An epidemiological study of social relationships as determinants of health: formulating a new psychosocial approach

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1 ABSTRACT

Background & objectives: There is an extensive body of literature suggesting that social relationships are beneficial for health. The present study explores this association by testing two hypotheses. The first hypothesis is that people who are more socially orientated have better health than those who are less socially orientated. The second hypothesis has two parts; the first part is that people who have strong altruistic and collectivistic orientations have better health than those with less strong altruistic and collectivistic orientations; the second part is that altruistic and collectivistic orientations relate directly to health over and above the potentially mediating effect of social relationships on them. The main idea of the study is to introduce an integrated epidemiological model of the association between sociability and health which will include not only social relationships but also their determinants such as collectivism and altruism.

Methods: The study instrument measures health, social relationships, individualism, collectivism and altruism and was addressed to a sample of 926 people above 40 years old of both sexes in Greece. The main health outcomes of the study are self-reported mental and general health. The statistical analysis encompasses descriptive statistics, bivariate analysis, factor analysis, multivariate linear regression modeling and structural equation modeling.

Results: Through factor analysis three individualism-related, three collectivism-related and four altruism-related factors emerged. The multivariate analysis shows that most of the collectivism- and altruism-related factors associate with social relationships and two of them (Volunteering and Horizontal Collectivism) with both health outcomes. Also it suggests that friendships associate with general health and family relationships with mental health and that the associations of Horizontal Collectivism with general health and Volunteering with mental health are over and above social relationships. The structural equation models show that the proposed conceptual model is valid.

Discussion: Both hypotheses should partially be accepted; there is indication that people who are more socially orientated have better health; some of the determinants of social relationships associate significantly with health and in some cases these associations hold even over and above social relationships.

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4 INTRODUCTION

Health is a multidimensional and extremely complex phenomenon determined by innumerable factors throughout the entire spectrum of life. The genetic substratum along with a myriad of historical, cultural, economic, environmental, social and other factors and circumstances determine human health to a great extent and in many different ways. Among all the factors influencing health (and disease) social relationships are thought to be an important one (House et al. 1988). A large body of epidemiological literature suggests that the relationships among individuals or among individuals and social groups are major determinants of individual and population health (see for example Marmot & Wilkinson 2001; Wilkinson 1996). The concept of determinants of health was introduced in the public health scene in 1970s and refers to major non-genetic and non-biological factors that influence health (Graham & Kelly 2004).

The idea that social relationships influence health is not a new one. Ancient Greek philosophy and politics were based on the idea of the vitality of social relationships not only for the state but also for the individual survival and well-being. Aristotle in the first book of his Politics (1253a) wrote that "...a man that is by nature and not merely by fortune cityless is either low in the scale of humanity or above it...inasmuch as he is solitary, like an isolated piece at draughts" (Aristotle 1932). More recently Emile Durkheim in his seminal book "Suicide" showed that social factors and facts could explain suicide rates (Durkheim 1952). In epidemiological terms this means that he has shown an association between mortality (suicide-related mortality) and social factors like social relationships or social cohesion. The spark that came out of the Durkheimian thought has started to fire up since the late 1970's when a substantial amount of health-related research has started to accumulate showing a clear association between social relationships and health and disease. Nowadays it is established that social isolation is a major risk factor for morbidity and mortality and that social relationships and support flowing from them plays a beneficial role for health (Berkman & Glass 2000; House et al. 1988; Seeman 1996). Moreover, there is strong indication that social integration and

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social cohesion are health-enhancing factors for the individual and the population, respectively (Kawachi et al. 1997; Kawachi & Berkman 2000).

The present study, based on these premises, will examine the impact of social relationships on health. Most importantly it will try to expand and broaden the currently dominant model of social relationships' effect on health by exploring the sources of social relationships and examining them as potential health resources. The present study suggests that the factors behind the social relationships (the determinants of social relationships) have an effect on health, which perhaps might be as important for health as that of social relationships themselves. So instead of focusing on a model with two main interacting parts (health and social relationships) a model with three parts is proposed – health, social relationships and determinants of social relationships. This three-part proposed model potentially could be proven more comprehensive and powerful in explaining health and disease than the existing two-part model.

From the innumerable factors that might determine social relationships the present study looks into individualism-collectivism and altruism. This is because these three factors refer to the causes and reasoning behind socializing and as such they are expected to determine to a considerable extent human sociability and social relationship (Batson et al. 2002). Individualism and collectivism relate directly to the attachment to groups, group-life valuation and socializing while altruism is a major determinant of why people get social and connected to each other and directly relates to co-operation within group and human survival. Moreover, the present study focuses on individualism, collectivism and altruism as expressions of culture and societal norms which relate to the core of human hypostasis and human societies. The farthest scope (and hope) of the study is the distal and less visible but ubiquitous contextual factors that relate to either nature or nurture and culture to start being studied as important determinants of health either per se or as determinants of other more visible determinants of health such as social relationships.

Before going on to discuss the details of the study a brief delineation of the way these three concepts (individualism, collectivism and altruism) are conceptualized in this study is given in order to avoid misunderstandings about their content and meaning. Altruism is employed as an innate human virtue which relates to moral orientation

(Penner et al. 2005; Piliavin & Charng 1990; Ridley 1997). The present study is not conceptualizing altruism as a religious or philosophical concept but rather focuses on its practical dimensions as an individual life strategy within human groups and as generator of social relationships. Therefore, it attempts to explore the potential influence - either direct or indirect - of altruism on human health as a socializing strategy and process. Individualism-collectivism although primarily cultural syndromes here they are studied as self-attributes (Triandis 1993; Triandis & Gelfand 1998). Specifically the focus of interest of this study is the individualistic (independent) or collectivistic (interdependent) self and self-construal as core reifications at the individual level of individualism and collectivism (Markus & Kitayama 1991). Their selection as one of the main object of the study is based on the centrality of self for human life and its core role for human existence. Triandis (1993) postulates that the interdependent and independent selves are the most important facets of collectivism and individualism, respectively. Of course the adoption of this position by no means implies that independent or interdependent selves constitute the only expression of individualism and collectivism or that individualism and collectivism are confined to the individual. On the contrary, individualism and collectivism as expressions of culture are multifaceted constructs which relate to and characterize all major life domains such as norms, attitudes and goals (Triandis 1995) but for practical reasons (e.g. measurement) the present study is interested primarily in their self-related dimension. The obvious implication of the decision to focus on altruism, individualism and collectivism at individual-level is that the findings of the present study would be useful in explaining individuals' health and social life. The findings of the presents study neither delineate the effect of the culture or social organization on population health at an ecological level nor explain the health differences at any level higher than that of the individual by using cultural and psychosocial factors such as altruism, individualism and collectivism.

4.1 Social relationships and health

People are social beings and one of their greatest inherent needs is to socialize and get connected with other people. This need of the man to acquire relationships with other people has been detected and commented on, already, since the dawn of mankind. Homer in his Epics eloquently describes the man who has not got a pair or a company as either a deity or a wild beast. The social relationships are of primary importance to all people and as such expected to affect health to a major extent. There is a voluminous literature focusing on the effect of the social relationships on health and in the remaining of this section of the introductory chapter longitudinal evidence on the connection between social relationships and either mortality or survival will be presented. On the contrary, studies focusing on the associations between social relationships and various other health outcomes will not be presented, in detail, here as the target of the present literature review is to manifest in the most solid way the connection of social relationships and health and not to show the many different variants of this connection.

Generally, having social relationships and being socially integrated relate to better health while being socially isolated has a negative effect on health. House and colleagues (1988) have suggested that there is strong empirical evidence to support that social relationships are causally linked to health. In their review they show that insufficient social relationships consistently relate to increased risk of death among healthy individuals and that social isolation is a major risk factor for all-cause mortality. They, also, argue for the need to explore further the mechanisms through which social relationships affect health. According to Berkman and Glass (2000), thirteen large prospective studies that have been conducted within a period of twenty years throughout the world, from Scandinavia to Japan and to United States provide evidence that socially isolated people or people lacking social contacts are at increased risk of dying prematurely and that there is a causal relationship between social relationships and health. Hemingway and Marmot (1999) in their critical review for the association

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between psychosocial factors and coronary heart disease found that social relationships and networks do have an impact on the health of healthy individuals; five out of the eight examined prospective cohort studies focusing on social support and coronary heart disease show that the former impacts positively the latter. Also they found that nine out of ten examined prognostic studies reveal a positive association between the quality of social relationships or social support and reduced mortality from CHD and other heart diseases. Based on these findings they argue for the consistency and strength of these findings and for the existence of a causal association between social networks, social support and coronary heart outcomes.

One of the first studies that has focused on the influence of social relationships on mortality is that of Berkman & Syme (1979). They used data from the Alameda County Study and tried to assess the influence of four types of social relationships – marriage, contacts with extended family and friends, church attendance and group membership – on all-cause mortality. They reported that an index consisting of all four types of relationships could predict all-cause mortality in a period of nine years for both men and women. Specifically it was found that individuals who lacked social relationships had 2.3 to 2.8 time higher risk to die in the follow-up period. Moreover, lacking social ties remained a significant predictor of all cause mortality independently of health behaviours such as smoking, physical activity, alcohol consumption and other factors such as general health, socio-economic status, obesity and use of preventive health care.

House and his colleagues (1982) have found that composite indices of social relationships are inversely associated with mortality in men and women within a follow-up period of 10 to 12 years even when adjusting for age and a wide range of biomedical (e.g. forced expiratory volume at one second, cholesterol and blood pressure) and self-reported risk factors (e.g. smoking). Schoenbach and colleagues (1986) suggest that social networks and relationships could predict mortality. Specifically they have found an inverse association between social relationships and health for the succeeding 11- to 13-year follow-up period, after adjusting for many biomedical and self-reported risk factors. The associations, they found, though, are weaker than those reported in the previous two studies. Another prospective study of 13301 people both men and women in Karelia (rural Eastern Finland) report that a "social connections" index predicted,

after adjustment for various risk factors, all-cause mortality for men in a five-year follow-up (Kaplan et al. 1988).

Orth-Gomer and colleagues (1993) in a study of 736 men found that both attachment (measured as emotional support from very close persons) and integration (measured as support provided by the extended network) were lower in those who were affected by CHD (within a six-year follow-up period). The relative risks reported for social integration is 3.8 (p = 0.04) and for attachment is 3.1 (p = 0.07). Both factors remained significant predictors of new CHD events after controlling for other risk factors. According to Hemingway and Marmot's critical review this study by Orth-Gomer and colleagues has reported the greatest relative risks with respect to the relationship between social networks, social support and heart health from all the prospective studies included in their analysis (Hemingway & Marmot 1999). In a study of ischemic heart disease, cancer, stroke and hypertension, Vogt and colleagues (1992), report that social network measures are powerful predictors of 15-year mortality hazard but not of morbidity (only exception the incident cases of ischemic heart disease) in a group of healthy (at the baseline) individuals. Moreover, they report that social network measures could predict all-cause and cause-specific mortality among individuals with incident cases of ischemic heart disease, cancer, and stroke (Vogt et al. 1992).

A 10-year follow-up study of 28369 men in the USA examining the relationships between social networks, cardiovascular disease incidence and all-cause and cause-specific mortality suggests that socially isolated men (not married, fewer than six friends or relatives, no membership in church or community groups) are at increased risk of all-cause and cardiovascular disease-specific mortality after controlling for age, occupation, health behaviours, general physical condition, coronary risk factors, and dietary habits compared to men at the highest levels of sociability. Also it suggests that the rates of deaths by accidents and suicide and by other non-cancer, non-cardiovascular causes are significantly increased among less socially integrated men. Moreover, it shows that an increase in number of close friends, in men, was significantly associated with a significant decrease in mortality risk (Eng et al. 2002).

Brummett and colleagues (2001) in an interesting - due to the variety of social networks measures employed - study report that the mortality rate is higher among isolated

individuals. Specifically people with three or fewer contacts in their social support network have a much higher relative risk for cardiac (RR=2.43) and all-cause mortality (RR=2.11) after controlling for age and disease severity and that social isolation remains a significant predictor of mortality even after controlling for smoking, hostility and income. The researchers based on these findings propose that the effect of social isolation on mortality cannot be attributed to the mediating and confounding effect of other factors on the association between social isolation and health and therefore that the former should be considered an independent and important risk factor for mortality (Brummett et al. 2001). In the same vein, Oxman and colleagues (1995) conducted a study to explore, among others, the potential effect of social networks and social support on mortality after open heart surgery. Their approach was as well to use a variety of different social networks and support measures. They suggest that lack of participation in social or community groups was an independent and significant predictor of post surgery mortality after adjusting for many biomedical or not confounding variables (Oxman et al. 1995).

Apart from evidence connecting social isolation with either all cause or disease-specific mortality, there is an large body of literature for the effect of social networks on various other health outcomes like: mental health (Kawachi & Berkman 2001; Seeman 1996), dementia and cognitive decline (Bassuk et al. 1999; Fratiglioni et al. 2000), health behaviours (Unger & Johnson 1995), patients' re-hospitalization (Mistry et al. 2001), patients' quality of life (Michael et al. 2002), physical functioning (Avlund et al. 2004; Hyyppa & Maki 2001), health status and self-rated health (Hyyppa & Maki 2001; Seeman 2000; Seeman et al. 2002) and even common cold (Cohen et al. 1997).

The studies presented above, regardless of their differences in design, methods and aims, they all appear to have two common points. First, they show that social isolation is a major risk factor for morbidity and mortality and social relationships are beneficial for health. Second, they show that social integration and social isolation are the two ends of the same continuum. The positive end (social integration) refers to a state where an individual does have social relationships (both formal and informal) which are meaningful throughout all the societal levels – from the most intimate ones (e.g. spouse) to the outer ones (e.g. membership in social groups). The other end pertains to

social isolation a state where an individual lacks to a great extent social relationships and contacts and possibly experiences loneliness. The point along this continuum where an individual positions her/himself potentially seems to determine her/his health and longevity. The conceptualisation of social integration and social isolation as two ends of the same continuum also shows, in practical terms, that these two states are mutually exclusive and should be considered as a kind of communicating vessels; when social isolation becomes a dominant state for an individual then it is expected that her/his level of social integration is deteriorated and vice versa.

Moreover, the existing literature on the association between social relationships and health shows that merely focusing on the quantitative element of social relationships (number of social relationships) and exploring their association with health is just a part of a broader picture as it provides no information on the qualitative aspects of social relationships and their influence on health. Many researchers have underlined the importance of the qualitative dimension of social relationships for public health research and practice as well as for social policy (House 2001; House et al. 1988; Marmot & Wilkinson 2001; Muntaner et al. 2001). The importance of studying the qualitative dimension of social relationships (their quality and the motives behind them) pertains to the fact that merely knowing how many social contacts an individual has but being unaware of their nature and content constitutes a serious limitation when trying to explore and evaluate their association with health and disease. Ignorance about the qualitative element of social relationships equals, de facto, to ignorance of what is transmitted over them and therefore great difficulty to explain their potential impact on health. A Finnish research group based on an unexpected finding, they found, in a study of social relationships, hostility and health in young individuals (hostile individuals with many social contacts had the highest prevalence of physiological CHD risk factors like serum cholesterol and triglycerides) suggest that the number and frequency of social contacts do not necessarily give the "whole picture" of the interaction between sociability and health outcomes as quantitative adequacy of social contacts does not guarantee good social skills necessary to use these contacts in a fruitful way (Keltikangas-Jarvinen & Ravaja 2002).

As regards the pathways and mechanisms through which social relationships relate to health, literature suggests that there are many and of various types (Berkman & Glass 2000; Lewis & Rook 1999; Cohen et al. 2000; House 2001). Berkman & Glass (2000) have proposed a comprehensive model of the mechanisms through which social relationships exert their effect on health. They suggested that there are at least five such mechanisms – social support, social influence, social engagement, person-to-person contact and access to material resources.

Other researchers have, in addition, highlight social control as a mechanism through which social relationships might exert an impact on human health (Lewis & Rook 1999; House 2001). Out of the six proposed mechanisms through which social relationships influence health, social support is the most well-known one. Cohen et al (2000) define rather broadly social support as "...the social resources that persons perceive to be available or that are actually provided to them by non-professionals in the context of both formal support groups or informal helping relationships". They, also, suggest that there are two main social support-related mechanisms through which social relationships affect health. These are the main effect and the stress-buffering models. The former suggests a direct (main) effect of social resources on health irrespectively of whether individuals are under stress or not and refers mostly to health benefits that accrue from social participation. The latter postulates that social resources (social support) relate to health mostly in their capacity as stress buffering mechanisms.

Wills & Shinar (2000) provide a five-fold classification of received social support. The five categories are: emotional support, instrumental support, informational support, companionship and validation. Among them, the most well known dimensions of social support are the first three. The first dimension (emotional) of social support refers to caring, sympathy and acceptance a person receives from other people. The second dimension of social support relates to practical or tangible provided support whilst the third (informational) dimension has to do with the provided information and knowledge useful to solve problems (Wills & Shinar 2000). In addition, companionship refers to the availability of people to socialise with in leisure time and validation to the information provided through social relationships on the appropriateness or normativeness of behaviour (Wills & Shinar 2000). Social support is the best studied

(and so far thought to be the most important) mechanism of how social relationships relate to health but nonetheless it is not the only one.

Social influence is also another such mechanism. Patrick & Wickizer (1995) suggest that within society a reciprocal social influence process occurs among all the social agents that expectedly affects health and well being of the individuals. Individuals and social groups are both agents and recipients of this social influence. Berkman & Glass (2000) propose that social influence is an often ignored and under appreciated mechanism through which social relationships relate to health. They suggest that the process of mutual influence among the members of a social network could be concurrent but also independent (or at least quite apart) from the process of social support exchange and that shared norms might function as sources of social influence to the health behaviours of the members of a network. They also cite the work of Marsden & Fridkin (1994) who suggest that at individual level the proximity between two individuals determines the occurrence of mutual influence between them and that this process of mutual influence does not require a person-to-person contact.

Quite close to the social influence pathway is that of social control. Lewis & Rook (1999) define social control as the interactions between individuals that involve influence, constraint and regulation. They delineate two basic mechanisms of social control; an indirect and a direct. The indirect social control relates to the internalization of a sense of obligation to one or more significant others and the avoidance of health risks as a consequence of the compliance with those obligations. The direct social control operates when members of a social network actively prompt or persuade another member of this network to engage in health promoting activities or abandon health damaging behaviours. House (2001) considers social control as a mechanism complementary to that of social support in explaining the effect of social relationships on health. In addition Umberson (1992) suggested that the beneficial effect of marriage to health should be interpreted as an example of the effect of social control on health.

Another proposed mechanism through which social relationships connect with health is that of social engagement which refers to the social participation and to the active involvement to social life. Social participation has been identified as a central mechanism through which social relationships exert their effect on health (e.g.

(Berkman & Syme 1979; Oxman et al. 1995; Bassuk et al. 1999). Lately social participation has been studied in relation to health as a component of the concept of social capital (Kawachi et al. 1997; Baum et al. 2000). Berkman & Glass (2000) suggest that through active participation in social networks the various meaningful social roles of every person are defined and reinforced and every individual acquires a sense of identity and belongingness. Moreover, they have proposed two more mechanisms through which social relationships might affect health: person-to-person contact and access to material resources. These two social mechanisms are not very-well studied as pathways connecting social relationships with health and evidence on their association to health is rather limited. The former (person-to-person) refers to the way the interpersonal contacts within a group or network affect health. So far research has been studied mostly the impact of the person-to-person contact across networks on the transmission of infectious diseases (Morris et al. 1996; Koopman & Lynch 1999; Riolo et al. 2001). The latter refers to the possibility affluence of social networks to result in access to more resources. This is a mechanism in direct relation to the idea of social capital literature which "...refers to the capacity of individuals to command scarce resources by virtue of their membership in networks or broader social structure" (Portes 1998). In that sense social relationships might as well be a means to improve health through better access to health services and health-related information.

Another important aspect of the association between social relationships and health is that this should not be a priori and mechanistically acknowledged as positive and beneficial for health. There is always the possibility of social ties with negative effect on health outcomes. Research suggests that there are also social relationships that might not contribute positively to health. Berkman & Glass (2000) and Kawachi & Berkman (2001) in recent accounts of the interaction between social relationships and health discuss several negative aspects of it. They suggested that social support apart from its beneficial effects might also have negative effect and that both the provision and effect of social support vary systematically with gender, socio-economic status and stage of life. Liang and colleagues (2001) and Rook (2003) show that negative interaction completely counteracts the positive influence of social support on mental health and well-being. House (2001) speculates that since people try to avoid negative

relationships, social relationships tend on average to be positive. But sometimes people are locked into negative relationships by law (marriage) or by blood (parent-child) and research has not explored satisfactory the effect of such negative relationships on health.

A last dimension of the association between social relationships and health that should be presented refers to social capital. Wilkinson (1996) is one of the first authors who brought into the epidemiological forefront the idea that social cohesion and social capital might have an independent effect on health. He describes social cohesion as that dimension of public life, which is dominated by people's active involvement, is not abandoned to market values and "...people come together to pursue and contribute to the commonly shared purposes". Kawachi & Berkman (2000) define social cohesion as "the extent of connectedness and solidarity among groups in society" which is based on to two broader intertwined features of society: a) absence of latent social conflict and b) presence of strong social bonds. As regards social capital per se, Macinko & Starfield (2001) suggest that it is a concept which describes a number of phenomena pertaining to social relationships at both the individual and the societal levels. Harpham et al. (2002) propose that social capital refers to "...the degree of connectedness and the quality and quantity of social relations in a given population". Within this perspective, although social capital is a concept much broader than that of social relationships, still it is of interest for this literature review since social relationships (at an individual level) constitute one of its core dimensions.

There is an accumulating body of literature showing that social capital either at individual or at population level relates to health. Kawachi and his colleagues are among the first ones who provided evidence for the relation between social capital and health. In a cross-sectional ecological study based on data from 39 American states, they found that social capital (measured as per capita density of membership in voluntary groups in each state and level of social trust) is inversely related to income inequality and is associated with all-cause mortality as well as coronary heart disease, malignant neoplasm and infant mortality (Kawachi et al. 1997). Since then the concept has been used widely to public health research. Studies have been conducted trying to relate social capital to various health outcomes like self-rated health (Hyyppa & Maki 2001; Blakely et al. 2001; Veenstra 2000; Rose 2000; Kawachi et al. 1999) and mortality (Kawachi et al. 1997;

Kennedy et al. 1998). One of the main achievements of the social capital literature, in terms of social epidemiology, is that it shows that social relationships contribute positively to health at levels higher than that of the individual complementing that way the already existing knowledge on the association between social relationships and health. The finding that social relationships relate to health at all levels underscores the importance of sociability for health and therefore makes the rationale of the present study even stronger.

4.2 Developing a model for health and social relationships – a theoretical synthesis

Although undoubtedly our knowledge about the potential mechanisms and pathways through which social relationships affect health has improved, our knowledge about the factors that determine social relationships and their potential influence on health remains still limited. Thus, there is need research to explore the effect of the social relationships on health in a more integrated way and within a broader perspective which will include both social relationships and their determinants as factors influencing health. This research needs to focus on mainly two matters. The first one is to identify which factors might be important determinants of social relationship; in other words to find out which powers are behind the social relationships. The second issue is to explore the associations between social relationships, their determinants and health.

These two matters relate to Muntaner and colleagues' suggestion that a central issue for public health research and practice is "...to explore the sources of connections among different individuals and groups – i.e., what determines who gets connected to whom?" (Muntaner et al. 2001). A structural exploration of the hidden causes of social relationships is a matter of substantial importance for explaining the causal effect of social relationships on health. It is possible some "unknown" determinants of social relationships to influence health both directly and indirectly via the social relationships. House and colleagues have proposed since 1988 that the observed association between social relationships and health may be totally or partially spurious and artificial as it might merely be a reflection of a hidden causal association between the determinants of social relationships and health (House et al. 1988). The present study employs this hypothesis by House et al. (1988) as its initial conceptual basis.
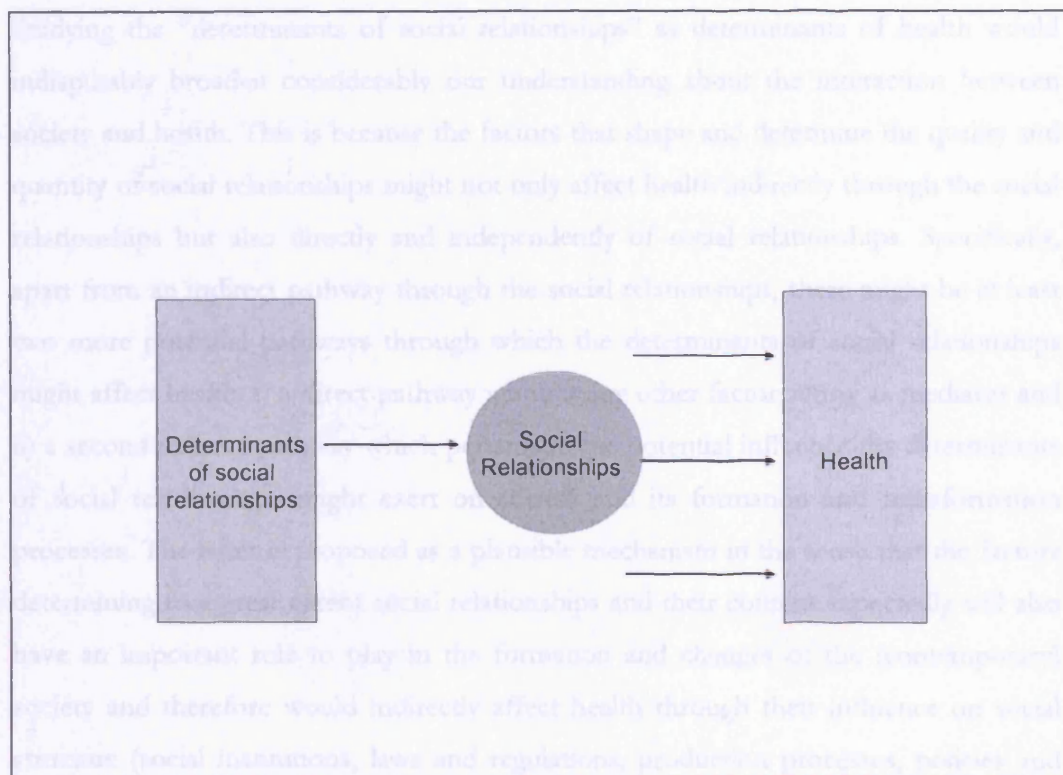
Figure 1. The "hidden" effect of the determinants of social relationships on health

Other researchers sharing the same questioning argue that the most important questions in relation to the association between social relationships and health refer to understanding the determinants of network structure and social support (Berkman & Glass 2000). While Wilkinson (2000) proposed that the key to explain the interaction between social cohesion, social capital and health is "...to think what might lie behind it *(social capital)* that could affect health" – a suggestion in accordance with the present study's proposal for the potential importance of the determinants of social relationships for health. Within this perspective, for example, just knowing in what way and to what extent social support affects mortality or morbidity risk is just one part of the health puzzle. Another important piece of that puzzle is to extend our knowledge about what might affect the provision of social support and which are the determinants of the supportive relationships and more generally social relationships.

Studying the "determinants of social relationships" as determinants of health would indisputably broaden considerably our understanding about the interaction between society and health. This is because the factors that shape and determine the quality and quantity of social relationships might not only affect health indirectly through the social relationships but also directly and independently of social relationships. Specifically, apart from an indirect pathway through the social relationships, there might be at least two more potential pathways through which the determinants of social relationships might affect health: i) a direct pathway without any other factor acting as mediator and ii) a second indirect pathway which pertains to the potential influence the determinants of social relationships might exert on society and its formation and transformation processes. The latter is proposed as a plausible mechanism in the sense that the factors determining to a great extent social relationships and their content expectedly will also have an important role to play in the formation and changes of the (contemporary) society and therefore would indirectly affect health through their influence on social structure (social institutions, laws and regulations, production processes, policies and the general social "climate").

Based on these premises this study proposes a model of "the determinants of social relationships as determinants of health" extending and broadening that way the existing hypotheses and conceptualizations which mostly are confined to the interaction between social relationships and health. The proposed model drawing upon existing literature (House et al. 1988; Berkman & Glass 2000; Marmot & Wilkinson 2001; Muntaner et al. 2001) suggests that instead of exclusively focusing on the association between social relationships and health, epidemiological research should as well try to explore the association between the determinants of social relationships and health and therefore to enlighten in a more holistic way the complex association between sociability as multidimensional concept (which encompass both social relationships and their determinants) and health. Such integrated exploration of the association would contribute to highlighting unexplored pathways and new determinants of health as well as to clarifying what portion of the observed effect of social relationships on health (e.g. the health-protective effect of social support) is a function of their "latent" determinants and what is not.

Figure 2. A proposed model for the effect of sociability (social relationships and their determinants) on health

Figure 2 presents the proposed model of "the determinants of social relationships as determinants of health" which attempts to delineate in an abstract but tangible way how the determinants of social relationships (like moral orientation/altruism and individualism-collectivism – see 4.3) might influence health either directly or indirectly. The direct (independent of social relationships) effect of the determinants of social relationships on health is denoted by the letter (a) and it is divided into two parts (a1 and a2). The first part refers to the influence of the determinants of social relationships on every individual and the second part how this influence might have an impact on

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human health. The letter (b) denotes the indirect effect of the determinants of social relationships on health via social relationships. This is also split in two parts (b1 and b2) which pertain to the influence of factors like moral orientation/altruism and individualism-collectivism on social relationships and the effect of this association on health, respectively. Finally as it has been already mentioned there must be also a far more difficult to capture effect of these determinants on health through the influence they have on society and societal structure which is denoted in figure 2 by the letters (c1) and (c2).

The present study will mostly focus on the examination of the direct effect of the determinants of social relationships on health (the (a) pathway of figure 2) and the indirect effect of these determinants on health through the social relationships channel (the (b) pathway of figure 2).

4.3 From determinants of health to determinants of social relationships

As mentioned already there are numerous distal and context-related factors that determine social relationships both in terms of quantity and quality but also in terms of motives and incentives to get (or not) social. Among the potential determinants and regulators of human relationships culture-related factors thought to be important as they are ubiquitous in everyday life and they exert a powerful influence on people's life (Cohen 2001). Their importance also pertains to fact that they are reifications of the way people have adapted in their living environments and distant echoes of how nature has shaped human societies (Ridley 1997; 2003). Despite their indisputable significance for socializing and therefore potentially for health (Dressler 2004) culture-bound factors are literary absent from the social epidemiological research. Only very few longitudinal studies have focused on cultural facets of human life as potentially important correlates of human health e.g. Stronks et al. (1997).

From the universe of the socio-cultural factors the present study focuses on three factors - individualism, collectivism and altruism - which refer to and determine core elements of culture and human nature like the relationship formation, prosocial (altruistic) orientation and the balance between independence and relatedness (Greenfield et al. 2003; Penner et al. 2005). Their selection was based on their presence in everyday life and their importance for human and social life. The sense of individualism or collectivism an individual possesses determines how her/his social life will be and determines her/his self, emotion, cognition, norms, values and of course behaviour. Altruism is a life strategy that relates to moral orientation, influences people's social life and determines what value one gives to other people and how much respect pays to them.

Factors affecting such important domains of life are expected to affect health in many different ways and by multiple different means. Thus, within an epidemiological perspective, individualism, collectivism and altruism are expected to be important

determinants of social relationships and health both at individual and population level. In that sense it is imperative to learn more about the pathways connecting these factors with social relationships and health either directly or indirectly so that to diversify and enrich the social aspect of epidemiology and provide alternative routes to health promotion. Practically applying the above presented ideas and employing the proposed model would mean that individualism, collectivism and altruism (among many other such factors): a) might relate to health independently of the social relationships b) relate indirectly to health through social relationships and c) the effect of social relationships on health might be proven, partially, an artefact or a reflection of the "hidden" effect of individualism-collectivism and altruism on health. In the remainder of the introductory chapter individualism, collectivism and altruism are presented and their main dimensions are discussed. This is for the reader to understand better the nature of these notions, their importance for human life and the way they are conceptualized and used in the study.

4.3.1 Individualism and collectivism

Cultures and societies differ regarding the way and the extent to which they are organized around the concepts of the individual and collective. Some cultures value more the individual while others the collective (Triandis 1995). A culture where the autonomous individual is one of its central organisational axes can be characterized as individualistic. On the contrary a culture where the collective life and groups constitute one of its central organisational axes and individuals consider themselves primarily members of a group should be seen as a collectivistic culture. Thus, the tendency of some cultures to be more focused on and orientated towards the autonomous individual is called individualism whereas that of other cultures to be orientated towards the group life and collective is called collectivism. "The core element of individualism is the assumption that individuals are independent of one another" and their connections are loose (Oyserman et al. 2002). On the contrary the core element of collectivism is the assumption that individuals are strongly related with each other and "…that groups bind and mutually obligate individuals" (Oyserman et al. 2002).

According to Triandis (1996) individualism and collectivism constitute two major cultural syndromes that appear to account for the most significant differences among cultures and therefore a considerable amount of the cultural variance should be attributed to the extent a culture could be characterized as individualistic or collectivistic. He defines as a cultural syndrome "a set of elements of subjective culture organized around a theme" (subjective culture describes the abstract and non tangible facet of culture as opposed to the tangible and "objective" dimension of it). In order a cultural syndrome to be established the conditions are: a) the existence of correlations among the elements of subjective culture that are organized around the theme b) the variance in these elements of subjective culture (cultural syndromes) within cultures to be smaller than that between cultures and c) the existence of co-variation between geographical regions and subjective culture (Triandis 1993). The same author asserts that individualism and collectivism constitute cultural syndromes as they refer to a set of elements of subjective culture organized around the theme of centrality or not of the autonomous individual and the collective and meet all three criteria to be considered as such. Hofstede (1980) defines individualism as a focus on rights above duties and an emphasis on personal autonomy and self-fulfilment. Numerous other researchers have tried to define these two concepts (Lukes 1973; Markus & Kitayama 1991; Schwartz 1990). Most of the attempted definitions consider individualism as a worldview that focuses on the individual (personal uniqueness, individual goals and individual control) and neglects or see social as a peripheral matter (Oyserman et al. 2002) and collectivism as the worldview that centralizes the social and peripheralizes the individual. Triandis (1993) suggests that the prototypical collectivistic relationship is family and that, within a collectivistic perspective, cooperation should be considered a natural state and social status is determined mostly by position within the group. On the contrary, within an individualistic perspective, competition is a common place and social status depends predominantly on personal accomplishments (Rhee et al. 1996).

There are two predominant conceptualizations regarding the relationship between individualism and collectivism; this of the opposites and that of mixture or coexistence of individualistic and collectivistic attributes. The former conceptualization, that of the opposites, was predominant for many years (Hofstede 1980). According to it

individualism and collectivism should be considered the two poles of a continuum which opposes each other and cannot co-exist. Cultures could be either individualistic or collectivistic. This manihaistic approach which is a direct analogous of the simplistic view that an individual cannot be characterized simultaneously as "good" and "bad" or individualistic and collectivistic, has been challenged recently e.g. Triandis (1993) and Kagitcibasi (1997). The latter conceptualization of the coexistence of individualism and collectivism suggests that the two concepts should not be seen as opposites and mutually exclusive as most cultures include a mixture of individualistic and collectivistic elements (Triandis 1993). Individualism and collectivism should be seen more as worldviews differing in the issues they make salient (Kagitsibasi 1997) and as polythetic constructs with many different attributes (Triandis 1995). Rhee, Uleman & Lee (1996) found that collectivism and individualism are best conceived of as two independent dimensions the connection of which depends to great extent on perceptions about in-group and out-group.

The notions of in-group and out-group refer exactly to the distinction every individual makes between groups (ranging from family to society and religion) she/he considers her/himself being a member of and the remaining part of society which consisted of groups that she/he considers her/himself not belonging to; the former are the in-group(s) and the latter are the out-group(s). Dawkins (2004) argues from an evolutionary perspective that the distinction between in-group and out-group is of major importance for the human race. Triandis (1989a; 1989b) defines as in-group a group which norms, goals and values determine the behaviour of its members or as a group of individuals with whom a person feels sharing a common fate. The concept of in-group is not static as it is defined by several attributes and characteristics which could change in time (e.g. demographic attributes). Notable is also the cultural variation regarding which groups is characterized as in-groups and what attributes serve as a basis to define and determine in-groups. In collectivistic cultures in-groups most of times are defined through tradition (e.g. kin or religion) while in individualistic cultures mostly are defined on the basis of achievable and acquired attributes and attitudes (e.g. occupation or similar beliefs) (Triandis 1989a; Rhee et al. 1996). This cultural variation in defining and determining in-groups accounts for the paradox of a group to be considered an in-

group in one culture and an out-group in another; for example neighbours could be seen as an out-group in a predominantly individualistic country or culture and as an in-group in a highly collectivistic country or culture. The importance of in-groups is greater for collectivistic cultures since people with strong collectivistic orientation pay far more attention to the distinction between in-group and out-group (Rhee et al. 1996). Within a collectivistic context, individuals considered as non-members of the in-group will be treated differently than others considered belonging to same in-group e.g. research has shown that within a collectivistic context (e.g. Japan and Puerto Rico) individuals considered as out-groups were treated more individualistically by the participants than other individuals thought to be in-groups. On contrary, the distinction between in-group and out-group is not that important for individualistic cultures since the major attributes of individualism (or at least of its US version) are the subordination of in-group goals to personal ones and low concern with and distance from in-groups (Triandis et al. 1988).

Individualism and collectivism could be defined by many attributes, but there are four defining attributes that are in particular important (Triandis 1995). The first refers to the definition of the self; it can be independent or interdependent (Markus & Kitayama 1991)) or emphasizing personal or collective aspects (Triandis 1989b; 1993). The second refers to the personal goals; in individualistic cultures personal goals have priority over the group or social goals while in collectivistic ones priority is given to collective goals (Triandis et al. 1990). The third refers to relationships; individualistic cultures value more exchange relationships whereas collectivistic cultures emphasize communal relationships (Clark & Mills 1993). The fourth and last refers to the emphasis on attitudes or norms; in individualistic cultures attitudes are more important than norms whereas in collectivistic cultures norms are seen as more important than attitudes (Kashima et al. 1992).

The present study focuses on the first of these four attributes of individualism and collectivism - that of self - mainly because of its centrality to an individual's perceptions, evaluations and behaviours (Markus & Kitayama 1991; Triandis 1989b). For that reason it adopts the self-construal approach as its main theoretical and practical tool for the analysis of individualism and collectivism at the individual level (see Markus &

Kitayama 1991). This approach is based on the observation that the self concept varies markedly around the world and that there are two main views of the self in relation to the collective. Self can be defined as either more orientated towards individualism (independent self-construal) or towards collectivism (interdependent self-construal) (Markus & Kitayama 1991). The individual self is achieved by differentiating from others and contains those aspects of the self that distinguish and separate the individual from her/his social context. The independent self-construal emphasizes elements such as: a) internal abilities, thoughts and feelings b) being unique and expressing the self c) realizing internal attributes and promoting one's own goals and d) being direct in communication (Markus & Kitayama 1991). The relational and collective selves are achieved by assimilating with others and inclusion in social groups and they contain all those aspects of the self that bond the individual either personally or impersonally with other people and in-groups (Sedikides & Brewer 2001). The interdependent self-construal focuses on: a) external and public features like statuses, relationships and roles b) belonging and fitting in c) occupying one's proper place and engaging in appropriate action and d) being indirect in communication and "reading others' minds" (Markus & Kitayama 1991). It has been proposed that interdependent and independent self-construals can co-exist within the same individual and that all individuals have both kinds of self-construals (Markus & Kitayama 1991; Sedikides & Brewer 2001). Therefore, the present study employs the conceptualization of individualism and collectivism as two non-mutual exclusive concepts which can co-exist and they are not necessarily opposites.

Hierarchy has also been discussed as another important defining attribute of individualism and collectivism (Triandis 1993; Singelis 1994; Singelis et al. 1995; Triandis & Gelfand 1998). It has been argued that the culture-based tendency to emphasize equality (horizontality) or hierarchy (verticality) could exist in both individualistic and collectivistic cultures and that individualism and collectivism could be further divided in relation to their extent of horizontality or verticality. Thus, there are the horizontal and vertical individualism and the horizontal and vertical collectivism (Singelis et al. 1995; Triandis & Gelfand 1998). Horizontal individualism refers to individuals having their own goals and being highly self-reliant while at the same time

having a strong sense of equality. Vertical individualism has much in common with horizontal individualism. The major difference between these two versions of individualism refers to vertical individualism's focus on hierarchy; vertical individualism is a state where competing with other people is important and hierarchy thought to be the most important aspect of social structure. Horizontal Collectivism is characterized by a sense of similarity to others and emphasis is given to common goals, interdependence and sociability and also by a lack of easiness to submit to authority and a strong sense of equality. Vertical collectivism has the same characteristics with Horizontal Collectivism but obedience to authority is unquestionable even if evokes discomfort or is extremely distasteful.

4.3.2 Altruism

Altruism is the third socio-cultural factor that is employed in the present study as an important determinant of social relationships (Lyons 1983) and therefore potentially of health. Researchers drawing upon different scientific traditions have defined altruism differently. The evolution scientists define as altruistic those behaviours where the benefit for the recipient is greater than for the actor and therefore raises her/his reproductive success while at the same time diminish that of the actor (Kitcher 1998). Social scientists are more orientated towards examining the motivation behind altruism and helping behaviours (Piliavin & Charng 1990). Altruism is an issue that has created much controversy within the scientific community. Still there are scientists who do not accept its existence as such and maintain that in most cases the motivation of altruistic behaviour is self-interest (Miller 1999; Ratner & Miller 2001). Nevertheless there is accumulating diverse scientific evidence that the altruistic impulse exists and that altruism is natural to the human species irrespectively of the way it is expressed in different occasions and cultural contexts (Piliavin & Charng 1990).

The present study accepts that altruism, with its evolutionary roots, is the basis for one's moral orientation and influences the way individuals and groups live with each other (Hinde 2002; Ridley 1997). In that sense it is expected altruism to determine to a considerable extent one's orientation towards other people and most importantly why an individual associates with other people (Batson et al. 2002). This study is interested

in examining the balance between self-interest and altruistic tendency, how this might affect health and through which mechanisms.

The central theme around which the altruism-related part of the study is organized is that of prosocial behaviour. Prosociality is a concept referring to altruistic behaviours performed voluntarily and not because of external stimuli (either these be anticipation of external rewards or avoidance of punishment) (Eisenberg & Miller 1987). The concept of prosociality, as inner innate disposition to help the other without being obligated to do so, relates to everyday conventional morality as it regulates relationships between individuals without the need of any official procedure to take place in relation to it and no authorities to be involved in it (Gert 1998). There are many hypotheses about the way(s) innate altruistic disposition relates to observed prosocial behaviour. A possible one is that empathetic mechanisms, triggered by external stimuli, activate one's own altruism which results in prosocial behaviour (Batson 1981; Batson 1983; Batson et al. 1987; Hoffman 2000). The focus of this study on prosocial behaviour flows out from its interest in studying the inner altruistic predisposition and prosocial tendencies as causes of observed behaviour. This is because prosocial behaviour reflects one's inner life strategy and associates with her/his hypostasis and inner self. At this point it should be clarified that the present study is not interested in systematic care giving and any type of provision of help or care which is a result of of external obligations and not a prosocial act. This is because focusing on informal care giving and other obligation-related help provision would remove the study from one of its main original objectives which is to examine the relationships between altruism (and not obligation) and health.

A second axis around which the altruism-related part of the study is organized is the potential multilevel perspective of altruism and prosocial behaviour (Penner et al. 2005). Altruistic and prosocial tendencies are not exclusively expressed in the context of the dyad helper-receiver of help but also at a higher group-level (e.g. volunteering). Altruism at a group-level differs from altruism within the helper-receiver of help dyad as it is a less spontaneous act and more a conscious thoughtful decision. Altruism at a group level has a social load and therefore it is not an entirely prosocial in the sense that it is context-related act. Volunteering is the typical example of altruistic behaviour at the

group level which although it has a prosocial basis definitely has as well an important social dimension (Penner et al. 2005). Its social dimension relates to the fact that other members of the group are aware of the offer of the volunteer and this awareness expectedly influences both the potential consequences of a voluntary act for the volunteer and possibly volunteer's motivation. Volunteering (especially if formal and systematic) within a group has as well the meaning of a social statement and potentially might result in the volunteer being rewarded either tangibly or intangibly by the group for her/his altruistic behaviour. The present study is also interested in this kind of altruism as this relates directly to reciprocity and co-operation (Hinde 2002; Ridley 1997; Trivers 1971) which are the main vehicles for the common survival.

Another related issue is that of moral development; how innate altruistic tendency develops in an individual worldview and transforms in personal moral system that directly affects one's social relationships and social functioning? Moral development is based on the predisposition to prosocial behaviours of all human beings (Hinde 2002; Ridley 1997) and is a life-long process through which innate altruism and prosocial tendency translate into everyday morality and moral orientation (Eisenberg et al. 1995; 1999). Hinde (2002) underlines the importance of understanding moral development not as the acquisition of a moral sense but as the development and flourishing of a pre-existing ability to behave morally (prosocially). Moral development is not only about learning not to do "bad" things but most importantly about people realizing and elaborating their prosocial predispositions (Hinde 2002).

The importance of moral development reflects on the fact that although all people have altruistic predispositions not all people express their altruism in the same way and most importantly to the same extent. Apparently the expression of altruism is conditional upon the way the individual has been reared and the context within which she/he has lived. The process of moral development seems to be the interplay between the selfish and prosocial sides of human nature, which takes place in the social world within the broader fields of culture and physical environment (Hinde 2002). It is a part of the process of self-development within a specific (different for each individual) psycho-socio-cultural context. Research consistently views moral orientation as an aspect of ego development (Blasi 1998; Kohlberg 1984; Loevinger 1979) connecting, in a sense,

altruism with self and self-development (and therefore with independent and interdependent self-construal and individualism and collectivism).

Equally inherent predisposition in all humans is also that of selfish assertiveness – the opposite of altruism and prosocial tendency. People are equally capable to display either selfish or prosocial behaviour (Hinde 2002). This selfishness seems to stem from a struggle to gain status which results in the acquisition of more resources (Hinde 2002). Brandt (1996) perceives self-interest as the pursuit of own well-being irrespectively of whether this coincides with the common well-being. Drawing upon this proposition he suggests that one can find a parallel between the various kinds of well-being and self-interest and therefore could classify the self-interest-related acts accordingly as i.e hedonism-related or eudaimonia-related. According to Hinde (2002) a nodal issue in human life is exactly the balance between individuals' propensities to act cooperatively or prosocially to others and to maintain and assert their own interests.

There are many theories as regards the moral development and therefore how innate altruistic dispositions are expressed in everyday life. Rest (1984) has suggested that moral development consisted of at least four different major processes: moral sensitivity, moral judgment, moral motivation and moral character. The moral sensitivity relates to how the individual empathizes with those affected by an action; moral judgment determines whether line in action is morally justified; moral motivation refers to the priority that an actor gives to morally acting than any other values or motives (recall the importance for human life of the balance between self-interest and altruism). Moral character reflects the ego strengths and self-regulation ability.

A prominent moral theorist and researcher, Lawrence Kohlberg, has proposed a cognitive-developmental stage theory of moral development (Kohlberg 1984) to explain differences in moral orientation and therefore different levels of expression of innate prosocial disposition. His theory suggests that individuals progress and develop morally through a sequence of invariant and universal stages. There are six stages grouped into three levels each one of which is a prerequisite for the next and represent a qualitative advance in the individual's ability to make moral judgements and act morally (Kohlberg 1976). The first level of moral judgment is the pre-conventional which includes two stages: the heteronomous morality and individualism. In these two stages the epicentre

is the self and the main drives to act morally are either avoidance of punishment or serving one's own self-interest. The second level of moral judgment is the conventional encompassing the interpersonal relationships and social system and conscience stages. The former refers to caring for others and the latter is about fulfilling the actual duties agreed in order to keep the institution going as a whole. The third and higher level is the post-conventional and includes the social contact and universal ethical principles stages; the latter is the highest of all stages. In the social contact stage the individual is concerned with the 'greatest good for the greatest number of people' while in the universal ethical principles (sixth) stage the individual perceives and treats other people as ends in themselves and is committed to universal ethical principles (equality of human rights and respect and dignity for human beings as individual persons) (Kohlberg 1976). The present study is interested in Kohlberg's theoretical approach as this could serve as a conceptual basis to connect altruism, as a generator of moral orientation, with the justice and equity principles and therefore with concepts currently much used in epidemiological research such as fairness, reciprocity and social capital.

Kohlberg's approach and theory have been criticized for focusing on what the person thinks (content) rather than how he/she thinks (process) (Shelton & Mcadams 1990); for neglecting caring as an expression of moral orientation and being gender biased (Gilligan 1977; 1982; Haan 1978); for neglecting the importance of interdependence for people (Skoe & Marcia 1991) and for equating the moral with the impartial (Bowden 1997). The most eminent critic of Kohlberg's moral development and reasoning theory is Carol Gilligan. According to Jaffe & Shibley-Hyde (2000), Gilligan (1982) criticised Kohlberg's cognitive-developmental stage theory of moral development basically for two reasons. The first is that moral reasoning needs a broader conceptualization that will encompass a care orientation as well as a justice orientation. The second reason is that Kohlberg's approach is gender biased as the instrument he developed and used (Moral Judgment Interview – MJI) was validated on male samples and the scoring procedure considered caring and respond to others' needs less sophisticated than being concerned with equity and fairness.

Gilligan's (1982) approach on morality emphasizes attachment to other individuals, responsibility and will to maintain relationships and focuses primarily on connections

with others. She proposed a model of three stages for the development of the ethic of care: the first is characterized by a predominant concern with individual's own needs (caring for self), the second is characterized by a predominant concern with others' needs and provision of care to them on one's own expenses (caring for others) and the third by an integration of both concerns with self and others (dynamic balance between caring for others and self) (Gilligan 1982; Jaffe & Shibley-Hyde 2000). Gilligan's theoretical standpoint that moral orientation and therefore altruism has a strong caring aspect connects altruism with socializing with others and social relationships strengthening that way the present study's standpoint that altruism (among other factors) determine social relationships.

A final interesting point in relation to altruism is its potentially cognitive or emotional nature. Is altruism a cognitive or an emotional function? Hinde (2002) suggest that various cognitive abilities relate to moral development and altruism; cognitive abilities such as comprehension of cause and effect relation, use of language, consciousness and self-consciousness, ability to interpret others' behaviours in terms of intentions (mind theory), perspective taking, controlling of emotions, internalisation of rules and ability to evaluate situations, actions and intentions. In contrast, Kagan (1984) focuses more on the emotional element of altruism and suggests that moral development and externalization of the altruistic instinct associates not only with emotional empathy and sympathetic understanding but also with anxiety about punishment or disapproval, feelings of responsibility, shame and guilt, boredom and confusion and self-satisfaction from doing the right thing or moral rectitude. Nevertheless, there is agreement that moral development requires and relates to both emotions and cognitive skills and ability (Kagan 1984; Ridley 1997). Brandt (1996) drawing on a utilitarian philosophical tradition presents his scepticism about the cognitive aspect of morality and moral development and suggests an alternative view of morality based on a motivation depending (at least in part) to parental warmth, love and guilt (a position which unintentionally connects altruism and moral development with attachment – see for example Mikulincer & Shaver 2005).

4.3.3 The relation of individualism-collectivism and altruism to health – existing evidence

The evidence on the association between health and altruism, although existing, is not very rich and is rather fragmented. As regards altruism per se there is almost no epidemiological evidence for its relationship to health (see for an exemption Kishon-Barash et al. 1999). This is because despite the evolutionary and social importance of altruism for human survival, no epidemiological research has focused on it as an important determinant of health and disease. Nevertheless epidemiological evidence on the association between various types of altruism-related concepts like volunteering and helping behaviours and health gradually has started to accumulate.

The literature on the association between volunteering and health suggests that the former exerts a positive impact on the latter. As regards the impact of volunteering on mortality, Musick et al. (1999) have found that moderate levels of volunteering (volunteering for one organization or forty hours or less yearly) exert a protective effect on mortality in older age, especially for those reporting low levels of informal social interaction. Oman et al. (1999) suggest that volunteering is inversely related to mortality in older community-dwelling people, but contrasting Musick et al. (1999) they found that high and not moderate formal volunteering (measured as participation into two or more organizations) relates to better survival in older age while hours of voluntary work per week do not. In the same vein, Luoh & Herzog (2002) propose that more than a hundred hours of voluntary work yearly impact beneficially on older people's longevity. Glass et al. (1999) suggest that volunteering along with other productive activities is a protective factor for mortality in older age. Ganguli et al. (1998) comparing three different types of recruits for an epidemiological study (people who directly volunteer to participate in the study, people who finally accept participate after intensive recruitment efforts by the researchers and people who are recruited by direct advertisement) show that the group of volunteers had significantly lower mortality rates than the randomly selected subjects.

As regards physical health there are longitudinal studies showing that different aspects of volunteering (e.g. volunteer status or hours of voluntary work) influence positively physical functioning (Berkman et al. 1993; Luoh & Herzog 2002; Moen et al. 1992; Morrow-Howell et al. 2003) and relate to better self-rated health (Luoh & Herzog 2002; Morrow-Howell et al. 2003; Van Willigen 2000). Nevertheless still much is unknown with respect to the potential association between volunteering and disease-specific outcomes. The evidence on the positive association between volunteering and mental health is somewhat more and more diverse. Morrow-Howell et al. (2003) and Musick & Wilson (2003) suggest that volunteering has a protective effect against depression. Greenfield & Marks (2004) propose that formal volunteering is a protective factor for older adults' psychological wellbeing while Van Willigen (2000) suggests that it also increases life satisfaction. The connection between volunteering and wellbeing is also shown in a recent meta-analysis which proposes that "...elder volunteers' sense of wellbeing seemed to be bolstered through volunteering..." (Wheeler, Gorey, & Greenblatt 1998). Moreover, volunteering seems to be protective against psychosomatic symptoms and cognitive decline (Herzog et al. 2002).

The evidence on the association between other than volunteering types of altruism and health is less consistent and sparse. Brown et al. (2003) in a prospective study of mortality found that providing rather than receiving social support connects to survival over a five-year period. Specifically their main findings show that mortality is significantly reduced for individuals who provide emotional support to their spouse or instrumental support to their friends, relatives or neighbours. Schwartz et al. (2003) show that altruistic social interest relates in a positive way to mental health and that it is more important predictor of it than receiving help. Interestingly they report no association between physical health and altruistic social interest. These results on the importance of providing rather than receiving help coincide to those of Liang et al. (2001) who also found that giving help is more important for health than receiving help. Finally there is indication that helping others might relate to better cognitive functioning (Herzog 2002).

The evidence connecting individualism and collectivism with health is even scarcer and is far from constituting a consistent body of knowledge. This is because very few studies have focused on the associations between individualism, collectivism and health and even fewer of them are, in essence, epidemiological. Specifically, there is indication that at an individual level individualism associates positively with loneliness which is a known risk factor for health (Triandis et al. 1988). Also there is an accumulation of evidence suggesting that individualism is a factor related to the causation of suicide-related mortality (Congdon 1996 ;Whitley et al. 1999; Hawton et al. 2001; Eckersley & Dear 2002). In conjunction to the relationship between suicide and individualism, is also the potential connection of individualism with poor mental health (Scott et al. 2004). Finally, an ecological study has shown that individualism might relate to high asthma and allergies-related morbidity (James 2001). As regards collectivism, literally there is not any study on its association with health. Very few studies have focused on the possible associations of collectivism with factors known for their quality as health predictors such as social support. Specifically there is documentation that collectivism relates positively to social support (both in terms of quantity and satisfaction with it) and low levels of alienation (which is a known risk factor for health) (Triandis et al. 1988) and to better coping with unpleasant life events (Kashima & Triandis 1986).

5 HYPOTHESES & OBJECTIVES

5.1 Hypotheses

First hypothesis:

People who are more socially orientated have better health than those who are less socially orientated.

Second hypothesis (two parts):

First part: People who have strong altruistic and collectivistic orientations have better health than those with less strong altruistic and collectivistic orientations.

Second part: The associations of altruistic and collectivistic orientations with health are direct and over and above the potential mediating effect of social relationships on them.

5.2 Objectives

i) To explore whether the suggested by literature positive effect of social relationships on health holds also in Greece.

ii) To assess whether altruism, collectivism and individualism qualify as predictors of health independently of social relationships.

iii) To enlighten the possible pathways through which social relationships and their determinants (altruism, collectivism and individualism) associate with health.

iv)   To broaden, if possible, the knowledge base regarding the social
       determinants of health by formulating a new model for health and
       sociability which would account not only for social relationships but also for
       their determinants like altruism, collectivism and individualism.

6 METHODS

6.1 Study design

The scientific field of the study is that of social epidemiology and social determinants of health. The design of the study was non-experimental observational. The study was individual-level cross-sectional aiming to assess the relationships between two health dimensions (self-reported mental and general health) and three groups of explanatory factors – social relationships (with friends and relatives), individualism and collectivism (measured as individualistic/collectivistic self-referrals) and altruism (measured as helping behaviours).

The character of the study was purely exploratory since this dealt with either unexplored issues (i.e. the relationships between individualism/collectivism or altruism and health) or epidemiological issues for which there was evidence (i.e. the association between social relationships and health) but still further exploration was needed (i.e. do all types of social relationships have the same uniform beneficial influence on all major health outcomes?). The primary concerns of the study were to generate and develop hypotheses about the associations between social relationships, individualism, collectivism, altruism and health and to point out new unexplored pathways through which social life and social networks might affect health. Ultimate target was the empirical testing and establishment of a conceptual model for sociability and health which would account not only for social relationships but also for their psychosocial/cultural determinants like individualism, collectivism and altruism.

6.2 Sampling

6.2.1 The spatial location of the study

The study took place in Greece where not much social epidemiology research has been conducted. The spatial location of the study in Greece had many advantages. The most important of which was to test in a non-predominantly western cultural context

hypotheses and ideas about health and sociability which were developed and tested in western societies. Such testing was expected to contribute in the most fruitful manner to the improvement of the existing epidemiological theory. Another advantage of the spatial location of the study in Greece - a supposedly collectivistic culture (in contrast with the presumed individualistic West) – was the acquisition of new rich information about the effect of living in a collectivistic culture on health where individualism and collectivism and even sociability probably have a different meaning than that they have in western countries. A third advantage of conducting the study in Greece is the opportunity such arrangement gives to explore the high health profile of Greece (at least in terms of high life expectancy) in relation to social relationships and their determinants (WHO 2001).

6.2.2 The selection criteria of the sample

The first selection criterion was age. The study sample consisted of individuals forty years old or older (at the time data collection occurred) of both sexes. Such age limitation aimed primarily in the creation of a sample in which observable health differences and variations could be found that in turn could be explained by the selected independent factors (social relationships, individualism, collectivism and altruism). A sample consisting of young people probably would not be appropriate to study the associations between the selected outcomes and explanatory variables given that the vast majority of young people were not expected to have important health problems and therefore there would not be enough health variation to explain. A second selection criterion employed related to the health of the study participants. People who were incapable to be interviewed (e.g. bedridden patients) or people with obvious mental health problems or psychiatric illnesses were exempted.

A third selection criterion was the nationality of the participants. Non native Greeks or immigrants were not included in the study sample. This was decided because of the culture-related nature of this study. Immigrants and non-native Greeks possibly were carriers of different cultures and therefore had different perceptions of individualism,

collectivism and altruism. The exploration of ethnicity or nationality as a potential confounders or covariates of the associations between the explanatory and the outcomes variables was out of the limits and aims of this study. A final criterion used for the selection of the eligible individuals was that of the permanent residence. All individuals included in the sample should be permanent residents of the municipality where the data collection occurred. This was decided in order to ensure that the sample consisted of the people it is supposed to be consisted of and in particular to safeguard that the rural part of the sample did not consisted of city-dwellers who happen to have country-side houses in the selected rural areas instead of real inhabitants of these areas.

6.2.3   The sampling framework and levels – an overview

The sampling framework of the study was a mixture of purposive and random sampling techniques. The purposive element of the sampling mostly referred to the selection of the higher level (primary and listing) sampling units – broader areas where the data collection was carried out – and resulted in a sample as representative as possible of social classes and geographical and cultural strata which reflected the main points of the full social and cultural continua in Greece. The random element in the sampling process pertained to the random selection of blocks (and therefore households and individuals) in the three purposively selected urban areas. The sample of the study was not a probabilistically random sample. This was decided mainly due to the practical difficulties of drawing a purely random sample. In addition it was not clear in what way a purely probabilistic sample would serve better the main purpose of this study which was predominantly exploratory – an attempt to investigate new pathways leading from social relationships and their determinants to health and to create a new conceptual model.

The sampling framework employed had four levels which are presented in greater detail further down (see sections 6.2.4 - 6.2.7). The first level was a crude one and referred to splitting Greece into two parts - an urban and a rural – which were the primary sampling units of the study. The second level referred to the selection of the listing sampling units. These were municipalities within Athens greater area (for the urban part of the study) and prefectures throughout Greece (for the rural part of the study). The

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third level of sampling in the urban areas pertained to the selection of blocks from the selected urban municipalities whilst in the case of the selected rural areas on the selection of the appropriate rural municipalities/villages. The fourth and lowest level of sampling framework pertained to the selection of the individuals who were included in the sample. The selection of units in the first two levels of the sampling framework was purposive. In the third level the selection of the blocks in the urban areas was random whilst in the rural areas the selection of rural municipalities/villages was once again purposive according to set criteria (which will be discussed further down). The fourth level of the sampling framework referred to the individuals included in the study and did not encompass any selection element as all eligible individuals in all households in the selected areas were contacted.
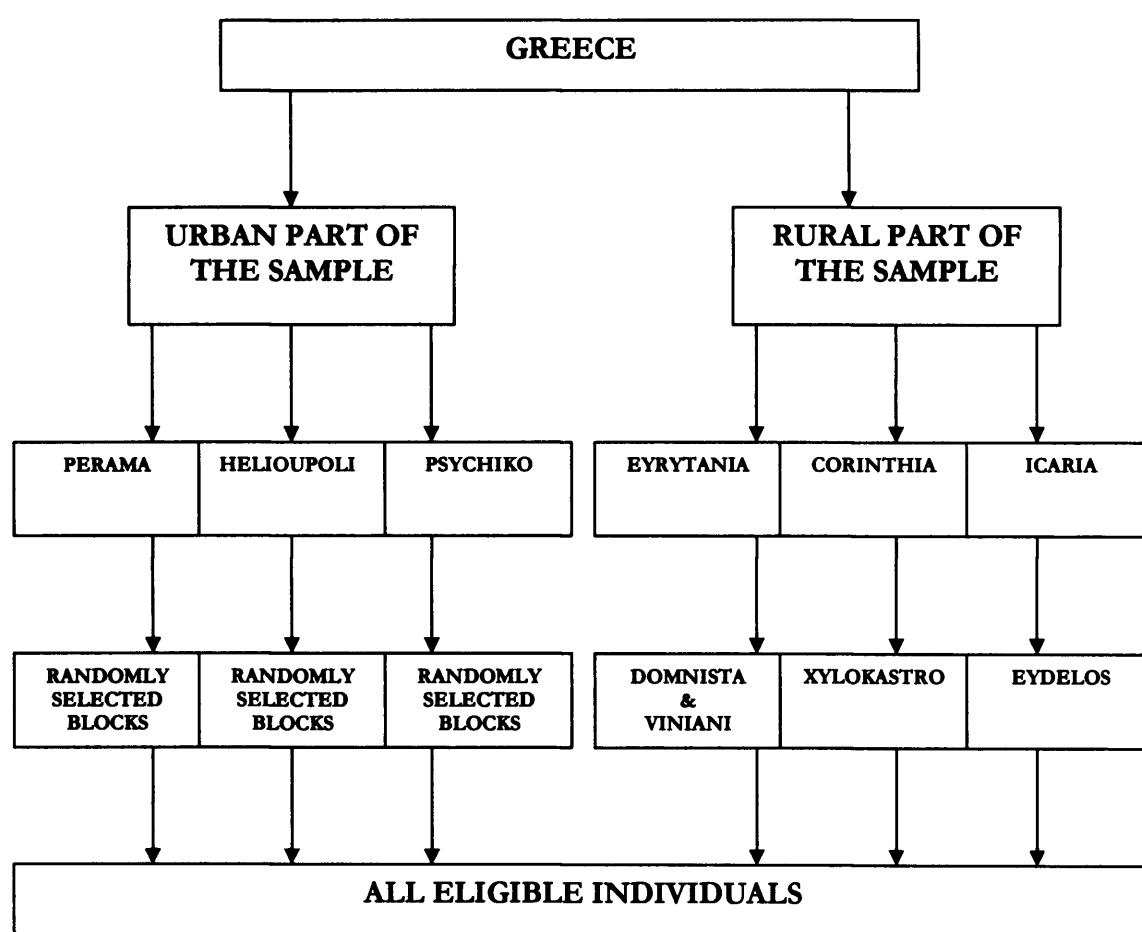
Figure 3. The sampling framework

6.2.4 The first sampling level

The first sampling level referred to the study having two main parts - a rural and an urban. This partition was made in order the study sample to resemble as much as possible to the Greek population and to reflect its main division between the city-dwellers and the inhabitants of the rest of the country. Greece is a country with two faces that could easily be split into two halves. The first half is a network of few tens of cities (in Greece there are only six cities – including Athens - with more than 100.000 inhabitants) and the second half is the rural or semi-urban part of the country. The inclusion of the two structural elements of the Greek society in the study would result in it being comprehensive enough and its conclusions not being exclusively either urban-bounded or rural-bounded. Also it provided a good opportunity to highlight potential differences that might exist between urban and rural areas (due to their different historical and cultural trajectories and differences in their social and economic organization) with respect to the health outcomes but also to the explanatory variables (individualism, collectivism, altruism and social relationships). The rural population have a more traditional way of living while the urban population a more modernistic attitude towards life. These differences were expected to affect the way people get social and relate to each other, their feelings of closeness to other people (independence vs. interdependence) and the extent to what they consider themselves as altruists and sociable and of course their health status.

Given that the study sample was not a probabilistic and specific areas of Greece would be selected on the basis of their representativeness as characteristic specimen of a particular type of area (according to the "ideal type" criterion – see 6.2.5), it was decided that Athens Greater area would represent the urban part of the study while all rural or semi-urban areas of Greece would represent the rural part of the study (according to the National Statistical Service of Greece any area in which the largest locality has less than 10,000 inhabitants is not urban). The decision to select Greater Athens area and not any other Greek city as one of the two primary sampling units was grounded on many reasons. The most important of which were: its size (it is by far the

biggest city in Greece; a great proportion of the urban Greek population lives in this region), its predominant role for Greece and its clear socioeconomic spatial division which would allow to test any social gradient-related hypothesis either in relation to the outcomes or to the independent variables.

6.2.5 The second sampling level

The second sampling level pertained to the selection of the listing sampling units – urban municipalities and rural prefectures - from within the urban and rural parts of the sample. This selection process was based on socioeconomic and cultural information and employed an "ideal type" criterion. The "ideal type" approach draws on the Weberian tradition (Schroeder 1992) and attempts to deal with the problem of producing intersubjectively meaningful selections from a vast reality by using an "ideal type" tool. This was "…drawn from culture and shaped by evaluative implications that are present in the cultural sources from which ideal-types must be constructed" (Eliaeson 2000). In practical terms the use of an "ideal type" criterion implied that the settings where the data collection would be carried out should be selected on the basis of their representativeness of a typical setting of their category. This ideally would result in the study sample reflecting the main points of the social and cultural continua and the main socioeconomic and cultural attributes of the Greek population.

The selection of the urban municipalities

The criterion used for the selection of the urban municipalities was that of the socioeconomic profile of the municipalities. The Greater Athens area is an area clearly divided into three socioeconomic zones (see Appendix 1) and therefore it was decided that three municipalities should be selected which ideally would represent the low, medium and high status Athenian municipalities. Using information from the Social and Economic Atlas of Greece (Maloutas 2000) the following municipalities were chosen: Perama, Helioupoli and Psychiko. Perama municipality, nearby the Piraeus port, is a place where the majority of the residents are blue-collar workers (either in the local or nearby shipyards or elsewhere) and it was selected as the typical example of a working class municipality. Helioupoli, a municipality eastern of the Athens

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municipality, is a middle-class area which was selected for inclusion in the sample as the typical of its kind. Finally the municipality of Psychiko, a typical affluent suburb, was included in the study as a typical representative of the wealthy high socioeconomic profile municipalities of Athens. Details on the profile of the three selected municipalities could be found in Appendix 2.

The selection of the rural areas

Rural Greece can easily, as well, be divided into three different parts –the mountainous areas, the low-line areas and islands. Accordingly it was decided that the sample should encompass three areas which ideally would represent these three types of rural areas - typical examples of a mountainous area, a low-line zone and an island. For their selection various criteria were used. The main criteria used were: altitude (mountainous areas included in the study are of altitude of 800 metres or higher in accordance to the National Statistical Service of Greece definition of mountainous settings), the touristic character of the area (predominantly touristic places were excluded on the basis that tourism expectedly has affected the character of the area) and the vicinity with borders with another country (this kind of settings were also excluded because living in the borders could be a factor with a major effect on the health which exploration was beyond the scope of this study). Further selection criteria employed were:

a) (regarding the selection of the mountainous setting) the proximity of the selected area to any major urban setting and the percentage of urban population in the prefecture where the mountainous area administratively belongs to (the mountainous area of the sample should not be close to any urban setting and ideally the prefecture to which it belonged should not have any major urban setting)

b) (concerning the selection of the island) its size and location; islands of big size (e.g. Crete) or very small remote and isolated islands (e.g. Othoni or Kastellorizo) were excluded because most probably could not be characterized as the "ideal type" of a contemporary Greek island

c) (concerning the low-line area) its predominantly farming character (NSSG 2000).

The use of all these led to the selection of Eyrytania as the most representative of the mountainous areas, Corinthia as a typically low-line agricultural area and Icaria as the ideal type of a Greek island (see Appendix 3).

6.2.6 The third sampling level

The elementary sampling units for the urban part of the study were blocks within the three selected urban municipalities (Perama, Helioupoli and Psychiko) while for the rural part were rural municipalities/villages within the three selected prefectures (Eyrytania, Corinthia and Samos & Icaria). The blocks in the urban municipalities were selected according to a simple random technique; every block from each selected municipality was enumerated sequentially and then the blocks were drawn from a computer-generated table of random numbers. This process was repeated separately for all three selected municipalities.

In the rural areas the selection of the villages employed the criteria discussed in 6.2.5 along with two additional criteria. The first was a population criterion (the number of permanent inhabitants of the selected rural settings) in order to avoid visiting particularly small villages where it was really difficult to locate any of the dwellers. The second was the remoteness of the selected area; isolated villages that were hard to be reached with the usual means of transport (e.g. car) were excluded. The rural municipalities selected, were: a) in Eurytania: the municipalities of Domnista and Viniani b) in Corinthia: the non-coastal zone of the Xylokastro municipality c) in Icaria: the municipality of Eydelos.

6.2.7 The fourth sampling level

The fourth and finally level of sample selection referred to the selection of the individuals who would comprise the sample of the study. This final part of the sampling process was not based – as ideally it should be - on any kind of official list registering all potentially eligible people. Reasons for not doing so were on the one hand the relative lack of accurate lists of such kind (i.e. the registries of municipalities usually did not include people who live in the respective municipalities but were not officially citizens of them; electoral registries are not constantly updated) and on the other hand and most

importantly the inaccessibility of such catalogues by the researcher. This lack of a proper registry containing all eligible individuals led to the interpolation of the third sampling level (i.e. selection of blocks) which otherwise would not be necessary and added to the sampling process an unnecessary element of complexity (i.e. dealing with uncertainties like: the unknown number of households per block and the unknown number of eligible people per block and household).

In the urban areas all households within the selected blocks were contacted. In the rural areas also all households in the visited villages were contacted up to the attainment of the desired number of interviews.

The total number of people contacted was 1534; 1052 were city dwellers and 482 resided in rural areas.

6.3 Research procedures and study instrument

6.3.1 The study instrument

6.3.1.1 The conceptual base for the development of the instrument

The design and the development of the study instrument were based on two main axes: the first was the characteristics of the sample and the second the purposes of the study – the instrument ought to be appropriate for the population in study and in accordance with the purposes, aims and theoretical foundations of the study. The characteristics of the sample influenced the technical characteristics of instrument by setting its practical limits mostly in terms of language and sophistication. Given that the sample to which the questionnaire would be addressed was community-based and non-clinical, consisting of healthy, middle or older age people of both sexes from all kinds of socioeconomic and cultural backgrounds with varying educational levels, the questionnaire should have simple wording without any technical jargon. Also it should not contain any wording that could potentially be understood as offending by anyone of the participants.

The purposes of the study shaped the conceptual frame of the questionnaire - the instrument should reflect as much as possible the concepts the study tried to explore. It was necessary the questionnaire not only to provide valid information but also to be in accordance with and reflect the concepts and objectives of this study. Since the ultimate objective was to build a model for the association between social relationships, their determinants and health the information collected should provide insights and reflect all these concepts. The questionnaire should focus on behaviours related to socialization and social relationships and provide an adequate basis for the exploration of the interaction among individuals within social networks. Moreover, it should enlighten as much as possible the context of social interaction and people's attitudes regarding self and others when socializing. Also, it should be sensitive enough to capture even weak evidence of relationships between the independent constructs (altruism, individualism, collectivism and social relationships) and health outcomes.

A further matter which was taken into account when designing the instrument was that of the comparability of the present study results to those of other studies. Therefore, effort was made to include in the instrument measures widely and internationally used.

6.3.1.2   The study instrument

In this section all the measures included in the instrument are presented; though not all of them were used for in the present study. The present study used only these measures which related to the hypotheses under examination. In general, the questionnaire included five main parts. One of them as expected focused on the outcome (health), three of them on the four main independent concepts (social relationships, individualism, collectivism and altruism), and a fifth and final referred to the socio-demographic characteristics of the sample. All information collected was self-reporting.

The measurement of health focused on participants' perceptions and self-evaluation of their health, self-reports of chronic diseases and health behaviours. No objective measurement of any health dimension was made and no clinical information was gathered. The focus on self-reported health status and problems was decided due to

practical reasons (i.e. the measurement of clinical dimensions of health would had made the data collection unnecessary complex) but mostly because it was unclear in what way including clinical measures would contribute to the further exploration of pathways relating sociability and health. The study did not intend to enlighten the causation of any specific disease or condition and therefore it seemed more important to pay extra attention to that part of the questionnaire that dealt with the explanatory concepts (social relationships, individualism-collectivism and altruism) rather than focusing on technical details about the clinical dimension of the respondents' health.

Regarding the translation of the employed scales it should be mentioned that there was need to translate the empathy scale (Interpersonal Reactive Index) (Davis 1983), the altruism scale and items from the Individualism-Collectivism as these had not been translated into Greek before. The translation of these scales has been made by the researcher and assessed by a bilingual psychologist.

6.3.1.2.1 The health section of the instrument

The health part of the questionnaire included measures of health-related quality of life (SF-36), self-rated health, chronic disease, physical activity and smoking. SF-36 was selected on the grounds that it was a well-known and widely used world-wide instrument for which adequate evidence on its psychometric values existed (Ware et al. 1998; Ware & Gandek 1998). Also because it that had been used previously in Greece (see Tountas et al. 2003). It contained 36 questions which formed eight scales measuring physical and mental disability, well-being, functioning and personal evaluation of health. The eight scales included in it were: Physical Functioning (10 items), Role-Physical (4 items), Bodily Pain (2 items), General Health (5 items), Vitality (4 items), Social Functioning (2 items), Role-Emotional (3 items), and Mental Health (5 items) (Ware & Gandek 1998). Other health measures contained in the questionnaire were: a) a single-item self-rated health measure b) a long-standing illness measure which encompassed two items; one asking the respondents for the existence of any chronic disease or any chronic health problem due to which prescribed medication had to be taken or with which they were concerned in any way (possible response: yes-no)

followed by an open question asking the respondent (in case she/he had reported suffering from some chronic disease) to specify from which chronic disease did she/he suffer c) a measure "portraying" the smoking profile of the participants (5 items - their current smoking status and smoking history - both personal and family) and d) a single item focusing on physical activity. From all these health measures only the mental health and general health scales of SF-36 were used for the needs of this study (for the reasoning of this decision see section 6.3.2.1.2).

6.3.1.2.2 The social networks section of the instrument

The section of the questionnaire which focused on participants' social networks included measures of social relationships, social support, loneliness and social capital. The social networks/relationships measures employed in the present study have been used widely by many national and international studies as their standard measure to evaluate people's social networks and contacts (e.g. Berkman et al. 2004; Melchior et al. 2003a & 2003b; Zunzunegui et al. 2004). It draws upon the work of Berkman and colleagues (Berkman & Syme 1979; Glass et al. 1997) contained four items referring to the number, density and closeness of contacts with either relatives or friends. Regarding social support it was measured with a block of six items capturing not only the positive dimension of close relationships but also their negative side like criticism and disappointment by others. Loneliness was measured directly with a single item asking the participants whether they were feeling lonely accompanied by another question on whether participants enjoy other people's company or not. Finally the social networks section of the questionnaire contained four social capital questions on participants' perceptions of trust, fairness and reciprocity. From all these social measures the present study used for its needs only the four-item social network measure which was applied two times, separately for friends and relatives.

6.3.1.2.3 The altruism and empathy section of the instrument

Another section of the questionnaire referred to measuring the participants' moral orientation (altruism and empathy). As mentioned earlier this study conceptualized altruism as prosocial (altruistic) behaviours. Accordingly the study instrument should encompass a scale that could capture as much accurately as possible participants' prosocial (altruistic) orientation and behaviour. The present study measured altruism with a scale which was based on self-reported altruistic behaviours (Johnson et al. 1989) which in turn built on scale initially developed by Rushton and colleagues (Rushton et al. 1981). The Johnson and colleagues' scale contained 56 items and looked more as a pool of altruistic item rather than as a well-validated instrument. It was a scale with mostly unknown psychometric values that contained many items culturally inappropriate for a sample of middle-age and older Greek and in general could not to be used as it was. Therefore, it was decided that a new scale measuring altruistic behaviours should be developed which would be shorter and more consistent. The new scale consisted of 15 items and it was based on Johnson and colleagues' scale. The inclusion of the items in the new scale was made on a conceptual basis using a criterion of face validity.

The moral orientation section of the questionnaire encompassed also two subscales (Perspective-Taking and Empathetic Concern) of the Interpersonal Reactivity Index (Davis 1983) that focused on empathy and sympathy which were not used in the present study.

6.3.1.2.4 The individualism and collectivism section of the instrument

The study instrument focused also on the measurement of individualism and collectivism. A literature review performed by the researcher revealed the existence of 23 different such measures. Oyserman and her colleagues (2002) in their meta-analysis identified some 27 different scales measuring individualism and collectivism. This study measured individualism and collectivism as the independent and interdependent

dimensions of self (self-referrals) using a scale developed by Singelis et al. (1995). This scale was one of the most widely used individualism-collectivism scale and there was some initial evidence on its psychometric values. The version of the scale used was based on data presented by Triandis (1996) and measured individualism and collectivism within the perspective of equal or hierarchical relationships (along the horizontality – verticality bipolar concept). The scale contained in total 28 individualism/collectivism items which according to its developers should constitute four different dimensions: Vertical Individualism (7 items), Horizontal Individualism (6 items), Vertical Collectivism (7 items) and Horizontal Collectivism (8 items). In the original scale all responses were given on a 7-level scale (Singelis 1994) or a 9-level scale (Singelis et al. 1995) but the present study adopted a 5-level response scale. The adoption of a cognitively simpler 5-level scale was selected mostly because a 7- or a 9-level response scale would require higher cognitive skills and therefore might result in an unnecessary (and artificial in a sense) concentration of cases around specific points of the response scales. Towards adopting a simpler 5-level pointed out also the pilot study where many respondents commented that they encountered problems in handling the 7-level response scale then used. In addition none of the original studies that introduced the scale and its main variants provided any clear reasoning why a 7- or 9-level response scale would be preferable over the standard 5-item response scale.

6.3.1.2.5 The sociodemographic section of the instrument

The sociodemographic section included items relevant to age, sex, family status, educational level, income, employment and social status of the participants.

6.3.1.2.6 Outline of the questionnaire

So practically the questionnaire in total (irrespectively of what items are finally used for the needs of this study) had the following five different sections:

1) *Sociodemographic section (19 items):*

a) Area of residence (1 item)

b) Sex (male or female) (1 item)

c) Age (1 items)

d) Family status (2 items)

e) Education (highest qualification obtained) (1 items)

f) Paid employment – Unemployment (6 items)

g) Income (personal and family) (2 items)

h) Wealth: private house ownership (2 items) & private car ownership (1 item)

i) Residential stability (1 item)

j) Social position ladder (perceived social status) (1 item)

2) *Health section (44 items)*

a) SF-36 (36 items)

b) Long-standing illness (2 items)

c) Smoking (5 items)

d) Physical activity (1 items)

3) *Social relationships & Social support section (20 items)*

a) Density & frequency of contacts with relatives (4 items)

b) Density & frequency of contacts with friends (4 items)

c) Social support (6 items)

d) Sociability (1 item)

e) Loneliness (1 item)

f) Trust (2 item)

g) Reciprocity (1 item)

h) Fairness (1 item)

4) Individualism-collectivism section (28 items)

a) Vertical individualism (7 items)

b) Horizontal individualism (6 items)

c) Vertical collectivism (7 items)

d) Horizontal collectivism (8 items)

5) Altruism and empathy section (28 items)

a) Empathic concern (6 items)

b) Perspective taking (7 items)

c) Self-reported Altruism scale (15 items)

The instrument in total included 139 items (the instrument used can be found in Appendix 4).

6.3.2 The variables employed in the study

6.3.2.1 The variables and dataset employed in the study – an overview

Conceptually all questions and scales presented above could be divided into three main categories of variables: the explanatory, the outcome and the confounding variables. The present study employed explanatory variables derived from (or related to) the Individualism/Collectivism, Altruism and social relationships measures; as outcome variables the mental and general health scales of SF-36 and as potential confounders the main sociodemographic characteristics of the sample (age, sex, area of residence, family income and educational level).

6.3.2.1.1 The explanatory variables

The explanatory variables used were of two types: three variables pertaining to social relationships and ten psychosocial determinants of social relationships derived from the factor analysis of the individualism/collectivism and altruism scales.

The social relationships

The main social relationship-related explanatory variables used in the study were three: two derived indices of social relationships (a family relationships index and a friendship index) and the dichotomous variable referring to the absolute lack of any friends ("Do you have friends?" yes-no). The equivalent dichotomous variable for relatives ("Do you have relatives?") was not used as an explanatory variable as only eight respondents reported that they had no relatives and the variable considered to be redundant (and these eight cases were excluded from further analysis).

The two indices were summary scores obtained by adding together either the set of four questions focusing on family relationships or the set of four questions focusing on friendships. The two sets of questions were similar and their only difference was that they refer to different types of relationships (family relationships vs. friendships). The four questions were: "How often do you have contact with any of your friends (or relatives) who do not live with you?" (this question is asked twice – one time for direct face-to-face contacts and another time for indirect contacts e.g. over the phone – and aimed to capture the frequency of social contacts), "How many of all your friends (or relatives) you meet at least once a month?" (question aiming to capture the density of one's social relationships) and "With how many of all your friends, would you say, that you have a close relationship?" (or in case of family relationships: "With how many of all your relatives, would you say, that you have a very close relationship?") (question aiming to measure the closeness of the reported social contacts). The possible response options were for the first two intertwined questions "Almost everyday", "Once or twice a week", "Once or twice a month", "Every other month", "Once or twice a year" and "Not even once a year or never" and for the third question: "None", "1-2", "3-5", "6-10" and "More than 10". In contrast the fourth question asked the respondents to give the number of the close friends they have without any restrictions (continuous variable). The two indices of social relationships were created after careful consideration of the existing literature and in accordance to how previous research has created similar indices (see for example Berkman et al 2004; Melchior et al 2003a & 2003b; Zunzunegui et al. 2004).

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The family relationships index score ranged from 0-42 (0 denoted lowest possible family-related sociability – 42 denoted highest possible family-related sociability). Each question was scored from 0 to 15. With regard to the two intertwined 6-level "frequency of contacts with relatives" questions, the "never or not even once a year" response was assigned the value of 0 while "almost everyday" was assigned the value of 15 (equal intervals between levels). Then the two questions were added together and it was their average that was used in the creation of the family relationships index. Regarding the 5-level "How many of all your relatives you meet at least once a month?" question, "none" was scored 0 while "more than 10" was scored 15 (equal intervals between levels). The variable referring to the closeness of relationships ("With how many of your relatives, would you say, you have a very close relationship?") was dealt with differently. Given that it was a continuous variable, the number of close relatives reported by the respondents was kept and used as it was without any further handling. Nevertheless this variable was problematic in the sense that there was a small group of respondents (N=40) reported having more than 15 (the selected cut-off point) close relatives (initial range of this variable = 0-60). The problem with these 40 cases was that they reported values much higher than the rest of the participants and their inclusion in the study would influence to a major extent the results.

The practical/statistical aspect of this problem referred to the selection of the cut-off point employed (15). This cut-off point was not chosen arbitrarily but after careful consideration of the frequency table and distribution of the "closeness of family relationships" variable which revealed that: a) 96% of all valid cases reported values ranging from 0 to 15 (had from 0 to 15 close relatives) and b) the full range of 0-15 was observed while from that value (15) and onwards the distribution was not continuous and cases were distributed on a digit-preference basis (see Appendix 14). The conceptual dimension of the problem (which was the most important one) referred to the possibility a person to truly have more than 15 very close relatives-confidents. Conceptually it seemed possible people who reported having more than 15 close relatives either simply reciting how many relatives they had or not being able to distinguish those of their relatives who were really close to them from the rest. Both

prospects pointed towards the exclusion of these 40 cases. Further evidence corroborating the stance to exclude these cases came from a sensitivity analysis performed which showed that the cases of people with more than 15 close relatives were not evenly distributed across the urban and the rural parts of the sample; 85% of these people were living in the rural areas. A finding probably showing that some country-side dwellers failed (or did wish) to think of some of their relatives as less close to them than others.

Finally and although various statistical solutions to deal with this problem were examined (i.e. included all cases and then use a log transformed version of the family relationships index or various transformation of the "closeness of relationships" variable before its inclusion in the index), the exclusion of these 40 cases was selected as the most appropriate both methodologically and conceptually solution. Respondents who reported not having any relatives (N=8) or true missing cases (N=2) were treated as missing cases as literature suggested (Melchior et al. 2003a). In total the valid cases for which a family relationships index score was calculated was 850.

The friendship index was created in the same way. Its range was 0-28 and each question was scored from 0 to 10 (0 denoted lowest possible friendship-related sociability – 28 denoted highest possible friendship-related sociability). The two 6-level "frequency of contacts with friends" questions were assigned values from 0 ("never or not even once a year") to 10 ("almost everyday") and the intervals between the levels were equal; as with the respective questions in the family section, the average of these two questions was used as a single variable in the creation of the friendship index. The 5-level question "How many of all your friends do you meet at least once a month?" was scored from 0 ("none") to 10 ("more than 10") while once again the intervals between the response levels were equals. The continuous variable "With how many of your friends, would you say, you have a close relationship?" did not constitute much of a problem, as it did in the respective family-related question, as far less respondents reported having more friends than the set cut-off point (10) which was selected, again as in the family section, on a conceptual and empirical basis. The observed range in this question was 0-45 but only 15 cases reported having more than 10 close friends which were not assigned a friendship index score and excluded from further analysis.

Respondents who had not had any friends (N=80) or were true missing cases (N=3) were treated as missing cases (Melchior et al. 2003a). The cases for which a friendship-related sociability score was calculated and therefore qualified to be included in the multivariate analysis were 805.

As mentioned earlier the dichotomous variable "Do you have friends?" was also used to explain the selected health outcomes. It was used as a possible predictor of the health outcomes independently of the two derived indices of social relationships. This was decided because any analysis based on this variable would provide a good opportunity to explore a further dimension of the relationship between social relationships and health - that of the interaction between being (or feeling) deprived of friends and health and would result in possibly useful findings on whether friendlessness related negatively to health. Moreover, the use of this variable as a main explanatory variable would allow full utilisation of almost all 926 cases in the sample (as there were only three truly missing cases which did not state whether they have any friends or not).

The determinants of social relationships (the ten altruistic, individualistic and collectivistic factors)

Another important group of independent variables was that of the ten psychosocial factors that were extracted from the factor analysis of the individualism/collectivism and altruism scales. These were: three individualism-related factors (Sense of Uniqueness and Vertical and Horizontal Individualism), three collectivism-related factors (Collectivism-Dependency, Vertical and Horizontal Collectivism) and four altruistic factors (Altruism, Responsibility Assumption, Provision of Practical Help and Volunteering). The ten factors were employed as explanatory variables in their original standardized (mean=0, SD=1) factor score form and not in the form of a raw score (i.e. the sum of the responses for all items supposedly constituting a given scale). The use of weighted standardized factor scores instead of raw scores seemed as the most appropriate methodological choice mostly due to the lack of sound evidence on the dimensionality of either individualism-collectivism or altruism in Greece and internationally and therefore the consequent lack of any sound basis to calculate raw

scores of any kind (this lack of sound evidence was exactly the stimulus to factor analyze all over from the beginning the individualism-collectivism and altruism data).

Specifically as regards individualism and collectivism calculating any kind of raw score on the basis of the four-dimension structure of individualism/collectivism (two two-dimensional concepts) proposed by the developers of the individualism-collectivism scale (Singelis et al. 1995) would imply that the study tacitly accepted the proposal for a four-dimension structure of the employed scale. But it was decided the study to take a more critical stance and reconsider the structure of individualism and collectivism. The rationale behind this decision was that the adoption of the proposed 4-factor structure methodologically was not justified as this relied heavily on analyses of convenience samples consisted mostly of students from USA (Singelis 1994; Singelis et al. 1995), its psychometric grounding was not well-established and nothing was known for its appropriateness for a sample of middle- and older age Greek people. A further reason for using the weighted factors scores was that these accounted for the differential contribution of each item to each factor and were based on the most realistic assumption that not all items had the same loadings on the emerged factors.

The same reasoning applied even more in the case of altruistic data. Altruism was a concept on which dimensionality and psychometric values only scarce evidence existed and therefore any attempt to calculate and use any kind of raw score would be completely unsound.

6.3.2.1.2 The outcome variables

The study employed two health outcomes; mental and general health scales of the SF-36. They were selected among the eight scales of SF-36 as the most representative of two major dimensions of health (mental health and self-perceived health) and as the most compatible with the aims and design of the study. The mental health scale measures feelings of nervousness, depression and positive affect. The general health scale measures evaluations and perceptions about personal health (Ware & Sherbourne 1992). Both scales consisted of five items (see Ware & Gandek (1998) for a detailed

description of the both scales). The transformed scores of both scales were used as the outcome variables of the study and they were obtained according to the instructions of the SF-36 manual (Ware et al. 1993). Both outcomes variables used ranged from 0-100 (0 denoted worst possible health state – 100 denoted the best possible health state).

The use of the transformed scores instead of factor weights (which could had been obtained from the factor analysis of the SF-36 data) was selected because SF-36 was a well-validated instrument which psychometric values were known and dimensionality has been tested extensively in many different countries (see for example (Aaronson et al. 1992; Ware et al. 1995 & 1998; Ware & Gandek 1998) and therefore no significant reason existed to attempt to explore further its dimensionality.

6.3.2.1.3 The confounding variables

The confounding variables in this study were exclusively sociodemographic factors which might influence the relationships between the explanatory and outcome variables. The employed confounding variables were: age, sex, area of residence, family income and educational level. Age and sex were selected because of their importance for all human beings and societies. Area of residence was selected because of the potentially important role for socializing process (Curtis & Rees-Jones 1998) and of course because of the nature of our sample (consisting of two major parts, an urban and a rural). Education and family income were included in the array of the employed variables as two potentially important socioeconomic confounders. Age was treated as continuous variable and used in its initial continuous form; sex was a dichotomous variable (1=male & 2=female); area of residence was also treated as dichotomous (1=urban areas & 2=rural areas); educational level was an ordered 7-level variable (1=not at all education, 2=less than 6 years of education, 3=less than 9 years of education, 4=less than 12 years of education, 5= completed secondary education, 6=university degree holder and 7=postgraduate studies); family income (which was selected over the personal income because many housewives did not report any personal income) was also an ordered variable with six levels (monthly family income: up to 1000 Euros, up to 2000 Euros, up to 3000 Euros, up to 4000 Euros, up to 5000 Euros, more than 5000 Euros). Due to the concentration of many cases on the lowest

family income category instead of the family income per se its logarithm was used as literature suggested in such cases (Kirkwood 1988).

6.3.3 The sample size calculation

The calculation of the required sample size was necessary in order to practically have an estimate of the number of people needed to be interviewed (and therefore of the resources needed) and to assess the power and statistical significance of the study.

There are many different formulas to calculate the sample size of a study. The calculation of a sample size, when continuous outcomes are employed, relies on mainly three factors: the desired statistical significance and power of the study and the effect size (the size of the effect to be detected) (Whitley & Ball 2002). This study was decided to have 95% statistical significance (p $\leq$ 0.05) and 80% power (1- β $\geq$ 0.8).

The effect size (δ) for continuous variables can be calculated using the following formula

$$\delta = \Delta / \sigma$$

where δ is the effect size, Δ is the target (or meaningful) difference between the two samples being compared and σ is the standard deviation of the population (Whitley & Ball 2002). The target difference (Δ) used here for the calculation of the sample size of the present study was that of 5 points on a 100-point scale. The standard deviations used for the calculation of effect size (δ) were those ones reported by previous studies having used SF-36 in Greece (Tountas et al. 2003).

For the calculation of the sample size various formulas were used like:

i)   A formula presented by (Whitley & Ball 2002):

$$n = 2/ \delta^2 * C_{p, power}$$

where n is the number of subjects required in each group, δ is the effect size

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and $C_{p,\ power}$ is a constant defined by the values chosen for the statistical significance and power.

ii)   A quick formula proposed by (Lehr 1992):

$$m=16/\ \delta^2$$

where m is the number of subjects required in each group and δ is the effect size.

i)   A two-sided student's t test related formula (Cohen 1977):

$$n=2\theta^2\ /\ \delta^2$$

where n is the number of cases required for each group, θ is the non-centrality parameter of the t-test (Owen 1965) and δ is the effect size.

All the formulas used gave similar results. As expected Lehr's quick formula overestimated the samples size (Campbell et al. 1995). Table 1 presents the samples size required for each group (there were two groups – an urban and a rural - of equal size $n_1=n_2$) to achieve a 95% statistical significance and 80% power and detect a 5-point difference on either of the outcome measures.

Table 1. The calculation of the sample size*		
	General Health‡	*Mental Health‡*
Lehr $\approx$	229	234
Whitley $\approx$	227	231
t test $\approx$	226	231
Sample size required to detect 5-point differences on either of the health outcomes while achieving 95% statistical significance and 80% power ‡ Sample size corresponding to the number of subjects required for each of the two groups (rural/urban)		

The conclusion of all calculations performed was that the sample size necessary to achieve 80% power and 95% statistical significance was 486 cases (234 cases from the

urban areas and 234 cases from the rural areas). Thus, the number of interviews required from each of the six selected areas was approximately 80.

Although the estimation for the required sample size was 486 cases, the actual sample consisted of 926 cases. This difference between the sample size calculations presented above and the actual size of the sample was due to the fact that the sample size calculatations were based not only on the two continuous measures used in this study but also on dichotomous outcomes not used in the present study.

6.3.4 The sampling procedures

The data were collected through personal face-to-face interviews. This type of interview thought to be the best to address a lengthy questionnaire as that of the present study. Also, it was expected to increase the probability that all contacted people would give accurate information regardless of their educational status since they would not be asked to read or write and therefore expected to result in higher response rate than any other type of survey (e.g. postal or telephone surveys). Moreover, it was decided given the nature of the study (focus on psychosocial factors) that no proxy interviews would be made in order to get as high quality data as possible.

The interviews were fully anonymous and confidential. People before granting an interview were informed about the survey and its purposes and their voluntary participation was considered as an indication of their consent. The data collection was carried out in 2003. The interviews were conducted by the researcher and a group of interviewers. The average time needed for an interview was approximately 30 - 40 minutes but this varied mainly according to people's educational level and age.

An effort was made to achieve a high response rate. All households within the selected urban areas were sent, a few days prior to the data collection, a letter informing them on the study and its purposes and asking them for their cooperation. In the urban areas interviews were made exclusively either on Sunday mornings or during the afternoon on working days so that to ensure that all eligible people who were full-time workers were not excluded. In the rural areas where life is organized in a rather more relaxed

way households were not informed in advance (due to practical difficulties) and interviews were made on all days of week both mornings and afternoons.

6.3.5 The data processing and analysis

The data were handled with SPSS 10.1. The data were initially entered into a SPSS database by the researcher and other typists who worked in pairs; one was reading the questionnaire and the other was entering the data. Then, after all data were entered in the database, two different pairs of typists checked independently the entire database by juxtaposing the original questionnaires with the contents of the database. All found discrepancies between the original questionnaires and the contents of the database were checked and corrected appropriately. Then the data cleaning process was completed with the check of the entire database for out-of-range values and violations of conditions/filters (i.e. respondents who reported that they are no smokers normally should not report number of cigarettes smoked daily).

The statistical analysis was performed using SPSS 10.1 and AMOS 4 (for the structural equation modelling). The first stage of the statistical analysis was the descriptive analysis. This included the calculation of measures of central tendency, dispersion and assessment of the frequency distributions of the raw data which was followed by the calculation of all derived variables and their descriptive analysis.

The next stage of the statistical analysis was the factor analysis of the individualism/collectivism and altruism scales. For both scales exploratory factor analyses (EFA) were performed while individualism/collectivism scale was analyzed also with confirmatory factor analysis (CFA).

The exploratory factor analysis aimed to reduce the large number of observed variables and of course to allow latent variables/factors to emerge. It had two stages; this of the initial unrotated factor analysis and that of the final rotated factor analysis. The scope behind the former was diagnostic, to assess the relevance of each of the items with the rest of the scale. Items with initial communalities $\leq.3$ (communality is the percent of variance of a given variable explained by the factorial solution) were excluded from further analysis on the basis of their ill-fit with the rest of the scale (Singelis et al 1995). The inclusion of items with communality lower than .3 would result in undermining the

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emerged factorial structures. The scope of the latter stage of the factor analysis (rotated factor analysis) was to create the final factors which would be employed later on in the analysis as independent variables. All factor analyses performed employed as method to extract the factors the principal components analysis technique which is the most appropriate if one wants to reduce the initially large number of observed variables (Gorsuch 1983).

The factor analysis of the altruistic data had a non-orthogonal design (Oblimin rotation) as the expected factors were anticipated to be correlated between each other and to be somehow complementary constructs. The set criterion for the creation of the factors was rather relaxed (eigenvalue >.7) because the target of the factor analysis was to explore in-depth the dimensionality of the altruism in Greece as this was completely unknown. Then drawing upon the obtained results the final decision on the factorial solution would be made. All missing cases were deleted listwisely.

The factor analysis of the individualism/collectivism data had a different design. It was a standard orthogonal design as individualism and collectivism were expected to either be unrelated or not much related constructs. Initially a four-factor forced solution was pursued following Singelis and colleagues' suggestions (1995). Then once the four-factor solution was proven to be unsatisfactory a six-factor solution was pursued. The revision of the dimensionality of the individualism/collectivism scale from four- to six-factor was tested further with confirmatory factor analysis. The aim of the confirmatory factor analysis was different than that of the exploratory analysis. Confirmatory factor analysis was not used simply to explore the dimensionality and internal structure of the data but also to test a priori existing models against them. It was performed mainly to assess to what extent the two proposed models (a 4-factor and a 6-factor) were consistent with the data. All missing cases were listwisely deleted in EFA while in CFA the analysis were performed using both listwise deletion (mostly for comparability to EFA reasons) and the Full-Information-Maximum-Likelihood imputation technique as literature suggests when data are missing at random (Enders 2001; Wothke 2000). The final factors after their creation were analyzed descriptively and their validity was assessed. The validation process encompassed the assessment of criterion-based, convergent and divergent validity of all ten factors. The internal consistency (reliability)

of the emerged constructs was not possible to be calculated because of their form (factors weights and not summary scores). Nevertheless some indicative Cronbach's a values were calculated for all ten psychosocial constructs after their transformation into scales consisting of all items with loadings higher than .3 (see Appendix 5).

After factor analysis the next stage of the analysis was the assessment of the bivariate associations between the explanatory, confounding and outcome variables. This included initially a long series of cross-tabulations which then followed by a series of correlations (both parametric and non-parametric, Pearson's product-moment correlation and Spearman's rank correlation, respectively) or ANOVAs (wherever applicable) between the explanatory, confounding and outcome variables.

All statistical significant bivariate associations between the explanatory and the outcome variables were explored further through multivariate linear regressions (using the conventional OLS – ordinary least squares technique). This multivariate testing was chosen mainly because of the continuous nature of the outcome variables. No particular selection technique was used and all variables employed in a given model entered it in a single step and in a single block. All examined relationships between the sociability-related predictors and health outcomes were gradually adjusted for all five selected confounding variables. But no model was adjusted simultaneously for the educational level, family income and area of residence as the bivariate analysis had shown that these three covariates correlated highly between each other and therefore uncritical inclusion of all these factors together in a model might resulted in it being over-adjusted. Instead two final fully-adjusted versions of the same model were developed: one adjusted for sex, age, area of residence and family income and another adjusted for sex, age, area of residence and educational level. In that way all models were adjusted for all five potential confounders. The multivariate analysis was of a staged type; every stage of it used information acquired in the previous stages and built upon them (see figure 4). Thus, all initially statistically significant bivariate relationships were tested in a multivariate environment. Then all major predictors of a particular outcome entered altogether a model trying to explain this outcome.

The study apart from the exploration of health, explored also the associations between family relationships and friendships and the ten psychosocial factors as this was necessary step towards creating two final integrated models ("sociability trees") which would then be used to explain the two health outcomes. In this part of the analysis the Family Relationships Index or the Friendship Index employed as outcome variables and selected collectivistic, individualistic and altruistic factors as explanatory variables (selection based on assessment of initial correlations). Apart from the conventional OLS linear regression models also four structural equation models were created. These models assessed the extent to what the two health outcomes (mental and general health) could be explained by the two "sociability trees" (one for family relationships and another one for friendships). The "sociability trees" as mentioned already were constructs consisted of a social relationships index (either family relationships or friendship index) and all individualistic, collectivistic and altruistic factors that predicted it. The structural equation models developed tested empirically the conceptual model the present study proposes for social relationships, their determinants (altruism, collectivism and individualism) and health. The structural equation analysis is a type of graphical causal modelling (Greenland & Brumback 2002). In Appendix 17 it is explained what each geometrical figure in such model denotes. The method employed to estimate the structural equation models was Maximum Likelihood (Full-Information-Maximum-Likelihood).

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        ┌─────────────────┐        ┌ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┐
        │   DESCRIPTIVE   │          Each stage of the
        │    ANALYSIS     │        │ analysis tests     │
        │   Section 7.3   │          exclusively
┌──────────────┐  └─────────────────┘  │  associations found │
│ EXPLORATORY &│           │             statistically significant
│ CONFIRMATORY │           │          │  in the previous stages │
│FACTOR ANALYSIS│          ▼          └ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┘
│  Section 7.2 │  ┌─────────────────┐
└──────────────┘  │    BIVARIATE    │
                  │    ANALYSIS     │
                  │   Section 7.4   │
                  └─────────────────┘
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EXPLORATORY & CONFIRMATORY FACTOR ANALYSIS Section 7.2

DESCRIPTIVE ANALYSIS Section 7.3

Each stage of the analysis tests exclusively associations found statistically significant in the previous stages

BIVARIATE ANALYSIS Section 7.4

MULTIPLE REGRESSIONS: SOCIAL RELATIONSHIPS VS. HEALTH SECTION 7.5

MULTIPLE REGRESSIONS: DETERMINANTS OF SOCIAL RELATIONSHIPS VS. HEALTH SECTION 7.6

MULTIPLE REGRESSIONS: DETERMINANTS OF SOCIAL RELATIONSHIPS VS. SOCIAL RELATIONSHIPS SECTION 7.7.3.1

MULTIPLE REGRESSIONS: ALL SELECTED DETERMINANTS OF SOCIAL RELATIONSHIPS VS. HEALTH WHILE CONTROLLING FOR SOCIAL RELATIONSHIPS SECTION 7.7.1 & 7.7.2

MULTIPLE REGRESSIONS: ALL SELECTED DETERMINANTS OF SOCIAL RELATIONSHIPS VS. SOCIAL RELATIONSHIPS – THE CREATION OF THE SOCIABILITY TRESS SECTION 7.7.3.2

STRUCTURAL EQUATION MODELS: SOCIAL RELATIONSHIPS & THEIR DETERMINANTS VS. HEALTH SECTION 7.7.4

Figure 4. The flowchart of the statistical analysis

The structural equation modelling (SEM) was selected over any multiple regression technique to test the associations between the two "sociability trees" and the two health outcomes for various reasons. First of all it dealt better with collinearity (the high correlation between two or more of the explanatory variables) (Loehlin 1992; Wall & Li 2003). This was particularly important for the models developed in this study as they include many highly correlated explanatory variables. A second advantage was that the results of the analysis became more easily interpretable as the relationship of each predictor to each outcome became clearer and more straightforward (Wall & Li 2003). A third advantage was that SEM provided the opportunity to assess the indirect effects of factors such as collectivism or altruism on health (via social relationships) i.e. volunteering may relate not only directly mental health but also indirectly through its significant association social relationships (Loehlin 1992).

A fourth advantage of SEM over conventional regression techniques was that it allowed to assess the measurement error as all observed constituent variables of each latent variable (factor) were included in the model and their unexplained variance was taken into account (Loehlin 1992; Musil 1998). This is an important advantage given that not much was known on the measurement error of the scales employed in the study (e.g. individualistic, collectivistic and altruistic factors). A fifth and final advantage was that SEM gave the opportunity to assess an overall model in addition to calculating regression coefficients. The missing values were imputed using the Full Information Maximum Likelihood estimation method as imputation of missing data was preferable over any kind of ad-hoc missing data techniques (e.g. listwise deletion or mean imputation) if data were missing at random (Enders 2001; Wothke 2000). The overall goodness-of-fit of the models (how well did they fit and were consistent with data) was assessed mostly by the use of two goodness-of-fit indices: the Comparative Fit Index (CFI) and Root-Mean-Square Error of Approximation (RMSEA); CFI values of .95 or higher considered to be evidence of an acceptable fit of the model and RMSEA values .05 or lower indicated excellent fit while values between .05 and .08 indicated moderate fit (Musil et al. 1998; Schermelleh-Engel et al. 2003).

The following multivariate models were sequentially developed to test the first hypothesis (Greek people who are more socially orientated have better health than those who are less socially orientated):

i.   Three series of regression models testing the relationships between each of the three social relationships variables (Friendship Index, Family Relationships Index and "Having friends or not") and mental health (section 7.5.1 of the results)

ii.   Two series of regression models testing the relationships between the friendship-related variables (Friendship Index and "Having friends or not") and general health (section 7.5.2 of the results). The association between Family Relationships Index and general health was not tested further as the bivariate analysis showed that these two variables were not significantly associated with each other

The following multivariate models were sequentially developed to test the first part of the second hypothesis (Greek people who have strong altruistic and collectivistic orientation have better health than those with less strong altruistic and collectivistic orientation):

iii.   Three series of regression models testing the relationships between each of the following three selected factors: Volunteering, Horizontal Collectivism and Sense of Uniqueness (selection based on correlation analysis results – section 7.4.3) and mental health (section 7.6.1 of the results)

iv.   Four series of regression models testing the relationships between each of the following four selected factors: Provision of Practical Help, Volunteering, Horizontal Collectivism and Collectivism-Dependency (selection based on correlation analysis results – section 7.4.3) and general health (section 7.6.2 of the results)

The following fully adjusted models were sequentially developed to test the second part of the second hypothesis (the association of strong altruistic and collectivistic orientation with health is direct over and above the potentially mediating effect of social relationships on it):

v.   Four series of regression models exploring the associations of Volunteering and Horizontal Collectivism (the only two determinants of social relationships found significantly related to both health outcomes – see 7.6.1 and 7.6.2 parts of this chapter) with both health outcomes while controlling for either Friendship Index or Family Relationships Index (the selection of index is informed by the results of section 7.5). These models are presented in sections 7.7.1 and 7.7.2.

vi.   Five series of regression models testing the relationships between each of the following five selected factors: Altruism, Responsibility Assumption, Provision of Practical Help, Volunteering and Collectivism-Dependency (selection based on correlation analysis results – section 7.4.4) and Friendship Index (presented in section 7.7.3.1.1 of the results). This part of the analysis associates indirectly with the second part of the second hypothesis as it is a necessary step to build the final friendship-related sociability model ("friendship tree").

vii.   Three series of regression models testing the relationships between each of the following five selected factors Altruism, Provision of Practical Help, Volunteering, Horizontal Collectivism and Horizontal Individualism (selection based on correlation analysis results – section 7.4.4) and Family Relationships Index (presented in section 7.7.3.1.2 of the results). This part of the analysis associates also indirectly with the second part of the second hypothesis as it is a necessary step to build the final family-related sociability model ("family relationships tree").

viii. A series of regression models testing the relationships between all following four selected factors: Altruism, Provision of Practical Help, Volunteering and Collectivism-Dependency (selection based on results presented in section 7.7.3.1.1) and Friendship Index. This is a series of

regressions which led to the creation of the friendship-related sociability tree (presented in section 7.7.3.2.1 of the results)

ix.   A series of regression models testing the relationships between the following two selected factors: Provision of Practical Help and Horizontal Collectivism (selection based on results presented in section 7.7.3.1.2) and the Family Relationships Index. This is a series of regressions which led to the creation of the family-related sociability tree (presented in section 7.7.3.2.2 of the results)

x.   One unadjusted and one fully adjusted structural equation models testing the relationships between the developed family-related tree and mental health (presented in section 7.7.4.1 of the results)

xi.   One unadjusted and one fully adjusted models testing the relationships between friendship-related sociability and general health (presented in section 7.7.4.2 of the results)

The level of statistical significance for all analyses performed was that of $p \leq .05$.

6.3.6   The potential sources of bias

Another issue that the present study took care of are the possible sources of bias. There are many types of bias and all of them if ignored could potentially undermine the validity and the value of any study. From the various kinds of biases the present study was concerned mostly with two; the response bias and the social desirability bias. The former did not seem to constitute much of a problem since data were collected through personal interviews.

The latter, idiomorphic in itself, in theory could be a potentially important problem. The stance of the present study on social desirability was that this is an ill-defined concept which potentially would confuse social orientation, collectivism and altruism with the need for social approval and personal achievement (Barger 2002; Bekkers 2001; Platow 1994) and therefore any attempt to control fully for it would be an ill-grounded vain task. Nevertheless all suggested precautions to reduce social desirability bias have been taken (Ganster et al. 1983); the interviews were completely anonymous and confidential and this was stressed to the participants; all scales and measures were

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disguised; the participants were not given detailed information on what each particular scale was supposed to measure; much attention was paid when developing the questionnaire to identify phrases that could trigger a socially desirable reaction. Also the researcher considered to what extent the obtained results could be explained by social desirability by carefully examining the distributions of all family-, friendship-, altruism-, individualism- and collectivism-related variables. This examination provided indication that social desirability was not a serious, at least, issue as all altruistic factors were normally distributed (if social desirability bias had affected the responses given by the participants one would expect more negatively skewed distributions – e.g. people reporting higher levels of altruism) and individualistic factors were negative skewed (here one would expect if responses were biased - particularly because the sample came from Greece - the opposite; positive skewed distributions and people reporting lower levels of self-orientation and individualism).

6.3.7 The pilot study

A pilot study was carried out prior to the main study. This study aimed primarily to assess the applicability of the study instrument in the Greek context, to identify potential weak points in the instrument (inappropriate wording, unclear items and response scaling), to estimate the resources and time needed for the main fieldwork and to assess the efficacy of two different data collection techniques (personal interview vs. self-administration). Data from 17 people were collected during the pilot study. Also the comments of all 17 participants on the instrument and interview process were asked. The pilot study revealed some cases of inappropriate wording of items or of ambiguous items with unclear meaning which after the pilot study were amended by the researcher (i.e. the need to clarify that the question referring to close relatives meant the real close relatives and not all relatives with whom the participants had contacts). The main conclusion regarding the study instrument was that this seemed appropriate for the Greek people over 40 years old but its length made it unsuitable for self-completion. The pilot study data were not used in the main study as they were collected on a convenience basis.

6.3.8 The ethical considerations

The ethical implications of the present study were considered. It was decided that an official ethical approval was not necessary. This decision was mainly made on the ground that the study had a minimal ethical load as it used only non-clinical self-report data and therefore the danger to harm people was literally non-existing. Nevertheless and despite the minimal ethical load of the study, every effort was made to protect the respondents from the disclosure of any sensitive information. The collected data were strictly anonymous and they were collected in such way that respondents could not be traced back or identified. Finally, all respondents were informed about the study and its purposes. The participation in the study was completely voluntary. Respondents' participation in the study was considered as an indication of their consent.

7 RESULTS

Introduction

In this chapter the results of the statistical analysis are presented. The chapter is divided into ten sections.

The first section (7.1) presents the response rates achieved.

The second section (7.2) is devoted to results of the factor analysis (both exploratory and confirmatory). The emerged factors are presented along with evidence on their validity.

The third section (7.3) contains the results of the descriptive analysis.

The fourth section (7.4) explores the bivariate associations between the various confounding, explanatory and outcome variables through a series of cross-tabulations and correlations.

The fifth section (7.5) relates to testing the first hypothesis which refers to the association between the social relationships and the two health outcomes.

The sixth section (7.6) refers to the exploration of the first part of the second hypothesis and presents the multivariate assessment of the relationships between the determinants of social relationships (these are the factors which emergence is presented in the second section of the present chapter) and the two selected health dimensions.

The following three sections (all three contained in 7.7) – from the seventh to the ninth– are devoted to the exploration of the second part of the second hypothesis and the empirical testing of the proposed conceptual model in this study (see introduction chapter).

The seventh section (7.7.1 - 7.7.2) presents the multivariate regression models which assess whether the observed associations between some of the determinants of social relationships like Volunteering and Horizontal Collectivism with health hold after adjustment for social relationships.

The eighth section (7.7.3) refers to the development of two integrated sociability models (one for friendship- and another one for family-related sociability) which will be employed to explain the health outcomes in the next (ninth) section.

The ninth section (7.7.4) presents the two final integrated structural models – one for mental health and another one for general health which test empirically the proposed conceptual model.

The chapter concludes with the tenth section (7.8) which is a summary of all major findings of the study.

7.1 The response rate

The weighted average response rate for the entire sample is 67.9%. The response rate achieved in rural areas is better than that in urban areas. All three rural areas had similarly high response rates; in Eyrytania it was 89% (best response rate among all six areas) while in Corinthia and Icaria 83% and 84%, respectively. On the contrary, in urban areas, there was considerable variation with regard to the response rate; the higher the socioeconomic status of the area the lower the response rate. In Perama (low SES area) the response rate was 73%, in Helioupoli (intermediate SES area) was 52% and in Psychiko (high SES area) was 34% (worst response rate among all six areas).

7.2 The development of the altruistic, individualistic and collectivistic factors

7.2.1 The (raw) altruistic data

The altruistic measure contained fifteen items. The descriptive analysis showed that there was considerable variation in the distribution of cases across the 5-level response scale. All items had sufficient number of cases on all five levels of the Likert-type response scale (see table 2 for the frequencies distribution in the form of valid percent and Appendix 23 for the frequencies distribution). Nevertheless in most items a large number of respondents were concentrated on levels 3 & 4 ("sometimes" & "often") a preliminary indication that the majority of participants was altruistically orientated. As regards the missing data, they seemed not to constitute a particular problem. The vast majority of the items had more than 900 valid cases (total sample N=926). Only item 7 ("I share credit for something I have done with others when easily I could have kept it all for myself") suffered from a relatively high number of missing cases (104 cases, ≈11% of the total sample). The large number of missing cases in this item apparently differentiated it from the rest of the altruistic scale. The missing data analysis showed that the vast majority of the missing cases (95 cases) in this item were respondents with low educational qualifications and of rural origin (99 cases). These findings provided

basis to assume that item 7 required respondents to have higher cognitive abilities (a requirement that might result in many missing cases).

Table 2. The frequencies of all altruistic items (Valid percent):						
Item:	*Never*	*Rarely*	*Sometimes*	*Often*	*Very Often*	*Missing*
I give information to a stranger (H1)	14%	18%	23%	27%	18%	4
I give money to a stranger who needs it (or asks for it) (H2)	26%	23%	30%	13%	7%	3
I offer voluntary work for a good purpose (H3)	14%	15%	28%	29%	15%	16
I lent an item of some value (e.g. a tool) to a neighbour or an acquaintance whom I do not know well (H4)	31%	18%	18%	21%	12%	11
Consciously I buy a little more expensive from the store of someone who I think I should support (H5)	22%	14%	26%	25%	13%	3
I assume responsibility for an acquaintance's or colleague's mistake when he/she needs this kind of help (H6)	30%	22%	28%	15%	6%	28
I share credit for something I have done with others when easily I could have kept it all for myself (H7)	15%	12%	26%	32%	15%	104
I help someone with something he/she does not know well although it is not my responsibility (H8)	7%	9%	22%	42%	19%	12
I help a stranger in the street (H9)	6%	11%	28%	34%	21%	7
I take care of a neighbor of mine when he/she is ill (H10)	6%	7%	19%	36%	31%	4
I defend a stranger in the street who is in danger (H11)	10%	13%	25%	31%	21%	10
I risk my position to help a colleague, acquaintance or neighbour (H12)	20%	23%	26%	20%	10%	15
I volunteer to help in any way an effort for the common good (H13)	6%	11%	23%	38%	21%	16
I do something against my own rules to help someone exit a difficult situation (H14)	19%	20%	32%	20%	9%	14
Whenever I offer money or help I do it anonymously (H15)	7%	8%	17%	24%	44%	7

7.2.2 The (raw) individualistic and collectivistic data

The individualism-collectivism scale contained twenty eight (28) items. The variation in all individualism-collectivism subscales but the Horizontal Collectivism was satisfactory with sufficient number of responses per level. In case of the Horizontal Collectivism the majority of respondents reported high scores on all of its items and it was concentrated around the "high collectivism" end of the 5-level response scale. Only few cases reported a negative attitude towards Horizontal Collectivism.

As in the case of altruism scale, missing data did not constitute a particular problem for the individualism and collectivism scale (see table 3 for the frequencies distribution in the form of valid percent and Appendix 23 for the frequencies distribution). There was only one item (VI12.7 – "Some people emphasize the importance of winning I am not one of them") that appeared having a somehow large number of missing cases (74 cases, ≈8% of the sample). The relatively large number of missing cases of this item probably should be attributed to its negative wording (reverse coding) which made it difficult for respondents to understand it. Two initial conclusions could be drawn upon this part of the analysis: the first is that the most of the respondents reported strong collectivistic orientation and the second that collectivism and individualism can co-exist given that a large number of respondents reported having both collectivistic and individualistic attitudes.

Table 3. The frequencies of all individualistic and collectivistic items (Valid percent)							
	Item:	Comple tely agree	Partially agree	Neither agree nor disagree	Partially disagree	Comple tely disagree	Mis sing
Vertical Individualism	VI12.1- Competition is the law of nature and life	43%	26%	12%	6%	14%	23
	VI12.2- It annoys me when other people perform better than I do	4%	7%	11%	10%	68%	5
	VI12.3- Without competition it is not possible to have a good society	40%	22%	17%	8%	14%	27
	VI12.4- Winning is everything in life	22%	22%	16%	13%	28%	18
	VI12.5- It is important that I to do my job better than others	51%	28%	10%	5%	6%	8
	VI12.6- I like competing with others	28%	24%	15%	9%	24%	29
	VI12.7- Some people emphasize winning I am not one of them	35%	21%	15%	11%	19%	74

Horizontal Individualism	HI12.8- I do "my own thing" irrespectively of what others think	35%	22%	11%	12%	20%	7
	HI12.9-I'd rather depend on myself than on others	78%	14%	4%	3%	2%	2
	HI12.10- I rely on myself most of the time, I rarely rely on others	68%	19%	6%	4%	4%	5
	HI12.11- I enjoy feeling unique and different from others	19%	19%	13%	13%	36%	13
	HI12.12- I am a unique person, separate from others	18%	17%	12%	11%	43%	15
	HI12.13- One should live one's life independently of others	29%	21%	11%	13%	28%	22
Vertical Collectivism	VC12.14- I would do what pleases my family even if I detest that activity	56%	22%	7%	6%	9%	7
	VC12.15- I could sacrifice my self-interest for the benefit of my group	48%	27%	12%	7%	6%	8
	VC12.16- I would sacrifice an activity that I enjoy much if my family did not approve of it	47%	21%	9%	9%	13%	7
	VC12.17- Children should be taught to place duty before pleasure	66%	17%	9%	4%	4%	11
	VC12.18- It is important to me that I respect the decisions made by my groups	72%	19%	6%	2%	2%	9
	VC12.19- It annoys me if I have to sacrifice activities that I enjoy to help others	16%	24%	14%	16%	30%	7
	VC12.20- I usually do what others want me to do even if I would like to do something else	18%	22%	14%	17%	29%	11
Horizontal Collectivism	VC12.21- The well-being of others is important to me	66%	19%	10%	2%	3%	5
	VC12.22-If a colleague or fellow-villager or neighbour gets a prize, I would feel proud	78%	14%	6%	1%	1%	6
	VC12.23- If a relative were in financial difficulty, I would help within my means	79%	16%	4%	1%	1%	7
	VC12.24- It is important to me to maintain balance within my group	83%	11%	4%	1%	1%	17
	VC12.25- I like sharing things with other people (e.g. neighbours or fellow-villagers)	58%	26%	10%	4%	3%	6
	VC12.26- It is important to consult close friends and get their ideas before making a decision	45%	30%	10%	5%	10%	9
	VC12.27- My happiness depends on the happiness of those around me	60%	24%	10%	4%	4%	5
	VC12.28- To me, pleasure is devoting time to others	49%	31%	13%	4%	3%	6

7.2.3 The Exploratory Factor Analysis (EFA) of the altruistic and individualistic and collectivistic data

7.2.3.1 The Exploratory Factor Analysis (EFA) of the altruistic data

The pool of altruistic (Helping Behaviours) items initially consisted of 15 items. Fourteen (14) of them entered an EFA (Exploratory Factor Analysis). One item (H7– "I share credit for something I have done with others when easily I could have kept it all for myself") was excluded from further analysis because of the many missing cases (104 cases) which indicated the rather problematic nature of this item (given that no other altruistic item had more than 16 missing cases with the exception of H6 which had 28 missing cases). The EFA of the altruistic data was not based on any a priori hypothesis about the internal structure and the content of the expected factors. This was mostly due to a) the scarcity of evidence regarding the psychometrics of this scale (and the structure of altruism as a psychosocial concept) and b) the fact that the altruistic items used in this study were more a bulk of items rather than constituent parts of a well-validated scale. The lack of an a priori model for the structure of altruism and of any restrictive hypothesis for the structure of the anticipated factors influenced the design of the EFA and imposed the use of a rather relaxed criterion of eigenvalue $\geq$ .7 for the formation of the factors. The use of this less strict criterion would result in exploring adequately altruism and getting necessary and important information on its dimensionality.

The initial EFA was unrotated and performed for diagnostic reasons. Primarily it aimed to assess the relevance of each of the 14 items with the rest of the scale. The criterion used for this purpose was that of communality $\geq.3$. All items with communality below .3 would be excluded from further analysis on the basis of their loose connection and ill-fit with the employed scale (Singelis et al. 1995). The results of this diagnostic EFA showed that all 14 items had communalities well above .3 (see Appendix 6) and therefore all were included in the main rotated EFA.

The main rotated EFA employed the same criterion as the unrotated analysis (eigenvalue $\geq$ .7) and its design was non-orthogonal (Direct Oblimin rotation) since

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conceptually the anticipated factors were expected to correlate between each other and not oppose each other. The performed EFA resulted in a 7-factor solution which explained 72.8% of the total variance (see Appendix 7). The emerged factorial solution provided valuable evidence on the structure of the altruistic scale (e.g. initial eigenvalues of the emerged factors and the percentage of variance they explained). Also it showed that among the seven emerged factors there were two unique factors (unique factor is any factor with only one item loading significantly onto it) (see Appendix 7). The first such factor had high loading exclusively on item H15 ("Whenever I offer money or help I do it anonymously"). The second unique factor loaded highly only on item H2 ("I give money to a stranger that needs it or asks for it"). The presence of unique factors was a sign that the altruistic scale employed included items conceptually distant from the majority of the items of the scale (it should be noted that these two items – H2 and H15 - were the only ones which referred to donating money) which existence undermined the robustness and conceptual clarity of the emerged factorial solution. Thus, on the basis of their uniqueness and within the perspective of getting meaningful, distinct and clear factors the two items which constituted the core of the two unique factors were excluded from further analysis.

The analysis was repeated with the 12 remaining items. This time the design of the EFA of the 12 altruistic items was that of a non-orthogonal four-factor forced solution. The decision for a 4-factor forced solution was based on available information (from the previous EFA) on the initial eigenvalues of the factors (a four–factor solution would encompass exclusively only factors with eigenvalue > 1 or close to unity) and the differences in the percentages of variance explained by the various factorial solutions (a three- or fewer factor solution would explain an unsatisfactory - below 50% - percentage of the variance).

The final four-factor forced solution explained 61.2% of the scale variance. All four factors had either eigenvalues >1 or >.9. This is a clear indication that our analysis neither has omitted any important factor nor has let an unimportant factor to be expressed (see Table 4). In addition the KMO test (>.88) and the Bartlett's test of sphericity (p<.000) (tests performed to assess the factorability of the correlation matrix

of the items included in the EFA) provided evidence that the 12-item altruistic scale is appropriate to be factor analyzed.

Table 4. Exploratory Factor Analysis of the 12 Altruistic items (final four-factor solution): the explained variance

Component	Initial Eigenvalues	% of Variance	Cumulative %
1	4.312	35.937	35.937
2	1.169	9.743	45.680
3	.949	7.912	53.591
4	.912	7.604	61.195
5	.759	6.326	67.521
6	.682	5.686	73.207
7	.663	5.521	78.728
8	.598	4.985	83.713
9	.570	4.754	88.467
10	.498	4.149	92.617
11	.473	3.946	96.562
12	.413	3.438	100.000

Extraction Method: Principal Component Analysis.

Shade denotes the selected four factors and the variance they explain

Table 5. Exploratory Factor Analysis of the 12 Altruistic items (final four-factor solution): the items loadings

ITEM:	Component:			
	Altruism	Responsibility Assumption	Practical Help	Volunteering
I give information to a stranger (H1)	.201	-.204	.809	-.076
I offer voluntary work for a good purpose (H3)	-.039	-.084	.073	.885
I lend an item of some value (e.g. a tool) to a neighbour or acquaintance whom I do not know well (H4)	-.088	.209	.521	.200
Consciously I buy a little more expensive from a store of someone who I think I should support (H5)	-.188	.249	.501	.343
I assume responsibility for an acquaintance's or colleague's mistake when he/she needs this kind of help (H6)	-.233	.787	.143	.016
I help someone with something he/she does not know well although this is not my responsibility (H8)	.352	.237	.470	-.051
I help a stranger in the street (H9)	.701	.077	.249	-.069
I take care of a neighbour of mine when he/she is ill (H10)	.584	-.156	.085	.348
I defend a stranger in the street who is in danger (H11)	.668	.035	.076	.182
I risk my position to help a colleague, acquaintance or a neighbour (H12)	.405	.438	-.054	.199
I volunteer to help in any way an effort for the common good (H13)	.264	.100	-.097	.676
I do something against my own rules to help someone exit a difficult situation (H14)	.322	.687	-.116	-.048

Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization. Rotation converged in 15 iterations. Shade denotes loadings ≥ .3

The first factor emerged from the analysis loaded highly (> .3) on six variables. Its highest loadings were on variables H9 ("I help a stranger in the street") (.701), H11 ("I defend a stranger in the street who is in danger") (.668), H10 ("I take care of a neighbour of mine when she/he is ill") (.584) and H12 ("I risk my position to help a colleague, acquaintance or neighbour") (.405). It also loaded on H8 ("I help someone with something he/she does not know well although this is not my responsibility")

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(.352) and H14 ("I do something against my own rules to help someone exit a difficult situation") (.322). It was a factor which clearly pertained to being altruist and therefore it was labelled Altruism.

The second factor has been developed around variable H6 ("I assume responsibility for an acquaintance's or colleague's mistake when he/she needs this kind of help") (.787) and loaded highly also on to two other variables H14 ("I do something against my rules to help someone exit a difficult situation") (.687) and H12 ("I risk my position to help a colleague, acquaintance or neighbour") (.438). It was decided that an appropriate label for it would be Responsibility Assumption.

The third factor loaded significantly on H1 ("I give information to a stranger") (.809), on H4 ("I lend an item of some value (e.g. a tool) to an acquaintance or neighbour whom I do not know well") (.521), H5 ("I buy consciously a bit more expensive from a store of someone who I think I should support") (.501) and H8 ("I help someone with something he/she does not know well although this is not my responsibility") (.470). This factor was given the label Provision of Practical Help.

The fourth factor loaded on four variables. It loaded most highly on H3 ("I offer voluntary work for a good purpose") (.885) and H13 ("I volunteer to help in any way an effort for the common good") (.676). Also it loaded on H5 ("Buy consciously a bit more expensive from a store of someone I think I should supported") (.343) and on H10 ("Take care of a neighbour/acquaintance when he/she is ill") (.348). Volunteering seemed an appropriate label for this factor.

7.2.3.2 The Exploratory Factor Analysis (EFA) of the individualistic – collectivistic data

Initially the individualism-collectivism data were handled according to the suggestions of the developers of the scale (Singelis et al 1995). Thus, the design of the initial unrotated diagnostic EFA analysis was a four-factor forced solution. The analysis pointed out that eight items: VI12.2 ("It annoys me when other people perform better than I do"), VI12.7 ("Some people emphasize winning, I am not one of them" – reverse item), HI12.8 ("I do "my own thing" irrespectively of what others think"), HI12.13 ("One should live one's life independently of others"), VC12.17 ("Children should be taught to place duty before pleasure"), VC12.19 ("It annoys me if I have to sacrifice activities that I enjoy to help others" – reverse item), HC12.21 ("The well-being of other people is important to me") and HC12.26 ("It is important to consult close friends and get their ideas before making a decision) had communalities below the set criterion of .3 (see Appendix 8). On the base of their loose structural relation with the rest of Individualism and Collectivism scale and with the proposed factorial solution these eight items were excluded from further analysis.

The remaining 20 items enter the main rotated EFA. Once again a forced four-factor solution was pursued but this time an orthogonal design was employed (Varimax rotation) for the creation of the factors. The decision for an orthogonal design was mostly made on the ground that individualism and collectivism were two concepts not expected to correlate highly between each other and therefore the selection of any non-orthogonal design would result in less robust results. The four factors that emerged from the analysis explained 45% of the total variance and all four factors had eigenvalues greater than the unity (>1). The structure of the emerged factors was consistent with existing evidence. Nonetheless two major deviations from what was expected were observed.

The first deviation was that two supposedly core individualistic items HI12.11 ("I enjoy feeling unique and different from others") and HI12.12 ("I am a unique person, separate from others") loaded significantly and unexpectedly on an obviously collectivistic factor – a finding that conceptually constituted a major contradiction. The

second deviation was that item HC12.24 ("It is important to me to maintain balance within my group"), a clearly collectivistic item, had a loading of .3 on a predominantly individualistic factor. This unexpected behaviour of these three items and their unsatisfactory fit with the four-factor solution provided a base to consider the decision to pursue a greater-than-four-factor solution. Towards the direction of pursuing a factorial solution that would allow more than four factors to emerge advocated also the rather low rate of variance explained by the four factor solution (45%) and the existence of two additional factors with eigenvalue above the unity which were not allowed so far to emerge (see Appendix 9). Therefore, it was decided to pursue a six-factor solution which seemingly fitted better the data.

Thus, the EFA of the 20 individualistic and collectivistic items was repeated but this time an orthogonal (Varimax rotation) six-factor forced solution was pursued. The results obtained from the analysis were completely satisfying. The factorial solution emerged was symmetrical with three factors easily identifiable as individualistic and three predominantly collectivistic factors. The structure of the emerged factors was clear without any unexpected aberrations - all collectivistic items load on collectivistic factors and all individualistic items on individualistic factors. The six factors accounted for a greater and more satisfactory percentage of the total variance (56.5%) than that explained by the four-factor solution. Also all factors with eigenvalues above unity were allowed to emerge. The KMO (.746) and Bartlett's sphericity tests (p<.000) confirmed the factorability of the 20-item individualism and collectivism (self-construal) scale.

A comparison between the six-factor solution adopted in this study and the four-factor solution proposed by the developers of the self-construal scale (Singelis et al. 1995) showed that there are two main differences between them. The first was that in the case of the six-factor solution the original Horizontal Collectivism factor was split into two smaller components that of pure Horizontal Collectivism and a dependency-relevant aspect of collectivism. The second was, similarly, that in the six-factor solution the original Horizontal Individualism was also split into two; a factor having the characteristics of the original Horizontal Individualism factor and a "Sense of Uniqueness" dimension of individualism which has emerged as a separate factor. The

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Confirmatory Factor Analysis (CFA), which results are presented below, also pointed out that the pursued six-factor solution was the most appropriate for the data. The decision to pursue a six-factor solution for the self-construal scale was in accordance with recently published evidence suggesting also that a six-factor solution fitted better the individualism/collectivism (self-construal) data (Hardin et al. 2004).

Table 6. Exploratory Factor Analysis of the 20 Individualism-Collectivism items (final six-factor solution): the variance explained

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of variance explained	Cumulative % of variance explained	Total	% of variance explained	Cumulative % of variance explained
1	3.467	17.335	17.335	2.204	11.022	11.022
2	2.634	13.169	30.504	2.189	10.943	21.965
3	1.565	7.823	38.327	1.800	8.998	30.963
4	1.334	6.671	44.998	1.754	8.768	39.731
5	1.252	6.260	51.258	1.713	8.565	48.296
6	1.049	5.244	56.501	1.641	8.205	56.501
7	.887	4.434	60.935			
8	.856	4.278	65.213			
9	.812	4.058	69.271			
10	.751	3.756	73.027			
11	.714	3.570	76.596			
12	.695	3.473	80.069			
13	.644	3.219	83.288			
14	.610	3.050	86.338			
15	.557	2.783	89.121			
16	.544	2.721	91.842			
17	.478	2.390	94.232			
18	.439	2.194	96.425			
19	.416	2.078	98.503			
20	.299	1.497	100.000			

Extraction Method: Principal Component Analysis.
Shade denotes the selected six factors and the variance they explain

Table 7. Exploratory Factor Analysis of the 20 Individualism-Collectivism items (final six-factor solution): the items loadings

Item:	Component:					
	VI	HC	SoU	C-D	HI	VC
Competition is the law of life and nature (VI12.1)	.764	.184	-.060	-.061	-.085	-.051
Without competition it is not possible to have a good society (VI12.3)	.748	.041	-.019	.037	.083	.082
Winning is everything in life(VI12.4)	.497	-.214	.250	.212	.259	.139
It is important that I do my job better than others (VI12.5)	.448	.086	.236	.119	.365	-.054
I like competing with others (VI12.6)	.736	-.013	.141	.039	.107	.076
I'd rather depend on myself than on others (HI12.9)	.094	.164	-.060	-.027	.791	.022
I rely on myself most of the time, I rarely rely on others (HI12.10)	.116	.075	.075	.053	.835	.014
I enjoy feeling unique and different from others (HI12.11)	.131	-.066	.883	-.042	.087	-.009
I am a unique person, separate from others (HI12.12)	.067	-.055	.887	-.123	-.043	.026
I would do what pleases my family even if I detest that activity (VC 12.14)	.094	.033	.018	.025	.220	.701
I could sacrifice my self-interest for the benefit of my group (VC12.15)	.007	.444	-.065	.112	.050	.486
I would sacrifice an activity that I enjoy much if my family did not approve of it (VC12.16)	-.001	.071	-.023	-.033	-.013	.717
It is important to me that I respect the decisions made by my groups (VC12.18)	.071	.688	.051	.056	.034	.130
I usually do what others want me to do even if I would like to do something else (VC12.20)	.048	-.037	.060	.182	-.223	.552
If a co-worker or an acquaintance or a fellow-villager won a prize I would feel proud (HC12.22)	.078	.384	-.133	.413	.182	-.026
If a relative were in financial difficulty, I would help within my means (HC12.23)	.008	.689	-.094	.204	.063	.003

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It is important to me to maintain harmony within my group (HC12.24)	.022	.728	.008	.098	.121	-.023
I like sharing things with other people (e.g. neighbors or fellow-villagers) (HC12.25)	.054	.410	-.201	.350	.007	.097
My happiness depends on that of others around me (HC12.27)	.041	.173	-.051	.816	-.019	.016
To me, pleasure is devoting time to others (HC12.28)	.039	.179	-.007	.779	.011	.166
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 6 iterations. Shade denotes loadings ≥ .3 VI=Vertical Individualism, HC=Horizontal Collectivism, SoU=Sense of Uniqueness, C-D=Collectivism-Dependency, HI=Horizontal Individualism and VC=Vertical Collectivism						

As regards the loadings of the the six factors on the 20 items, the first factor that emerged had important loadings on all Vertical Individualism items. Its highest loadings were on VI12.1 ("Competition is the law of life and nature") (.764) and VI12.3 ("Without competition it is not possible to have a good society") (.748) and VI12.6 ("I like competing with others") (.736). It also loaded on: VI12.4 ("Winning is everything in life") (497) and VI12.5 ("It is important to me to do my job better than others") (.448). It was labelled as suggested by the developers of the scale Vertical Individualism.

The second factor consisted mostly of Horizontal Collectivism items. Its core (highest) loading was HC12.24 ("It is important to me to maintain harmony within my group") (.728) and also loaded highly on VC12.18 ("It is important to me to respect the decisions made by my groups") (.688) and HC 12.23 ("If a relative were in financial difficulty, I would help within my means") (.689). Other items on which the second factor loaded were: HC12.22 ("If a co-worker or an acquaintance or a fellow-villager won a prize, I would feel proud") (.384), HC12.25 ("I like sharing things with other people (e.g. neighbours or fellow-villagers)") (.410) and VC12.15 ("I could sacrifice my self-interest for the benefit of my group") (.444). The most appropriate label for factor seemed to be that of Horizontal Collectivism.

The third factor consisted exclusively of two highly correlated items both with loadings higher than .8 - HI12.11 ("I enjoy feeling unique and different from others") and HI12.12 ("I am a unique person, separate from others"). This factor could be seen as a

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dimension of the Individualism concept which would has been suppressed if a four-factor solution was adopted in this study instead of the finally selected six-factor solution. This factor was labelled Sense of Uniqueness.

The fourth factor that emerged from the six-factor solution was a dimension of collectivism concept. Its highest loadings were on the following two items: HC12.27 ("My happiness depends on the happiness of those around me") (.816) and HC12.28 ("To me, pleasure is devoting time to others") (.779). It also loaded considerably highly on HC12.22 ("If a co-worker or an acquaintance or a fellow-villager won a prize, I would feel proud") (.413) and HC12.25 ("I like sharing things with other people (e.g. neighbors or fellow-villagers")) (.350). This factor loaded highly on items referring to a dependency dimension of the collectivistic concept -as measured by the individualism/collectivism (self-construal) scale – therefore the label Collectivism-Dependency seemed suitable for it.

The fifth factor should be seen as a variant of the original Horizontal Individualism factor described by the developers of the individualism/collectivism (self-construal) scale (Singelis et al. 1995) which our analysis brought into the forefront. It comprised three individualism items and its loadings on them were: HI12.9 ("I'd rather depend on myself than on others") (.791), HI12.10 ("I rely on myself most of the time, I rarely rely on others") (.835) and VI12.5 ("It is important for me to do my job better than others") (.365). This fifth factor represented an equality-based self-reliance dimension of individualism and therefore it was given the label Horizontal Individualism.

The last factor loaded exclusively on Vertical Collectivism items: VC12.14 ("I would do what pleases my family even I detest that activity") (.701), VC12.15 ("I could sacrifice my self-interest for the benefit of my group") (486), VC12.16 ("I would sacrifice an activity that I enjoy very much if my family did not approve of it") (.717) and VC12.20 ("I usually do what others want me to do even if I would like to do something else") (.552). This factor was given the label Vertical Collectivism.

7.2.4 The Confirmatory Factor Analysis (CFA) of the individualistic and collectivistic data

The CFA used to assess the plausibility and goodness-of-fit of the proposed in this study six-factor solution comparatively to the four-factor solution suggested by Singelis et al. (1995). This comparison had primarily - apart from its technical significance - conceptual importance as it was a test of an alternative approach on the dimensionality of individualism and collectivism. The missing cases were listwisely deleted and both models presented below were based on 831 cases (this was decided so that the CFA models to be directly comparable with the EFA models presented earlier). Also for comparison reasons, the same models were developed using the Full Information Maximum Likelihood (FIML) imputation technique. Both methods produced similar results. The FIML-based full results for both the 4-factor and the 6-factor solutions are presented in Appendix 10.

7.2.4.1 The Confirmatory Factor Analysis (CFA) of the four-factor model of Individualism and Collectivism items

The results of the CFA for the four-factor model showed that such factorial approach does not fit very well with the data. All three goodness of fit indices were considerably below (or above in case of RMSEA) the conventionally acceptable goodness-of-fit thresholds (GFI=.87, CFI=.66 and RMSEA=.089 with χ^2 =1232.3 for df=164, p=.000 – conventional limits of goodness-of-fit: GFI$\geq$.95 CFI$\geq$.95 RMSEA$\leq$.05). Also the residual covariance matrix and modification index showed that there are cases of significant relationships between variables (e.g. between HI12.11 ("I enjoy feeling unique and different from others") and HI12.12 ("I am a unique person and separate from others") or between HC12.27 ("My happiness depends on the happiness of those around me") and HC12.28 ("To me, pleasure is devoting time to others")) for which the four-factor solution did not account. Therefore, a more appropriate than the four-dimensional structure of individualism and collectivism should be sought. At this point it worth mentioning that the developers of the scale in their original report (Singelis et al 1995) reported considerably poorer goodness-of-fit (GFI=.79) for their four-factor

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model than that one reported in the present study for the same model. The tables with the full results of the CFA of the four-factor model (listwise deletion) are presented in Appendix 11.

Table 8. Confirmatory Factor Analysis of a four-factor individualism and collectivism model: the factor weights				
Factor	Item	Factor weights	S.E.	p value
Vertical Individualism	VI12.1	.539	N/A	N/A
Vertical Individualism	VI12.3	.615	.102	.000
Vertical Individualism	VI12.4	.511	.103	.000
Vertical Individualism	VI12.5	.513	.078	.000
Vertical Individualism	VI12.6	.672	.117	.000
Horizontal Individualism	HI12.9	.646	.072	.000
Horizontal Individualism	HI12.10	.816	N/A	N/A
Horizontal Individualism	HI12.11	.182	.079	.000
Horizontal Individualism	HI12.12	.08	.077	.049
Vertical Collectivism	VC12.14	.376	.252	.000
Vertical Collectivism	VC12.15	.616	.33	.000
Vertical Collectivism	VC12.16	.316	.245	.000
Vertical Collectivism	VC12.18	.509	.204	.000
Vertical Collectivism	VC12.20	.26	N/A	N/A
Horizontal Collectivism	HC12.22	.493	.054	.000
Horizontal Collectivism	HC12.23	.573	.055	.000
Horizontal Collectivism	HC12.24	.511	.048	.000
Horizontal Collectivism	HC12.25	.497	.077	.000
Horizontal Collectivism	HC12.27	.567	.084	.000
Horizontal Collectivism	HC12.28	.594	N/A	N/A

Figure 5: Confirmatory factor analysis of the Individualism and Collectivism items: the four-factor solution
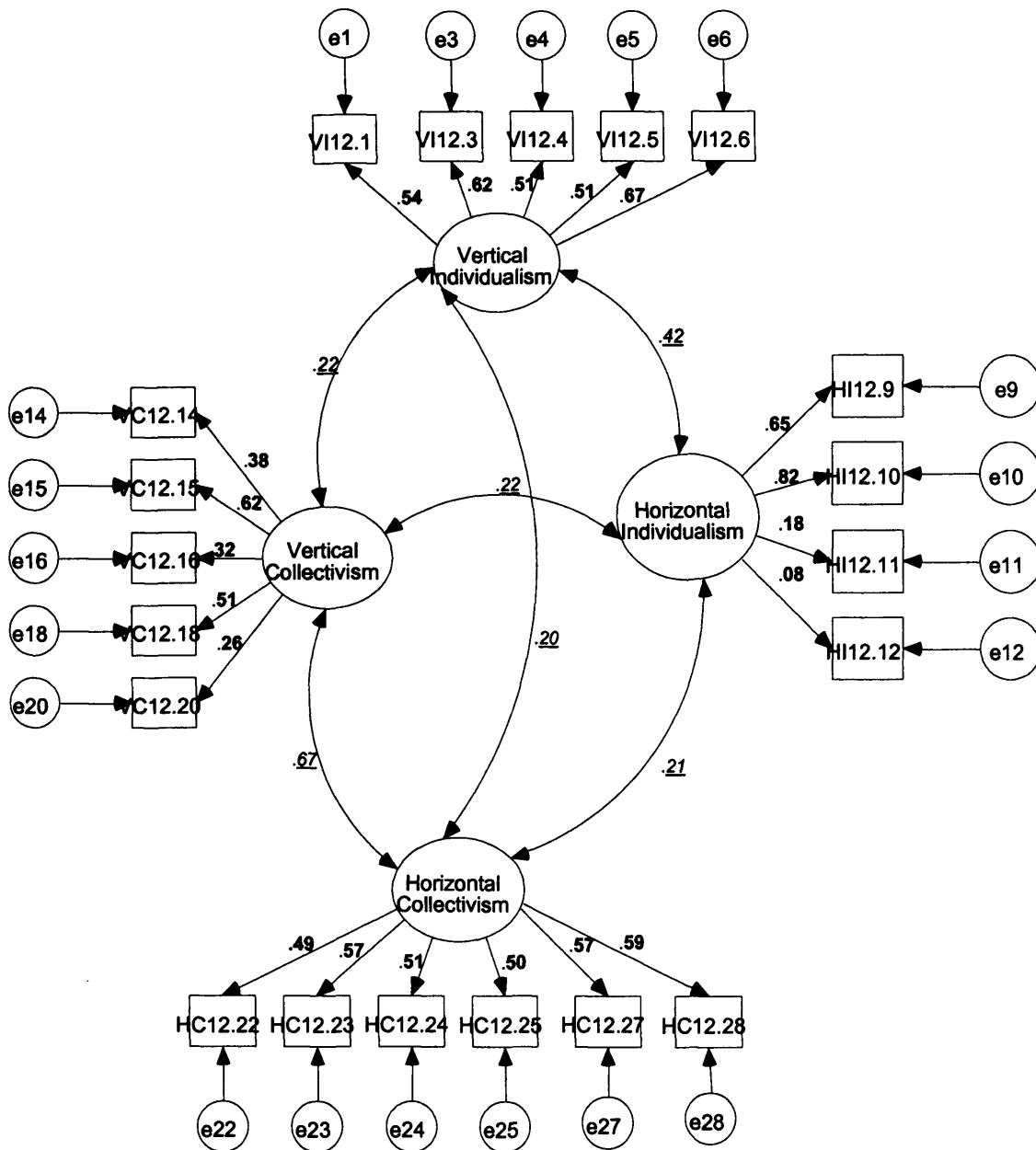
Rectangle=observed variable, Circle = unobserved variable, Single-head arrow= regression
Double-head arrow=correlation, Underlined characters in italics = parametric correlation coefficient
Bold characters = Statistically significant standardized beta regression coefficient

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7.2.4.2 The Confirmatory Factor Analysis (CFA) of the six-factor model of Individualism and Collectivism items

The six-factor model that the EFA pointed out as the best factorial solution was also tested using CFA. The six-factor solution appeared fitting well (better than its four-factor equivalent) the data (GFI=.95, CFI=.92 and RMSEA=.044 – conventional limits of goodness-of-fit: GFI≥.95, CFI≥.95 and RMSEA≤.05). Also all factor loadings were statistically significant at 95% level of statistical significance. Moreover, as expected all collectivistic factors correlated highly between each other and the same was the case for all individualistic factors. Only exception was the pair of "Horizontal Individualism" and "Sense of Uniqueness" which correlation was rather weak (r=.13) and indicated that these two factors are not conceptually as close as they were supposed to be. With respect to the existence of standardized residual covariance the six-factor model did well since there was not any important case of residual covariance. In line with this the modification index showed that there was not any room for major improvement of the goodness of fit of the model. In Appendix 11 are presented the tables with the full results of the CFA of the six-factor model.

Table 9. Confirmatory Factor Analysis of a six-factor individualism and collectivism model: the factor weights				
Factor	Item	Factor weights	S.E.	p value
Vertical Individualism	VI12.1	.529	N/A	N/A
Vertical Individualism	VI12.3	.601	.104	.000
Vertical Individualism	VI12.4	.531	.107	.000
Vertical Individualism	VI12.5	.419	.079	.000
Vertical Individualism	VI12.6	.692	.123	.000
Vertical Collectivism	VC12.20	.352	N/A	N/A
Vertical Collectivism	VC12.16	.509	.226	.000
Vertical Collectivism	VC12.15	.337	.143	.000
Vertical Collectivism	VC12.14	.58	.237	.000
Sense of Uniqueness	HI12.12	.752	N/A	N/A
Sense of Uniqueness	HI12.11	.898	.114	.000
Horizontal Individualism	VI12.5	.214	.063	.000
Horizontal Individualism	HI12.9	.668	.069	.000
Horizontal Individualism	HI12.10	.797	N/A	N/A
Horizontal Collectivism	VC12.15	.359	.143	.000
Horizontal Collectivism	VC12.18	.529	.111	.000
Horizontal Collectivism	HC12.22	.392	.11	.000
Horizontal Collectivism	HC12.23	.636	.097	.000
Horizontal Collectivism	HC12.24	.596	N/A	N/A
Horizontal Collectivism	HC12.25	.334	.152	.000
Collectivism-Dependency	HC12.22	.159	.052	.003
Collectivism-Dependency	HC12.25	.234	.074	.000
Collectivism-Dependency	HC12.27	.699	.083	.000
Collectivism-Dependency	HC12.28	.725	N/A	N/A

Figure 6. Confirmatory factor analysis of the individualism and collectivism scale: the six-factor solution
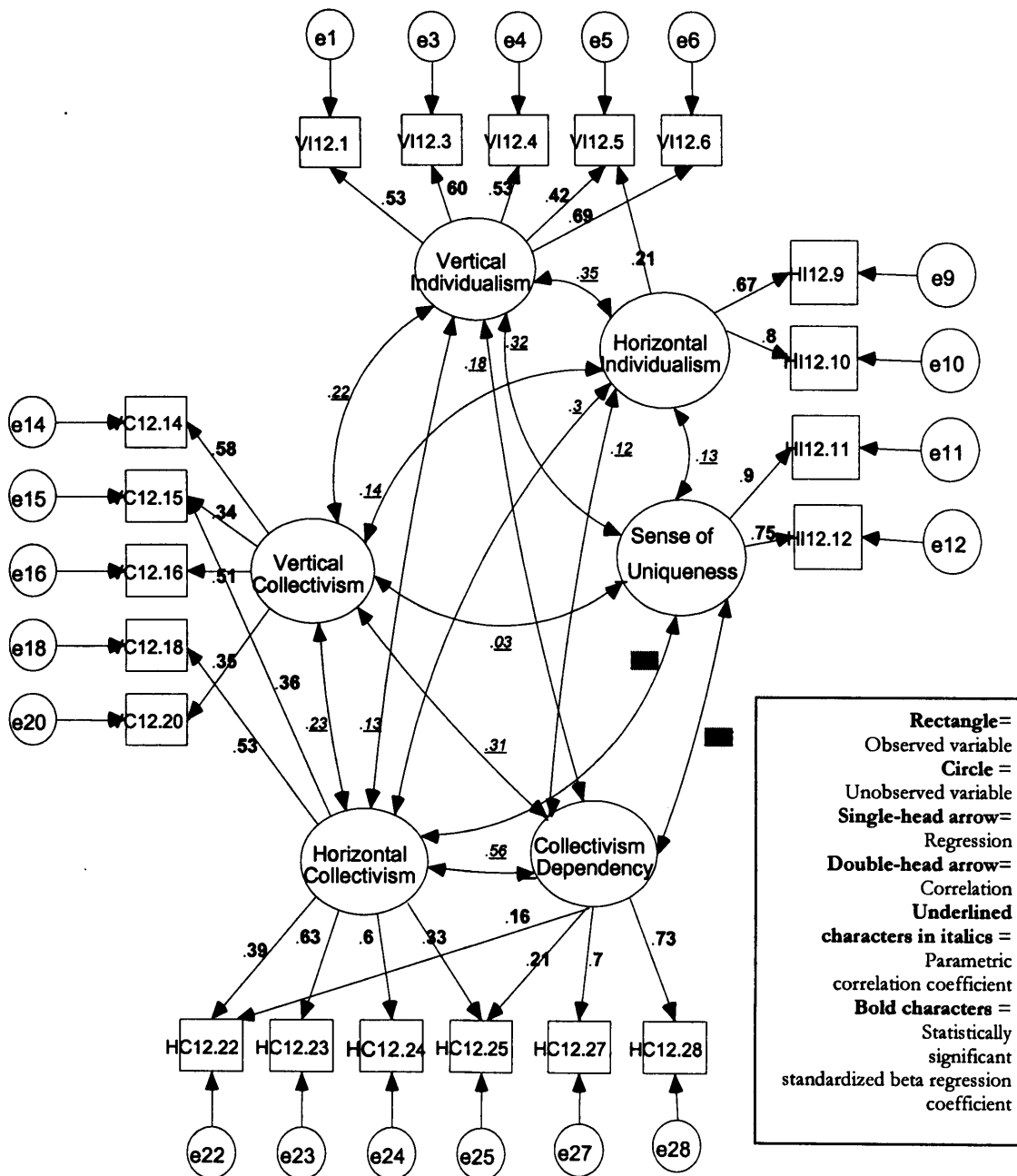
7.2.5 The validity of the emerged factors

7.2.5.1 Altruism

7.2.5.1.1 The criterion-based validity

The criterion-based validity of the emerged altruistic factors was tested by assessing how well they could capture existing differences between groups of the population. Two pre-determined hypotheses referring to expected differences in altruism between groups of the population were tested. The first hypothesis was that rural people would be more altruists than the city-dwellers (Steblay 1987) and the second that was that more educated respondents would score higher on the Responsibility Assumption (Kohlberg 1984). Both hypotheses were fully confirmed. The participants from rural areas reported higher scores on all altruistic scales than the Athenians. The second hypothesis not only was confirmed but actually the analysis revealed the existence of a stepwise linear association between education and Responsibility Assumption; people on each educational category having scored higher than those of the previous educational level and lower than those of the subsequent educational level.

Table 10. Criterion-based validity of the altruistic factors: the four altruistic factors vs. area of residence (urban/rural)

	Altruistic factors				
Area of residence		Altruism	Responsibility Assumption	Provision of Practical Help	Volunteering
Urban	Mean (SD)	-.28 (1)	-.022 (.99)	-.28 (.94)	-.36 (.95)
	N	487	487	487	487
Rural	Mean (SD)	.4 (.78)	.03 (1)	.4 (.94)	.5 (.84)
	N	346	346	346	346

Table 11. Criterion-based validity of the Responsibility Assumption factor: its breakdown by educational level		
Education:		Responsibility Assumption
Not at all education	Mean (SD)	-.4 (.94)
	N	25
<6 years of education	Mean (SD)	-.16 (1)
	N	118
6-8 years of education	Mean (SD)	-.04 (1)
	N	255
9-11 years of education	Mean (SD)	0 (.98)
	N	129
12 years- secondary education completed	Mean (SD)	.09 (.99)
	N	180
University degree	Mean (SD)	.15 (.97)
	N	100
Postgraduate studies	Mean (SD)	.25 (.97)
	N	26

7.2.5.1.2 The convergent and divergent validity

The convergent and divergent validity of the four altruistic factors was assessed through the inspection of their correlation matrix. The four scales related to each other (convergence) to a considerable degree and in the expected (positive) direction. The convergence of the four altruistic factors was a clear evidence for their validity. Also the same correlation matrix showed that regardless their interrelationship the four altruistic are self-existing measures capturing distinct aspects of the altruistic concept as no

correlation was too strong to raise questions about their substantiveness, distinctiveness and autonomy. The observed divergence of the four altruistic factors is a further indication of their validity.

Table 12. Convergent and divergent validity of the four altruistic factors: their correlation matrix[‡]				
	Altruism	Responsibility Assumption	Provision of Practical Help	Volunteering
Altruism	1	.196(**)	.255(**)	.308(**)
Responsibility Assumption	.196(**)	1	.231(**)	.262(**)
Provision of Practical Help	.255(**)	.231(**)	1	.300(**)
Volunteering	.308(**)	.262(**)	.300(**)	1
N	833	833	833	833
[‡]Pearson's product-moment correlation ** Correlation is significant at the 0.01 level (2-tailed).				

7.2.5.2 Individualism – collectivism

7.2.5.2.1 The criterion-based validity

The pre-existing hypotheses tested to assess the criterion-based validity of the individualism and collectivism scale were that: 1) women would be more orientated towards collectivism than men who are expected to be more orientated towards individualism than women (Madson & Trafimow 2001) 2) rural people would be more collectivism-orientated than urban people (Georgas 1989).

Both hypotheses were completely confirmed. Women scored higher on all collectivistic factors whilst in contrast men scored higher on all individualistic factors. Also participants from rural areas reported higher levels of collectivism than those reported by city dwellers.

Table 13. Criterion-based validity of the individualism- and collectivism-related factors: the six factors vs. area of residence and sex

		Factors :	VI	HC	SoU	C-D	HI	VC
Area of residence	Urban	Mean (SD)	-.01 (.92)	-.12 (1.13)	.16 (.97)	-.23 (1)	-.18 (1.1)	-.06 (1)
		N	489	489	489	489	489	489
	Rural	Mean (SD)	.01 (1.1)	.17 (.73)	-.23 (.99)	.32 (.84)	.25 (.81)	.089 (.96)
		N	345	345	345	345	345	345
Sex	male	Mean (SD)	.14 (.97)	-.03 (1)	.03 (1)	-.07 (1)	.12 (.91)	-.18 (1.1)
		N	387	387	387	387	387	387
	female	Mean (SD)	-.12 (1)	.02 (.94)	-.03 (.96)	.06 (.96)	-.1 (1.1)	.15 (.91)
		N	447	447	447	447	447	447

VI=Vertical Individualism, HC=Horizontal Collectivism, SoU=Sense of Uniqueness, C-D=Collectivism-Depenedency, HI=Horizontal Individualism and VC=Vertical Collectivism

7.2.5.2.2 The concurrent validity

The best way to estimate the concurrent validity of the six individualistic and collectivistic factors given that they have emerged from an orthogonal factorial solution is through their correlation to the altruistic factors.

Table 14. Concurrent validity of the the individualism- and collectivism-related factors: their correlation[‡] with the four altruistic factors

Factors:	VI	HC	SoU	C-D	HI	VC
Altruism	0.022	0.182**	-0.036	0.275**	0.102**	0.118**
Responsibility Assumption	0.082*	0.116**	-0.027	0.127**	-0.093**	0.130**
Provision of Practical Help	-0.029	0.188**	-0.114**	0.046	0.036	0.080*
Volunteering	0.034	0.199**	-0.168**	0.179**	0.115**	0.082*

‡Pearson's product-moment correlation
* Correlation is significant at the 0.05 level (2-tailed), ** Correlation is significant at the 0.01 level (2-tailed)
VI=Vertical Individualism, HC=Horizontal Collectivism, SoU=Sense of Uniqueness, C-D=Collectivism-Depenedency, HI=Horizontal Individualism and VC=Vertical Collectivism

The existence of significant relationships between individualism-, collectivism- and altruism-related factors confirmed our pre-existing hypotheses that all collectivism factors would be positively related to all altruistic factors as collectivism and altruism are both other-oriented motives (Batson et al. 2002). The only exception was the lack of association between Collectivism-Dependency and Provision of Practical Help which was rather a consequence of the conceptual incompatibility of these two constructs; Collectivism-Dependency encompassed a dimension of literally being dependent while Provision of Practical Help presupposed being able to provide help and give to others.

7.3 The descriptive analysis

7.3.1 The sociodemographic characteristics of the sample

The sample comprises 926 individuals; 418 males (45.1%) and 508 females (54.9%). In spatial terms the sample consists of two major parts – an urban and a rural. The former encompasses 517 individuals (55.8%) while the latter 409 (44.2%). The three areas included in the urban part of the sample (all municipalities within the Greater Athens area) are: Perama (N=183), Helioupoli (N=178) and Psychiko (N=156). The rural part of the sample came from three areas: Eurytania (N=142), Corinthia (N=136) and Icaria (N=131).The mean age of the participants is 62.7 years (SD 13.3 years). The age distribution is faintly negatively skewed with the median value (64 years old) slightly exceeding the mean – an indication that the majority of the sample is slightly older than 62.7 years old.

N=925
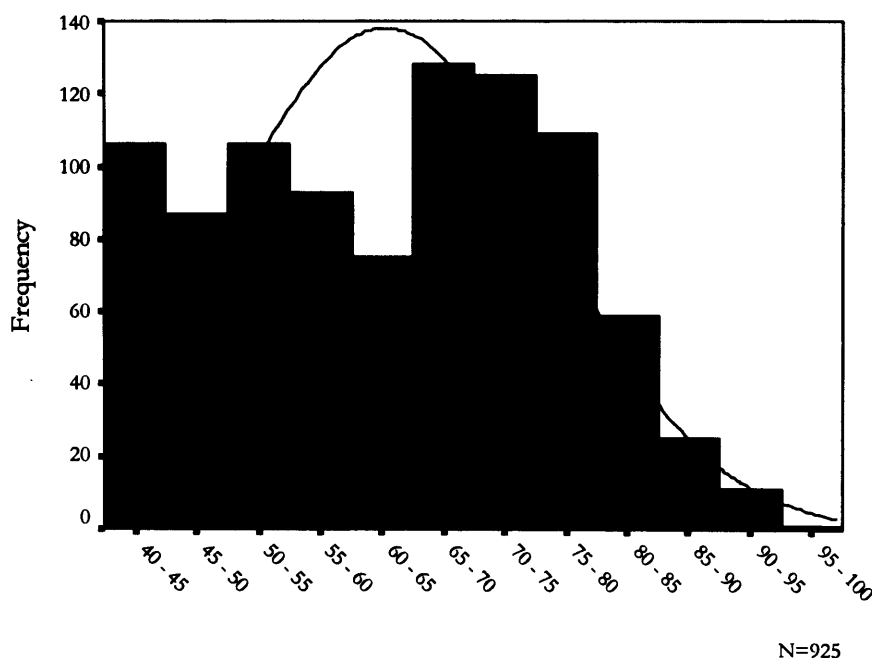
Figure 7. The age distribution of the sample

Regarding their education the study participants are of an intermediate educational level (which nevertheless should not be considered low given the mean age and the spatial composition of the sample – many people from rural and poor areas). The largest distinct category (31.1% of the entire sample, N=288) is that of respondents having spent 6 to 8 years in school (completion of the 6-year primary school - demotiko in Greek language – but not of the high school). Another considerable part of our sample - 325 people (35% of the sample) - reported completion of at least the secondary education (12-year school). 138 (14.9% of the entire sample) participants held a university degree. Only 35 participants reported that they have never been to school and in addition a non-negligible 15.4% (N=143) reported that they have not completed the 6-year primary school. Using as a criterion the completion or not of the compulsory (nowadays) 9-year school we can draw a gross dividing line separating our sample into two almost equal halves; one half (50.3%, N=466) consisted of individuals having spent less than 9 years in education and the other half (49.7% - N=460) of individuals having completed at least a 9-year education.

With respect to family income the vast majority of the respondents (664 out of 820 – 81% of the participants who provided information regarding the economic position of their family) lived in families which monthly income was less than 2000 euros per month while only 76 participants (9% of those having reported their family income category) lived with families with monthly income more than 3000 euros. A considerable part of our sample, 106 participants (11.4% of the sample) avoided to give any information regarding their family income choosing consciously not to reveal their family financial status.

7.3.2 The social relationships

7.3.2.1 Family Relationships

Almost all people of our sample (99%) reported having relatives. Only eight people stated that they had no relatives at all. The majority of the participants reported having frequent contacts (at least 1-2 times per month) with those of their relatives who did not live with them; either directly (744 individuals – approximately 80%) or indirectly (e.g. through phone calls) (858 individuals – 93%). Only a minor fraction of the sample

reported no direct (22 individuals, 2.4%) or indirect (20 individuals, 2.2%) contacts with relatives with whom they did not live with. A cross-examination of both types of family contacts shows that only 26 people (2.8%) of the sample reported having less frequent than every other month such contacts.

With respect to the number of relatives met within in a month, most of our participants (867 individuals) reported meeting at least one or two relatives on a monthly basis. Only 45 individuals (4.9%) did not to meet any relative within a month and should be considered a group of relatively isolated people given the practical but also symbolic significance of family relationships for middle-age and older people in a country like Greece. Regarding the closeness of the family network (measured as the number of relatives one considers to be very close to him/her) the vast majority (863 individuals – 93% of the entire sample) reported having at least one very close relative while 38 people (4.2%) reported not feel close to them any of their relatives The frequencies of all family relationships variables can be found in Appendix 14.

7.3.2.2 Friendships

The picture of the friendships, the participants reported, differs from that of family relationships. The number of people stating that they did not have any friends is much higher compared to its equivalent for relatives. Eighty (80) people (approximately 9% of the sample) considered themselves as not having any friends. These were mostly women (71%) who were considerably older than those reported having friends (the mean age of the friendless group was 68.4 years (SD 11.3) and of the rest of the sample 62.2 years (±13.4)) and came mostly from low socioeconomic areas (see Appendix 15). This rather high proportion of participants without any friends is, at a first glance, rather unexpected given that the Greek culture supposedly has a predominantly collectivistic character where people presumably having many social connections at least within their referral groups.

As regards the participants who reported having friends, the frequency of their direct contacts (visits) with their friends (who did not live with them) was high; 787 individuals (approx. 94% of those reported having friends) reported meeting at least

one friend one or two times per month. Only a small fraction of the sample (39 participants – 4.2%) claimed that they met with their friends in person twice a year or rarer. Similarly only 40 individuals (4.8% of those reported having friends) stated that they have indirect contacts with their friends very rarely (one or two times per year) if at all. A cross-tabulation of the two types of contacts reveals that only 13 participants (1.6% of those reported having friends) reported having any contacts with friends twice per year or rarely.

A large proportion of the participants (more than 74% of the participants who had friends) also reported that they met on a regular monthly base with more than two of their friends. Only 13 respondents (just 1.6% of those who had friends) reported that it is possible for them not to meet with any of their friends within a month. Moreover the descriptive analysis shows that 106 participants (approximately 13% of those reported having friends) considered none of their friends to be close to them. This finding probably shows that a considerable part of the sample uses other than friendship socialization mechanisms in their everyday life (e.g. dense network of everyday contacts with familiar people within the boundaries of a close-knit community). The frequencies of all friendship-related variables are presented in Appendix 14.

7.3.2.3 Indices of social relationships

7.3.2.3.1 Family Relationships Index

The Family Relationships Index has a normal distribution and the full range of 42 is observed (0-42, 0=lowest possible family-related sociability and 42=highest possible family-related sociability). Its mean score is 23.1 (SD 7.5) and its median is 22.8. The mode is 22 and its distribution curve has only one mode (unimodal). The normality of the distribution reflects in a clear manner how normally distributed is abundance and deprivation of family relationships in the Greek socio-cultural context.

N=850
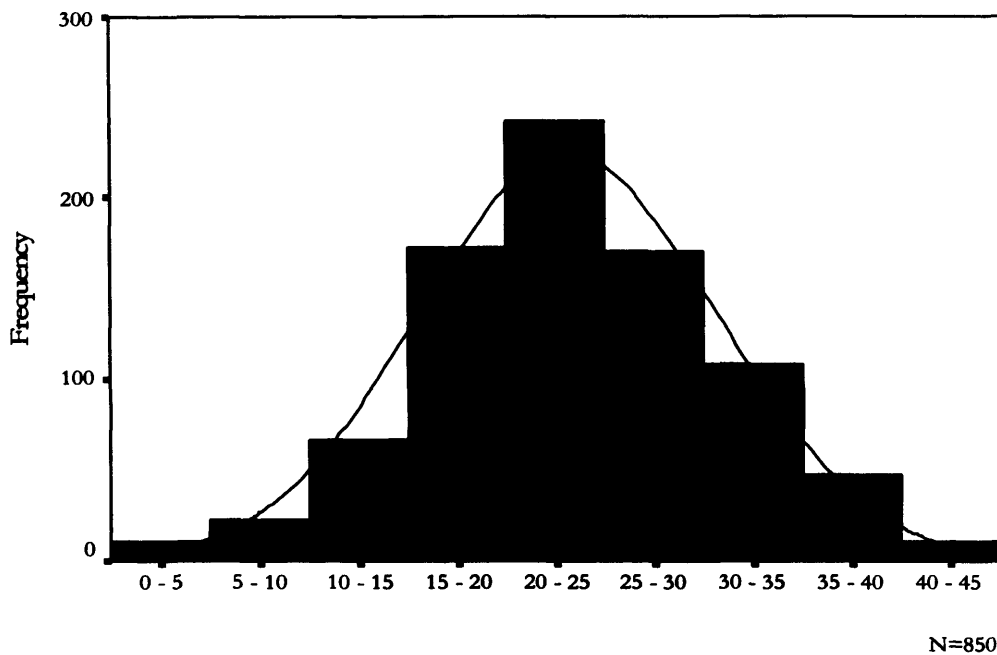
Figure 8. The distribution of the Family Relationships Index

7.3.2.3.2 Friendship Index

The Friendship Index is as its equivalent for Family Relationships rather normally distributed. Its full range of 28 (0-28, 0=lowest possible friendship-related sociability and 28=highest possible friendship-related sociability) is observed and its mean (15.3, SD 4.3) almost coincides with the median (15). The mode is 14 and the distribution is unimodal. The distribution curve exhibits a faint positive skewness but its main characteristic is its considerable kurtosis; most of cases are concentrated around the median - 50% of the sample reported a score between 13 and 18 - and the two tails of the curve are rather flat. The distribution of the Friendship Index indicates that the life of the majority of the participants has an adequate friendship element and points out the existence of two groups of respondents which differ considerably from the majority.

The first group consists of people who although having reported having friends seem significantly less sociable than the majority and a second group of very sociable and friendship-orientated individuals.

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N=805
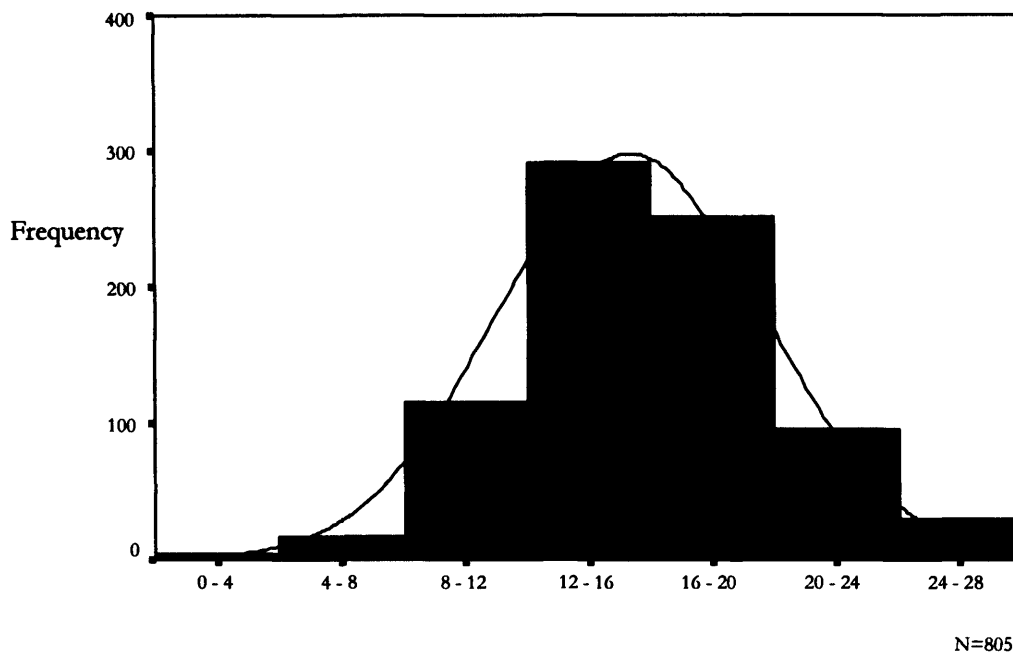
Figure 9. The distribution of the Friendship Index

Table 15. The descriptive statistics of the two indices of social relationships											
	Valid Case	Missing Cases	Mean (SD)	SE of Mean	Range (min/max)	25th percentile	Median	75th percentile	Mode	Skewness (SE)	Kurtosis (SE)
Family Relationships Index	850	76	23.1 (7.5)	.26	0/42	18.5	22.75	28.5	22	-.07 (.08)	.055 (.168)
Friendship Index	805	121	15.3 (4.3)	.15	0/28	13	15	18	14	.23 (.09)	.72 (.172)

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7.3.3 The health outcomes

7.3.3.1 Overview

The full range of 100 (0-100) is observed on both scales (mental and general health scales of SF-36). Also both scales have an adequate number of observed categories (levels) and are characterized by negative skewness with participants' scores concentrated mostly on the positive end of them. The concentration of cases on the positive (better health) ends of the distributions of both scales (negative skewness) is an anticipated finding and constitutes a sign of validity of our data given that our study sample is not selected on any disease or special condition base and therefore expected to consist of relatively healthy and functional individuals.

7.3.3.2 The general health scale

The general health (GH) scale reflects the self-assessment of health by the respondents themselves. The distribution of the scale is negatively skewed as expected. The mean value of the scale is 58.6 (SD 23.6) and is considerably smaller than that one observed on mental health scale. The median is 62 and exceeds the mean as anticipated in healthy populations. The most popular value (mode) is 72 and the curve is unimodal.

N=925
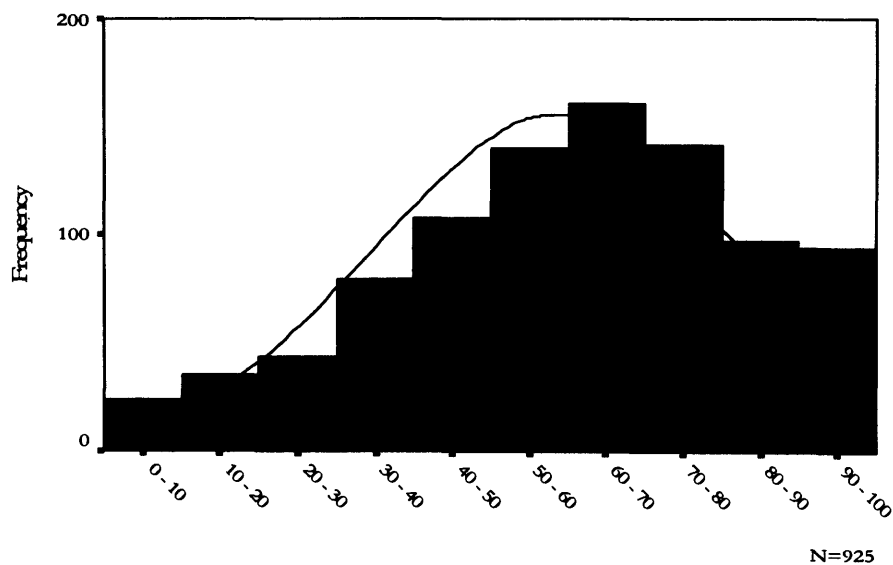
Figure 10. The distribution of the general health scale

7.3.3.3 The mental health scale

The mental health (MH) scale is, as general health, rather normally distributed, its mean is 68 (SD ±20.4) (higher than that of the GH scale) and its median 72. The fact that the median exceeds the mean indicates the good state of mental health of the population under examination. The most interesting attribute of this scale is a kind of polarization that characterized its distribution. Specifically there is almost an absolute absence of cases having scored the minimum possible value or values close to it. Only three participants have scored below 10 (that is within the first – worst possible mental health – decile of the full range) and only 30 (3.2%) with scores below 25 (within the first – worst possible mental health - quartile of the full range). This relative lack of cases on the first quartile of the scale (worst possible mental health) points towards two intertwined issues. The first is the relative lack of cases of serious mental illnesses in our sample (a finding expected given that the sample is non-clinical). The second pertains to the breadth of the mental health scale of SF-36 as a screening instrument (in terms of capturing a wide range of mental health symptoms) which in case the scale is applied to any non-clinical sample results in profoundly negatively skewed distributions with relative or absolute lack of cases on the left-hand side end (worst possible mental health) of the distribution.

N=926
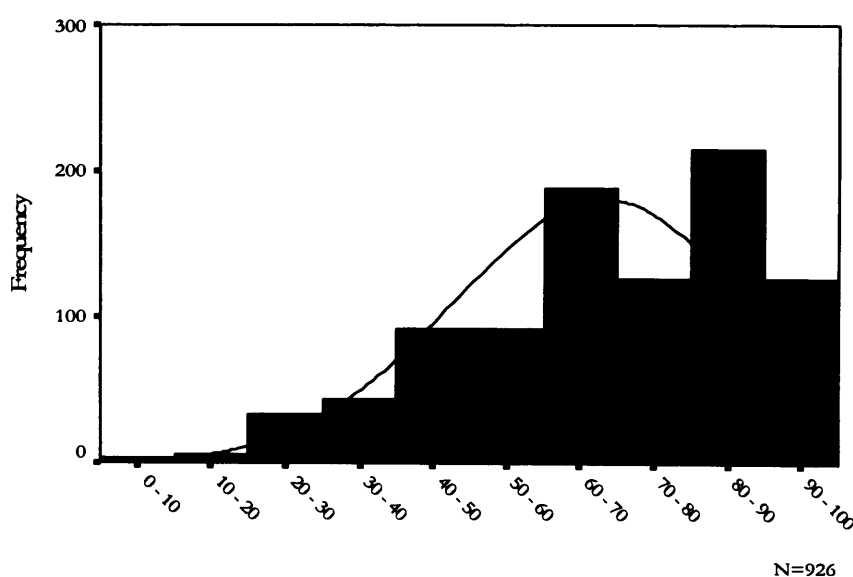
Figure 11. The distribution of the mental health scale

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Table 16.The descriptive statistics of the mental and general health scales of SF-36[‡]													
	Valid Cases	Missing Cases	Mean (SD)	SE of Mean	Range (min/ max)	25th 100ile	Median	75th 100ile	Mode	Skewness (SE)	Kurtosis (SE)	% Floor*	% Ceiling*
General Health	925	1	58.6 (23.6)	.78	0/100	43.5	62	77	72	-.4 (.08)	-.4 (.16)	1.4%	1.7%
Mental Health	926	0	68 (20.4)	.67	0/100	56	72	84	84	-.5 (.08)	-.3 (.16)	.1%	5%

*Percentage of participants with the worst and best possible score, respectively

[‡] SF-36® Health Survey © 1988, 2002 by JE Ware, Jr., MOT, Health Assessment Lab, QualityMetric Incorporated – All rights reserved, SF-36® is a registered trademark of the Medical Outcomes Trust (MOT)

7.3.4 The determinants of social relationships (altruistic, individualistic and collectivistic factors)

7.3.4.1 Overview

The descriptive analysis of the emerged altruistic, individualistic and collectivistic factors does not include their means, standard errors and standard deviations. This is because they are developed through factor analysis and their scores are standardized so all of them have a zero mean value and their standard deviation fixed to one.

An examination of the distributions of the ten factors/determinants of social relationships showed that most of them are negatively skewed. This is an initial sign that the majority of the participants are orientated towards collectivism and altruism but also towards individualism. Only two factors are positively skewed – Responsibility Assumption (altruistic factor) and Sense of Uniqueness (individualistic factor). The differentiation of these two factors although not much intense (slightly negative median – in both cases -.04) still carries a message for their rather distinct nature. Responsibility Assumption relates to higher levels of moral development (see Kohleberg 1984) while Sense of Uniqueness is peculiar in its excessive individualistic nature. The highest median is that of the two Horizontal constructs - Horizontal Collectivism (.28) and Horizontal Individualism (.27). The high median values of the two horizontal constructs probably signal that a large proportion of the sample has an equality-based orientation in their everyday life. Interestingly the three individualistic constructs (Sense of Uniqueness, Vertical and Horizontal Individualism) are the only factors with negative mode (-1.2, -.6, -.04, respectively). The intensely negative mode of "Sense of Uniqueness" factor possibly constitutes a sign of the unpopularity of excessive individualism among our participants. The widest range is observed on the Horizontal Collectivism factor scores (7.27) while the narrowest on the Sense of Uniqueness. Finally the high kurtosis of Horizontal Collectivism and Horizontal Individualism as well as of Collectivism-Dependency indicates that the majority of the sample consists of people sharing common views regarding these aspects of collectivism and

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individualism. The distribution curves of all ten psychosocial factors/determinants of social relationships are presented in Appendix 13.

Table 17. The descriptive statistics of the ten altruistic, individualistic and collectivistic factors

	ALT	RA	PoPH	VOL	VI	HC	SoU	C-D	HI	VC
Valid	833	833	833	833	834	834	834	834	834	834
Missing	93	93	93	93	92	92	92	92	92	92
25th 100ile	-.67	-.7	-.68	-.66	-.66	-.30	-.92	-.51	-.37	-.56
Median	.07	-.04	.02	.06	.13	.28	-.04	.24	.27	.15
75th 100ile	.65	.68	.69	.7	.81	.62	.90	.74	.64	.76
Mode	.3	.6	.9	.7	.7	0.4	-1.2	.0	.0	-.6
Range	6.6	5.5	5.7	5.6	4.8	7.3	4.1	6.4	7.1	5.1
Min	-3.8	-2.4	-3.2	-3.2	-2.8	-5.4	-2	-4.5	-5.1	-3.3
Max	2.8	3.1	2.4	2.5	2	1.9	2.1	1.9	2	1.8
Skewness	-.2	.2	-.1	-.3	-.5	-1.9	.1	-1.2	-1.7	-.7
Kurtosis	.1	-.3	-.4	-.3	-.5	4.4	-1.2	1.6	3.8	.1

ALT= Altruism, RA= Responsibility Assumption, PoPH=Provision of Practical Help, VOL=Volunteering, VI=Vertical Individualism, HC=Horizontal Collectivism, SoU=Sense of Uniqueness, C-D=Collectivism-Dependency, HI=Horizontal Individualism and VC=Vertical Collectivism

7.4 The bivariate associations

7.4.1 The associations of the sociodemographic variables with the health outcomes

Age found exerting a powerful negative impact on general health (older people reported poorer general health) while it seems not relate to mental health. Specifically the Pearson's coefficients for the correlations between age and general health and age and mental health are $r=-.311$ ($p \leq .001$) and $r=.030$ ($p > .05$), respectively. In contrast sex seems to affect health in a wider perspective as women scored considerably lower than men on both health measures. The observed sex difference (Δ) on general health scale is 8.9 points and on the mental health scale is 8 points. The ANOVA tests shows that the observed sex differences on both health scales are statistically significant. The F value for the sex differences on general health scale is 33.93 ($df=1$, $p \leq .000$) and on the mental health scale is 36.88 ($df=1$, $p \leq .000$).

Another significant socio-demographic correlate of health is education. Education relates positively to both health outcomes and these relationships have clearly the characteristics of a gradient; the higher the educational level of a participant the better her/his health (see table 18). The correlation coefficients are: Pearson's $r=.27$ ($p \leq .01$) (Spearman's $r=.28$, $p \leq .01$) (for the association between education and general health) and Pearson's $r=.17$ ($p \leq .01$) (Spearman's $r=.16$, $p \leq .01$) (for the association between education and mental health). An interesting but tentative finding regarding the association between education and health is the very poor health scores of the individuals in the lowest educational category (those who have never been to school). Their difference (Δ) with the next educational category ($\leq$ 6 years of education) is 10.2 points (on general health scale) and 8.3 points (on mental health scale). Thus, it seems that these people constitute a particularly vulnerable group with very poor health status. Nevertheless no safe conclusion can be draw for them from the present bivariate analysis given that the observed health differences in part could have been a result of confounding (e.g. with age) or some other unknown factor.

In line with these findings is the relationship between family income and the two health measures. People who belong to the lower categories of family income reported considerably lower scores on both health dimensions than those in the higher categories. The Pearson's correlation coefficient of the association between the log transformed family income and general health is r=.24 (p≤.01) (Spearman's r=.25, p≤.01) and its equivalent for mental health is Pearson's r=.15 (p≤.01) (Spearman's r=.14, p≤.01). The comparison of the urban and the rural parts of the sample suggests that there are not any important differences neither on general health nor mental health among the city dwellers and the participants living in rural areas. Specifically the difference on the general health is 1 point and on the mental health is 2 points in favour of the rural people. The ANOVA performed indicates that the observed health differences are (marginally) not statistically significant. The F value for the area differences on general health between the two groups (rural vs. urban) is 4 (df=1 & p≥.52) and on mental health is 3.7 (df=1 & p≥.054).

Table 18. The breakdown of mental and general health by education			
Education		General Health	Mental Health
not at all education	Mean (SD)	34.8 (20.9)	54.3 (22)
	N	35	35
less than 6 years	Mean (SD)	48.9 (24.4)	62.6 (21.1)
	N	143	143
6-8 years	Mean (SD)	57.1 (24.8)	67.6 (21.4)
	N	287	288
9-11 years	Mean (SD)	62.1 (22.1)	69.9 (20.4)
	N	135	135
12 years- 2ary education completed	Mean (SD)	65.1 (20.2)	70.9 (18.9)
	N	187	187
university degree	Mean (SD)	65.3 (18.5)	72.6 (15.7)
	N	109	109
postgraduate studies	Mean (SD)	67.3 (19.9)	70.5 (17.4)
	N	29	29
Total	Mean (SD)	58.6 (23.6)	68 (20.4)
	N	925	926

7.4.2 The associations of the social relationships with the health outcomes

7.4.2.1 "Having friends or not" vs. the two health outcomes – Cross-tabulations & ANOVA

The analysis of both general and mental health by the variable "Having friends or not" reveals important differences between these people reported having friends and those reported lacking any friends. Lacking friends appears to relate in a negative way to health. The difference between the two categories on general health scale touches 10 points while its equivalent on mental health scale reaches 5 points. Although the variable "Having friends or not" associates with both physical and mental health its connection with the former seems more important. The statistical significance of the observed differences is tested through analysis of variance (ANOVA) tests. The ANOVA shows that the differences between people with and without friends are statistically significant for both health outcomes. The differences on general health are significant at a higher level (F=12.4, df=1, p≤.000) than those on mental health which is significant at the conventional level of 95% (F=4.3, df=1, p≤.04).

Table 19. The breakdown of general and mental health by "Having friends or not"			
"Having Friends or not"		General Health	Mental Health
NO	Mean (SD)	49.8 (±24.5)	63.5 (±21.6)
	N	80	80
YES	Mean (SD)	59.4 (±23.4)	68.4 (±20.2)
	N	842	843
Difference between the two categories	*Δ*	*9.6*	*4.9*

7.4.2.2 Friendship Index vs. the two health outcomes – Cross-tabulations & ANOVA

The analysis of both health outcomes by Friendship Index reveals the existence of considerable differences on both health scales across the quartiles of the index. Reporting higher scores on the friendship index associates with better health. Nevertheless friendships found related more closely to general health than to mental health. The differences (Δ) between the first quartile (least sociable respondents) and the fourth (most sociable respondents) on general health scale is 9.1 points and on mental health is 4.3 points. The ANOVA tests (p value set at $\leq.001$ because of the multiple categories comparison) performed to assess the statistical significance of the observed differences on the two health scales show that these are significant for general health (F=5.5, df=3 and p$\leq$.001) but not for mental health (F=1.8, df=3 and p$\leq$.15).

Table 20. The breakdown of mental and general health by Quartiles of Friendship Index			
Quartiles of Friendship Index		General Health	Mental Health
1st (least sociable)	Mean(SD)	54.8 (±23.4)	66.2 (±21.1)
	N	200	200
2nd	Mean(SD)	59 (±23.5)	68.4 (±20.3)
	N	229	229
3rd	Mean(SD)	59.3 (±23.2)	67.2 (±20.1)
	N	154	154
4th (most sociable)	Mean(SD)	63.9 (±22.3)	70.5 (±19.5)
	N	221	222
Total	Mean(SD)	59.3 (±23.3)	68.2 (±20.3)
	N	804	805
Difference between the most and least sociable quartiles	Δ	9.1	4.3

7.4.2.3 Family Relationships Index vs. the two health outcomes – Cross-tabulations & ANOVA

Similarly the bivariate analysis shows the existence of the considerable differences on both health scales among the quartiles of Family Relationships Index and that having good quality adequate family relationships associate with better health. The difference (Δ) between the least sociable quartile (1st) and the most sociable quartile (4th) on general health scale is 4.9 points while the equivalent on mental health scale is 7.8 points. Also it shows that the relationship between mental health and Family Relationships Index seems to have the characteristics of a gradient.

The statistical significance of the observed differences on the two health scales across the four family-related sociability categories is tested through ANOVA (because of the multiple categories comparison the p value is set at a higher level - p $\leq$.001). The tests show that the observed differences across the quartiles of the family-related sociability are particular significant for mental health (F=6.4, df=3 and p$\leq$.000) and marginally significant for general health (F=2.7, df=3 and p$\leq$.047).

Table 21. The breakdown of mental and general health by Quartiles of Family Relationships Index

Quartiles of Family Relationships Index		General Health	Mental Health
1st (least sociable)	Mean(SD)	55.9 ($\pm$24.5)	63.8 ($\pm$21.1)
	N	211	211
2nd	Mean(SD)	56.6 ($\pm$22.5)	65.7 ($\pm$21.3)
	N	214	214
3rd	Mean(SD)	60.7 ($\pm$22.9)	69.3 ($\pm$19.9)
	N	204	204
4th (most sociable)	Mean(SD)	60.8 ($\pm$24.5)	71.6 ($\pm$18.8)
	N	221	221
Total	Mean(SD)	58.5 ($\pm$23.7)	67.7 ($\pm$20.5)
	N	850	850
Difference between the most and least sociable quartiles	Δ	*4.9*	*7.8*

7.4.2.4 All social relationships variables vs. the two health outcomes - Correlations

The correlation analysis (see table 22) shows that the employed social relationships variables ("Having Friends or not", Friendship Index and Family Relationships Index) are significantly correlated to both outcomes. The only exception is the weak and not statistically significant correlation between Family Relationships Index and general health. Therefore, the major finding of this part of analysis is that social relationships at a first glance seem to be a major correlate of health since almost all three of them correlate significantly to both health outcomes. Specifically Friendship Index and "Having friends or not" correlate to both health outcomes while Family Relationships Index only to mental health. A very interesting dimension of all these associations is their positive direction; all employed social relationships variables contribute positively to the health outcomes to which are related.

A more thorough examination of the results indicate that general health correlates most highly with the Friendship Index whilst mental health with Family Relationships Index. "Having friends or not" although correlates with both outcomes it does not relates particularly strongly to either of them. Furthermore, the correlation analysis confirms the results of the analysis of variance by showing that not all types of social relationships relate to all types of health outcomes and that different types of social relationships pertain to different aspects of human health. This finding has important theoretical implications and could be seen as a challenge for the current conceptualization of "social relationships" as a single and one-dimensional concept and the currently dominant notion that social relationships are in general beneficial for health. A second intriguing finding is that lacking friends does not seem to be a very important correlate of human health as it was hypothesized to be; on the one hand lacking friends clearly relates more strongly to general health but this relationship is not as strong as that one between Friendship Index and general health; on the other hand lacking friends is weakly associated with mental health contrary to what would be expected given the plausible link between being socially isolated and mental health.

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Table 22. The correlations among social relationships variables and the health outcomes

	General Health	Mental Health
"Having Friends or not"	.115** (.114)**	.068* (.064)*
Friendship Index	.151**	.082*
Family Relationships Index	.063	.130**

**Correlation is significant at the .01 level (2-tailed), *Correlation is significant at the .05 level (2-tailed), in parentheses is the Spearman's rho non-parametric correlation coefficient.

7.4.3 The associations of the determinants of social relationships (altruistic, individualistic and collectivistic factors) with the health outcomes

The correlation analysis between the ten altruistic, individualistic and collectivistic factors (determinants of social relationships) and health reveals the existence of interesting associations (see table 23). The major findings of this analysis are two: the existence of relationships between health and altruistic and collectivistic factors and the relative absence of associations between individualism and health. These two findings is an impetus to assume that at least in a socio-cultural environment such as Greece altruism and collectivism are important to health while individualism is less important to it if at all.

Our analysis indicates that Volunteering and Horizontal Collectivism are related in a positive way to both mental and general health. Volunteering is the most closely related factor to mental health while Collectivism is the closest correlate of general health. The relationship between Provision of Practical Help and general health is similarly positive. On the contrary the negative association between Collectivism-Dependency and general

health is an interesting and intriguing finding in the sense that this factor conceptually is close to Horizontal Collectivism factor which is found positively related to general health (and mental health). This differential relationship of these two factors to general health does not constitute a contradiction given that Horizontal Collectivism is a core collectivistic factor while Collectivism – Dependency is more a peripheral collectivistic construct which apart from its collectivism-related aspect has a strong dependency dimension. Thus, it seems that dependency, no matter if it bears on collectivism or not, is a negative correlate of health. Negative is, also, the association of Sense of Uniqueness with mental health. This association is the only statistically significant correlation observed among any individualistic factor and health variable. The negative relationship between these two factors is rather expected as feeling intensely unique probably is an attitude which does not fit well within the Greek socio-cultural environment (which has strong collectivistic underpinnings (Triandis et al. 1988)). Therefore feeling intensely unique might relate to experiencing conflict with the social norms/structure and consequently lead to poorer mental health.

Table 23. The correlations among the determinants of social relationships (altruistic, inidivualistic and collectivistic factors) and the health outcomes		
Factor:	*General Health*	*Mental Health*
Altruism	-0.040	-0.012
Responsibility Assumption	0.043	-0.011
Provision of Practical Help	0.089[*]	0.066
Volunteering	0.111[**]	0.128[**]
Vertical Individualism	0.048	0.018
Horizontal Collectivism	0.122[**]	0.099[**]
Sense of Uniqueness	0.013	-0.069[*]
Collectivism-Dependency	-0.073[*]	-0.011
Horizontal Individualism	0.064	0.052
Vertical Collectivism	-0.062	-0.042

7.4.4 The associations of the social relationships variables with their determinants (altruistic, individualistic and collectivistic factors)

The correlation analysis highlights the existence of many and significant relationships between the social relationships and their ten selected psychosocial determinants (individualistic, collectivistic and altruistic factors). The most important findings of this part of the analysis are four. The first and most important, in practical terms, is that not all emerged factors associate with social relationships. There are three factors which do not relate at all to any social relationships related variable. These are the vertical dimensions of individualism and collectivism and the intensely individualistic factor Sense of Uniqueness. A second major finding is that social relationships associate significantly with most of the altruistic and collectivistic factors as expected given that altruism and collectivism are well-known other-oriented motives (Batson et al. 2002). The third major finding is that all observed associations between the social relationships measures and their determinants are positive. There is not a single case of a negative association between any altruistic or collectivistic factor and a social relationships measure - a finding strengthening the theoretical stance taken by the present study that collectivism and altruism co-exist with and promote social relationships. The fourth important finding is that individualism relates only to a minor degree to social relationships.

Analytically, from all ten factors examined only Provision of Practical Help and Volunteering are associated with all three social relationships variables. Particularly Provision of Practical Help seems an important correlate of both social relationships indices (Friendship and Family Relationships Indices) since it is the most closely related to both indices factor. Horizontal Collectivism is related to Family Relationships Index and "having friends or not" but not to the Friendship Index; a finding probably indicating the determining role of this factor for family-bounded relationships. The absence of association between Horizontal Collectivism and Friendship Index is counterbalanced by the relationship of Collectivism-Dependency to this index which

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clearly shows the existence of links between collectivistic self and outside-family sociability. Notable is also the relationship between Horizontal Individualism and Family Relationship Index. This relationship is the only one observed between any individualistic factor and any social relationships measure and could be considered as an initial indication that (Horizontal) Individualism potentially could relate positively to sociability. Moreover, another interesting finding is the lack of association between Responsibility Assumption and Family Relationships Index which indicates that family relationships do not pertain to (and therefore seemingly do not require) higher moral development (if we assume that Responsibility Assumption factor reflects high moral development – see Kohlberg 1984) while this is not to the case for friendships. It should be noted that the first altruistic factor (Altruism) is weakly associated with the two social relationships indices and therefore should be considered a construct loosely connected to social relationships.

The main conclusion that can be drawn from this part of the analysis is that not all ten factors employed in this study as determinants of social relationships finally found functioning as such. Also it can be concluded that strong hierarchical orientation (as verticality refers to hierarchy and its use as the foundation of sociability) does not promote social relationships and sociability.

Table 24. The correlations among the social relationships and their determinants (altruistic, individualistic and collectivistic factors)			
Factors	Having friends or not	Friendship Index	Family Relationships Index
Altruism	.028 (.039)	.094*	.092*
Responsibility Assumption	.084* (.089*)	.125**	.008
Provision of Practical Help	.136** (.113**)	.195**	.200**
Volunteering	.090** (.078*)	.193**	.137**
Vertical Individualism	-.003 (-.020)	.070	-.022
Horizontal Collectivism	.104** (.091**)	.061	.143**
Sense of Uniqueness	-.024 (-.024)	-.047	-.048
Collectivism-Dependency	.045 (.034)	.127**	.045
Horizontal Individualism	.038 (.011)	.048	.082*
Vertical Collectivism	.016 (.002)	-.019	.009
**Correlation is significant at the .01 level (2-tailed), *Correlation is significant at the .05 level (2-tailed) In parentheses is the Spearman's rho non-parametric correlation coefficient			

7.5 Testing the first hypothesis: the social relationships as determinants of health

The strength of associations between each of the variables referring to social relationships ("Having friends or not" and Family Relationships and Friendship Indices) and the two health scales is tested in a series of multivariate regressions.

7.5.1 The social relationships as predictors of mental health

This part of the analysis aims at exploring the associations between mental health and the three selected social relationships variables. The three regressions models presented here employed sequentially each of the three social relationships variables to explain mental health and are adjusted for all selected socio-demographic covariates (sex, age, education, family income and area of residence).

7.5.1.1 Family Relationships Index vs. mental health

The multivariate regression analysis (see table 25) confirms the conclusions drawn from descriptive and correlation analysis for the positive association between Family Relationships Index and mental health and clarifies further the nature and characteristics of this association. The fully adjusted multivariate models developed, clearly, show that family relationships are associated in a powerful way and at a higher level of statistical significance ($p \leq .01$) to mental health. They also show that this association holds even after controlling for all selected confounders (age, sex, education, family income and area of residence). The results of the multivariate analysis provide an adequate basis to argue that family relationships influence positively mental health and therefore they should be positioned among the potentially significant determinants of it. The variance of the outcome variable that the all-confounders inclusive model explains is $R^2 \approx .09$.

7.5.1.2 Friendship Index vs. mental health

The regression analysis results (see table 25) are in line with the bivariate analysis suggesting that Friendship Index is not as closely related to mental health as the Family Relationships Index. The unadjusted association between the Friendship Index and mental health erodes gradually as it is adjusted for the confounding variables. The inclusion of sex in the model makes the initially significant association between Friendship Index and mental health weaker and statistically significant at a lower level (90% - $p \leq .1$). Then, the adjustment for either education or family income makes the association between friendship and mental health completely non-significant and therefore not of great importance. Thus, friendships (as measured by Friendship Index) appear not to be a much important predictor of mental health. This finding suggests that friendships cannot predict mental health as well as family relationships can. The variance of the dependent variable explained by this series of models is considerably smaller than that explained by the series of regression models based on Family Relationships Index. Specifically the models that includes age, sex and either education or family income as potential confounders explain approximately 6% of the dependent variance.

7.5.1.3 "Having friends or not" vs. mental health

The multivariate regression modelling indicates that the relationship of the dichotomous variable "having friends or not" to mental health is rather weak and not much important (see table 25). The unadjusted positive relationship between these two variables loses any statistical significance already from the first step of the adjustment process (adjustment for sex). The power of the confounding effect of sex on the association between "having friends or not" and mental health is indicative of the weakness of this association and of course of the powerful impact sex exerts on mental health.

Table 25. Linear Regression Models: Social Relationships vs. Mental Health								
Independent variables	Unadjusted Model	Model adjusted for sex	Model adjusted for sex and age	Model adjusted for sex, age and family income (log)	Model adjusted for sex, age and education	Model adjusted for sex, age and area of residence (urban vs. rural)	Model adjusted for sex, age, family income (log) and area of residence (urban vs. rural)	Model adjusted for sex, age, education and area of residence (urban vs. rural).
FRI	.130**	.129**	.133**	.147**	.152**	.128**	.115**	.125**
(R²)	.017	.050	.053	.083	.079	.053	.092	.086
FI	.082**	.060^m	.061^m	.047	.056			
(R²)	.007	.037	.038	.063	.062			
HFoR	.068*	.048						
(R²)	.005	.040						

*$p \leq .05$, **$p \leq .01$, m denotes $1 > p > .05$

FRI=Family Relationships Index, FI=Friendship Index and HFoR= "Having friends or not"

7.5.2 The social relationships as predictors of general health

This section of the multivariate analysis examines the associations between general health (outcome variable) with each of the selected social relationships variables while gradually adjusting the models for all selected covariates (sex, age, education, family income and area of residence).

7.5.2.1 Family Relationships Index vs. general health

The relationship between Family Relationships Index and general health scale was not explored further given that a previous stage of the analysis (correlation) suggests that this is a statistically non-significant association. Thus, any further exploration of this initially weak and non-significant association would have been a violation of the criteria set for the selection of the predictor variables towards building the final integrated models of sociability and general health (see Methods chapter).

7.5.2.2 Friendship Index vs. general health

The multivariate regression analysis (see table 26) shows that Friendship Index is an important predictor of general health. Specifically, it indicates that the unadjusted strong relationship between Friendship Index and general health remains statistically significant and strong even after controlling for all potential confounders. Thus, the existence of an adequate number of good quality friendships influences in a positive manner people's perceptions about their health. The final versions of the model explain approximately 19% of the dependent variance.

7.5.2.3 "Having friends or not" vs. general health

"Having friends or not", although significantly related to general health in the unadjusted version of the model, it loses much of its predictive value once age enters the multivariate regression model (see table 26). The erosion of the initially significant relationship between "having friends or not" and general health indicates both the

importance of age as a confounder and the weakness of the association between these two variables. "Having friends or not" loses completely its predictive value when either of the socioeconomic position variables (education and family income) are included in the model.

Table 26. Linear Regression Models: Social Relationships vs. general health								
Independent variables	Unadjusted Model	Model adjusted for sex	Model adjusted for sex and age	Model adjusted for sex, age and family income (log)	Model adjusted for sex, age and education	Model adjusted for sex, age and area of residence (urban vs. rural)	Model adjusted for sex, age, family income (log) and area of residence (urban vs. rural)	Model adjusted for sex, age, education and area of residence (urban vs. rural).
FI	.151**	.132**	.137**	.125**	.134**	.126**	.098**	.108**
(R²)	.023	.045	.160	.168	.172	.164	.185	.186
HFoR	.115**	.097**	.051ᵐ	.053	.036			
(R²)	.013	.045	.147	.163	.160			
*p≤ .05, **p≤ .01, m denotes 1>p>.05								
FI=Friendship Index and HFoR= "Having friends or not"								

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7.6 Testing the first part of the second hypothesis: the determinants of social relationships (selected altruistic, individualistic and collectivistic factors) as determinants of health

The correlation analysis presented earlier (section 7.4) suggested the existence of significant associations between various factors that determine social relationships and the two health outcomes. In particular it showed that two factors, Volunteering and Horizontal Collectivism, associate with both health scales. Also it indicated that Sense of Uniqueness correlate to mental health and that Provision of Practical Help and Collectivism-Dependency relate to general health. In this section, these statistically significant bivariate relationships will be tested in a series of multivariate regressions tests where gradually they will be adjusted for all major confounding variables (sex, age, education, family income and area of residence). This part of the analysis is performed in order to explore the possible direct associations of the determinants of social relationships with health.

7.6.1 Selected altruistic, individualistic and collectivistic factors as predictors of mental health

7.6.1.1 Volunteering vs. mental health

The multivariate regression analysis performed highlights the importance of Volunteering as an important predictor of mental health (see table 27). Specifically it was found that there is a direct and statistically significant positive association between Volunteering and mental health over and above the possible mediating effect of any of the selected covariates. Therefore, Volunteering should be seen as a beneficial factor for mental health. The variance of the dependent variable explained by the fully adjusted versions of the model is approximately 10% to 11%.

7.6.1.2 Horizontal Collectivism vs. mental health

Horizontal Collectivism, as Volunteering, was also associated with mental health at an earlier stage of the analysis. This unadjusted bivariate association is tested in a multivariate regression analysis (see table 27). The multivariate regression analysis in line with the bivariate analysis shows that Horizontal Collectivism is positively related to mental health over and above all major confounding variables. Thus, Horizontal Collectivism could be considered a factor influencing positively and directly mental health. The variance of the dependent variable that the final versions of the model explain ranges from 8% - 11%.

7.6.1.3 Sense of Uniqueness vs. mental health

Sense of Uniqueness is the third psychosocial factor which significant bivariate association with mental health is tested in a series of regression models (see table 27). The Sense of Uniqueness is a core individualistic factor which is found - contrary to Horizontal Collectivism and Volunteering - negatively related to mental health. The multiple regression analysis partially confirms the bivariate analysis results and highlights the negative association between the Sense of Uniqueness and mental health. Nevertheless it also shows that Sense of Uniqueness does not remain a significant predictor of the outcome in the fully adjusted models. Specifically, Sense of Uniqueness looses its significance as a predictor of mental health once their relationship is adjusted for area of residence. Thus, there is sufficient evidence to support that Sense of Uniqueness is somewhat associated to mental health but does not qualify as a powerful independent predictor of it. The variance that the various versions of the model explain ranges from 7% to 11%.

Table 27. Linear Regression Models: selected determinants of social relationships vs. mental health								
Independent variables	Unadjusted Model	Model adjusted for sex	Model adjusted for sex and age	Model adjusted for sex, age and family income (log)	Model adjusted for sex, age and education	Model adjusted for sex, age and area of residence (urban vs. rural)	Model adjusted for sex, age, family income (log) and area of residence (urban vs. rural)	Model adjusted for sex, age, education and area of residence (urban vs. rural).
VOL	.128**	.125**	.128**	.159**	.146**	.104**	.103**	.092*
(R²)	.016	.057	.063	.095	.086	.065	.111	.099
HC	.099**	.105**	.104**	.112**	.096**	.092**	.081*	.068*
(R²)	.010	.050	.050	.084	.066	.055	.109	.084
SoU	-.069*	-.075*	-.078*	-.081*	-.078*	-.064^m	-.052	-.050
(R²)	.005	.044	.046	.078	.063	.051	.105	.082

*p≤ .05, **p≤ .01, m denotes 1>p>.05

VOL=Volunteering, HC=Horizontal Collectivism and SoU=Sense of Uniqueness

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7.6.2 Selected altruistic, individualistic and collectivistic factors as predictors of general health

7.6.2.1 Provision of Practical Help vs. general health

The Provision of Practical Help is an altruistic factor found correlated to general health. The multiple regression analysis partially confirms the correlation analysis results by showing that there is a positive association between Provision of Practical Help factor and general health (see table 28). Nevertheless Provision of Practical Help is not a significant independent predictor of general health as its association becomes statistically non-significant once adjusted for the selected socio-demographic covariates.

7.6.2.2 Volunteering vs. general health

Volunteering is another altruistic factor which association with general health is tested through a series of multivariate regressions. The analysis performed suggests that Volunteering is a significant predictor of general health (see table 28). Thus, Volunteering, unlike Provision of Practical Help, is an altruistic factor that relates to general health in a statistically significant way over and above the potential confounding effect of various sociodemographic covariates and therefore it can be suggested that Volunteering is an important independent predictor of general health. The final versions of the model explained more than 20% of the outcome variance.

7.6.2.3 Horizontal Collectivism vs. general health

Horizontal Collectivism is one of the two collectivistic factors that were found significantly correlated to general health. The multivariate regression models developed show that Horizontal Collectivism remains a powerful predictor of general health (see table 28) after the adjustment of their relationship for all selected covariates. Its observed association with general health is clearly positive and direct and constitutes sound basis to suggest that Collectivism in its equality-based form seems to be beneficial for general health. The final models explain approximately 19% of the dependent variance.

7.6.2.4 Collectivism-Dependency vs. general health

Like Horizontal Collectivism, a second collectivistic factor, Collectivism-Dependency, was found related to general health at the previous bivariate stage of the analysis. But unlike Horizontal Collectivism, it does not remain a statistical significant predictor of general health at the multivariate stage of the analysis. Specifically, the relationship between Collectivism-Dependency and general health becomes (marginally) non-significant once sex enters the analysis and loses any significance when age is as well included in the analysis (see table 28). Thus, Collectivism-Dependency seems not to be a significant predictor of general health.

Table 28. Linear Regression Models: the selected determinants of social relationships vs. general health								
Independent variables	Unadjusted Model	Model adjusted for sex	Model adjusted for sex and age	Model adjusted for sex, age and family income (log)	Model adjusted for sex, age and education	Model adjusted for sex, age and area of residence (urban vs. rural)	Model adjusted for sex, age, family income (log) and area of residence (urban vs. rural)	Model adjusted for sex, age, education and area of residence (urban vs. rural).
PoPH	.089*	.081*	.067*	.068*	.073*	.025	.003	.007
(R²)	.008	.042	.150	.160	.163	.162	.192	.191
VOL	.111**	.108**	.123**	.150**	.138**	.083*	.086*	.074*
(R²)	.012	.047	.161	.177	.177	.167	.198	.196
HC	.122**	.127**	116**	.115**	.109**	.100**	.083*	.078*
(R²)	.015	.051	.151	.166	.162	.160	.193	.185
C-D	-.073*	-.061ᵐ	-.005	N/A	N/A	N/A	N/A	N/A
(R²)	.005	.039	.138	N/A	N/A	N/A	N/A	N/A
*p≤ .05, **p≤ .01, m denotes 1>p>.05								
PoPH=Provision of Practical Help, VOL=Volunteering, HC=Horizontal Collectivism, C-D= Collectivism-Dependency								

7.7 Testing the second part of the second hypothesis: the determinants of social relationships (Horizontal Collectivism and Volunteering) as determinants of health over and above social relationships

The previous stage of the multivariate analysis showed that only two out of the ten psychosocial determinants of social relationships associate significantly and clearly with health namely Volunteering and Horizontal Collectivism. Both these predictors are significant predictors of both health outcomes (mental and general health). The major question in relation to these two pairs of associations is whether they remain significant once controlled for social relationships (as Volunteering and Horizontal Collectivism are included in the study as determinants of social relationships). This is a core question for the present study as it refers to clarifying the associations of social relationships and their determinants with health and assessing whether the determinants of social relationships might relate to health independently of social relationships. The exploration of this nodal question in this section of the analysis was made through two series of multivariate regressions. The first series of regressions refers to testing the associations of Volunteering and Horizontal Collectivism with mental health when these are controlled for Family Relationship Index (which is the most powerful relationship-related predictor of mental health) and the second to the assessment of the associations of Volunteering and Horizontal Collectivism with general health when adjusting for Friendship Index (which is the most powerful relationship-related predictor of general health). Nevertheless the test of the second part of the second hypothesis for the connections among social relationships, their determinants and health is not confined to these two series of regressions (sections 7.7.1-7.7.2). It continues in sections 7.7.3 and 7.7.4 of this chapter where two versions of the conceptual model presented in this study will be developed and tested.

7.7.1 Horizontal Collectivism and Volunteering as predictors of mental health against family relationships

7.7.1.1 Horizontal Collectivism vs. mental health while controlling for Family Relationships Index

The degree to which the observed association between Horizontal Collectivism and mental health is independent of Family Relationships Index (which is the most important relational predictor of the latter) is assessed through multivariate linear regression analysis (see table 29). The regression analysis suggests that the association between Horizontal Collectivism and mental health is not independent of family relationships as the adjustment for the Family Relationships Index makes it statistically non-significant (marginally, though).

Table 29. Linear Regression Models: adjusting the relationship between Horizontal Collectivism and mental health scale for Family Relationship Index		
Independent Variables	Unadjusted Model	Model adjusted for Family Relationships Index
Horizontal Collectivism	.082*	$.066^{m(p \leq .069)}$
Family Relationships Index		.114**
(R^2)	.007	.019
*p≤ .05, **p≤ .01, m denotes 1>p>.05		

7.7.1.2 Volunteering vs. mental health while controlling for Family Relationships Index

Unlike Horizontal Collectivism, Volunteering seems to be an important predictor of mental health independently of family relationships as its association with mental health does not weaken after adjustment for either Family Relationships Index or any of the major confounders (only when education and area of residence, two highly interrelated confounders, are included in the same model Volunteering's association with mental

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health becomes marginally non-significant - $p \leq .06$) (see table 30). Thus, Volunteering appears not only to be a significant predictor of mental health but also to relate to it independently of family relationships (which are the only significant social relationship-related predictor of mental health). Volunteering qualifies as an autonomous predictor of mental health.

Table 30. Linear Regression Models: Adjusting the relationship between Volunteering and Mental Health scale for Family Relationships Index									
Independent variables	Unadjusted model	Model adjusted for FRI	Model adjusted for FRI and sex	Model adjusted for FRI, sex and age	Model adjusted for FRI, sex, age and family income (log)	Model adjusted for FRI, sex, age and education	Model adjusted for FRI, sex, age and AoR	Model adjusted for FRI, sex, age, family income (log) and AoR	Model adjusted for FRI, sex, age, education and AoR
Volunteering	.097**	.087*	.085*	.087*	.120**	.103**	.085*	.086*	.071$^{m(p \leq .06)}$
FRI		.164**	.117**	.121**	.138**	.140**	.119**	.112**	.117**
Sex				-.188**	-.194**	-.184**	-.159**	-.193**	-.180**	-.151**
Age				-.072*	-.014	-.006	-.074*	-.040	-.022
Family income (log)					.194**	N/A	N/A	.225**	N/A
Education						.103**	N/A	N/A	.222**
AoR							.006	.109*	.097*
(R^2)	.01	.036	.06	.065	.103	.095	.065	.11	.10

*$p \leq .05$, **$p \leq .01$, m denotes $1 > p > .05$

FRI=Family Relationships Index and AoR=Area of residence (urban vs. rural)

7.7.2 Horizontal Collectivism and Volunteering as predictors of general health against friendships

7.7.2.1 Horizontal Collectivism vs. general health while controlling for Friendship Index

The multivariate regression analysis shows that the positive association between Horizontal Collectivism and general health remains significant even after including in the model Friendship Index (see table 31). This finding, although expected as the bivariate analysis has shown that Horizontal Collectivism does not correlate with friendship, is very important as it suggests that Horizontal Collectivism relates to general health over and above social relationships and therefore that it is a separate and independent of social relationships predictor of health. The multivariate models developed, clearly, shows that the association of Horizontal Collectivism with general health is to a very minimal degree "confounded" by friendships (minor decrease of the regression beta coefficient when Friendship Index was included in the model). They also showed that no other confounders could fully account for the relationship of Horizontal Collectivism and general health as this remains statistically significant at almost all stages of the adjustment for the various sociodemographic covariates. Only when the area of residence and either education or family income (all three variables highly correlate with each other) included in the model together the relationship between Horizontal Collectivism and general health becomes marginally non-significant ($p \leq .052$ and $p \leq .057$, respectively). The variance of the outcome variable that the all-confounders inclusive model explains is approximately $R^2 = .19$.

Table 31. Linear Regression Models: Adjusting the relationship between Horizontal Collectivism and general health for Friendship Index

Independent variables	Unadjusted model	Model adjusted for FI	Model adjusted for FI and sex	Model adjusted for FI, sex and age	Model adjusted for FI, sex, age and family income (log)	Model adjusted for FI, sex, age and education	Model adjusted for FI, sex, age and AoR	Model adjusted for FI, sex, age, family income (log) and AoR	Model adjusted for FI, sex, age, education and AoR
Horizontal Collectivism	.097**	.087**	.095**	.093**	.088*	.086*	.086*	.068^m (p≤.057)	.066^m (p≤.052)
FI		.164**	.143**	.148**	.135**	.144**	.137**	.109**	.121**
Sex			-.160**	-.191**	-.192**	-.175**	-.190**	-.186**	-.164**
Age				-.333**	-.294**	-.294**	-.354**	-.332**	-.316**
Family income (log)					.111**	N/A	N/A	.168**	N/A
Education						104.**	N/A	N/A	.161**
AoR							.064^m	.151**	.132**
(R²)	.01	.036	.057	.166	.179	.180	.174	.194	.192

*p≤ .05, **p≤ .01, m denotes 1>p>.05

FI=Friendship Index and AoR=Area of Residence

7.7.2.2 Volunteering vs. general health while controlling for Friendship Index

The analysis shows that the observed association between Volunteering and general health does not hold the adjustment for the Friendship Index which is the most important social relationship-related predictor of the latter (see table 32). The developed models show that the association between Volunteering and general health becomes completely insignificant once Friendship Index enters the equation. This finding clearly suggests that Volunteering influences positively general health mostly indirectly through its friendship-facilitating and friendship–building qualities.

Table 32. Linear Regression Models: Adjusting the relationship between Volunteering and general health scale for Friendship Index		
Independent Variables	Unadjusted Model	Model adjusted for Friendship Index
Volunteering	.078*	.048
Friendship Index		.153**
(R^2)	.006	.029
*p$\leq$ .05, **p$\leq$ .01, m denotes 1>p>.05		

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7.7.3 Building the sociability "trees" (multivariate integrated models explaining social relationships)

The present study's stance is that social relationships themselves are the outcome of a long process and therefore in order to explore sufficiently their association to health one should take into account the factors that determine them. Social relationships apart from being a predictor of health are themselves the result of the interaction among many factors. In this section of the results two multivariate models are developed which attempt to explain friendships and family relationships (the outcome variables are Friendship and Family Relationships Index, respectively). The creation of these models will contribute to exploring in-depth the social relationships and enlighten their determinants. This is a necessary step towards studying effectively the relationship between sociability and health and creating the final integrated models of sociability and health.

The task of building the two multivariate models that explain social relationships has two parts. The first part is the selection of the factors that relate significantly to either of the indices of social relationships. This is be done through testing if each observed bivariate association (correlation) between any of the psychosocial factors and either of the two sociability indices (see section 7.4) holds when adjusted for all selected confounders. This process is expected to provide valuable information about what factors relate significantly to social relationships after adjusting for all confounding variables and therefore qualify to be included in the second phase of the model building process. The second part – drawing upon the first part - refers to the development of the two final sociability models ("sociability trees"); one for friendships and another one for family relationships. These two models will include, at the same time, all significant determinants of either friendships (measured as Friendships Index) or family relationships (measured as Family Relationships Index). The two multivariate models will then be used as predictive tools to explore the association between sociability (as an integrated and well-established psychosocial system encompassing both social

relationships and their major psychosocial and cultural determinants) and the two health outcomes (mental and general health).

Each final sociability model should be considered as having the form of a tree. The tree metaphor is employed to prompt the reader towards thinking of sociability not as a single entity but rather as a constellation of interrelated factors which in turn interacts with and possibly affects human health. The trunk of this tree is either friendships or family relationships and its roots are their psychosocial and cultural determinants like altruism and collectivism. The tree metaphor aims to underline the fact that social relationships have deep contextual "roots" and ultimately to practically highlight the potential importance of both parts of the tree (social relationships and their determinants) in creating or explaining health.

7.7.3.1 The first part of the "sociability tree" building process: selecting the determinants of social relationships among the altruistic, individualistic and collectivistic factors

This set of multivariate regression analyses is devoted in exploring the associations between either friendships (measured as Friendship Index) or family relationships (measured as Family Relationships Index) and their potential psychosocial determinants after adjusting for all potential confounders. In this part of the analysis each factor is tested individually (not in conjunction with any other such factor) against the social relationships index with which it was found associated in the bivariate analysis while gradually this association is adjusted for all selected sociodemographic covariates (age, sex, education, family income and area of residence). Thus, multiple series of regression models have been developed in order to assess the connection of the various determinants of social relationships with the two sociability indices (Friendship & Family Relationships Indices).

The criterion used for the selection of the psychosocial predictors of the two social relationships indices is their initial correlation to either index. Specifically all factors that appeared at the earlier stages of the analysis to correlate significantly to either of the social relationships indices are included in the first stage of the "sociability tree" building process. The purpose of this first stage is to identifying the psychosocial

factors that relate significantly to social relationships and therefore qualify to enter the second stage of the regression analysis.

7.7.3.1.1 The determinants of Friendship Index

The multivariate regression analysis shows that four out of the five factors that initially correlated to Friendship Index remain significantly related to it after adjusting for all confounding variables (see Appendix 16). These factors are: Responsibility Assumption, Provision of Practical Help, Volunteering and Collectivism-Dependency. Thus, the first major finding of our analysis is that altruism and collectivism are positively connected with friendship (measured as Friendship Index) beyond age, sex, socio-economic status, and area of residence (rural or urban). Provision of Practical Help and Volunteering are the predictors most closely related to the outcome. The standardized regression coefficient of the fully adjusted versions of the relationship between Provision of Practical Help and Friendship Index is $b=.13$ ($p \leq .01$) and of the relationship between Volunteering and Friendships Index is $b=.14$ ($p \leq .01$) while both models explain approximately 8% of the Friendship Index variance. Also it worth mentioning that alone either Provision of Practical Help or Volunteering explains approximately 4% of the dependent variance.

The third altruistic factor which found significantly related to Friendship Index is Responsibility Assumption. The standardized regression coefficient of this relationship after adjustment for age, sex, education and area of residence is $b=.1$ ($p \leq .01$) with the percentage of the outcome variance the model explain is also around 8%. Collectivism-Dependency is the only collectivistic factor that associated with Friendship Index. Their initial (unadjusted) association is $b=.13$ ($p \leq .01$) and the strength of this association remains intact after adjusting for age, sex, education and area of residence ($b=.12$, $p \leq .01$). The Collectivism-Dependency – Friendship Index model, like all the previously presented models, explains approximately 8% of the outcome variance. The bivariate analysis has also highlighted Altruism as a significant predictor of Friendship Index. Nevertheless Altruism does not remain so once the multivariate model is adjusted for area of residence. Based on these findings the next stage of the analysis will included as

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potential determinants of friendship the following factors: Responsibility Assumption, Provision of Practical Help, Volunteering and Collectivism-Dependency which are found significantly related to the outcome after controlling for major confounders.

7.7.3.1.2 The determinants of Family Relationships Index

The multivariate regression analysis highlights only two factors out of the five that initially correlated to Family Relationships Index (Altruism, Practical Help, Volunteering, Horizontal Collectivism and Horizontal Individualism) as significant predictors of it (see Appendix 16). These are: Provision of Practical Help and Horizontal Collectivism. Thus, the main finding of this set of regression analyses is that altruism and collectivism, as with Friendship Index, are found positively related to Family Relationships Index. Both Provision of Practical Help and Horizontal Collectivism remain significantly associated with Family Relationships Index in models that are adjusted for age, sex, education, family income and area of residence.

The initially (unadjusted) high correlation between Provision of Practical Help and Family Relationships Index decreases in the fully adjusted model but nevertheless remain statistically significant. The model explains in total approximately 12% of the variance of the variance of Family Relationships Index while Provision of Practical Help alone explains approximately 4% of it.

Horizontal Collectivism is the second factor that the analysis points out as a significant predictor of Family Relationships Index. Its initial (unadjusted) relationship to it also decreases but nevertheless remains significant to a higher statistical level (p≤.01) after adjustment for age, sex, education and area of residence The "Horizontal Collectivism – Family Relationships Index" model in its fully adjusted form explains approximately 10% of the Family Relationships Index's variance while Horizontal Collectivism alone approximately 2% of it. The results of this stage of the analysis will be used to build the final integrated family-related sociability model which then in turn will be employed to explain mental health.

7.7.3.2 The second part of the "sociability tree" building process: developing the two sociability "trees" (multivariate integrated sociability models)

In this section of the results the development of the two integrated multivariate sociability models is presented; one for each index of social relationships. All factors that are significant predictors of either of the indices of social relationships (in section 7.7.3.1) will enter the respective final sociability model. The ultimate aim of this process is by making the best use of the available data to create two models that explain in the best possible manner sociability. These two final models will be the two "sociability trees" which will then be used to explain in a comprehensive way the two health outcomes of the study – mental and general health.

7.7.3.2.1 The friendship "tree" (the integrated multivariate model for friendship)

The multiple regression analysis performed primarily shows that our implicit hypothesis that altruistic and collectivistic factors are potentially important determinants of friendships should be considered, at least partially, valid. Most of collectivistic and altruistic factors in the model remain important predictors of the Friendship Index after controlling for all potentially major confounders (see table 33). Specifically three (Provision of Practical Help, Volunteering and Collectivism-Dependency) out of the four psychosocial (collectivistic or altruistic) factors that entered the analysis are found significantly related to the outcome after controlling for sex, age, education or family income and the dichotomous variable area of residence (urban vs. rural). The contribution of all three factors to friendship as expected is positive and in most cases more powerful than that of sex or family income or education. Collectivism-Dependency, in the fully adjusted model, is the most powerful predictor of the outcome (standardized b=.12, p≤.01). The two altruistic factors are somehow a bit less strongly related to the outcome than the Collectivism-Dependency (standardized b=.1 (p≤.01) and standardized b=.09 (p≤.05) for Provision of Practical Help and Volunteering, respectively). The fully adjusted model accounts approximately for 10% of the dependent variance.

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The only psychosocial factor that does not seem to predict the outcome in this final integrated model is Responsibility Assumption. This factor although positively related to the outcome at earlier stages of the analysis (see 7.7.3.1) failed to show any sign of significant relationship to the outcome in this part of the analysis.

Table 33. Linear Regression Models: Responsibility Assumption, Practical Help, Volunteering and Collectivism-Dependency vs. Friendship Index

Independent Variables	Unadjusted Model	Model adjusted for sex	Model adjusted for sex and age	Model adjusted for sex, age and family income (log)	Model adjusted for sex, age and education	Model adjusted for sex, age and area of residence (urban vs. rural)	Model adjusted for sex, age, family income (log) and area of residence (urban vs. rural)	Model adjusted for sex, age, education and area of residence (urban vs. rural)
RA	.054	.050	.047	.032	.032	.057	.045	.043
PoPH	.137**	.133**	.131**	.122**	.136**	.110**	.089*	.103**
VOL	.118**	.119**	.121**	.142**	.133**	.090*	.094*	.086*
C-D	.102**	.108**	.116**	.142**	.134**	.101*	.122**	.116**
Sex		-.128**	-.132**	-.125**	-.119**	-.127**	-.114**	-.106**
Age			-.030	.002	.000	-.052	.030	.024
Family Income (log)				.107*	N/A	N/A	.150**	N/A
Education					.103*	N/A	N/A	.149**
Area of residence						.090*	.152**	.148**
(R²)	.065	.081	.082	.090	.091	.087	.103	.103

*p≤ .05, **p≤ .01, m denotes 1>p>.05

RA=Responsibility Assumption, PoPH= Provision of Practical Help, VOL=Volunteering and C-D=Collectivism-Dependency

7.7.3.2.2 The family relationships "tree" (the integrated multivariate model for family relationships)

The Family Relationships Index is regressed on Provision of Practical Help and Horizontal Collectivism in a model gradually adjusted for sex, age, family income, education and area of residence (see table 34). In all these models and no matter which confounding variables are included in them, both Provision of Practical Help and Horizontal Collectivism factors are proven to be significant predictors of the outcome. The altruistic factor Provision of Practical Help which initially was the most powerful predictor of the outcome gradually loses some of its predictive value over family relationships (especially after the inclusion of area of residence as a potential confounding variable in the model) but remains a statistically significant predictor of them. The regression coefficient of the relationship between Provision of Practical Help and Family Relationships Index in the fully adjusted model is standardized $b=.09$ ($p \leq .05$). The association of Horizontal Collectivism with the outcome is weaker than that of Provision of Practical Help but nevertheless remains relatively stable and significant along the various stages of adjustment for the selected confounding variables. The regression coefficient of its relationship to the outcome in the fully adjusted model is standardized $b=.08$ ($p \leq .05$).

The main conclusion of this part of the analysis is that collectivistic (Horizontal Collectivism) and altruistic (Provision of Practical Help) factors contribute positively to the family-related sociability.

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Table 34. Regression Models: Provision of Practical Help and Horizontal Collectivism vs. Family Relationships Index

Independent Variables	Unadjusted Model	Model adjusted for sex	Model adjusted for sex and age	Model adjusted for sex, age and family income (log)	Model adjusted for sex, age and education	Model adjusted for sex, age and area of residence (urban vs. rural)	Model adjusted for sex, age, family income (log) and area of residence (urban vs. rural)	Model adjusted for sex, age, education and area of residence (urban vs. rural)
Provision of Practical Help	.189**	.188**	.195**	.170**	.190**	.094*	.079*	.094*
Horizontal Collectivism	.104**	.104**	.106**	.116**	.117**	.078*	.083*	.079*
Sex		-.018	-.011	-.037	-.033	-.003	-.015	-.004
Age			.079*	.056	.035	-.023	-.021	-.024
Family Income (log)				-.116**	N/A	N/A	.002	N/A
Education					-.130**	N/A	N/A	.008
Area of residence						.322**	.328**	.319**
(R^2)	.054	.054	.060	.068	.075	.143	.141	.143

*p≤ .05, **p≤ .01, m denotes 1>p>.05

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7.7.4 Using the sociability "trees" to explain health: the final structural equation models of sociability and health

In this section the final multivariate models for health and sociability are presented. These models are variants of the conceptual model presented in the introduction chapter (see figure 2) and is an attempt to explain, in practical terms, mental and general health by employing the "sociability trees" (integrated sociability models) which were developed at the previous stages of the analysis (section 7.7.3). The ultimate aim of both multivariate models presented here is to explore in depth the association between friendship- or family-related sociability and health. The analysis presented in this section has two parts: a) the development of an integrated model of family-related sociability ("family-related sociability tree") and mental health and b) the development of an integrated model of friendship-related sociability ("friendship-related sociability tree") and general health. This decision to estimate exclusively only these two models (family-related sociability vs. mental health and friendship-related sociability vs. general health) was made in the light of the results of earlier analysis showing a lack of significant associations between Friendship Index and mental health and Family Relationships Index and general health. The two models are presented below in their unadjusted and fully adjusted (adjusted for age, sex, socioeconomic position and area of residence) forms (for the full results of the analysis see Appendices 18 and 19). They have been developed using structural equation modelling. The same models have also been tested using conventional linear regression technique just for comparison reasons (see Appendix 20).

7.7.4.1 "Family-related sociability tree" and Mental Health scale

The association between the family-related sociability and mental health is explored through structural equation analysis; specifically a model encompassing family relationships, their psychosocial determinants and mental health is estimated. Both the unadjusted and fully adjusted models are based on 916 cases. The unadjusted model (which includes the Family Relationships Index, its two psychosocial determinants

namely Provision of Practical Altruism and Horizontal Collectivism (with all their constituent items) and mental health as an outcome) has satisfying goodness-of-fit (x^2=166.2 (df=50), CFI=.996 and RMSEA=.05 (95% CI=.042-.059)) and it explains approximately 3% of the variance of mental health (see table 35 and figure 12). The standardized regression coefficient for the relationship between Family Relationships Index and mental health is b=.118 (p≤.000) while the respective coefficient for the Horizontal Collectivism is b=.091 and marginally does not exceed the conventional limit of statistical significance (p≤.056). Horizontal Collectivism is as well indirectly (through the Family Relationships Index) associated to mental health (standardized b=.02, p≤.005). Provision of Practical Altruism (the other determinant of family relationships included in the analysis) is also indirectly related to the outcome (b=.02 (p≤.000)). Thus, in the unadjusted model all the independent variables (either the family relationships or their determinants) are either directly or indirectly associated with mental health.

The adjustment of the model for age, sex, socioeconomic position (education and family income) and area of residence does change much the conclusions draw on its unadjusted version. The adjusted version of the model explains almost 14% of the outcome variable variance and its goodness-of-fit is satisfying (x^2=301.6 (df=98), CFI=.995 and RMSEA=.048 (95% CI= .042-.054)) (see table 36 and figure 13). Family Relationships remain directly related to mental health and Horizontal Collectivism's association with it (mental health) also becomes statistically significant. The standardized regression coefficients of these associations are b= .117 (p≤.001) and .092 (p≤.05), respectively. Interestingly, Horizontal Collectivism maintains also its indirect but significant association with mental health through family relationships (standardized b= .012, p≤.01). Thus, the total "effect" of Horizontal Collectivism on mental health is standardized b=.104 (p≤.01). On the contrary, the indirect association between Practical Help and mental health observed in the unadjusted model does not remain statistically significant. A replication of the model using conventional linear regression techniques (Ordinary Least Regression – OLS) is presented in Appendix 20 and the full results of the structural equation analysis are presented in Appendix 18.

Table 35. The structural equation model of "family-related sociability and mental health" (unadjusted version): direct, indirect and total standardized regression estimates			
	Independent variable		
	Standardized Total Estimates		
Dependent Variable	Horizontal Collectivism	Provision of Practical Help	Family Relationships Index
Family Relationships Index	.137**	.184**	N/A
Mental Health	.108^m	.012	.118**
	Standardized Direct Estimates		
Family Relationships Index	.137**	.184**	N/A
Mental Health	.091^m	-.009	.118**
	Standardized Indirect Estimates		
Mental Health	.016**	.022**	N/A
*p≤ .05, **p≤ .01, m denotes 1>p>.05.			

Rectangle=observed variable, Circle = unobserved latent variable, Single-head arrow= regression, Shaded single-head arrow= statistically non-significant regression, Double-head arrow = Correlation
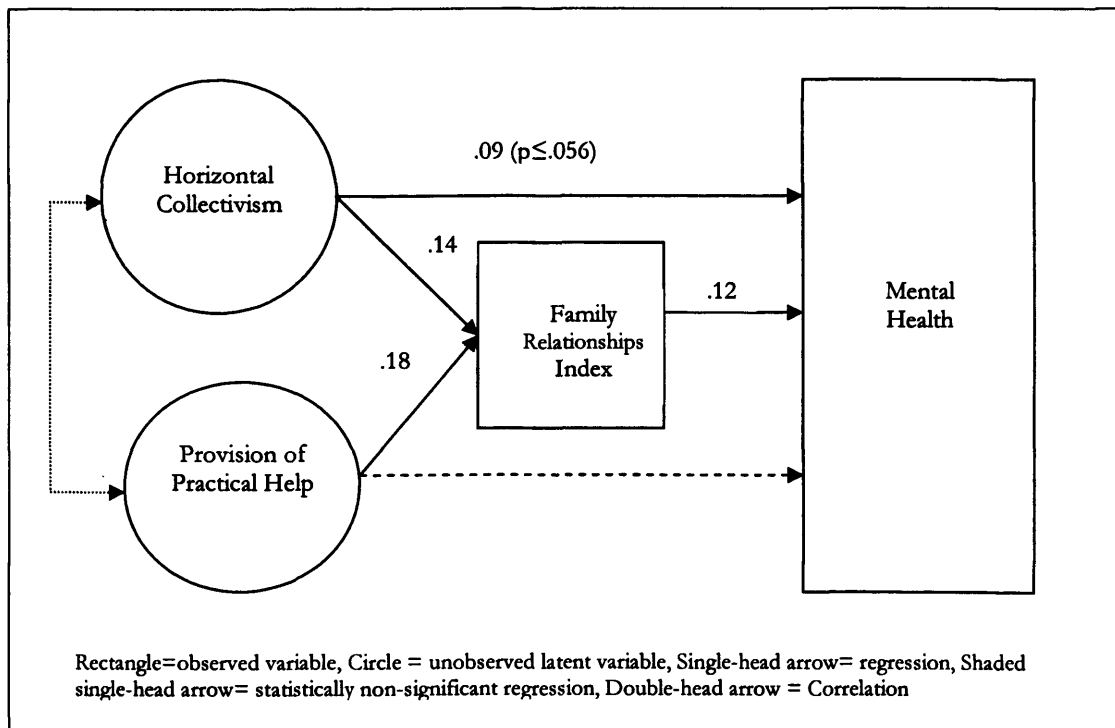
Figure 12. The unadjusted structural equation model of family-related sociability and Mental Health

Table 36. The structural equation model of "family-related sociability and mental health model" (adjusted version): the direct, indirect and total standardized regression estimates							
	Independent variable						
	Standardized Total Estimates						
Dependent Variable	**PoPH**	**HC**	**SES**	**Area of residence**	**Sex**	**Age**	**FRI**
FRI	.068	.104*	.005	.261	-.006	-.015	N/A
Mental Health	-.055	.104*	.365**	.254**	-.135**	.033	.117**
	Standardized Direct Estimates						
FRI	.068	.104*	.005	.261**	-.006	-.015	N/A
Mental Health	-.063	.092*	.364**	.223**	-.134**	.034	.117**
	Standardized Indirect Estimates						
Mental Health	.008	.012*	.001	.03**	-.001	-.002	N/A
*p≤ .05, **p≤ .01, m denotes 1>p>.05 PoPH= Provision of Practical Help, HC=Horizontal Collectivism and FRI=Family Relationships Index							

Rectangle=observed variable, Circle = unobserved latent variable, Single-head arrow= regression, Shaded single-head arrow= statistically non-significant regression, Double-head arrow = Correlation
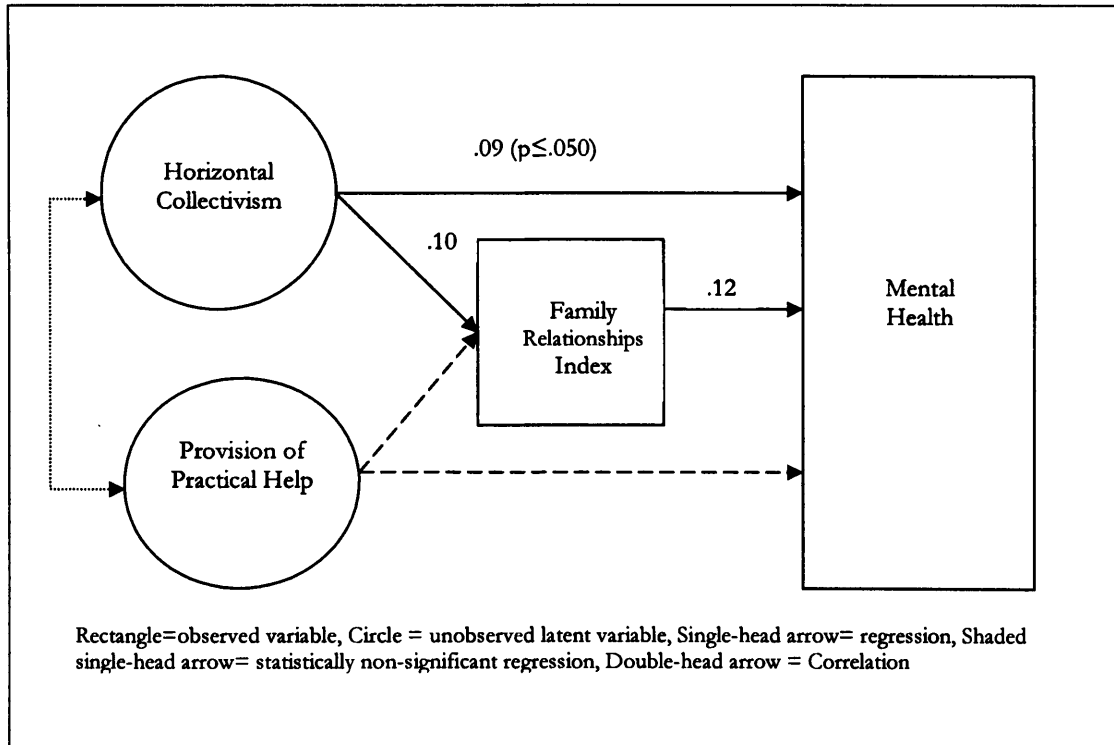
Figure 13. The fully adjusted structural equation model of family-related sociability and Mental Health

The analysis primarily shows that the model fits well the data. The good goodness-of-fit of the model is an important finding showing that the proposed in this study conceptual model for sociability and health is technically and methodologically valid as its variant for mental health and family-related sociability fits the data. It also highlights the importance of family relationships and collectivism for mental health and underlines the consistency of these associations. Moreover, it provides firm basis to suggest (as family relationships do not relate to general health) that at least partially social relationships associate in a positive manner with mental health.

Specifically, the structural analysis shows that the association of Family Relationships Index with mental health is a positive one over and above any other factor. This positive association denotes the significance of family bonding for mental health and/or the detrimental effect of not having family bonds for mental balance and well-being. Family bonding and an active family network are expected to function as a protective web which preserve (and may be enhance) people's piece of mind and mental health (at least in Greece). This finding corroborates the conclusions draw in earlier stages of the analysis about the importance of family relationships for mental health.

As regards the associations between the selected determinants of family relationships and mental health, the structural analysis highlights Horizontal Collectivism as a potentially important predictor of mental health. Horizontal Collectivism relates to mental health both indirectly (through family relationships) and directly (marginally though). These findings provide ground to argue that having collectivistic spirit and a sense of referral to one's own group seem to be beneficial for mental health (at least at an individual level). In contrast, Provision of Practical Help, the altruistic factor included in the model, does not associate much with mental health. It is connected with it exclusively indirectly and only as long as the model is unadjusted for the selected socio-demographic variables.

These findings are consistent with earlier analysis findings suggesting the existence of an important association between Horizontal Collectivism and mental health and the lack of an association (even at a bivariate level) between Provision of Practical Help and

mental health (see table 23). The model also shows that socioeconomic status (the combined family income and education factor) exerts a positive and direct influence on mental health contrary to sex which is a directly negative predictor of the outcome (women have poorer mental health). Age did not seem to influence the outcome while area of residence has both direct and indirect positive contributions to both family-related sociability and mental health (inhabitants of rural areas have more adequate family relationships and better mental health than the city dwellers). The results concerning the associations between the socio-demographic variables and the outcome can be found in Appendix 18.

7.7.4.2 "Friendship tree" and general health

The proposed integrated model of friendship-related sociability and general health is also tested through structural equation analysis. Both the unadjusted and adjusted versions of the model are based on 843 cases. In its unadjusted version (see table 37 and figure 14) the model accounts approximately for 4% of the dependent variable's variance and it fits adequately the data (x^2=301.9 (df=91), CFI=.994 and RMSEA=.052 (95% CI 46-59)). Friendship Index and Collectivism-Dependency are directly associated with the outcome as in the linear regression model replicating this structural equation model (see Appendix 20). The former has a positive direct connection with general health (standardized b=.15, $p \leq .000$) while the latter has a negative direct association with it (standardized b=-.11, $p \leq .05$). In addition the unadjusted structural model provides evidence for the existence of an indirect relationship between Provision of Practical Altruism and the outcome through friendships. The indirect association between Provision of Practical Help and general health is b=.044 and is statistically significant ($p \leq .05$). In a similar way Collectivism-Dependency seems to exert apart from its direct relationship to the outcome, an indirect positive but statistically non-significant influence on the outcome (b=.015, $p \leq .078$).

The fully adjusted for sex, age, area of residence (urban vs. rural) and socioeconomic status (family income and education) model accounts for almost 23% of the dependent variable (see table 38 and figure 15). The fitness of the model is good (x^2=486.5

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(df=151), CFI=.992 and RMSEA=.051 (95% CI=.046-.057)). The standardized regression coefficient of the direct relationship between Friendship Index and general health is b=.09 (p≤.05). Interestingly Collectivism-Dependency looses its significance as a direct predictor of the outcome while its indirect association with it remains significant (b=.013, p≤.05). Regarding the confounding variables all of them are related directly and in a statistically significant manner to the outcome. Age is a very powerful negative predictor of the outcome while in addition socioeconomic position (education and family income) and sex are as well indirectly related to it. Sex is negatively related to general health (older people and women reported poorer general health) and higher socioeconomic status and living in rural areas are associated with better general health (see Appendix 19 where the full results of the analysis are presented).

Table 37. The structural equation model of "friendship-related sociability and general health" (unadjusted version): direct, indirect and total standardized regression estimates					
Dependent Variable	**Independent Variable**				
	Standardized Total Estimates				
	Collectivism - Dependency	Volunteering	Responsibility Assumption	Practical Help	Friendship index
Friendship index	.095	-.016	-.051	.288	N/A
General Health	-.097	.068	-.099	.11	.153
	Standardized Direct Estimates				
Friendship index	.095m	-.016^m	-.051	.288*	N/A
General Health	-.111*	.07	-.092	.066 ^{m}	.153**
	Standardized Indirect Estimates				
General Health	.015^m	-.002m	-.008	.044*	N/A
*p≤ .05, **p≤ .01, m denotes 1>p>.05.					

Rectangle=observed variable, Circle = unobserved latent variable, Single-head arrow= regression, Shaded single-head arrow= statistically non-significant regression, Double-head arrow = Correlation
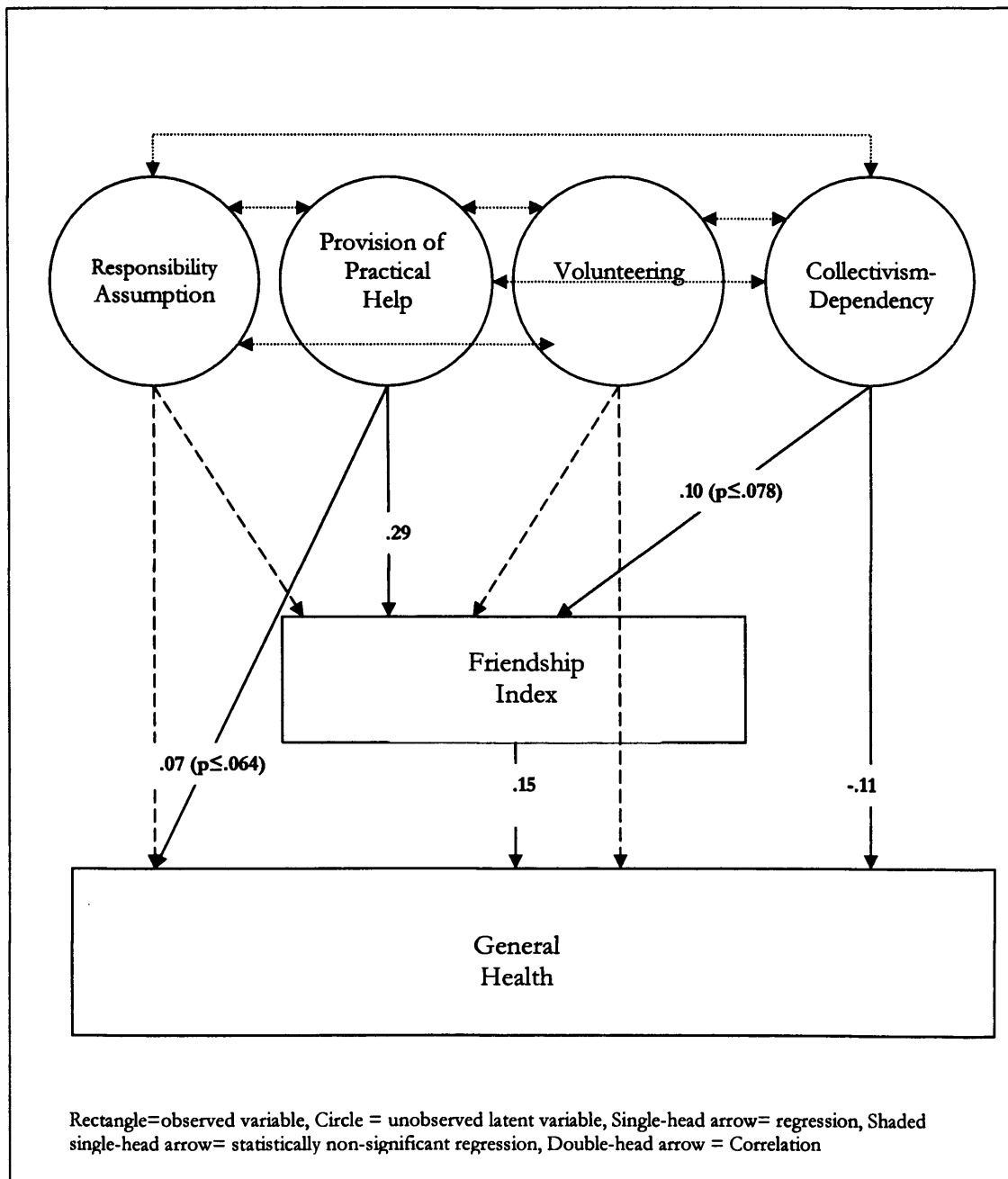
Figure 14. The unadjusted structural equation model of friendship-related sociability and General Health

Table 38. The structural equation model of "friendship-related sociability and general health" (adjusted version): direct, indirect and total standardized regression estimates

Dependent Variables	Independent variable								
	Standardized Total Estimates								
	PoPH	C-D	VOL	RA	SES	Area of residence	Age	Sex	FI
FI	.28	.14	.04	-.11	.16	.05	.02	-.1	N/A
General Health	.05	.053	.16	-.16	.26	.13	-.29	-.18	.09
	Standardized Direct Estimates								
FI	.281ᵐ	.142*	.043	-.111	.158**	.049	.022	-.12**	N/A
General Health	.024	.04	.157	-.152	.241**	.123**	-.296**	-.167**	.089**
	Standardized Indirect Estimates								
General Health	.025ᵐ	.013*	.004	-.01	.014**	.004	.002	-.011**	N/A

*p≤ .05, **p≤ .01, m denotes 1>p>.05
FI=Friendship Index, PoPH=Provision of Practical Help, VOL=Volunteering, SES=Socioeconomic status
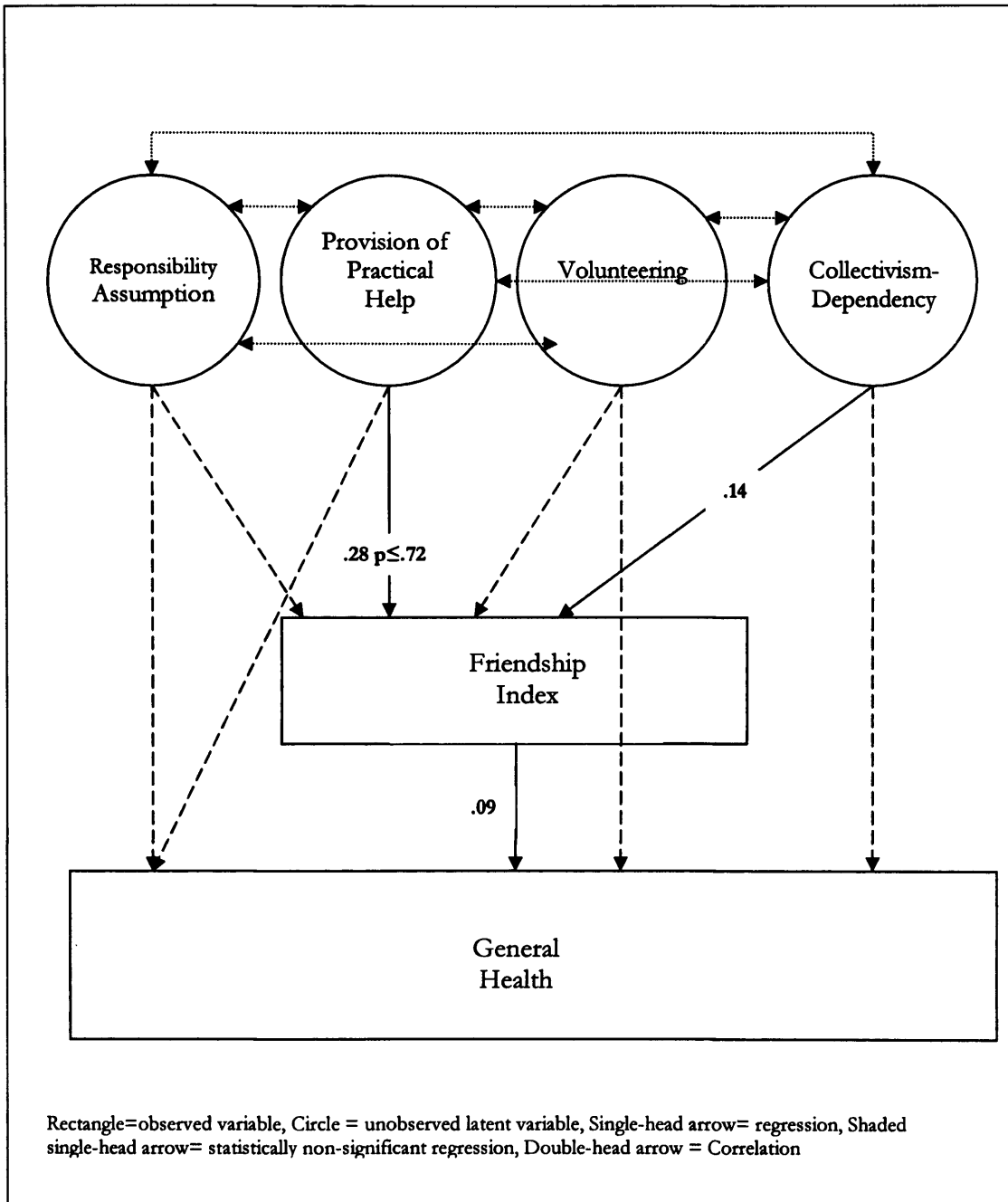
Figure 15. The fully adjusted structural equation model of friendship-related sociability and General Health

The analysis shows that the model has an adequate goodness-of-fit and provides firm basis to support that there is a significant relationship between friendship-related sociability and general health. Therefore, it provides grounding to support that the conceptual model this study proposes is appropriate in explaining the interaction between friendship-related sociability and self-perceived health. It also provides basis to support the conclusion that friendships relate partially to general health (as friendships do not relate to mental health) over and above the confounding effect of any other factor. Moreover, it provides evidence that Provision of Practical Help and Collectivism-Dependency influence indirectly general health as determinants of friendship-related sociability.

Specifically, the structural model (either in its unadjusted or fully adjusted form) highlights friendships as an important predictor of general health. The Friendship Index is found to be a variable with a positive influence on the outcome which persists even after controlling for all major confounders and all selected determinants of friendships. Thus, it is warrant to postulate that a good quality and adequate quantity web of friendships is a condition for people to be healthy and flourish. Similarly our model indicates the existence of a positive indirect connection between Collectivism-Dependency and the outcome. Collectivism-Dependency is a factor included in the model as determinant of the Friendship Index and as such it appears being indirectly (through the Friendship Index) related to general health. Based on this finding one can assume that having a collectivistic attitude towards life promotes friendship between people which in turn help people maintain a good health status and perceive themselves as healthy and capable. At a first glance this positive indirect association of Collectivism-Dependency with general health seems contradictory with its negative direct association (in the unadjusted version of the model) with the same outcome. But a more thorough consideration of this antithesis could only show that this should be expected given that on the one hand the dependency element of the Collectivism-Dependency factor most probably relates to poor health while on the other does its collectivistic element is compatible to being social and having friends.

Apart from Collectivism-Dependency three more factors which were found at previous stages of the analysis to be significantly associated to Friendship Index are included in the model. None of these, though, associates to the outcome either directly or indirectly in the final adjusted model. Only Provision of Practical Help associates with general health indirectly in the unadjusted version of the model but this association does not remain significant once the model is adjusted for the selected confounding variables. As regards the association between Volunteering and general health, the model confirms the findings of previous stages of analysis (see 7.7.2.2) showing that Volunteering does not qualify as an independent predictor of general health once friendships (Friendship Index) are taken into account.

In contrast, all the confounding variables included in the final adjusted version of the model are significantly associated to the outcome. The socioeconomic status (a factor including education and family income) and area of residence are positively related to the outcome (higher socioeconomic status and living in a rural area associate with better general health) while on the contrary sex is negatively associated to the outcome (women have poorer health than men). Particularly powerful is the negative relationship of age to the outcome (older participants have considerably worst health than their younger counterpartners). A tangible indication of the powerful association between age and general health is the approximately 10% increase in the percentage of the dependent's variance the model explains once age is included in it.

7.8 Summary

In summary, the main results of the analysis are:

The development of the ten altruistic, individualistic and collectivistic factors/determinants of social relationships

1. The factor analysis of the helping behaviour (altruism) data has revealed the existence of four altruistic factors.

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2. The factor analysis of the self-construal (individualism – collectivism) scale has revealed the existence of three individualistic and three collectivistic factors.

3. Collectivism and Individualism co-exist and they do not seem to be mutually exclusive concepts.

Social relationships and health

1. All observed associations between any of the three social relationships-related examined variables ("Having friends or not", Family Relationships Index and Friendship Index) and health (either mental or general health scale) are positive.

2. Family relationships (measured as Family Relationships Index) found significantly related to mental health scale at all stages of analysis. On the contrary they do not relate at all to general health.

3. Friendships (measured as Friendship Index) found positively related to general health scale at all stages of analysis. The initial correlation between friendships and mental health became statistically non-significant once adjusted for the selected covariates.

4. "Lacking friends" at the multivariate stage of the analysis do not relate significantly to health although at the bivariate analysis it predicted both health outcomes.

Individualism, collectivism and health

1. Only three out of the six individualistic/collectivistic factors relate to health at the bivariate stage of the analysis (Horizontal Collectivism, Collectivism-Dependency and Sense of Uniqueness).

2. Horizontal Collectivism is the only individualistic/collectivistic factor (out of the six examined) found relates positively to both health outcomes even after adjustment for all major socio-demographic covariates.

3. Horizontal Collectivism is the only factor (out of all factors examined) which found related to general health over and above social relationships (friendships).

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4. Collectivism-Dependency found negatively related to general health but this association does not hold after its adjustment for the selected socio-demographic covariates.

5. No individualistic factor relates to either of the health outcomes at the multivariate stage of the analysis. Only "Sense of Uniqueness" relates negatively to mental health at the bivariate stage of the analysis.

Altruism and health

1. Only two out of the four altruistic factors relate to health at the bivariate stage of the analysis (namely Provision of Practical Help and Volunteering).

2. Volunteering is the only altruistic factor (out of the four examined) found positively related to both health outcomes even after adjustment for all selected socio-demographic covariates.

3. Volunteering is the only factor (out of the all factors examined) found related to mental health over and above social relationships (family relationships)

4. Provision of Practical Help found positively related to general health at bivariate level but this relationship became non-significant once adjusted for the selected socio-demographic covariates

Individualism, collectivism and social relationships

1. Collectivism relates to social relationships

2. Individualism relates only to a minimal extent to social relationships

3. Horizontal Individualism is the only individualistic factor (out of the three examined) that found related to social relationships (family relationships)

4. All observed associations among individualistic and collectivistic factors and social relationships are positive

5. The only individualistic/collectivistic factor that associates positively to Friendship Index (either at a bivariate or at a multivariate level) is Collectivism-Dependency

6. Two individualistic/collectivistic factors (Horizontal Collectivism and Horizontal Individualism) correlate significantly to Family Relationships Index but only the former remains a significant predictor of it at a multivariate level.

7. Horizontal Collectivism is the only factor that significantly correlates to "having friends or not"

Altruism and social relationships

1. Almost all four altruism-related factors correlate significantly to all three social relationships related variables. Only Altruism does not correlate to "Having friends or not" and Responsibility Assumption to Family Relationships Index.

2. All observed associations among altruistic factors and social relationships are positive

3. Provision of Practical Help and Volunteering remain positively associated to Friendship Index at a multivariate level of the analysis.

4. Provision of Practical Help remains positively associated to Family Relationship Index at a multivariate level of the analysis.

8 DISCUSSION

The present study is predominantly exploratory and aims to enlighten the possible associations among social relationships, their determinants and health. It tests two hypotheses which refer to the potential pathways through which different aspects of sociability relate to health.

1) The first hypothesis is that:

People who are more socially orientated have better health than those who are less socially orientated.

The second hypothesis has two parts.

The first part is that:

2a) People who have strong altruistic and collectivistic orientations have better health than those with less strong altruistic and collectivistic orientations.

The second part is that:

2b) The associations of altruistic and collectivistic orientations with health are direct and over and above the potential mediating effect of social relationships on them.

The results of the analysis performed provide basis to partially accept both hypotheses. The first hypothesis tested refers to the association of social relationships with health. The present study examined three different measures of social relationships (a family relationships index, a friendship index and the dichotomous variable "Have you got any friends?") against the two selected health outcomes (mental and general health) in order to assess the strength of the association between social relationships and health.

The performed analysis highlights the existence of significant positive associations between family relationships and mental health and friendships and general health over and above the confounding effect of any major covariate. These two powerful observed associations constitute a clear indication that social relationships relate positively to human health and that people who are more socially orientated have better health than those less socially orientated. Nevertheless the analysis also shows that not all types of social relationships associate to the same extent with all dimensions of health (as family

relationships were not significant predictor of mental health and friendships of general health). Therefore, it suggests that the effect of the various types of social relationships on health is not uniform and that there is not sufficient empirical grounding to support that in general social relationships relate to health. The findings rather indicate that specific types of social relationships relate to specific health outcomes. Specifically they show that friendships relate to having a good physical health state and family bonds are important for mental health.

These findings are very important as they can be used as basis to argue that the existing hypothesis that at individual level social relationships are beneficial for health is far too broad and should be refined. Specifically the analysis provides evidence that this hypothesis could be broken down into at least two related but distinct hypotheses; one focusing on the potential effect of family relationships on health and another concentrating on the association between friendships and health. This refinement of the existing hypothesis would add to the clarification of the association between health and social relationships and potentially could support future research in exploring more effectively what proportion of the proposed effect of social relationships on health is attributable to family relationships and what to friendships. Also it could be proven particularly useful in showing in practical terms what health outcomes relate to family life and what to friendships and broader social networks. The empirical manifestation of the differences between family relationships and friendships in relation to health should be seen as a contribution of the present thesis to the study of the social determinants of health.

Another interesting finding in relation to the first hypothesis is the lack of any significant association at a multivariate level between lacking friends and either of the health outcomes. The lack of such association between lacking friends and mental health is rather expected as neither the friendship index relates significantly to mental health at the multivariate stage of the analysis and one could plausibly assume that friendships in general do not relate much to mental health in middle and older age. On the contrary the lack of a significant association between lacking friends and general health seems, at a first glance, rather unexpected given that the friendship index is an important predictor of this health dimension. But a more thorough examination of the

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data would show that this finding is not peculiar as it does not associate that much with the possible connection between friendships and general health but rather shows that sociability is a complex and multidimensional concept which encompasses but is not limited to family relationships and friendships. It is a finding showing that people develop and use, apart from family relationships and friendships, various other social mechanisms to get social (e.g. everyday socializing within the boundaries of a community) which also need to be examined in relation to health. Based on these findings, the first hypothesis could only partially be accepted as the association between social relationships and health does exist but not all kinds of social relationships associate with both mental and general health.

With respect to the first part of the second hypothesis the results show that some but not all of the altruistic and collectivistic factors associate with health. It is found that Volunteering and Horizontal Collectivism are the only two factors (out of the ten altruistic, individualistic and collectivistic factors examined) which relate significantly to both health outcomes after controlling for all selected covariates. These findings provide a basis to partially accept the first part of the second hypothesis as people with stronger altruistic and collectivistic orientation do have better health than those who are less orientated towards collectivism and altruism but not all kinds of collectivistic and altruistic orientation associate with health. Moreover, they indicate the need for further clarification and elaboration of the proposed relationships between altruism, collectivism and health as it seems that it is specific aspects of these two broad concepts (like volunteering and orientation towards relationship harmony) that relate to health. This means that future research needs to refine altruism and collectivism as concepts and beyond that to identify (both in theoretical and empirical terms) the elements of these two concepts that relate to either social relationships or health and use them to explain health or the association between social relationships and health.

The second part of the second hypothesis is about whether the observed significant associations between the psychosocial and cultural determinants of social relationships remain so after their adjustment for social relationships (friendships or family relationships). This part of the second hypothesis refers to the very core of this study

and in fact is about testing whether factors such as Volunteering and Horizontal Collectivism, which are found related to health over and above all major socio-demographic covariates, qualify as independent predictors of health over and above social relationships; whether friendships and family relationships are the exclusive pathways through which such factors relate to health and finally about testing the strength of the association between social relationships and health. It also refers to empirically testing the proposed conceptual model which includes not only social relationships but also their determinants like altruism and collectivism as predictors of health and views the association between sociability and health within a more holistic perspective.

The main findings of the study in relation to the second part of the second hypothesis is that there are altruistic or collectivistic factors which relate significantly to health outcomes even after adjustment for social relationships indices (either family relationships or friendships). Specifically Horizontal Collectivism clearly relates to general health over and above friendships (which is the most powerful relational predictor of general health) and Volunteering relates to mental health over and above family relationships (which is the most powerful relational predictor of mental health). Therefore, the second part of the second hypothesis should not completely be rejected as there is evidence suggesting its partial acceptance. The main conclusion that can be drawn from analysis in relation to it is that most of the selected determinants of social relationships which relate to health express a large proportion of their influence on health indirectly through social relationships but nevertheless there are factors (Horizontal Collectivism and Volunteering) that relate in a direct way to health over and above social relationships. Of course this is an initial conclusion which needs to be tested further in the future.

Moreover, the performed analysis provides evidence that the conceptual model of the present study is valid. Specifically all three possible pathways through which sociability might associate with health, that the model proposes are existing and active. Therefore, there is empirical grounding to suggest that this model can be used as a conceptual tool to explain the interaction between sociability and health. Finally, it should be mentioned that the emergence of collectivism (in its Horizontal Collectivism form) and

volunteering as important autonomous health predictors and the development of the model of "the determinants of social relationships as determinants of health" should be seen as a second contribution (the first was the manifestation of the differences between family relationships and friendships as health determinants) of the present work in the study of health and social relationships.

Also the study meets most of its collateral objectives. It succeeds in providing a fresh and alternative theoretical stance as to how society (and in a sense culture) associate with human health. It also indirectly challenges in a positive manner some currently nodal constructs of social epidemiology (i.e. social support and social capital) by highlighting ignored by them dimensions of the complex association between social relationships and health (e.g. indirect pathways leading from psychosocial factors to health) and by underlining the importance of the determinants of social relationships (and therefore of social support and social capital) as potentially important determinants of health. Furthermore it shows that the proposed (and observed in western countries) association of social relationships with health holds in Greece, too.

In the remainder of this chapter the main findings of the analysis are discussed and possible explanations for them are presented. In order to avoid repetitions if two different observed associations can be explained by the same mechanism (e.g. social support or social isolation potentially can explain both the associations between friendships and general health and family relationships and mental health) then this mechanism will be discussed only once. This undertaking practically imposes the discussion to be divided into two main parts. In the first part the main findings of the study are presented and discussed while in the second part various possible explanations of these findings are proposed. The main findings that are discussed are: the observed associations between dimensions of social relationships and aspects of health (the associations between family relationships and mental health and friendships and general health), the lack of statistically significant associations between aspects of sociability and health (the lack of association between lacking friends and health), the associations between collectivism and altruism and health, the lack of association between individualism and health and the pathways leading from Volunteering and

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Horizontal Collectivism to mental health and general health, through family relationships and friendships, respectively.

The chapter concludes with the discussion of the limits of the presents study, suggestions for future research and the main conclusions.

Before departing to the main part of the discussion it should be stated that the discussion of the possible explanations of the observed associations between various predictors and health is orientated towards highlighting new and possibly less explored pathways from social relationships to health. This means that pathways well-known, well-established and thoroughly studied like that of social support and its effect on health are not going to be discussed in great detail as focusing on them does not add anything new to what is already known on the association between social relationships and health.

8.1 Discussing the findings

8.1.1 Socio-demographic factors and health

All major socio-demographic variables used as covariates in the analysis (age, sex, education, family income and area of residence) found exerting significant effects on both health outcomes. These effects are discussed before departing to the main theme of the study which is the association of sociability (social relationships and their psychosocial and cultural determinants) and health.

Age influences to a major extent general health. This is a finding in accordance with a vast body of epidemiological literature suggesting that age determines physical health and health perceptions (Drewnowski & Evans 2001; Pinquart 2001). The bivariate analysis reveals not just the existence of a relationship between age and general health but also that this relationship has a clear linear and stepwise form; the older people get the worst their health gets. Moreover, the multivariate analysis indicates that age is not just another demographic factor that influences general health but that it is the factor with the most powerful relationship with it (out of all predictors and covariates used in the multivariate analysis). Thus, it is warrant to conclude that age is a very important predictor of general health. On the contrary the relationship of age to mental health is less clear. Older age generally seems to associate with a deterioration of mental health but the relationship between these two variables has not got a clear pattern. The multivariate analysis confirms the findings of the bivariate analysis by showing that age is not a statistically significant predictor of mental health. Nevertheless further exploration of this association between age and mental health is needed as participants who belong to the fourth (oldest) age quartile reported considerably worst mental health than any other age group and therefore older old age might have a particular role to play for mental health as a factor potentially accelerating its deterioration.

As regards sex the present study indicates the existence of major differences between men and women on both mental and general health and brings to the forefront the

persistent sex-related health inequalities and the increased female morbidity both in Greece and elsewhere (WHO 2001; Barsky et al. 2001; Piccinelli & Wilkinson 2000; Pinquart & Sorensen 2001a; van Wijk & Kolk 1997). Specifically the bivariate analysis shows that women consistently reported worst health than men and therefore that sex is a major determinant of health. The multivariate analysis confirms this conclusion by highlighting sex as an important predictor of both health outcomes.

The examination of the association between socioeconomic status and health shows that both education and family income are statistically significant predictors of health and reveals two major intertwined issues; the first is the existence of statistically significant socioeconomic inequalities in health and the second that socioeconomic status relates to health in a stepwise linear manner.

The first issue refers to the existence of non-negligible socioeconomic inequalities in health among the participants and implicitly highlights the importance of income distribution and education as health determinants. The analysis of health by family income or education reveals the existence of significant health differences among the various family income or education groups and shows that these are statistically significant (see Appendix 21). It also shows that respondents living in the poorest households and not having education at all potentially constitute a population at risk which needs immediate help as they reported much worst health than any other income or education group. As regards the second issue the breakdown of health by family income and particularly by educational level clearly indicates the existence of a socioeconomic gradient in health. The analysis shows that the higher the family income or the educational qualifications the better the health people enjoy. This is an important finding which confirms that in Greece, as in other developed countries (Marmot 2003; Martikainen et al. 2004; Orpana & Lemyre 2004), the social inequalities in health have the form of a gradient.

Another major socio-demographic factor that has been used as potential confounding variable when building the multivariate models is area of residence. This factor has been used to assess to what extent the associations between social relationships, their determinants and health have a spatial dimension (Curtis & Rees-Jones 1998) and whether the difference between being a city dweller or an inhabitant of a rural area

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could account for a considerable proportion of the outcomes' variance. The bivariate analysis shows that there are not any statistically significant health differences between participants living in urban areas and participants living in rural areas (see 7.4.1). Of course this does mean that there are not any spatial differences in health. It merely means that the crude distinction between urban and rural areas cannot explain per se much of the participants' health and that in order to explore further potential spatial differences in health it is necessary to employ lower level spatial units e.g. villages or neighbourhoods.

8.1.2 Friendships and health

The first important finding of the study in relation to friendship per se is that the participants of the study can easily be divided into two distinct categories according to their friendship status. The first category consists of participants who reported having friends and the second category of participants who reported not having any friends at all. The former group is much larger than the latter but nevertheless the size of the latter is relatively considerable as one in every nine participants belongs to it. Thus, the first major friendship-related conclusion that can be drawn is that a non-negligible proportion of the sample chooses not to socialize through friendship and therefore either to relate to other people through other socialization mechanisms or not to relate at all to other people. Moreover, one can safely conclude that there is no uniformity in people's friendship preferences as there are people who are orientated towards friends and other who are not.

8.1.2.1 Friendship Index and Health

The examination of the association between Friendship Index and health at a bivariate level reveals that the former relates positively to both mental and general health. Therefore, a major finding of this part of the analysis is that friendships associate positively with health. Another major finding of the analysis is that friendships relate stronger to general health than to mental health. This finding is valuable as it leads to

the conclusion that friendship does not relate in a uniform way to all health dimensions and provides sufficient basis to hypothesize that friendships might be important for the general health but less important for mental health.

These initial conclusions based on bivariate associations are confirmed by the multivariate analysis which shows that only the association of Friendship Index with general health remains significant after controlling for all designated covariates whilst that with mental health becomes non-significant. Specifically the multiple regression models developed show that the Friendship Index is a powerful predictor of general health over and above the effect of any socio-demographic covariate or any other factor. They also show that on the contrary the weak association between Friendship Index and mental health becomes marginally significant once the model is adjusted for sex and completely insignificant when in addition the model is controlled either for family income or education.

The observed association in this study between friendship and general health is a finding in line with a voluminous body of literature suggesting the existence of a connection between social relationships and various physical health dimensions ranging from common cold (Cohen et al. 1997) to all-cause mortality (e.g. House et al. 1988). Particularly it is in accordance with recent epidemiological literature focusing on the associations between self-rated health, physical health, functioning and friendship-related sociability which underlines the importance of friendships for various aspects of general and physical health (Hyyppa & Maki 2003; Mendes de Leon et al. 1999; Mendes de Leon et al. 2001; Seeman et al. 1996; Unger et al. 1999; Zunzunegui et al . 2004; Avlund et al. 2004). In contrast the observed lack of association between friendships and mental health is a finding not easily interpretable which will be discussed in greater detail in section 8.3.1. as friendships expected to relate directly to quality of life, life satisfaction and therefore well-being and mental health (see for example House et al. 1988; Seeman 1996; Seeman 2000)

8.1.2.2 Lacking friends and health

People who reported not having any friends at all found (at the bivariate stage of the analysis) having worst mental and general health that those people reported having friends. These associations as those of Friendship Index with the two outcomes are not of equal importance. Although both relationships are statistically significant lacking friends associates much more strongly (as Friendship index does) with general health than with mental health. These findings are of particular importance because they indicate that people who choose completely not to socialize through friends have worst health (both physically and mentally) than those who have an active network of friendships. Nevertheless these findings are of limited applicability as neither associations between not having friends and the two health outcomes holds after the adjustment for the selected covariates. The association of lacking friends with mental health becomes completely insignificant when adjusted just for sex while the association between lacking friends and general health becomes insignificant once it is adjusted for sex and age.

The lack of association between lacking friends and mental health at a multivariate level does not seem unexpected given that neither Friendship Index relates to it. On the contrary the unrelatedness of lacking friends with general health (at a multivariate level) initially might seem surprising given the significance of friendships (Friendship Index) for general health. But a thorough examination of the lack of association between not having any friends and general health shows that this should not be considered surprising at all as the question "Do you have any friends?" refers exclusively to friendships and does not focus on any other kind of social relationships. Thus, it is possible participants who reported not having any friends to have a developed network of social relationships of other kinds which counterbalances the lack of friends. Lacking any friends might not relate to ill-health because exactly people who have not got any friends might have substituted friendships with other kinds of social relationships or compensatory mechanisms and therefore not experiencing the loneliness. This line of

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reasoning becomes even stronger when the composition of the friendless sub-group is examined. A thorough examination of it shows that the majority of it consisted of women of older age. Thus, the observed lack of association at a multivariate analysis between lacking friends and health should be considered more a sign that older woman who do not have any friends do not necessarily suffer from ill-health because of this deficiency rather than an indication that in general lacking friends does not relate to health. This is because being a friendless woman of older age does not necessarily equate to being socially isolated and therefore being at risk. A more detailed account and possible explanations as to why lacking friends is disconnected from health at a multivariate stage are presented in section 8.3.2.

8.1.3 Family relationships and health

An important finding in relation to family relationships per se is that the vast majority (99%) of the participants reported having relatives. This finding shows that almost all of our participants have access to even the most rudimentary network of relatives and therefore indicates the importance of family for the socialization processes during the adult phase of human life.

Family relationships, as friendships, do not relate to both health dimensions examined in this study. The bivariate analysis shows that family relationships relate to mental health but not to general health. In fact the correlation analysis shows that the association between family relationships and mental health is the most powerful correlation out of all the correlations between any social relationships variables and either of the health outcomes. The multivariate analysis simply confirms the findings of the bivariate analysis by showing that family relationships are an important predictor of mental health over and above the potential confounding effect of all the selected covariates and any other factor.

On the contrary, family relationships do not relate to general health. This is an interesting finding that disconnects self evaluations of health and physical health from family relationships and family context. The disassociation of family relationships from general health is a finding in accordance with recent epidemiological evidence suggesting that friendships but not family relationships are positively associated with

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self-rated health (Zunzunegui et al. 2004) and functional status (Mendes de Leon et al. 2001).

8.1.4 Determinants of social relationships (altruism, individualism and collectivism) and health

The analysis indicates that in general the participants reported strong altruistic, collectivistic and individualistic orientations. This is an important finding suggesting that individualism and collectivism can co-exist and should not be considered as opposites. This practically indicates that the same person can well be individualistic and collectivistic and no person should be considered exclusively either the one or the other.

As regards the association between these psychosocial/cultural factors and health, the bivariate analysis indicates that only one altruistic factor and one collectivistic factor (Volunteering and Horizontal Collectivism, respectively) out of the ten included in the study as determinants of the social relationships are significant correlates of both health outcomes. Also in addition it shows that in addition one more altruistic factor (Provision of Practical Help) is positively related to general health while a collectivistic and an individualistic factors (Collectivism-Dependency and Sense of Uniqueness) associate negatively with general health and mental health, respectively. All these findings of the bivariate analysis are important as they show that: a) five (Altruism, Responsibility Assumption, Vertical Individualism, Horizontal Individualism and Vertical Collectivism) out of the ten selected determinants of social relationships do not relate at all to either mental or general health b) collectivism does not necessarily contribute positively to health as Collectivism-Dependency associates – as expected given that it encompasses a dependency element - negatively with general health and c) the association between individualism and health (the relationship between Sense of Uniqueness and mental health) is rather weak and most importantly negative.

In addition the multivariate analysis highlights the importance of Volunteering and Horizontal Collectivism for both health dimensions and shows that no other determinant of social relationships managed to remain significantly related to either health outcomes. Also it indicates that individualism is a concept mostly unrelated to

health (at least in a social environment like that of Greece) as the only association between any individualistic factor and health (that of Sense of Uniqueness with mental health) becomes statistically non-significant after the full adjustment for all major covariates.

The final stage of the multivariate analysis (testing of the second part of the second hypothesis) shows that the associations of Volunteering with mental health and Horizontal Collectivism with general health hold even after adjusted for all selected covariates and either Family Relationships Index or Friendship Index, respectively. This is a particularly important pair of findings as it shows that there are determinants of social relationships that connect to health independently of the social relationships and therefore that there might be other mechanisms (which will is discussed in section 8.2.) through which these factors express their influence on health.

8.1.4.1 Altruism and health

As mentioned above the analysis shows that out of the four altruistic factors included in the study as independent variables only Volunteering (for the common good) relates significantly to both health outcomes after adjusting for key covariates like age, sex, socio-economic position and area of residence. Particularly important is the relationship of Volunteering to mental health. The multivariate analysis suggests that this remains significant even after adjustment for social relationships (family relationships) and therefore that Volunteering seems to be an important autonomous predictor of mental health. The remaining three altruistic factors did not found relate to either health outcome at the multivariate stage of the analysis.

The association between volunteering and health highlighted by the present study coincides with an expanding body of evidence suggesting that volunteering exerts a beneficial impact on human health (Wheeler et al. 1998; Wilson & Musick 1999; Piliavin 2003). Recent studies have shown that volunteering influences positively general and physical health (Ganguli et al. 1998; Glass et al. 1995; Luoh & Herzog 2002; Thoits & Hewitt 2001; Van Willigen 2000), mental health (Van Willigen 2000, Thoits &

Hewitt 2001; Wilson & Musick 2003) and longevity (Ganguli et al. 1998; Luoh & Herzog 2002; Musick et al. 1999; Oman et al . 1999).

8.1.4.2 Collectivism, individualism and health

The analysis shows that collectivism relates to human health while individualism is almost completely unrelated to it. Specifically, three out of the six individualism- and collectivism-related factors found associated with health at the bivariate stage of analysis: Horizontal Collectivism, Collectivism-Dependency and the individualism-related Sense of Uniqueness. From them after adjusting for the selected covariates only Horizontal Collectivism remains a significant predictor of both health outcomes. The relationship of Horizontal Collectivism (HC) to human health is notable because it seems to be multifaceted (Horizontal Collectivism relates to both health outcomes) and particularly powerful (HC associate with general health even over and above social relationships). Therefore, it is plausible to assume that HC is an important independent predictor of general health and its effect on health possibly is rather generic.

Individualism contrary to collectivism does not relate almost at all to human health. The only observed association between any of the individualistic factors and health is that of Sense of Uniqueness with mental health. The bivariate negative association between Sense of Uniqueness with mental health is negative and is in accordance with what psychiatric literature suggests (Ronningstam & Gunderson 1990). But it is not powerful enough as it becomes insignificant once adjusted for all key covariates. The generic lack of association between individualism and health at a multivariate level indicates that individualism is more or less unrelated to health. The unrelatedness of individualism and health could be seen as a consequence of the social and cultural context in Greece where collectivism is valued and having excessively independent self-referral and individualistic orientation would not add much to one's health.

8.1.5 Sociability trees and health

The study aims not merely to test the associations between each one of the selected predictors (either these be social relationships or their determinants) and health but

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most importantly to develop and empirically test a synthetical and integrated model for health and sociability. The proposed conceptual model (see introduction 4.2 and figure 2) encompasses three parts (health, social relationships and their determinants) instead of two (health and social relationships) and is a refined attempt to incorporate psychosocial and cultural factors in the study of health and its association with social relationships.

For the needs of the empirical testing of the conceptual model two structural equation models are developed; one for each of the health dimensions examined. The two structural equation models developed should be seen as variants of the proposed conceptual model in this study. Each model developed consists of a "sociability tree" and the health outcome under examination. Two sociability trees are built, one for family relationships and another for friendships. The sociability trees are constructs which consisted of either friendships or family relationships and selected determinants of them (e.g selected altruistic or collectivistic factors) arranged along a causal line. The sociability tress are built on the basis that social relationships are themselves the final outcome of a complex mechanism and therefore it would be much more useful and fruitful to explain health by employing the entire mechanism (sociability trees) rather than solely its outcomes (social relationships).

The structural equation models developed mostly show that the associations of family relationships with mental health and of friendships with general health are significant over and above the effect of their psychosocial/cultural determinants or any major socio-demographic confounder. Their satisfying goodness-of-fit is a clear sign of the validity of the proposed conceptual model and of its appropriateness in providing a satisfying account of the association between sociability (social relationships and their determinants) and human health. It also constitutes firm empirical grounding to argue that the proposed conceptual model is a good starting point for social epidemiological research; a conclusion that strengthens further when the percentage of the explained health variance by the two models is examined. The fully adjusted model of family relationships and mental health explains approximately 14% of the variance of mental health and the fully adjusted model of friendship approximately 23% of the variance of general health. These findings indicate that the conceptual model could explain a

satisfying part of either mental or general health but they also show that there are many unknown factors that account for the observed health variance which the model does not account for. As regards the health variance that the "sociability trees" explain, the "family relationships tree" explains approximately 3% of the mental health variance whilst the "friendship" tree approximately 4% of the general health variance. These percentages, at the first glance, might look somewhat small but nevertheless are important as they are not smaller than the variance of the dependent variable explained by the major socio-demographic factors (sex, age, education, family income and area of residence) included in the analysis (only exception is the impressive 10% of the general health variance explained by age).

8.1.6   Sociability and health – reverse causation

The study accepts as its conceptual basis the proposition that sociability exerts an impact on health and that health is, in part, the outcome of psychosocial processes and a product of psychosocial and cultural factors like social relationships, altruism and collectivism (social causation approach). Thus, all explanations for the observed associations between sociability-related factors and health offered in the present study are based on the assumption that the former determines the latter. This assumption is based on firm theoretical and empirical evidence (House et al. 1988; Berkman & Glass 2000; Cohen et al. 2000). Nevertheless and regardless its theoretical and empirical soundness this assumption is not the only possible conceptual basis to explain the findings of the present study. Potentially the findings of the present study can be explained by at least two other theoretical approaches; the health selection approach and a "circle-type" causation approach.

The health selection model despite the existing evidence suggesting its weakness to explain the association between social position and health (Manor et al . 2003), could function as an alternative theoretical basis to explain the interaction between sociability and health; especially when dealing with cross-sectional data like these of the present study. According to it, it is health that determines social relationships and not vice versa. Thus, it is healthier people who have more extended and better quality social networks and not that sociability leads to better health through various channels like

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social support or easier access to information. In that sense the observed associations between family relationships and mental health and friendships and general health show the positive effect of mental health on maintaining family relationships and of general health on maintaining an adequate network of friends. Moreover, the powerful associations (over and above social relationship) between Volunteering and mental health and Horizontal Collectivism and general health indicate that people in better mental health state volunteer more and people with better general/physical health tend to care more about the harmony in the relationships.

The second alternative approach is less well established as a social and epidemiological model and refers to an idea by Mendes de Leon and colleagues' for a more complex "circle-type" explanation of the association between social relationships and health (ADLs in their case) (Mendes de Leon et al. 2001). Mendes de Leon and colleagues (drawing on Verbrugge and colleagues' work) suggest that the association between social relationships and health is bidirectional and that there is a constant interaction between these two factors; social relationships affect health which in turn affects social relationships. It is as if social relationships and health constitute a kind of a circuit where any action by one part of the circuit would result in a direct reaction by its other part. This proposed approach is interesting and potentially could be proven fruitful in explaining the association between health and sociability but still lacks a clear conceptual background.

Both alternative approaches could be used as conceptual tools to explain the findings of the present study. But as mentioned already the stance of the present study is that of the social causation and therefore all finding are interpreted in the direction that social life determines health.

8.2 Explaining the observed associations between aspects of sociability and health

The conceptual model of the study proposes three possible pathways through which sociability might relate to health; the first pathway refers to the direct associations between social relationships and health; the second pathway refers to the connections between various determinants of health (e.g. collectivism and altruism) and health; the third relate to the indirect connections of the various determinants of social relationships (e.g. collectivism and altruism) with health through social relationships (see section 4.2). The analysis indicates that all three pathways are proven to be valid, significant and meaningful. As regards the first pathway, the analysis shows that family relationships relate to mental health and friendship to general health in a powerful and statistical way. With respect to the second pathway, Horizontal Collectivism and Volunteering found directly related to both health outcomes over and above all major socio-demographic covariates. Finally regarding the third pathway there is evidence that the associations of Horizontal Collectivism with general health and Volunteering with mental health are significant over and above friendships and family relationships, respectively.

Also the analysis underlines that not all sociability-related variables used could predict health. A number of such variables either do not relate to the employed health outcomes e.g. Responsibility Assumption and Vertical Collectivism or their relationships to them are not strong enough to hold after the adjustment for the selected covariates.

Thus, the crucial questions in connection to these findings are: a) why and in what way sociability relates to health? b) why various sociability-related factors found unrelated to health?

8.2.1 Sociability, social support and health

8.2.1.1 Social relationships as social support mechanisms and health

An obvious explanation for the association between social relationships and health is that the former are a source of social support that function as a protective factor for the latter (Berkman & Glass 2000; Cohen et al. 2000). This explanation is based on the classical epidemiological proposition that social support enhances individual's resistance to disease (host resistance theory - see Cassel 1976). The mechanisms through which social support exerts its protective effect on health are still not very clear. Two models have been proposed, the stress-buffering model and the main effect model (Cohen et al. 2000). The stress-buffering model postulates that social support functions as a mechanism which prevents responses to stressors that might be detrimental for health (Cohen et al. 2000). In contrast, the main effect model does not focus exclusively on the role of social support and social resources as moderating (buffering) forces within the stress-and-health circuit. It suggests that social support and social resources have multiple and main effects on health by influencing a wide array of health-related processes ranging from access to health services to biological processes like the immune system function (Cohen et al. 2000). According to both models it is expected socially orientated people with an adequate number of friends and relatives to enjoy good health as they have access to readily available support of all kinds. In the light of this theoretical approach both associations between friendship and general health and family relationships and mental health can easily be explained as friendships and family relationships are the most important sources of social support.

Friendships could contribute either directly or indirectly to the enhancement of general health in its capacity as a generator of all kinds of social support ranging from emotional to material. The indirect association refers to the transmission of support through friendships which in turn would evoke positive feelings and enhance well-being and finally have a positive effect on health perceptions and physical health. The direct

association pertains to the provision of more practical support like helping, caring and informing which is expected to influence positively general health in a more direct manner.

Social support and particularly emotional support could explain also satisfactorily the association between family relationships and mental health. Having adequate family relationships relates to accessibility to important emotional resources and support (Wellman & Wortley 1990). Therefore, the observed association between mental health and family relationships might be a product of the emotional support provided by the family. People's mental health expected to benefit from the care and emotional warmness they experience in their family environment. Particularly older people or people in need who have relatives to care for them or at least to express some interest in them are expected to be in better mental health state than other people of similar age who have not got this advantage. Recent evidence suggests that emotional support raises the feelings of life-satisfaction of older people (Krause 2004) . Thus, it seems that people and in particular older people in need who receive care by their relatives most probably experience feeling of being valued and not forgotten by the their own family which in turn make them feel more satisfied with life and consequently enhance their mental health.

8.2.1.2 Social relationships, anticipation of support and health

Apart from social support per se, friendships and family relationships might relate to health also through perceptions of support availability (Cohen et al 2000). People's needs by no means are confined to receiving contemporaneous help and support. They go far further to planning and trying to secure all necessary resources for the future. If these resources are secured and people do not have to worry much about the future, they then feel much more relaxed and less stressed. On the contrary, if people feel insecure about the future and reckon that the necessary for their survival resources are not guaranteed, they most probably experience anxiety. Within this perspective it is plausible to assume that having adequate and satisfying social relationships might relate positively to health through its connection with perceptions of support availability.

Individuals (especially older individuals) who have satisfying social relationships might feel less anxious about whether they will receive in the future adequate social support for their survival and well-being.

In particular literature focuses on the perceptions of unavailability of family support and its undermining effect on mental health (Krause 1997). Perceptions of availability of family support are expected to influence in particular the mental health of older people since older people know that their survival depends to a considerable degree on the future provision of support to them by their family. Older people who feel that in the future they will be offered enough resources to cover their needs by their family probably feel secure, have positive emotions and enjoy a better state of mental health. On the contrary, older people who anticipate that the provision of social support by their family is not guaranteed probably have worst mental health. Thus, high levels of anticipated support by family are expected to make people flourish and therefore contribute to a better quality of life and lead to life satisfaction and better mental health. Liang et al. (2001) in a study of social support, social exchange and depression underline the importance of anticipated social support for mental health and suggest that the protective effect of anticipated support on depression is much more important than that of either received or given support. In line with that, Krause et al. (1998) show that anticipated support relates to health not only to Western societies but also to non Western cultures as they found that in China perceived support is more important than the actually received support for the psychological well-being of older people. Moreover, Wethington & Kessler (1986) found that perceived support mediates the stress-buffering effect of the actually received support.

Literature also indicates that anticipated support is associated with general health. Specifically it is found that perceptions of access to support (especially instrumental support) may enhance physical functioning in older age and it is suggested that perceptions of support might be another pathway through which social relationships might relate to physical health (Shaw & Janevic 2004). The argument that anticipated social support associates positively to health applies in explaining not only the association between social relationships and health but also the positive association between volunteering and health. Building on the literature presented above one can

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support that volunteering might relate to health through the perceptions of availability of support it evokes to volunteers. This is because volunteers or people who help other people possibly believe that if in the future they will be in a difficult position they will receive the help they need as a response to their voluntary offer. In other words volunteering might contribute positively to health through prompting volunteers to anticipate that the future flow of support from the community/others to them is guaranteed or very probable.

8.2.2 Sociability as social exchange and health

The associations between social relationships and health and volunteering and health could also be explained within a reciprocity/social exchange perspective. The social exchange approach refers to the exchange of resources to which people are constantly involved in (through their social relationships) and to the balance (or imbalance) between what one gives and what it takes back in response (Nord 1969). Epidemiological research has successfully used social exchange theory to explain health and has stressed the importance for health of the ratio between resources expended and gains received in response (Siegrist 1998 & 2005).

8.2.2.1 Resources exchange within family and mental health

The social exchange approach can in particular be applied to explain the observed association between family relationships and mental health as the former relate directly to the intergenerational non-contemporaneous exchange of resources that occur within family (von dem Knesebeck & Siegrist 2003). Family is a multifaceted, kinship-based, life-long intergenerational system which is based on a long-term non-contemporaneous exchange of resources. Especially the resources exchange that occurs within the parent-offspring dyad might be of particular importance for the majority of middle aged and older adults who have children (Silverstein et al. 2002). Parents invest large amounts of resources in their offspring in order to enhance the possibility of them (offspring's) to survive and reproduce (Griffin & West 2002). Parental investment in offspring is a commitment which is uncertain in terms of its non-contemporaneous nature and possible outcome and relates to the expectation that the offspring will make the most out of this investment and will return some of it back to their parents when they will become dependent and frail (von dem Knesebeck & Siegrist 2003). This expectation due to the magnitude of the investment and its connections with both parental anticipations for offspring's future success in life and parental survival in older age is

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expected to associate to a major extent with older people's well-being and life satisfaction. Thus, satisfying family relationships, especially close relationships with the offspring, are expected to associate positively with middle and older age people mental health as a tangible proof of the offspring's appreciation of the parental investment in them. Within this perspective, a well-balanced ratio between effort invested, in general, in family and reward paid back (e.g. in terms of having active relationships with relatives) is expected to be beneficial for older people's (mental) health. In contrast, perceptions of imbalance in the exchange of resources within family expectedly lead to anxiety and frustration (as resources invested in relatives or the offspring did not bear any fruits) which in turn undermines mental health and jeopardize well-being.

8.2.2.2 Volunteering as resources exchange and health

As mentioned earlier the social exchange approach could also be used to explain the association between volunteering and health. Although volunteering indisputably has a strong altruistic basis (Penner et al. 2005) it also encompasses a reciprocity element. People volunteer for the common good (especially within the boundaries of a community) because of their altruistic orientation but their altruistic orientation does not necessarily inhibit them from anticipating gains from their voluntary offer (Wilson 2000). Volunteering, especially in the form of formal well-organized offer to a community, is an act with many social connotations and it would be unlikely not to encompass at least the slightest social exchange aspect.

Within this perspective, Volunteering might relate to health through its social exchange dimension in two possible ways; the first is directly through the actual exchange of resources and the rewards volunteers get back as a repay for their voluntary offer; the second is indirect and refers to volunteering as a sign of a balance volunteers experience between the resources they offer to their community or society and the gains they have out of this offer.

The actual and direct exchange of resources approach could satisfactorily explain the relationship between volunteering and general health as it refers to the individual gaining access to valuable resources which in turn would contribute to the

improvement of her/his general/physical health. This proposition becomes even more powerful if one takes into account the diversity of the exchanged resources and the timeframe of the exchange. Volunteer might get back for her/his voluntary offer resources she/he needs and at a time they are mostly needed.

The indirect pathway pertains to perceptions of resources exchange balance and seems particularly useful in enlightening the persistent association of volunteering with mental health. Volunteering as mentioned earlier encompasses an element of reciprocity; people volunteer as long as they feel that there is a balance between their effort/expenses and their gains. Therefore, it is plausible to assume that being a volunteer signifies experiencing a balance between the effort/expenses offered and the benefits enjoyed out of these expenses and it might be exactly this perceived balance that prompts the individual to volunteer. In this vein, volunteering might relate to mental health as an expression of experiencing a balanced exchange of resources.

It should also be mentioned that volunteering relates positively to health as it secures for the volunteer a good reputation within a community - an intangible but very significant asset - which relates to the social status volunteer has within the boundaries of this community. Regarding the social status aspect of volunteering (which in a sense is also an aspect of the social exchange occurring within the boundaries of a group) research suggests that volunteering could also relate to health through the status-bearing role of the volunteer (Hunter & Linn 1981 cited in Schwartz et al 2003).

8.2.3 Sociability as a counterbalance to loneliness and health

The association between social relationships and health (either mental or general) could also be explained in relation to social isolation and by extension to loneliness. Social isolation and loneliness are directly linked to health deterioration (Alpass & Neville 2003; Russell 1996; Seeman 2000). Within this perspective friendships and family relationships are expected to relate positively to health because of their qualities to fight social isolation and loneliness and their adverse effects on human life and health.

Friendships constitute a main means through which people meet their needs to socialize. Thus, expectedly, they are also a main means to fight social isolation and loneliness. It can be suggested that having satisfying friendships relate positively to general health because of their function to prevent social isolation and loneliness which is, exactly, the failure to attain satisfactory levels of social involvement (Russell et al. 1980). At this point it should be mentioned that there is a difference between loneliness and aloneness which both could be seen as state of social isolation but with potentially different implications for health. Social isolation equates to loneliness and exerts an importantly negative influence on health as long as it is involuntary and living a lonely life is not a conscious decision. If the decision to live without friends and in a state of (relative) social isolation is conscious (aloneness) then this self-imposed social isolation does not necessarily equate to experiencing loneliness and therefore might not have the same adverse influence on health and health perceptions as loneliness. Nevertheless even in the case of voluntary aloneness still the friendless individual is not in position to benefit from the advantages of social integration (see below the social embeddedness explanation). Also it should be stated that the vast literature on the adverse health effect of social isolation shows that social isolation irrespectively of its kind (voluntary and conscious or not) considerably worsen people's health.

Social isolation and loneliness can also satisfactorily explain the association of family relationships with mental health. Having satisfying family life and relationships means not living alone and therefore not being isolated and probably not feeling (at least

constantly and to a large extent) lonely. The (relative) absence of the burden of social isolation and its consequent negative feelings it may in turn lead to lower level of depression, anxiety and avoidance of cognitive decline which are mental health problems known to be related to loneliness (Alpass & Neville 2003; Russell 1996; West et al . 1986).

8.2.4 Sociability as social embeddedness and health

8.2.4.1 Social relationships and social embeddedness

An explanation conceptually close to that of social isolation/loneliness presented above is that of social embeddedness/integration. The association between social relationships and health indicates the significance of social embeddedness/integration for human health. Social relationships presuppose an interest in other people and being in touch with them in order to maintain old relationships or acquire new ones. Thus, having adequate social relationships is an indication of being socially embedded as it presupposes, enables and promotes social interaction among people from the same or different layers of society. Within this perspective, social relationships might relate to health exactly as a means to become socially integrated which is a state with profound health gains both in terms of mental and physical health (Berkman & Glass 2000, Seeman 1996 & 2000). Berkman & Glass (2000) also propose that social embeddedness is an avenue through which the individual gains a sense of value, belonging and finally an identity which leads to better health status.

In the same line of thinking, Rook (1987) suggests that the importance of social relationships for health is not confined to the social support but pertains as well to companionship (defined as shared leisure and activities undertaken primarily for intrinsic enjoyment). Her proposition is based on the conviction that the mere existence of social connections per se (not counting the support and resources exchange that occur within them) brings psychological and social benefits. She reports that whereas social support has a stress buffering effect on major life stress, companionship has both a stress-buffering effect on minor stress incidents and most importantly exerts a main positive effect on psychological well-being and is a powerful predictor of social satisfaction. Wellman & Wortley (1990) in their analysis of social networks and social support provision report that friends mainly function as sources of companionship and to a lesser degree of social support. This finding is of great importance for the present

discussion as it provides grounds to assume that the main mechanism through which friendships relate positively to general health might be companionship and not social support. A recent meta-analysis on well-being and satisfaction in older age suggests that having contacts with friends relate strongly to older people subjective well-being and underlines the importance of social embeddedness for health (Pinquart & Sorensen 2000).

8.2.4.2 Volunteering as social embeddedness and health

Many researchers have proposed that volunteering exerts a positive influence on human health in its capacity as a vehicle to social engagement and integration (see for example Herzog et al. 2002). Thus, a possible explanation for the association between volunteering and health might be that the former facilitates social relationships and through them it exerts its positive impact on the latter. Relatively few studies (compared to the relatively large number of studies which have focused on the interaction between health and volunteering) have explicitly addressed at an empirical level the potentially mediating effect of social relationships on the association between volunteering and health and most of them have resulted in different conclusions (although used the same dataset). Musick et al. (1999) suggest that social relationships do have a mediating role to play in the association between volunteering and health as the protective effect of volunteering on mortality was stronger for respondents who had reported low levels of informal social interaction (measured as frequency of telephone contacts with friends and family and frequency of meetings with friends and family). This finding practically indicates that volunteering is not that significant once people have adequate social relationships with friends and family but it is very important for the health of the less socially integrated people. Morrow-Howell et al. (2003) found that informal social relationships (measured as contacts with friends over the phone or in person) do not mediate the positive effect of volunteering on well-being. Musick & Wilson (2003) show that the positive relationship of volunteering on depression is present only to people over 65 years old and that formal social relationships (attendance of meetings) partly confound it. Interestingly in this study informal social relationships do not relate

to depression at all and psychological resources (e.g. self-esteem) cannot explain the association between volunteering and depression.

In relation to the mediating effect of social relationships on the association between volunteering and health, the present study provides evidence that Volunteering relates to health not exclusively through social relationships but also in some cases independently of them. Specifically, as regards the association of Volunteering with general health, this is fully mediated by social relationships (friendships) and therefore it is plausible to suggest that it relates to general health only indirectly in its capacity as a generator of social relationships. On the contrary, its association with mental health is both indirect and direct. It relates indirectly to mental health through family relationships probably as a mechanism contributing to their maintenance and directly and independently of them possibly through other pathways.

8.2.4.3 Volunteering as social role and health

Volunteering as a vehicle to social embeddedness might relate to health also in its capacity as a mechanism that generates social roles. The association between volunteering and health (either direct or indirect) might pertain to the potential loss of social roles in older age and volunteering's function as a substitute for the lost social roles (Greenfield & Marks 2004). Specifically volunteering might counterbalance the decrease in social involvement older people possibly experience as it provides them with opportunities to acquire new social roles. This explanation relates to a wider literature on the link between loss of major roles in life (like parental or that of employed and productive individual) and negative psychological outcomes (Kim & Moen 2002) and worse physical health (Adelmann 1994a & 1994b; Verbrugge 1983). Greenfield & Marks (2004) found that volunteering functions as a protective factor against the adverse effect the loss of major roles exerts on older people's psychological well-being. In the same vein, Okun & Schultz (2003) suggest that the major motive for older people to volunteer is to get social. Specifically, they found that out of the six possible motives an individual might have to volunteer only the motive to acquire new or strengthen already existing social relationships relate positively to age. This is a significant finding as is a clear indication of the importance of volunteering as a means

to acquire social roles in older age and a sign of older people' desire for social engagement. Volunteering should be considered a countermeasure to social withdrawal and isolation as it provides older people with valuable social roles and enhances their self-identity (Herzog et al. 2002; Greenfield & Marks 2004). Thus, a potential key to interpret the observed positive association between volunteering and health, either general or mental, might be the function of volunteering as an antidote to loss of social roles and purpose in life.

8.2.4.4 Horizontal Collectivism as social embeddedness and health

One of the important findings of the analysis is that Horizontal Collectivism (HC) relates to health both through social relationships but also independently of them. As regards mental health, HC associates with it predominantly indirectly through family relationships whilst its association with general health is direct over and above friendships. Thus, the proposition that HC relates to health via social relationships although valid is not sufficient to provide a full account of the association between HC and health. Therefore, the explanation that HC relates positively to health as a generator of social relationships seems to be just a part of a wider picture about how HC might relate to health. The data provide evidence for at least two other plausible explanations as to why HC relates to (general) health independently of social relationships. The first explanation pertains to strongly identifying with a group (or groups) and the second to being concerned with maintaining relationship harmony. These two explanations seem the most possible because HC as a factor loads significantly on items that refer to the existence of a reference group for the participants and reflect participants' identification with this group and their high appreciation of relational harmony within it.

8.2.4.4.1 Horizontal Collectivism as identification with a group and health

The identification with a group reflects a crucial dimension of human life that of having stable reference groups and being and feeling a member of these groups. Also in a

wider perspective reflects the need of belongingness which is universal and fundamental to every human being (Baumeister & Leary 1995). People identify with the groups they use as reference points in their everyday life and consider as referral groups or in-groups all the groups they feel belonging to. The function of in-groups for human life is nodal as they contribute to the formation of one's own self and identity and are employed by the individual as a "compass" for everyday life and as a basic measure both of others and self. Triandis et al. (1988), from a social psychology angle, define an in-group "...as a set of people with whom one shares some attribute that contributes to one's positive social identity" while by contrast any individuals who do not belong to one's in-groups belong to the out-group. Hui (1988) goes on to suggest that in-groups are groups one identifies with on the basis of demographic and attitudinal similarities or of sharing experience, time, language and beliefs. Markus & Kitayama (1991) define as in-group members all these people with whom one shares a common fate e.g. members of the same family members and stress the importance of the distinction between in-group and out-group. Dawkins (2004) from an evolutionary perspective argues for the significance of in-groups for human life and underlines the potential significance of the distinction between in-group and out-group for human survival.

All people feel the need to belong to a group and all people have referral groups. Nevertheless people's perceptions on what is a referral group and what is its importance for their life differ. For that reason a potential key to explain the observed positive association between HC and human health might not relate that much to the existence or not of such groups as this should be taken for granted but rather to the degree of identification with them and the stability of this identification over time and across the life-course. People differ with regard to the extent to which they identify with their in-groups and therefore to the extent they pay attention to the distinction between in-group and out-group. Moreover, people differ regarding their tendency to use or not the same referral groups throughout their life-course. The identification with in-groups is expected to vary from individual to individual, from community to community and from culture to culture. People with a strong collectivistic tendency (interdependent self-construal) are more orientated towards their in-group which is more clear and bounded while people with a less strong collectivistic tendency

(independent self-construal) tend "...to organize their behaviour by reference mostly to their own internal repertoire of thoughts, feelings and action, rather than by reference to the thoughts, feelings, and actions of others" (Markus & Kitayama 1991).

Based on this proposal one could take a step further and extend the initial conclusion that HC might relate to human health as a generator of social relationships by proposing that mostly it is HC's quality to generate meaningful relationships within the context of referral groups (in-groups) that makes it relevant for health. Markus & Kitayama (1991) suggest that for the people with a strong interdependent self (collectivists) social relationships are mostly ends in and of themselves and not means to achieve individual goals. Thus, the powerful and independent association between HC with general health over and above social relationships (friendships) might be a reflection of the difference between investing in relationships-means and relationships-ends in themselves; a reflection of the difference between initiating relationships-tools which presumably would be of minor importance for one's self and relationships-investments in other people which presumably would be major reference points for one's life and possibly sources of happiness and well-being. People who identify strongly with their in-groups are expected to invest more in their relationships, to value these relationships more and of course to expect more out of them. Cross et al. (2000) suggest that the tendency of collectivist people to create meaningful relationships is not confined only to relationships within the boundaries of in-group but refers to all kind of relationships: "...individuals with a very interdependent self-construal develop and nurture new relationships by being open about themselves and by showing sensitivity and concern for their relationship partners, even when these partners are randomly assigned strangers". A series of papers by Friedman and colleagues highlight the importance for health (longevity) of a factor labelled conscientiousness which refers to social dependability, social responsibility, a tendency to be free of egotism, conscientious of others people and prudent (Friedman et al. 1993 & 1995; Schwartz et al. 1995). Specifically they found that conscientiousness/social dependability is the only factor that could predict longevity (in men) in a cohort born in 1910. This finding (despite the partial adjustment of Friedman and colleagues' models for socioeconomic variables) seem to relate to and support the proposed hypothesis that strong

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identification with in-group relates to human health over and above the common key covariates.

8.2.4.4.2 Horizontal Collectivism as relationship harmony and health

Another explanation for the significant association between HC and general health is that of relationship harmony which conceptually is close to that of strongly identifying with one's in-groups. Clearly the data indicate that relational balance, harmony within in-group and their active pursuit might be the key to interpret the association between HC and health over and above social relationships. Relationship harmony is a well-known attribute of the interdependent self and collectivism (Markus & Kitayama 1991; Triandis 1989b & 1993). The data delineate relationship harmony as a dynamic equilibrium within one's referral group which is the product of an active effort on behalf of the individual. The interdependent individual would actively try to maintain (even on her/his expenses) a balanced relationship between her/himself and the in-group and pursue the good functioning of the in-group by avoiding or smoothly resolving existing conflicts.

Research on the potential association between relationship harmony and health or well-being is not very rich. Rothbaum et al. (2000) found that in Japanese populations symbiotic harmony is the most crucial dimension of human development. Kwan et al. (1997) argue that relationship harmony is an important aspect of human life leading along with self-esteem to life satisfaction. Specifically they suggest that self-esteem is mostly the way of people with a predominantly independent self-construal (individualists) to life satisfaction while relationship harmony is the way to the same target for people with a strong interdependent self-construal (collectivists). The findings of the present study seems to confirm and extend Kwan and colleagues' finding as they show that people who are conscientious of maintaining the closeness of their in-group, of achieving a harmony within it and actively trying to attain a balance between self and in-groups are healthier than those who do not care much about having a balanced and close in-group.

The argument that possibly it is relationship harmony quality of HC that account for its direct association with general health can be further extend so that to encompass the avoidance of conflicts or the non-confrontational resolution as potential mechanisms through which HC associate with health. It can be argued that the avoidance or the non-confrontational resolution of conflict is a product of the interdependent self-construal and relates to the active pursuit of relationship harmony. In fact conflict avoidance might be a mechanism to achieve relationship harmony. Thus, possibly people with a strong interdependent self-construal (collectivistic orientation) try to maintain relationship harmony by avoiding conflicts or trying to resolve them in a non-confrontational way (at least within the context of in-group). Therefore, HC might relate independently of social relationships to general health because collectivistic people might employ more often a conflict aversive and/or a non-confrontational style of living and behaving which keep stress levels low. Specifically avoidance of conflict and/or non-confrontational conflict resolution style might function as protective factor for health through keeping stress levels lower and minimising the stress-induced health damage.

So, the present study in conjunction to the proposal for the significance for human health of the identification with the in-groups also suggests that relationship harmony and its maintenance is probably another pathway through which Horizontal Collectivism associates with (general) health. Also it proposes a potential mechanism through which relationship harmony might affect health; the less confrontational and more of an "accommodation type" conflict resolution style (at least within the boundaries of an in-group).

8.2.4.5 Social relationships and life and residential stability

Another possible explanation for the association of social relationships with health pertains to the possible connection of social relationships with stable life conditions and in particular with being attached to a specific community and perhaps a specific place. Within this perspective having an active network of friends and relatives presupposes residential stability and life stability while living a turbulent life and moving often are obstacles to building a proper network of friends and to using the existing network of

relatives. Thus, the observed connection between social relationships with health might be part of a broader picture where having social relationships is an element of a stable life which in turn is a precondition for good health. This residence and life stability approach also fits within the broader social embeddedness/integration explanation as social integration is not only about not living deprived of friends and social networks but also about a positive state of living with stable points of reference either these be related to area of residency or to groups in society or to cultural norms.

The life stability explanation seems particularly appropriate in explaining the observed association between family relationships and mental health as not being under the burden of frequent moving from one place to another is a condition for the psychosocial development of the man and a sign that the individual has not been exposed much to the adversity of frequently loosing social and family contacts.

8.2.5 Social relationships, social skills and health

Another interpretation of the association between social relationships and health bears on the social skills required to initiate and maintain a satisfying number of social relationships

The social skills people possess to manage their family relationships and friendships constitute a matter of major importance as these directly affect their social life and indirectly their trajectories in life. The fact that all people have social contacts (even the most rudimentary ones) indicates that all people share a basic disposition to get social but does not indicate that all people have the necessary skills to successfully maintain or initiate meaningful and positive relationships as having social contacts neither presupposes nor requires higher social skills. People's differential social orientation and differing social skills are expected to result in differences in socializing and differential involvement in social activities and therefore in differences in the quantity and quality of contacts with friends and relatives. Thus, it seems reasonable to assume that it is the existence of skills to initiate and effectively manage social relationships in a meaningful way that might explain the positive association between social relationships and health. Extending this argument one can hypothesise that it is not social relationships per se that are important for health but rather the social skills that generate and determine them. The present study data do not provide any evidence to support or to reject this speculation. Nevertheless there is some initial epidemiological evidence for the importance of social skills as facilitators of social relationships which shows that high sociability (in younger age) if not accompanied by appropriate social skills to manage it might result in damaging physical health through synergistic relationships with known risk factors as hostility (Keltikangas-Jarvinen & Ravaja 2002). The social skills explanation indisputably relates also to the life-course explanation presented below as social skills are to a considerable extent product of the early life experiences.

8.2.6 Sociability and health within a life-course perspective

8.2.6.1 Social relationships, social orientation and the life-course experiences

The idea mentioned above that the social skills required to initiate, manage and maintain social relationships relate to life experiences and in particular early life experiences adds an interesting developmental/life-course perspective in the association between sociability and health. It connects life-course experiences and development with the socialization process, the opportunities given to the individual during her/his childhood to develop her/his social skills and of course her/his family orientation towards social life and other people. Stansfeld (1999) in his account of social support and social cohesion adopts the following standpoint: "It is likely that the ability to develop positive social relations is dependent on satisfactory early relationships with mother and father". Kuh et al. (1997) present an integrated model of individual social capital over the life course and suggest that it relates causally to adult health. They propose that the development of an individual's social capital is primarily a function of childhood and adolescence which are shaped by family and school characteristics. The main idea behind their model is that of a "chain of risk" where there is a continuity between childhood and adult life of socioeconomic adversity which conceptually draws on work by Rutter on pathways from childhood to adulthood (Rutter 1989). The chain of risk according to Kuh and colleagues (1997) starts with the social capital of parents which along with socioeconomic status of family, parenting skills and role models provided by the parents contribute to the development of their children's social capital; child social capital in turn affects school performance and other skills (e.g. negotiating life transitions) which in a long-term perspective will influence social position and social support received in adult life and in even longer-term perspective will affect health.

At this point it worth mentioning again Friedman and colleagues' findings (Friedman et al. 1993 & 1995; Schwartz et al. 1995) suggesting that conscientiousness in childhood is a factor predicting longevity in the later life in an cohort of American children (though

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only in men) born in 1910's and therefore that the tendency to socialize in a particular way in childhood could predict longevity up to the ninth decade of life. Thus, drawing on Kuh and colleagues' model and using Friedman and colleagues' findings one can support that the observed association between sociability and health in middle and older age can be the late part of a process that has started early in life. The hypothesized causal life-course pathway leads from early family life to health in later life through the transmission within the family context of the norms of interdependence and social responsibility which in turn are the foundations for meaningful social relationships which finally influence positively health.

In the same vein, Antonucci and Kahn have postulated the convoy model which is a framework to study social relationships as a lifespan phenomenon with often – but not always - stable and enduring qualities and an enduring cumulative influence on the individual (Antonucci et al. 2004). They highlight the developmental nature of social relationships and underline the importance of relational attachment for health (mostly mental). Their approach is based on the assumption of continuity or stability of social relationships (in a direct parallel with the attachment relationship between the infant in her/his first year of life) and attempts to connect attachment and early experience through their continuation in life in adult relationships with social support provision. Levitt (2000) in a recent review focusing on the life-course perspective of social relations stresses the importance of considering social development as life-long process. In the same line, Bisin & Verdier (2001) highlight the importance of early family life and socializing process in determining one's collectivistic tendencies. Family in childhood directly influences people's social preferences (and therefore social orientation) through teaching the offspring the life strategies that the parents themselves employ or think of as the best. The taught life strategies can either focus on the advantages of strongly identifying with an in-group and caring about relationship harmony or not. Moreover, they suggest that socialization (e.g. relationships with peer-group in childhood) exerts also an indirect influence on people's social preferences and social orientation.

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8.2.6.2 Attachment and Volunteering

The association between volunteering and health might also relate to attachment theory (Bowlby 1997). The idea that the association between volunteering and health might associate with the developmental process is based on the proposition that the form of the innate altruistic tendency (Ridley 1997; Hinde 2002) and propensity for socializing are shaped at an early stage of life (Bisin et al. 2004; Bisin & Verdier 2001). Experiences in the first years of life and family environment might influence apart from the social orientation, the altruistic orientation of an individual. Eisenberg and colleagues (Eisenberg 2000; Eisenberg et al. 2002) suggest that the prosocial (altruistic) development of children relates to family environment. Penner et al. (2005) propose that family is one of the most important social institutions with an important role in the initiation of volunteering. Other researchers go beyond this and suggest that attachment experiences in early life might determine levels of altruism and compassion in adult life and therefore voluntary offer in everyday life (Mikulincer & Shaver 2005; Shaver & Mikulincer 2004). The core assumption of this approach is that caring for the other (volunteering is such an act) is a reflection of secure attachment and that insecure attachment relates to deficiencies in altruism and presumably volunteering. Thus, the association between volunteering and health might be a result of the way the individual has been reared and her/his attachment experiences.

8.2.6.3 Intergenerational relationships

Close to the hypothesized life-course explanation for the connection between sociability and health is the explanation of the intergenerational relationships and their potential impact on mental health. This explanation pertains mostly to the association between family relationships and mental health and views the good mental health state of middle-age and older people with adequate family relationships as an outcome of the facilitation by the family network of intergenerational relationships. There is evidence suggesting that intergenerational relationships and the existence of intergenerational

family identity have a positive effect on older people's wellbeing (Reitzes & Mutran 2004a & 2004b). Thus, the observed positive influence of social relationships on health and well-being might reflect the positive effect intergenerational relationships have on middle-age or older people through prompting them to follow a contemporary life rhythm and to stay in tune with advances and developments in society. But most importantly they might relate to health through enhancing (older) people's feelings of usefulness as they give them the opportunity to have a participatory role in everyday life. Moreover, intergenerational relationships definitely have a role in promoting mental health as they could function as a source of mental stimulation for middle and older age people. The intergenerational family environment that includes young people might constitute a unique generator of mental stimuli for the older person who in this way obviates the danger of cognitive decline and all its consequences.

8.2.7 Sociability as motive for physical activation

Another explanation of the observed association between friendships and general health might relate to friendships function as a physical activation and mobilization factor (especially at an older age). Bisschop et al. (2003) and Mollenkopf et al. (1997) propose that networks of friends might positively influence people's general or physical health as such networks stimulate mobilization. It is possible an individual with many friends to be more often prompted to go out of her/his house and therefore to be more often physically mobilized and activated compared to an individual of the same age who lacks friends and therefore having fewer incentives to go out of her/his house. Thus, friends might act as agents stimulating physical activity and therefore contribute, in that way, to the preservation of older people' functional status and enhancement of general/physical health.

The physical motivation explanation potentially could also explain the association between volunteering and general health. Volunteering seems to function through the provision of new social roles as an incentive for physical activation and a means for older people to remain productive. The continuation of productive activities is according to the activity theory (Herzog et al. 2002) and the successful aging approach (Rowe & Kahn 1987 & 1997) a factor of crucial importance for people to manage to remain functional and socially integrated in older age.

8.2.8 Sociability as a social control mechanism and health

A potential explanation of the observed association between social relationships and health (in particular general health) is that friendships might function as a regulatory mechanism of health behaviours. Social relationships are a context where not only ideas and information are exchanged but also social control is exerted. It is possible that people might actively prompt their friends or relatives not to engage in health damaging behaviours and contribute that way actively to the enhancement of their health. Lewis & Rook (1999) suggest that social control exerted by social networks on the individual relates to her/his engagement to health-promoting behaviours (but also to higher levels of distress). They refer to two basic mechanisms of social control within the personal relationships context: an indirect where the individual behaves in the way members of her/his family/social network wanted her/him to behave because of feelings of obligation to them and a direct where members of one's family/social network actively prompt or persuade the individual to engage in health-promoting behaviours. Tucker (2002) contrasts this view by suggesting that social control either directly of indirectly influences health behaviours at a surfacial level whereas at a deeper level social control does not relate much to health behaviours. According to her it is satisfaction from relationship that regulates the association between social control and engagement in health promoting behaviours. In any case it seems plausible to assume that social relationships might influence health as health behaviour regulating mechanisms but yet this issue needs further clarification.

In relation to the social control quality of social relationships and its potential connection with health is also the hypothesis of social influence. People or groups might influence one's health behaviours through the influence they exert on her/him. Berkman & Glass (2000) drawing upon the work of Marsden & Friedkin suggests that social influence is another important and often ignored pathway through which social relationship might influence health. But so far the social influence-health pathway has

not been explored within an epidemiological perspective and therefore its role in the observed association between friendships and general health cannot be assessed.

8.2.9 Sociability, cognitive processes and health

Another possible explanation of the social relationships and health association could relate to self-efficacy. Antonucci & Jackson (1987) (cited in Antonucci and Akiyama 2001) have formulated the Support/Efficacy model which highlights self-efficacy as the cognitive mechanism through which social relationships impact on health and well-being. They suggest that it is not social support per se that is important for health but rather the exchange of mutually positive experiences within the boundaries of personal relationships. The individual interprets other people's company (or care/help provision) as an indication that she/he is still valued and capable of an active life. In case of accumulation of such positive experiences the individual internalising them and re-shape its beliefs about her/his capabilities with a consequent raise in self-esteem and ability to face true life difficulties. According to this approach social relationships is a pathway through which possibly people's self-efficacy could be enhanced and through it their health. Bandura (1997) proposes the existence of four major sources of self-efficacy: mastery experiences (attempt a task and succeed), vicarious experiences (watch and model successes by similar others), verbal persuasion (direct verbal confirmation by another person of one's own capabilities to master a task) and physiological and emotional states of the individual (assessment by the individual of her/his own strengths to accomplish a task and her/his mood towards it). In the light of this categorisation, the enhancement of self-efficacy through social relationships which in turn results in better health could happen directly through what is communicated to the person by her/his friends/relatives or indirectly through positive interaction with friends/relatives.

Seeman et al. (1999) have stressed the importance of self-efficacy beliefs for general health. They report that self-efficacy beliefs relate to managing interpersonal relationships and therefore exert a significant effect on general health perceptions. Blazer (2002) proposes that the self-efficacious older individual among others will engage self and her/his environment in maintaining high physical functioning and enhancing her/his physical health.

The self-efficacy explanation could also enlighten the association between volunteering and health. The positive association between volunteering and health might pertain to the potential enhancement of perceptions of personal-efficacy and control over life that volunteering stimulates (Wilson & Musick 1999). Possibly volunteering is associated with increased feelings of self-perceived efficacy and competence which in turn contribute positively to socializing, well-being and health. This explanation is in line with a wider proposal that volunteering might function as means to cope with stress (Oman et al. 1999) through various pathways (e.g. enhancement of self-perceived efficacy and feelings meaningfulness). The stress coping aspects of volunteering, although potentially could be an important research field, still has not been studied thoroughly in relation to human health and our data provide no grounds to support it.

Close to the self-efficacy explanation for the positive association between social relationships and health is that of the perceived control (Bisconti & Bergeman 1999). Having social relationships might associate in a positive manner with individual's sense of control over her/his environment and possibly with her/his life and health. Having friends and relatives make life more meaningful and therefore might enhance one's perceptions of mastery over it. Also positive social relationships are an empowerment generator of their own and might benefit people through making them feel valued and respected. Rowe & Kahn (1987) suggest that control and autonomy are important in older age ("...the extent to which autonomy and control are encouraged or denied may be a major determinant of whether aging is usual or successful on a number of physiologic and behavioural dimensions.") and that the lack of control has adverse effects on both mental and general health. Thus, the maintenance of social relationships in older age could be seen an indication that the older individual still exerts control over her/his life and probably is in a trajectory of successful aging which expectedly relate to better health.

Moreover, social relationships might also function as a secure base for the individual to maintain their self-consistency and identity and through this process to benefit health. But evidence to support this identity hypothesis is sparse (Whitbourne & Collins 1998) and the interaction between social relationships and identity maintenance process in relation to health is an issue not much studied.

8.2.10 Sociability, time perceptions and health

Finally a last (but by no means least) possible explanation of the association between social relationships and health pertains to the socio-emotional selectivity theory (Carstensen et al. 1999).

The socio-emotional selectivity theory proposes that the salience of social goals relates to perceptions of time. Specifically when people perceive that time is open-ended they are more orientated towards pursuing knowledge-related goals whereas when they start thinking of time as limited their orientation switch to more emotional goals. The proposition that people's social goals and orientation are influenced by time perceptions is particularly useful in explaining older people's choices of social relationships and potentially in explaining the observed associations in this study between social relationships and health. The usefulness of socio-emotional selectivity theory in explaining older people's socialising choices refers to the influence time urgency perceptions exert on life expectations. When (older) people perceive that the remaining time is finite and therefore constrained and not open-ended they tend to make their social networks smaller, discard their peripheral contacts and turn to sources of emotional satisfaction (Carstensen et al. 1999).

Applying the socio-emotional theory to explain the association between friendships and general health would probably lead to the conclusion that (older) people who age successfully (according to Rowe & Kahn (1997) successful aging encompasses the avoidance of disease and disability, the maintenance of high physical and cognitive functions and sustained engagement in social and productive activities) do not feel any serious time urgency (as they do not perceive the end of their life to be close) and therefore they maintain their usual social networks which serve both knowledge-related and emotional goals without switching to relationships which will bring them mostly immediate emotional gains. Within this line of reasoning, the maintenance of a relatively broad network of friends is mostly a function of time perceptions and of positive judgment about one's own life expectancy. It also implies that perceptions of

time availability is a variable mediating the relationship between friendships and general health. The present study provides some initial evidence supporting the proposition that time plays an important role as a regulator of older people's social networks and therefore as a mediating variable in the relationship between friendships and general health. The number of indirect (over the phone) contacts with friends decreases as age progresses in a clearly stepwise manner (see Appendix 22). A decrease which might be interpret as a sign of the discontinuation of peripheral friendships (as important friendships probably would be face-to-face contact) and detachment from less satisfying in terms of emotional directness relationships.

The socio-emotional selectivity theory could also be used to explain satisfactorily the observed association between family relationships and mental health. As mentioned earlier, older people, as soon as they start perceiving time as constrained and feel that their remaining time is finite, tend to maintain only these relationships which would provide them with direct and considerable emotional gains. Family relationships are indisputably such a type of relationships as family is a major emotional support provider (Wellman & Wortley 1990). Thus, older people are expected from the point they start perceiving time as limited and onwards, to turn to their family in order to cover their increased emotional needs. Therefore, the observed association between family relationships and mental health could be a result of the former being a major provider of emotional coverage for older people when such coverage is mostly needed. Older persons who have managed to meet their increased emotional needs through their family are expected to enjoy better mental health than those who have not achieved their emotional goals.

8.3 Explaining the lack of associations between aspects of sociability and health

8.3.1 Why friendships do not relate strongly to mental health?

Friendships relate to mental health but only at the bivariate stage of the analysis. The lack of association between friendships and mental health at multivariate level is an intriguing and not easily interpretable finding. A first possible explanation for the lack of association between friendship and mental health pertains to the reciprocity-related dynamic nature of the former. Friendship is based on mutuality and in most cases on equal exchange of resources (Sherman et al. 2000). In fact friendship is a dynamic predominantly reciprocal and contemporaneous exchange of resources. Thus, a possible interpretation of why friendships do not connect significantly with mental health in middle and older age might refer to their demanding nature in terms of resources (at least when compared to family relationships). On the one hand friendship is a major means of human development and relates to people's well-being (Erdley et al. 2001; Laursen & Hartup 2002; Phillipson 1997; Pinquart & Sorensen 2000 & 2001b) but on the other hand maintaining already existing or acquiring new friendships are hard tasks requiring the expenditure of a considerable amount of effort and resources.

Moreover, friendships encompass an element of challenge as they are not as stable as family relationships; they are not static and given; they are not based on kinship; and they are much more unpredictable than family relationships. Therefore, the observed lack of association between friendships and mental health might be a result of the former being of uncertain nature and requiring many resources which discourage people from investing in friends in older age. Within a wider perspective the lack of association between friendships and mental health might relate to older adults lacking resources and their decisions about the allocation of the sparse resources they possess. Extending this argument one could assume that it might also be the non-obligatory and not necessarily life-lasting nature of friendships combined with the fact that they occur

mostly among people of the same age that make them little relevant for older people's mental health. The older people get the more they realize that their friends also become gradually less able to contribute to their survival and well-being (and possibly mental health) as probably most of them — if still alive — they themselves would have become frail and dependent. So, friends in older people's minds are disconnected with help and care provision (and therefore survival).

A second possible explanation refers to the centrality of family in middle and older people lives. People invest differently in friends and in family and organize differently friendships and family relationships throughout the life-course (Laursen & Bukowski 1997; Wilson & Daly 1997). In middle age people primarily invest in the upbringing of their offspring and in older age people they expect in return to get from their offspring help and support when they would become frail and dependent (Liang et al. 2001; von dem Knesebeck & Siegrist 2003). Thus, as people get older they connect their well-being and survival more with their family than with their friends and it might be this age-related preference for family that could account for the observed lack of association between friendships and general health.

These two explanations considered together plausibly lead to the conclusion that the magnitude of the investment in offspring, the anticipated rewards from it in older age and the perceived or actual inability of friends to successful respond to increased needs of later life along with the demanding in terms of resources exchange nature of friendships prompt older people to link in their minds their survival and wellbeing more with their family members rather than with their friends. Therefore, the observed lack of association between friendship-related sociability and mental health should be considered a more or less expected finding echoing the connection of family life with well-being in older age.

8.3.2 Why lacking friends does not relate strongly to health?

Apart from the Friendships Index, the dichotomous variable "Having any friends or not?" was also used as a health predictor. The difference between these two variables is that the variable "Having any friends or not?" has been asked to all partipants while a Friendship Index score has been calculated only for those participants who reported having friends. "Having any friends or not?" attempts to distinguish friendless from socially integrated participants while the Friendship Index to capture qualitative and quantitative differences among socially orientated participants. Although not reporting any friends at all is found to be significantly related to both mental and general health scales in the initial bivariate analysis, the multivariate analysis showed that these initial associations do not last when adjusted for sex or age. A finding primarily indicating that the lack of association between not having any friends and general health is a function and result of age and sex. Nevertheless the lack of association, at multivariate level, between having any friends and general health might seem slightly surprising given the significance of Friendship Index for general health.

A first probable explanation for this lack of association might pertain to the possible differences in socialisation patterns of the friendless group compared to the rest of the sample which could be a reflection of differences in life experiences. Possibly the group of friendless people might invest significantly less to friendships while at the same time they are orientated towards other types of relationships (e.g. might have a broad and active network of neighbours). Friendships, although an important socialization mechanism, are not the only one. People socialization choices are not given and possibly vary from individual to individual, from community to community and from culture to culture. Thus, the group of people who reported not having friends at all might not suffer the detrimental effects of social isolation because their social and human needs might be met through other compensatory socializing mechanisms like e.g. dense everyday informal interaction with other people within the boundaries of a close-knit neighbourhood or community.

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Another explanation of the dissociation between general health and lacking any friends might relate to the role of the older women in the functioning of the family and the productive dimension of this role as most of the participants who lacked friends are old women. Although the analysis show that participants lacking any friends did not score significantly higher on the Family Relationships Index (see Appendix 15), it is still possible these participants to be mostly orientated to their immediate family and offspring while devaluing friendships. Older women most of times play an important role as grandmothers who facilitate the rearing of their grandchildren and the functioning of their close family which is a major role that can substitute successfully, in terms of its connection to health, any friendship (for the grandmother hypothesis – see Hawkes 2003 & 2004; Lahdenpera et al. 2004). Being a grandmother who actively contribute to the wellbeing of her immediate family is an important productive activity that may function as a protective factor for health (either per se or through the positive experience of being useful and contribute to the well-being of offspring) and counterbalance the negative effects of not having friends. As for the dissociation between lacking friends and mental health at the multivariate stage of the analysis the reasoning is the same with that of the dissociation between friendships and mental health presented in the previous section (8.3.1).

8.3.3 Why family relationships do not relate to general health?

The lack of association between family relationships and general health is an interesting finding disconnecting self evaluations of health from family relationships and family context. There are two possible explanations for this lack of association between family relationships and general health.

The first possible explanation is that family relationships do not presuppose a good state of general/physical health and therefore do not function as a stimulus for it. Family relationships do not relate to general health as their existence and status does not depend on one's physical ability, functional status and good shape. One could sustain his/her usual family relationships while getting older (or even becoming ill or disabled) as these most of the times these are predetermined, have a specific structure (in the sense that due to their very slow change they seem fixed) and the individual is not required to constantly assert his share in her/his family network. Moreover, family relationships in older age is the least demanding type of relationships (at least if compared to friendships which maintenance presupposes a contemporaneous reciprocal exchange - see von dem Knesebeck & Siegrist 2003) in many respects as one can maintain them easier and they require significantly less effort on behalf of the individual. Therefore, family relationships compared to friendships (which not strangely were found related to general health) seem less important as general/physical health generator.

The second possible explanation for the lack of association between family relationships and general health can well pertain to the very mission of the family as a source of support and caring. Family is a major source of help and support for older people or people in need and it is expected that they will turn to it for help and support of all kinds. A recent study strengthens this argument by showing that instrumental support provision relates in men to increased risk of ADL disability (Seeman et al. 1996). Stoller & Pugliesi (1988) (cited in Mendes de Leon et al. 2001)) suggest that particularly older people are more likely turn to their family (and in particular their

children) when due to their declining health they cannot perform (or anticipate that soon they will not be able to perform) successfully everyday life tasks. Thus, family relationships might not associate with general health because the physical health problems of older people by the time they turn to their family for assistance and support are greater than the remedy of familial support and caring and irreversible.

Extending this argument one can assume that family might generate feelings of self-depreciation to older people by being overprotective to them. These feelings of self-depreciation and low self-esteem might lead to family relationships not to relate to general health. Rowe & Kahn (1987) have underlined the danger of support turning against its recipient when it decreases autonomy and control. They suggest that provision of disproportionate support "…may convey caring but teach helplessness."

8.3.4 Why most of the altruistic factors found unrelated to health?

The analysis shows that not all employed dimensions of altruism associate with health and that Volunteering differs considerably from the rest of the altruistic factors (Altruism, Responsibility Assumption and Provision of Practical Help) in relation to health. Volunteering is a significant predictor of both dimensions of health whilst most of the other altruistic factors relate to neither of them. Thus, a plausible question that emerges is: why volunteering relates significantly to health whereas none of the other three altruistic factors does? What makes volunteering special to human health compared to the other altruistic factors in relation? The most possible answer to these questions is that volunteering has some key differences from the other altruistic factors and probably it is these key differences that account for its differential association with health. Two of these key differences refer to the context where volunteering occurs and its consistency over time.

Penner et al. (2005) suggest that the context is a very important dimension of the prosocial (altruistic) behaviours; volunteering occurs within groups (either this be a group of people or a community or the like) whilst helping others or being an altruist (to which all other altruistic factors refer) occurs at an interpersonal level (most of times in the helper-recipient dyad) within the context of a specific situation. These crucial differences make volunteering completely different from helping others in terms of its consequences for the volunteer/helper. Volunteering functions as a means for the volunteer to gain, in response to her/his voluntary offer, all sorts of gains, ranging from favourable social judgements for the volunteer to tangible resources and it might exactly be these gains that make Volunteering relevant for health in contrast to the rest of the altruistic factors.

Also it might be the differences in terms of consistency over time between Volunteering and the rest of the altruistic factors that might account for the observed lack of association between the latter and health. Helping someone in need is a situation-specific act and clearly does not have the characteristics of a social activity

which occurs within the perspective of a constant and consistent involvement in group affairs. In contrast, volunteering for the common good is not so much a situation-specific act and could be seen more as a long-term social interaction between the volunteer and her/his group. In that sense helping another person, unlike volunteering, does not guarantee a constant flow of resources from the community to the helper as a sign of appreciation for her/his altruistic offer.

Thus, one can assume that it might be key differences between volunteering and the other altruistic factors (such as differences in the context, the level and the consistency over time) that differentiate the former from the latter and makes it an important correlate of health.

8.3.5 Why some collectivistic factors do not relate to health?

Apart from the Horizontal Collectivism factor two more collectivism factors have emerged namely the Collectivism-Dependency and Vertical Collectivism. These are either completely unrelated to health (Vertical Collectivism) or become unrelated to health after adjustment for the socio-demographic covariates (Collectivism-Dependency).

There are two major possible explanations for the complete lack of association between Vertical Collectivism and health. The first explanation pertains to methodological issues and predominantly to the non-satisfying internal consistency of this factor (Appendix 5). It is possible the Vertical Collectivism factor not to relate to health because of its loose coherence as a statistical entity. The second explanation is of a conceptual type. Vertical Collectivism is a concept that according to the developers of the self-construal scale (Singelis et al. 1995) refers to the traditional aspects of collectivism; to hierarchies, familism and most importantly power distance. It is the version of collectivism that pertains to inequalities and the acceptance of such inequalities as a means to preserve the collective and encompasses a strong element of subordinance to the collective. Thus, the unrelatedness of it with health might occur either because it is a form of collectivism that the older generations (but not the younger generations) are used to and therefore could be considered more or less as a function of age or most probably because the expectedly negative influence of the subordinance aspect of it on health fully counterbalances the positive influence on health of its collective aspect.

As regards Collectivism-Dependency this is a factor that relates negatively to general health at a bivariate level, but not at a multivariate level, while it is completely unrelated to mental health. Its bivariate association with general health is in the expected direction as its dependency element expectedly would influence negatively physical health and general health perceptions. The lack of association between Collectivism-Dependency and general health at a multivariate level most probably indicates that the initially observed bivariate association is a function of other factors like sex and age. The

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complete lack of association between Collectivism-Dependency and mental health probably can be attributed to the dual character of this factor; the collectivistic side of this factor could potentially be mental health promoting (as is Horizontal Collectivism) while its dependency side most probably relate to deterioration of mental health through the feelings of self devaluation it might relates to. Thus, given that the two sides of the factor oppose each other in relation to mental health, the overall association between Collectivism-Dependency and mental health is as expected non-existent.

8.3.6 Why individualism does not relate to health?

Individualism contrary to collectivism is not found much related to human health. The only observed association between any of the individualistic factors and health is that of Sense of Uniqueness with mental health. The bivariate association between Sense of Uniqueness with mental health is negative and becomes insignificant once adjusted for all key covariates. The generic lack of association between individualism and health at a multivariate level indicates that individualism is little related to health. The unrelatedness of individualism and health could initially be seen as a consequence of the differences in the socialization patterns between people with strong independent and interdependent self-referral in Greece where collectivism is valued. In a sense it is expected individualism not to relate significantly to health in Greece as the Greek culture has strong collectivistic tendencies and therefore strong individualistic orientation might conflict with the dominant Greek cultural values.

Another explanation pertains to the tendency of people with independent self-construal to to be less group-minded and group-orientated than those with a strong interdependent self-construal. People who score high on individualism tend to build not necessarily meaningful for them relationships and in general to invest in fewer relationships than more collectivistic people. This life strategy regardless of its potential advantages or disadvantages for the individual survival definitely has two major indirect implications for social relationships and health and well-being. The first major

implication is the lack of a protective social web for the individual with the strong independent self-construal. People who are orientated towards their self, who do not have stable reference groups and consequently do not invest much in other people, lack a valuable asset in life. This is their in-group solidarity either actual or perceived. Individuals who do not consider themselves as true members of an in-group and have not invested significantly in any such group obviously do not have access to major group resources. Individualism is a life strategy where people live on their own, are self-referral and there is not much support available for them by their referral groups. Such life-strategy might relate negatively to health (especially in older age) as it brings no comparative advantage for the survival of the individual. The second major implication relates to feelings of alienation and loneliness people with strong independent self-construal might experience. This is based on the initial negative correlation between a core individualistic factor such as Sense of Uniqueness and mental health. Possibly intense feelings of uniqueness and very strong individualistic attitudes could hinder (meaningful) socialising and lead to a state of relative social isolation which in turn might lead to loneliness, alienation and therefore finally affect mental health.

8.4 Limitations

The present study has several limitations which should be taken into consideration when using its findings.

A first major limitation is its cross-sectional nature. All predictors and outcomes were measured concurrently so the temporal sequence of the events is unknown. From a statistical point of view the use of cross-sectional data makes it impossible to distinguish between causes and effects and therefore to determine the direction of causality. Thus, the present study as any cross-sectional study can only highlight associations and not establish causal pathways. Of course this does not mean that causal interpretations of the findings cannot be made. On the contrary such interpretations of the findings can and should be made but their basis would exclusively be existing theory as the establishment of robust causal associations between social relationships, their determinants and health would presuppose their repeated measurement within a longitudinal perspective.

A second limitation of the present study pertains to the nature of the data. The study is based exclusively on self-reporting and not on objective measures of health. Although the use of self-reports is of great importance as it allows the assessment of what people think and feel about their own condition, life and health, still it is vulnerable to reporting bias (see for example Harlow & Linet 1989; Kriegsman et al. 1996; Linet et al. 1989). Moreover, it is unknown whether the observed associations between the predictors and the outcomes would be the same if objective or biomedical outcomes had been used.

A third major limitation of the present study is that the validity of its results is exclusively based on statistical criteria. Specifically all associations reported in the study were assessed by the conventional 95% statistical significance criterion ($p \leq .05$). The use of p value as the main means to test a hypothesis or to explore the relationships between various interacting factors has its limitations as there is always a possibility of rejecting a true hypothesis or accepting a false one. Thus, relationships reported here

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should be treated more as statistical associations that do not necessarily exist in real life than as definite facts. When referring to statistically proven association the only way to assess whether it exists in real world or not is the accumulation of a large body of literature about it.

Other reasons to treat the study results as initial indications of possible associations and not as proofs of causal associations pertain to the age specificity and cultural relativity of the results. Age specificity refers to how the age distribution of the sample potentially affects the interpretation of the findings. The study sample has a given age range (40-96 years old) and therefore all conclusions drawn in this study are applicable to people within this age range. It is unclear to what extent these conclusions are also valid for younger populations. The cultural relativity issue pertains to the culture-bounded nature of some of the concepts employed in the study and the potential effect of it on the applicability of the study conclusions in non-Greek populations. The observed associations between social relationships, their determinants and health are part of the social life in Greece and the extent to what these associations hold in other cultures is unknown.

8.5 Conclusions

The main conclusions that can be drawn on this study are that:

i)   Family relationships (measured as frequency of direct and indirect contacts with relatives with whom the participants did not live with, number of relatives met on a monthly basis and number of very close relatives) and friendships (measured as frequency of direct and indirect contacts with friends with whom the participants did not live with, number of friends met on a monthly basis and number of close friends) relate positively to health in middle and older age but not in a uniform way. Family relationships associate exclusively with better mental health while friendships with better general health perceptions.

ii)   Volunteering (a factor that emerged from the factor analysis of the altruistic data and refers to volunteering for the common good) relates positively to both mental health and general health. It associates with general health indirectly as a generator and determinant of social relationships and with mental health predominantly directly and independently of social relationships (family relationships).

iii)   Horizontal Collectivism (a factor that emerged from the factor analysis of the individualistic and collectivistic dta and refers to strong identification with a group and harmony relationship) relates positively to both mental health and general health. It associates with the former indirectly as a generator and determinant of social relationships and with the latter directly and independently of social relationships (friendships).

iv)   The proposed conceptual model in this study which attempts to explain health not merely by employing social relationships but by using a more integrated sociability concept which includes social relationships and their psychososial and cultural determinants is valid.

8.6 Policy implications

The main findings and conclusions of the study have various policy implications. Some of them are:

1) The study shows that having a family is beneficial for mental health especially in older age. Thus, it might be useful to consider having policies and initiatives aiming to keep older people connected to their families.

2) The study also indicates the beneficial effect of volunteering in older age as a stimulus to maintain old and acquire new social roles and to be physically active. Thus, policies providing the opportunity to older people to become social and maintain social roles through volunteering might be proven useful.

3) Also the study highlights in general the importance of meaningful socializing for health. Thus, any policy orientated towards promoting meaningful social relationships might also be proven helpful.

4) Finally the study shows that there are particular groups (e.g. very poor people with no education) whose health is considerably worse than any other sub-group. Thus, policies to relief these people from the burden of ill-health might be considered of high priority.

8.7 Future Directions

The study has highlighted various important points of the multifaceted association between social and family relationships and health and brought into the forefront factors determining social relationships such as collectivism and volunteering as potential important determinants of health.

The first direct aim for the future is the further exploration of the most interesting and intriguing of the results. The differential effect of family and social relationships on mental and general health is definitely a finding deserving more attention. The different

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pathways through which the different types of relationships associate with health are an interesting and promising new research field with potentially important implications for health promotion interventions. Also the continuation of the search for the link between altruism and health and further examination of the relationship between Volunteering and health in older age seem a potentially fertile research field. Moreover, beyond any doubt the powerful connection between Horizontal Collectivism and health needs further investigation mainly for two reasons. The first reason is because there is a very good chance the former to be a major self-existent unexplored determinant of the latter. The secondly and equally important reason is because of its possible connection with social capital. Horizontal Collectivism seems to fit well within the social capital field and to qualify as a challenger of social capital as: is a clear-cut factor; is a purely context-related concept; is not a property of social relationships but a determinant of them; is present at all levels of human interaction and potentially could provide a more integrated and convincing explanation of how socializing relate to health at either individual or population level (distinction between in-groups – out-groups, identification with in-groups, building meaningful social relationships and maintaining relationship harmony).

A second task for future is to further elaborate the hypotheses and conceptual model used in this study. In order to improve the research on the interaction between health and society there is need to clarify the conceptual models used and sharpen existing hypotheses. The refinement of the concepts and hypothesis will help to clarify the research objectives and result in better focused and more efficient research.

A third future direction is to replicate the present study in other populations and cultural contexts so that to assess the cultural relativity of the obtained results along with a longitudinal testing of the hypotheses about the role of determinants of social relationships on human health. The accumulation of longitudinal and cross-cultural evidence is a necessary step towards creating an evidence-based unifying theory of health and sociability. The lack of longitudinal evidence on the potential role of the determinants of social relationships on health just reinforces the currently dominant approach to focus on social relationships in isolation as if they were not a part of a wider social and cultural environment. The lack of cross-cultural evidence would

perpetuate the uncertainty about the applicability of the present study results in predominantly individualistic cultures.

Finally the ultimate future aspiration is the development of a unifying theory of society and health._

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10 APPENDICES

Appendix 1. Maps of the social morphology of the Greater Athens area

a) Map of the social morphology of Greater Athens area

Athens

Low SES status part of Athens

Medium SES status part of Athens

High SES status parts of Athens

~ Municipalities boundaries

The socioeconomic morphology of Greater Athens area

Higher socioeconomic category
(Businessmen, managers, professionals)

Higher & middle socioeconomic category
(mostly professionals)

Middle socioeconomic category
(mostly people working in the domain of services)

Independent and stipendiary workers

Stipendiary workers

Farmers and workers

Marginalised groups
(vendors and seasonal farmers)

0   5   1

Source: NSSG Census 1991

Adopted from:

Social and Economic Atlas of Greece (Vol. 1): The cities. Th. Maloutas (ed.) 2000; EKKE & Thessalia University Press, Volos, Greece

b) Map of the educational differences within the Greater Athens area
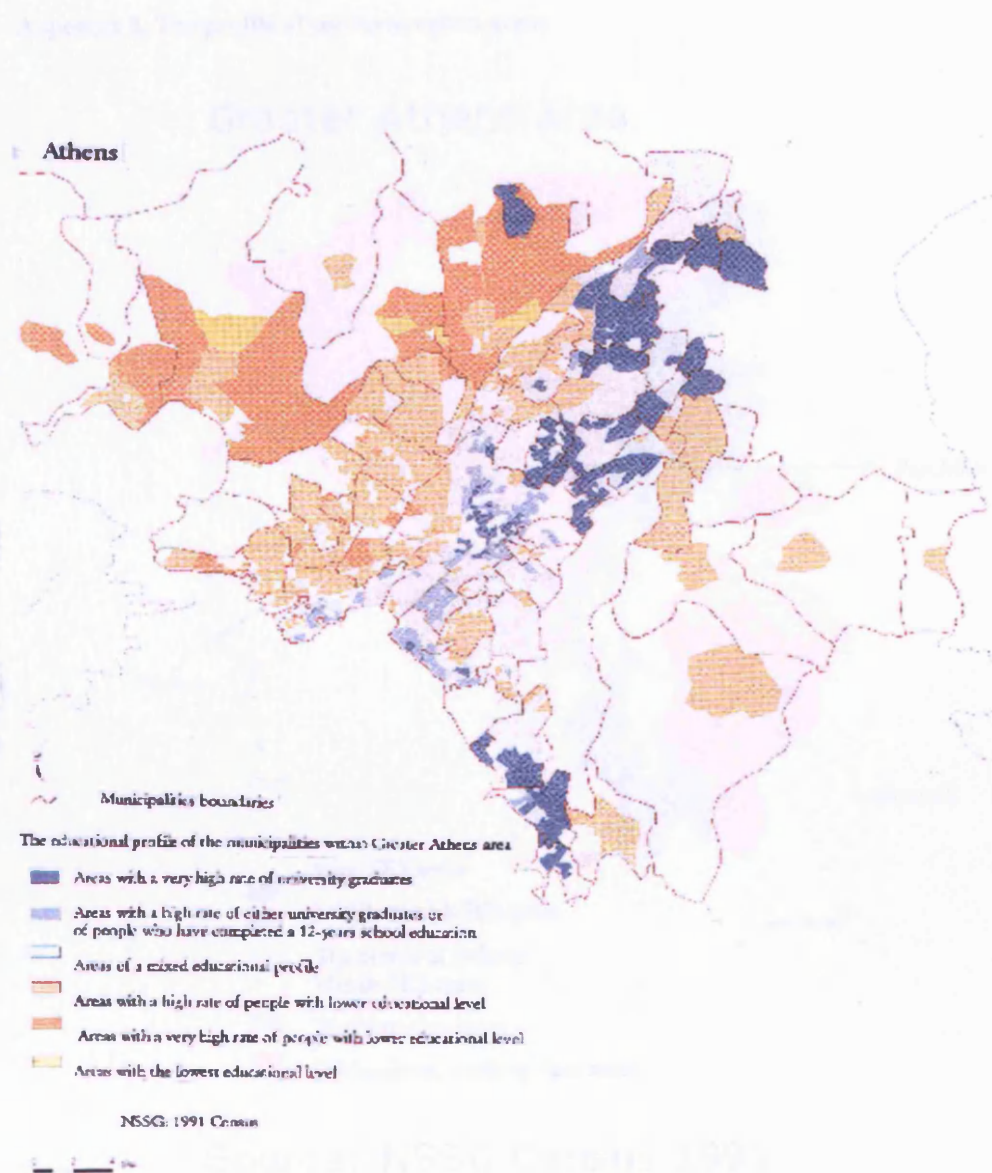
Athens

Municipalities boundaries

The educational profile of the municipalities within Greater Athens area

Areas with a very high rate of university graduates

Areas with a high rate of either university graduates or of people who have completed a 12-years school education

Areas of a mixed educational profile

Areas with a high rate of people with lower educational level

Areas with a very high rate of people with lower educational level

Areas with the lowest educational level

NSSG: 1991 Census

Source: NSSG Census 1991

Adopted from:

Social and Economic Atlas of Greece (Vol. 1): The cities. Th. Maloutas (ed.) 2000; EKKE & Thessalia University Press, Volos, Greece

Appendix 2. The profile of the three urban areas

Greater Athens Area
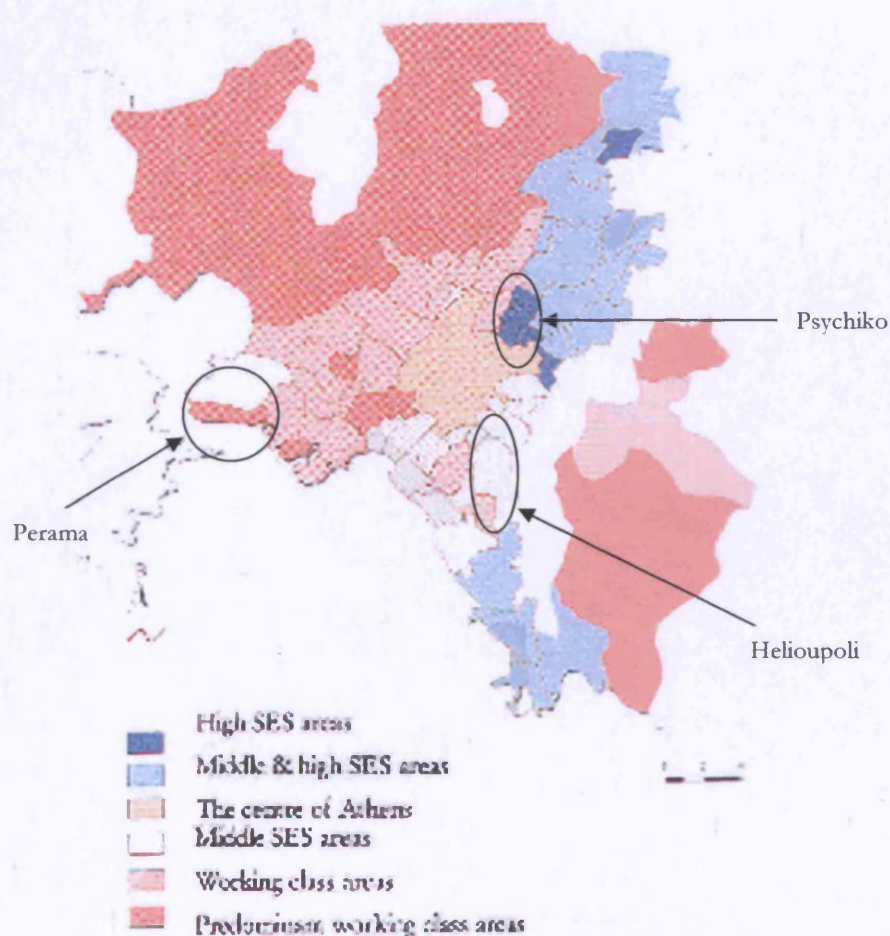
Psychiko

Perama

Helioupoli

High SES areas

Middle & high SES areas

The centre of Athens

Middle SES areas

Working class areas

Predominant working class areas

Source: NSSG Census 1991

The profiles of the selected urban municipalities*:

1) Perama: Population: 26,684, population 40 years old or over: 11,458

2) Helioupoli: Population: 81,024, population 40 years old or over: 37,684

3) Psychiko: Population: 11,046, population 40 years old or over: 5,971

*Data taken from the latest National Census (2001) – NSSG 2001

Appendix 3.The map of Greece* showing the selected three rural prefectures/districts and their profiles

*Downloaded from: http://www.lib.utexas.edu/maps/europe/greece_div96.jpg (last accessed 20/06/05)

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Prefectures/Districts**:

1) Prefecture of Eurytania: population: 19518, population 40 years old or older: 10732, no urban population at all.

2) District of Icaria: population: 8354, population 40 years old or older: 4694, no urban population at all.

3) Corinthia: population 144527, population 40 years old or older: 71512, a mixture of urban, semi-urban and rural population.

Municipalities:

within Eurytania:

1a) Domnista: population: 490, population 40 years old or older: 364, municipality consisted of 8 settlements (8 villages)

1b) Viniani: population: 1066, population 40 years old or older: 632 total, municipality consisted of 6 settlements (6 villages)

within Icaria:

2) Eudelos: population 2811, population 40 years old or older: 1678, municipality consisted of 3 settlements (2 villages and a small town)

within Corinthia:

3) Xylokastro: population: 13671, population 40 years old or older: 7551, municipality consisted of 28 settlements (27 villages and a town)

** Data taken from the last National Census (2001) – see NSSG 2001

Appendix 4. The Instrument of the study

The questionnaire in English:

Date

Society & Health

α/α Interview

Interviewer

Factors influencing the health of people over forty years old

CONFIDENTIAL QUESTIONNAIRE

Pilot Application

Athens
2003

| ██████████████████ | .... |

| ██████████████████ | Male | ☐ | Female | ☐ |

| ██████████████████ | ██████ |

██████████████████

What is, exactly, your marital status?

1. Married or permanently cohabiting with your partner	☐	4. Separated	☐
2. Single	☐	5. Widow/er	☐
3. Divorced	☐		

██████████████████

The last 12 months how many people live on a permanent basis in your household?...............

██████████████████

Have you ever been to school and if so up to what level?

1. Ihave not been at all to school	☐	6. I finished high school	☐
2. I did not finish elementary school	☐	7. Vocational training (after high school)	☐
3. I finished elementary school	☐	8. Tertiary institution graduate	☐
4. I finished intermediate school	☐	9. Holder of a postgraduate qualification	☐
5. I finished vocational school	☐		

██████████████████

7.1	Are you in paid and full-time employment worker?		
	YES	☐	→ if YES proceed to 7.2
	NO	☐	→ if NO proceed to 7.5
7.2	Please report what is the exact nature of your work (full title and position):
	....

7.3	Is your work:	Permanent	☐	Temporary	☐
7.4	Are you satisfied with your work:	YES	☐	NO	☐

7.5 If you do not have a paid and full-time occupation what of the following describes our current situation? (please select only one answer) ....

Unemployed	☐	Pensioner (due to age)	☐
Semi-employed	☐	Pensioner (due to health problem)	☐
Housewife	☐		

7.6 If you are unemployed please report for how long?...

██████████████████

8.1 PERSONAL MONTHLY INCOME:

To which of the following income categories you belong?

Up to 600 Euros	☐	2000 – 3000 Euros	☐
600 – 1000 Euros	☐	More than 3000 Euros	☐
1000 – 2000 Euros	☐	I do not have a personal income	☐

8.2 FAMILY MONTLHY INCOME:

If you add the income of all adults living permanently in your house, to which of the following income categories your household belong?

Up to 1000 Euros	☐	Up to 4000 Euros	☐
Up to 2000 Euros	☐	Up to 5000 Euros	☐
Up to 3000 Euros	☐	More than 5000 Euros	☐

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9.1	Is the house where you live your own property?			
	YES	☐	NO	☐

9.2 How many bedrooms have the house where you live? (Please give exact number without counting any other room of the house)...

9.3 For how long you live in the same house? (Please give exact number of years)..................

Have you got a private car? (not counting any professional car)			
YES ☐		NO	☐

How often do you do any of the following when you are in a similar situation?

	Never	Rarely	Sometimes	Often	Very often
1. I give information to a stranger	☐	☐	☐	☐	☐
2. I give money to a stranger who needs it (or asks for it)	☐	☐	☐	☐	☐
3. I offer voluntary work for a good purpose	☐	☐	☐	☐	☐
4. I lent an item of some value (e.g. a tool) to a neighbour or an acquaintance whom I do not know too well	☐	☐	☐	☐	☐
5. Consciously I buy a little bit more expensive from the store of someone who I think I should support	☐	☐	☐	☐	☐
6. I assume responsibility for an acquaintance's or colleague's mistake when he/she needs this kind of help	☐	☐	☐	☐	☐
7. I share credit for something I have done with others when easily I could have kept it all for myself	☐	☐	☐	☐	☐
8. I help someone with something he/she does not know well although it is not my responsibility	☐	☐	☐	☐	☐
9. I help a stranger in the street	☐	☐	☐	☐	☐
10. I take care of a neighbour of mine when he/she is ill	☐	☐	☐	☐	☐
11. I defend a stranger in the street who is in danger	☐	☐	☐	☐	☐
12. I risk my position to help a colleague, acquaintance or neighbour	☐	☐	☐	☐	☐
13. I volunteer to help in any way an effort for the common good	☐	☐	☐	☐	☐
14. I do something against my own rules to help someone exit a difficult situation	☐	☐	☐	☐	☐
15. Whenever I offer money or help I do it anonymously	☐	☐	☐	☐	☐

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Please report how much do you disagree or agree with the following statements?

	Absolutely agree	Partially agree	Neither agree nor disagree	Partially disagree	Absolutely disagree
1. Competition is the law of nature and life	☐	☐	☐	☐	☐
2. It annoys me when other people perform better than I do	☐	☐	☐	☐	☐
3. Without competition it is not possible to have a good society	☐	☐	☐	☐	☐
4. Winning is everything in life	☐	☐	☐	☐	☐
5. It is important that I to do my job better than others	☐	☐	☐	☐	☐
6. I like competing with others	☐	☐	☐	☐	☐
7. Some people emphasize winning I am not one of them	☐	☐	☐	☐	☐
8. I do "my own thing" irrespectively of what others think	☐	☐	☐	☐	☐
9. I'd rather depend on myself than on others	☐	☐	☐	☐	☐
10. I rely on myself most of the time, I rarely rely on others	☐	☐	☐	☐	☐
11. I enjoy feeling unique and different from others	☐	☐	☐	☐	☐
12. I am a unique person, separate from others	☐	☐	☐	☐	☐
13. One should live one's life independently of others	☐	☐	☐	☐	☐
14. I would do what pleases my family even if I detest that activity	☐	☐	☐	☐	☐
15. I could sacrifice my self-interest for the benefit of my group	☐	☐	☐	☐	☐
16. I would sacrifice an activity that I enjoy much if my family did not approve of it	☐	☐	☐	☐	☐
17. Children should be taught to place duty before pleasure	☐	☐	☐	☐	☐
18. It is important to me that I respect the decisions made by my groups	☐	☐	☐	☐	☐
19. It annoys me if I have to sacrifice activities that I enjoy to help others	☐	☐	☐	☐	☐
20. I usually do if I others want me to do even if I wanted to do something else	☐	☐	☐	☐	☐
21. The well-being of others is important to me	☐	☐	☐	☐	☐
22. If a colleague or fellow-villager or neighbour gets a prize, I would feel proud	☐	☐	☐	☐	☐
23. If a relative were in financial difficulty, I would help within my means	☐	☐	☐	☐	☐
24. It is important to me to maintain balance within the group I belong to	☐	☐	☐	☐	☐
25. I like sharing things with other people (e.g. neighbours or fellow-villagers)	☐	☐	☐	☐	☐
26. It is important to consult close friends and get their ideas before making a decision	☐	☐	☐	☐	☐
27. My happiness depends on the happiness of those around me	☐	☐	☐	☐	☐
28. To me, pleasure is devoting time to others	☐	☐	☐	☐	☐

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Please indicate how much the following statements are valid for you and how well they describe you?

	Very much	Much	Some	Little	Not at all
1. I often have tender feelings for people less fortunate than me (in life)	☐	☐	☐	☐	☐
2. Sometimes I do feel very sorry for other people when they are having problems	☐	☐	☐	☐	☐
3. When I see someone being taken advantage of, I feel, in a way, like protecting him/her	☐	☐	☐	☐	☐
4. Other people's misfortunes usually disturb me a lot	☐	☐	☐	☐	☐
5. When I see someone being treated unfairly, I feel pity for them	☐	☐	☐	☐	☐
6. I am often quite touched by things that I see happen	☐	☐	☐	☐	☐
7. I sometimes find it difficult to see things from the "others'" point of view	☐	☐	☐	☐	☐
8. In case of disagreement I try to look at "others'" side before I make a decision	☐	☐	☐	☐	☐
9. Sometimes I try to understand better my friends by imaging how things look from their perspective	☐	☐	☐	☐	☐
10. If I'm sure about something, I don't waste much time listening to other people's arguments	☐	☐	☐	☐	☐
11. I believe that there are two sides to every question and try to look at them both	☐	☐	☐	☐	☐
12. When I'm upset at someone, I usually try to "put myself in his shoes" for a while	☐	☐	☐	☐	☐
13. Before criticizing somebody, I try to imagine how I would feel if I were in his/her place	☐	☐	☐	☐	☐

14.1	Have you got any relatives?	YES	☐→ *if YES proceed to 14.2*
		NO	☐→ *if NO proceed to 15*

14.2 How often do you have contact with any of your relatives who do not live with you? (please select only one answer)

	Almost everyday	Once or twice a week	Once or twice a month	Every other month	Once or twice a year	Not even once a year or never
Meeting/Pay a visit	☐	☐	☐	☐	☐	☐
Communication over the phone	☐	☐	☐	☐	☐	☐

14.3 How many of all your relatives you meet at least once a month?

None	☐	1-2	☐
3-5	☐	6-10	☐
More than 10	☐		

14.4 With how many of all your relatives would you say that you have a very close relationship? *(Please give exact number)*..

15.1	Have you got any friends?	YES	☐ → if YES proceed to 15.2
		NO	☐ → if NO proceed to 16

15.2 How often do you have contact with any of your friends who do not live with you? (please select only one answer)

	Almost everyday	Once or twice a week	Once or twice a month	Every other month	Once or twice a year	Not even once a year or never
Meeting/Pay a visit	☐	☐	☐	☐	☐	☐
Communication over the phone	☐	☐	☐	☐	☐	☐

15.3 How many of all your friends you meet at least once a month?

None	☐	1-2	☐
3-5	☐	6-10	☐
More than 10	☐		

15.4 With how many of all your friends would you say that you have a close relationship? *(please give exact number)*..

Please answer the following questions for people you feel very close to you

	A lot	Some	A little	Not at all
1. How much do they understand how you feel about things?	☐	☐	☐	☐
2. How much could you trust them for a significant problem of yours?	☐	☐	☐	☐
3. How much could you open up with them if you need someone to talk about your worries?	☐	☐	☐	☐
4. How much do they criticise you?	☐	☐	☐	☐
5. How much do they let you down when you count on them?	☐	☐	☐	☐
6. How much do they get on your nerves?	☐	☐	☐	☐

Please give an answer to the following questions:

	Very much	Much	Some	A little	Not at all
1. Do you enjoy keeping company with other people?	☐	☐	☐	☐	☐
2. Do you feel loneliness?	☐	☐	☐	☐	☐
3. How much could you trust an unknown person in the street?	☐	☐	☐	☐	☐

Please tell us how much the following statements are valid for you?

4. Most people would take advantage of me if they could	☐	☐	☐	☐	☐
5. Most people are trustworthy and I can trust them	☐	☐	☐	☐	☐
6. We should treat other people exactly as they treat us	☐	☐	☐	☐	☐

Do you have any chronic disease or condition (e.g. diabetes, cholesterol, hypertension etc) for which you take any medication or which trouble you, in any way, during the last 12 months? YES ☐ NO ☐

If YES please report which are these:

1. ....

2. ....

3. ....

4. ....

5. ....

6. ....

19.1	During the last 7 days how many days you walked for more than 10 minutes (at a time) for any reason? (Please give exact number of days)...................................

20.1	Do you smoke?		YES	☐ → If YES proceed to 20.2
			NO	☐ → If NO proceed to 20.4
20.2	How many cigarettes per day?			
	1-5 ☐ 6-10 ☐ 11-20 ☐ 21-40 ☐ More than 40 cigarettes ☐			
20.3	At what age did you start smoking;...........................			
20.4	Did you smoke in the past?		YES	☐
			NO	☐
20.5	Apart from you, how many people in your house smoke?............			

Then SF-36 follows – a sample copy of SF-36 can be downloaded from the SF-36 website: http://www.sf-36.org/tools/pdf/SF-36v1_Standard_Sample.pdf

Think of this ladder as representing where people stand in our society. At the top of the ladder are the people who are the best off - those who have the most money, most education, and best jobs. At the bottom are the people who are the worst off - who have the least money, least education, and the worst jobs or no jobs. The higher up you are on this ladder, the closer you are to the people at the very top and the lower you are, the closer you are to the people at the very bottom.
Please mark a cross on the rung on the ladder where you would place yourself.

Example:
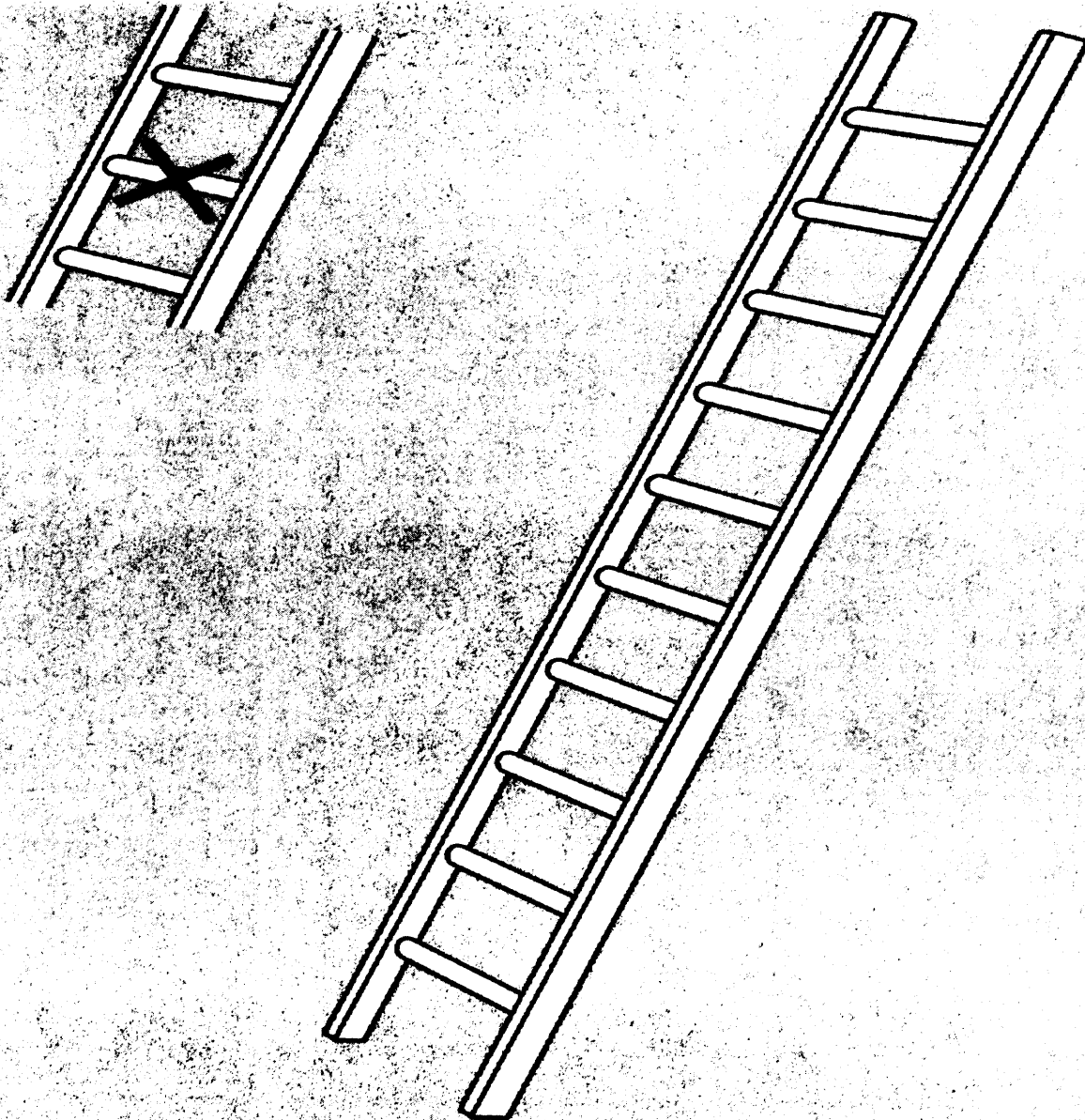
The questionnaire in Greek:

Ημερομηνία

☐☐☐☐☐☐

Κοινωνία & υγεία

α/α Συνέντευξης

☐☐☐

Συνεντεύκτης

☐☐☐

Οι παράγοντες που επηρεάζουν την υγεία των ανθρώπων πάνω από τα σαράντα

ΕΜΠΙΣΤΕΥΤΙΚΟ ΕΡΩΤΗΜΑΤΟΛΟΓΙΟ

Πιλοτική εφαρμογή

Αθήνα
2003

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▓▓▓▓▓▓▓▓▓▓▓▓▓▓	Άνδρας ☐ Γυναίκα ☐
▓▓▓▓▓▓▓ ▓▓▓	

Ποια ακριβώς είναι η οικογενειακή κατάσταση σας;

1. Έγγαμος ή ζείτε μόνιμα με τον/την σύντροφο σας	☐	4. Σε διάσταση	☐
2. Άγαμος	☐	5. Χήρα/ος	☐
3. Διαζευγμένος	☐		

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Τους τελευταίους 12 μήνες, πόσοι άνθρωποι ζουν σε μόνιμη βάση στο νοικοκυριό σας; ....

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Έχετε πάει στο σχολείο και μέχρι ποιό επίπεδο;

1. Δεν έχω πάει καθόλου στο σχολείο	☐	6. Απόφοιτος λύκειο	☐
2. Πήγα μέχρι κάποια τάξη του δημοτικού	☐	7. Μεταλυκειακή εκπαίδευση	☐
3. Τελείωσα το δημοτικό	☐	8. Απόφοιτος τριτοβάθμιου ιδρύματος	☐
4. Απόφοιτος γυμνάσιου	☐	9. Κάτοχος μεταπτυχιακού τίτλου σπουδών	☐
5. Απόφοιτος τεχνικής σχολής	☐		

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7.1	Είστε αμειβόμενος και με πλήρη απασχόληση εργαζόμενος;		
	ΝΑΙ	☐	→Αν ΝΑΙ, συνεχίστε στο 7.2
	ΟΧΙ	☐	→Αν ΟΧΙ, συνεχίστε στο 7.5

7.2 Παρακαλώ αναφέρατε ποια ακριβώς είναι η φύση της εργασίας σας (πλήρης τίτλος και θέση)

....

7.3	Είναι η εργασία σας:	Μόνιμη	☐	Προσωρινή	☐
7.4	Είστε ικανοποιημένος από την εργασία σας;	ΝΑΙ ☐		ΟΧΙ ☐	

7.5 Αν δεν έχετε πλήρη και αμειβόμενη απασχόληση, τι από τα παρακάτω περιγράφει την παρούσα κατάσταση σας; (παρακαλώ επιλέξτε μόνο μία απάντηση)

Άνεργος	☐	Συνταξιούχος (λόγω ηλικίας)	☐
Ημιαπασχολούμενος	☐	Συνταξιούχος (λόγω προβλημάτων υγείας)	☐
Νοικοκυρά	☐		

7.6 Αν είστε Άνεργος, παρακαλώ, αναφέρατε για πόσο καιρό;.....................................

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8.1 ΠΡΟΣΩΠΙΚΟ ΜΗΝΙΑΙΟ ΕΙΣΟΔΗΜΑ:

Σε ποια από τις παρακάτω κατηγορίες εισοδήματος ανήκετε;

Ως 600 Ευρώ	☐	2000 – 3000 Ευρώ	☐
600 – 1000 Ευρώ	☐	Παραπάνω από 3000 Ευρώ	☐
1000 – 2000 Ευρώ	☐	Δεν έχω προσωπικό εισόδημα	☐

8.2 ΟΙΚΟΓΕΝΕΙΑΚΟ ΕΙΣΟΔΗΜΑ:

Αν αθροίσετε τα εισοδήματα όλων των ενηλίκων που διαμένουν μόνιμα στο σπίτι σας, σε ποια, από τις παρακάτω κατηγορίες εισοδήματος, ανήκει το νοικοκυριό σας;

Ως 1000 Ευρώ	☐	Ως 4000 Ευρώ	☐
Ως 2000 Ευρώ	☐	Ως 5000 Ευρώ	☐
Ως 3000 Ευρώ	☐	Παραπάνω από 5000 Ευρώ	☐

9.1   Το σπίτι στο οποίο διαμένετε είναι ιδιοκτησία σας;

NAI   ☐   OXI   ☐

9.2   Πόσα υπνοδωμάτια έχει το σπίτι στο οποίο διαμένετε; (παρακαλώ δώστε ακριβή αριθμό δίχως να υπολογίσετε κανένα από τους υπόλοιπους χώρους του σπιτιού).................

9.3   Πόσο καιρό διαμένετε στο ίδιο σπίτι;(παρακαλώ δώστε ακριβή αριθμό σε έτη).........

Έχετε ιδιόκτητο επιβατικό αυτοκίνητο (όχι επαγγελματικό ή αγροτικό);

NAI   ☐   OXI   ☐

Πόσο συχνά κάνετε κάτι από τα παρακάτω **όταν** βρίσκεστε στην ανάλογη περίσταση;

	Ποτέ	Σπάνια	Μερικές φορές	Συχνά	Πολύ συχνά
1. Δίνω πληροφορίες σ'έναν άγνωστο	☐	☐	☐	☐	☐
2. Δίνω χρήματα σ'έναν άγνωστο που τα χρειάζεται (ή μου τα ζητάει)	☐	☐	☐	☐	☐
3. Προσφέρω εθελοντική εργασία για έναν καλό σκοπό	☐	☐	☐	☐	☐
4. Δανείζω ένα αντικείμενο κάποιας αξίας (π.χ. κάποιο εργαλείο) σε κάποιον γείτονα ή γνωστό που δεν γνωρίζω καλά	☐	☐	☐	☐	☐
5. Εν γνώσει μου ψωνίζω κάποιο είδος λίγο πιο ακριβά από το κατάστημα κάποιου που νομίζω πως πρέπει να υποστηρίξω	☐	☐	☐	☐	☐
6. Παίρνω την ευθύνη του λάθους ενός γνωστού ή συναδέλφου πάνω μου όταν αυτή/ος χρειάζεται αυτού του είδους την βοήθεια	☐	☐	☐	☐	☐
7. Μοιράζομαι τον έπαινο για κάτι καλό που έγινε με κάποιον άλλο ενώ εύκολα θα μπορούσα να τον κρατήσω όλον για εμένα	☐	☐	☐	☐	☐
8. Βοηθώ κάποιον για κάτι που δεν γνωρίζει - παρότι δεν είναι δική μου αρμοδιότητα ή δουλειά.	☐	☐	☐	☐	☐
9. Βοηθώ έναν άγνωστο ή μία άγνωστη στο δρόμο	☐	☐	☐	☐	☐
10. Φροντίζω κάποιον γνωστή/ό ή γείτονα μου όταν αυτή/ός ήτάν άρρωστη/ος	☐	☐	☐	☐	☐
11. Υπερασπίζομαι κάποια/ον άγνωστη/ο που κινδυνεύει στο δρόμο	☐	☐	☐	☐	☐
12. Διακινδυνεύω την θέση μου για να βοηθήσω έναν συνάδελφο, γνωστή/ό ή γείτονα	☐	☐	☐	☐	☐
13. Προσφέρομαι να βοηθήσω με οποιοδήποτε τρόπο μία κοινωφελή προσπάθεια	☐	☐	☐	☐	☐
14. Κάνω κάτι αντίθετο από τους κανόνες μου προκειμένου να βοηθήσω κάποια/ον να βγει από μία δύσκολη θέση	☐	☐	☐	☐	☐
15. Όταν προσφέρω χρήματα ή βοήθεια το κάνω ανώνυμα	☐	☐	☐	☐	☐

Αναφέρατε *πόσο διαφωνείτε ή συμφωνείτε* με τις παρακάτω προτάσεις:

	Συμ-φωνώ Από-λυτα	Συμ-φωνώ εν μέρει	Ούτε συμ-φωνώ Ούτε δια-φωνώ	Δια-φωνώ εν μέρει	Δια-φωνώ από-λυτα
1. Ο ανταγωνισμός είναι (ο) κανόνας της φύσης και της ζωής	☐	☐	☐	☐	☐
2. Εκνευρίζομαι όταν κάποιος τα πάει καλύτερα από μένα	☐	☐	☐	☐	☐
3. Χωρίς ανταγωνισμό είναι απίθανο να έχουμε μία καλή κοινωνία	☐	☐	☐	☐	☐
4. Το παν στη ζωή είναι να νικάς	☐	☐	☐	☐	☐
5. Είναι σημαντικό (για μένα) να κάνω την δουλειά μου καλύτερα από τους άλλους	☐	☐	☐	☐	☐
6. Μου αρέσει να ανταγωνίζομαι με τους άλλους ανθρώπους	☐	☐	☐	☐	☐
7. Κάποιοι άνθρωποι τονίζουν την σημασία του να νικάς, εγώ δεν είμαι ένας από αυτούς	☐	☐	☐	☐	☐
8. Κάνω του κεφαλιού μου ανεξάρτητα από το τι σκέφτονται οι άλλοι	☐	☐	☐	☐	☐
9. Καλύτερα να βασίζομαι στον εαυτό μου παρά σε άλλους	☐	☐	☐	☐	☐
10. Τις περισσότερες φόρες εμπιστεύομαι τον εαυτό μου – σπάνια εμπιστεύομαι άλλους	☐	☐	☐	☐	☐
11. Μου αρέσει να αισθάνομαι μοναδικός και διαφορετικός από τους άλλους	☐	☐	☐	☐	☐
12. Είμαι ένα μοναδικό και ξεχωριστό από τους άλλους ανθρώπους άτομο	☐	☐	☐	☐	☐
13. Θα πρέπει να ζούμε τις ζωές μας ανεξάρτητα από τους άλλους ανθρώπους	☐	☐	☐	☐	☐
14. Θα κάνω αυτό που ευχαριστεί την οικογένεια μου ακόμη κι αν είναι κάτι που απεχθάνομαι	☐	☐	☐	☐	☐
15. Μπορώ να θυσιάσω το προσωπικό μου συμφέρον για το καλό της ομάδας στην οποία ανήκω	☐	☐	☐	☐	☐
16. Θα θυσίαζα μια δραστηριότητα που μου αρέσει πολύ να κάνω αν η οικογένεια μου δεν την ενέκρινε	☐	☐	☐	☐	☐
17. Τα παιδιά θα πρέπει να μαθαίνουν να τοποθετούν το καθήκον πριν την ευχαρίστηση	☐	☐	☐	☐	☐
18. Είναι σημαντικό για μένα να σέβομαι τις αποφάσεις της ομάδας στην οποία ανήκω	☐	☐	☐	☐	☐
19. Ενοχλούμαι όταν πρέπει να θυσιάσω κάτι που μου αρέσει να κάνω για να βοηθήσω άλλους (ανθρώπους)	☐	☐	☐	☐	☐
20. Συνήθως κάνω αυτό που θέλουν οι άλλοι να κάνω ακόμα κι αν εγώ θα ήθελα να κάνω κάτι διαφορετικό	☐	☐	☐	☐	☐
21. Η ευημερία των άλλων ανθρώπων είναι σημαντική για μένα	☐	☐	☐	☐	☐
22. Θα αισθανθώ υπερήφανος εάν ένας συνάδελφος ή συγχωριανός ή γείτονας μου κερδίσει ένα βραβείο	☐	☐	☐	☐	☐

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23. Εάν ένας συγγενής βρεθεί σε οικονομική δυσκολία θα τον βοηθήσω με τα μέσα που διαθέτω	☐	☐	☐	☐	☐
24. Είναι σημαντικό για μένα να διατηρούνται οι ισορροπίες μέσα στην ομάδα την οποία ανήκω	☐	☐	☐	☐	☐
25. Μου αρέσει να μοιράζομαι πράγματα με άλλους ανθρώπους (π.χ. γείτονες ή συγχωριανούς)	☐	☐	☐	☐	☐
26. Είναι σημαντικό να συμβουλεύεσαι τους στενούς φίλους σου και να παίρνεις την γνώμη τους πριν πάρεις κάποια απόφαση	☐	☐	☐	☐	☐
27. Η χαρά μου εξαρτάται από αυτή των άλλων ανθρώπων τριγύρω μου	☐	☐	☐	☐	☐
28. Για μένα, ευχαρίστηση είναι να αφιερώνω χρόνο σε άλλους ανθρώπους	☐	☐	☐	☐	☐

████████████████████████

Παρακαλώ αναφέρετε *πόσο πολύ ισχύουν για σας και πόσο σας περιγράφουν* οι παρακάτω προτάσεις:

	Πάρα πολύ	Πολύ	Αρκετά	Λίγο	Καθόλου
1. Συχνά έχω τρυφερά συναισθήματα και νοιάζομαι για ανθρώπους λιγότερο τυχερούς από εμένα στη ζωή	☐	☐	☐	☐	☐
2. Μερικές φορές αισθάνομαι λύπηση για τους άλλους ανθρώπους όταν αυτοί αντιμετωπίζουν προβλήματα	☐	☐	☐	☐	☐
3. Όταν βλέπω κάποιον να πέφτει θύμα εκμετάλλευσης, μου δημιουργείται, κατά κάποιον τρόπο, μία αίσθηση να τον προστατεύσω	☐	☐	☐	☐	☐
4. Οι ατυχίες των άλλων ανθρώπων, συνήθως, με ταράζουν	☐	☐	☐	☐	☐
5. Μερικές φορές δεν αισθάνομαι και πολύ λύπηση, όταν βλέπω πως κάποιος αδικείται	☐	☐	☐	☐	☐
6. Συχνά συγκινούμαι από πράγματα που βλέπω να συμβαίνουν	☐	☐	☐	☐	☐
7. Μερικές φορές δυσκολεύομαι να δω τα πράγματα από την μεριά του άλλου/των άλλων ανθρώπων	☐	☐	☐	☐	☐
8. Σε περίπτωση διαφωνίας, πριν πάρω απόφαση, προσπαθώ να κοιτάξω την μεριά των άλλων ανθρώπων	☐	☐	☐	☐	☐
9. Μερικές φορές προσπαθώ να καταλάβω καλύτερα τους φίλους μου με το να φαντάζομαι πως βλέπουν αυτοί τα πράγματα από την μεριά τους	☐	☐	☐	☐	☐
10. Εάν είμαι σίγουρος για κάτι δεν χάνω τον χρόνο μου ακούγοντας τα επιχειρήματα των άλλων ανθρώπων	☐	☐	☐	☐	☐
11. Πιστεύω πως κάθε ζήτημα έχει δυο όψεις και προσπαθώ να τις βλέπω και τις δύο	☐	☐	☐	☐	☐
12. Όταν είμαι αναστατωμένος με κάποιον συνήθως προσπαθώ, για λίγο, να μπω στην θέση του	☐	☐	☐	☐	☐
13. Προτού κατακρίνω κάποιον προσπαθώ να φανταστώ πως θα αισθανόμουν εγώ στην θέση του	☐	☐	☐	☐	☐

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14.1	Έχετε συγγενείς;	ΝΑΙ	□ →	*Αν ΝΑΙ συνεχίστε στο 14.2*
		ΟΧΙ	□ →	*Αν ΟΧΙ συνεχίστε στο 15*

14.2 Πόσο συχνά έχετε επαφή με οποιονδήποτε από τους αυτούς τους συγγενείς σας που δεν μένουν μαζί σας; (επιλέξτε μία μόνο απάντηση)

	Σχεδόν κάθε μέρα	Μια ή δύο φορές την εβδομάδα	Μια ή δύο φορές το μήνα	Κάθε δεύτερο μήνα	Μια ή δύο φορές το χρόνο	Ούτε μία φορά το χρόνο ή ποτέ
Συνάντηση/Επίσκεψη	□	□	□	□	□	□
Τηλεφωνική επικοινωνία	□	□	□	□	□	□

14.3 Πόσους απ'όλους τους συγγενείς σας βλέπετε τουλάχιστον μία φορά το μήνα;

Κανέναν	□	1-2	□
3-5	□	6-10	□
Περισσότερους από 10	□		

14.4 Με πόσους απ'όλους τους συγγενείς σας θα λέγατε πως έχετε πολύ στενή σχέση; (παρακαλώ δώστε ακριβή αριθμό)..

15.1	Έχετε φίλους/ες;	ΝΑΙ	□ →	Αν ΝΑΙ συνεχίστε στο 15.2
		ΟΧΙ	□ →	Αν ΟΧΙ συνεχίστε στο 16

15.2 Πόσο συχνά έχετε επαφή με οποιονδήποτε από τους φίλους/ες σας που δεν μένουν μαζί σας; (επιλέξτε μία μόνο απάντηση)

	Σχεδόν κάθε μέρα	Μια ή δύο φορές την εβδομάδα	Μια ή δύο φορές το μήνα	Κάθε δεύτερο μήνα	Μια ή δύο φορές το χρόνο	Ούτε μία φορά το χρόνο ή ποτέ
Συνάντηση/Επίσκεψη	□	□	□	□	□	□
Τηλεφωνική επικοινωνία	□	□	□	□	□	□

15.3 Πόσους από τους φίλους/ες σας βλέπετε τουλάχιστον μία φορά το μήνα;

Κανέναν	□	1-2	□
3-5	□	6-10	□
Περισσότερους από 10	□		

15.4 Με πόσους από τους φίλους σας θα λέγατε πως έχετε στενή σχέση; (παρακαλώ δώστε ακριβή αριθμό)..

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Απαντήστε τις παρακάτω ερωτήσεις για τους ανθρώπους που αισθάνεστε πολύ κοντά σας

	Πολύ	Αρκετά	Λίγο	Καθόλου
1. Πραγματικά πόσο καταλαβαίνουν τί αισθάνεστε;	☐	☐	☐	☐
2. Πόσο θα μπορούσατε να τους εμπιστευθείτε για ένα σημαντικό πρόβλημα;	☐	☐	☐	☐
3. Πόσο μπορείτε να τους ανοιχτείτε αν χρειάζεστε κάποιον να μιλήσετε για τις ανησυχίες σας;	☐	☐	☐	☐
4. Πόσο σας κριτικάρουν;	☐	☐	☐	☐
5. Πόσο σας απογοητεύουν οι κοντινοί σας άνθρωποι όταν βασίζεστε σ'αυτούς;	☐	☐	☐	☐
6. Πόσο σας εκνευρίζουν;	☐	☐	☐	☐

Παρακαλώ δώστε απάντηση στις παρακάτω ερωτήσεις

	Παρά πολύ	Πολύ	Αρκετά	Λίγο	Καθόλου
1. Σας αρέσει να κάνετε παρέα με άλλους ανθρώπους;	☐	☐	☐	☐	☐
2. Αισθάνεστε μοναξιά;	☐	☐	☐	☐	☐
3. Πόσο πολύ θα μπορούσατε να εμπιστευθείτε έναν άγνωστο άνθρωπο στο δρόμο;	☐	☐	☐	☐	☐

Παρακαλώ πείτε μας πόσο πολύ ισχύουν για σας οι παρακάτω προτάσεις;

	Παρά πολύ	Πολύ	Αρκετά	Λίγο	Καθόλου
4. Οι περισσότεροι άνθρωποι, αν μπορούσαν, θα με εκμεταλλεύονταν	☐	☐	☐	☐	☐
5. Οι περισσότεροι άνθρωποι είναι αξιόπιστοι και μπορώ να τους εμπιστευθώ	☐	☐	☐	☐	☐
6. Πρέπει να συμπεριφερόμαστε στους άλλους ανθρώπους ακριβώς όπως μας συμπεριφέρονται	☐	☐	☐	☐.	☐

Έχετε κάποια χρόνια νοσήματα ή καταστάσεις (π.χ. διαβήτης, χοληστερίνη, υπέρταση κ.λ.π.) για τα οποία παίρνετε φάρμακα ή τα οποία σας απασχόλησαν, με οποιοδήποτε τρόπο, κατά την διάρκεια των τελευταίων 12 μηνών;   ΝΑΙ ☐ ΟΧΙ ☐

Αν ΝΑΙ αναφέρατε αναλυτικά ποία είναι αυτά;

1...

2...

3. ....

4. ....

5. ....

6...

19.1 Κατά την διάρκεια των 7 τελευταίων ημερών πόσες μέρες έτυχε να περπατήσετε για παραπάνω από 10 λεπτά (την φορά) για οποιοδήποτε λόγο; (παρακαλώ δώστε ακριβή αριθμό ημερών)...

20.1 Καπνίζετε;				NAI	□ → Αν Ναι, συνεχίστε στο 20.2
				ΟΧΙ	□ → Αν Όχι, συνεχίστε στο 20.4

20.2 Πόσα τσιγάρα την ημέρα καπνίζετε;

1-5 □	6-10 □	11-20 □	21-40 □	Περισσότερα □ από 40 τσιγάρα

20.3 Σε ποια ηλικία αρχίσατε το
κάπνισμα;..

20.4 Καπνίζατε στο παρελθόν;	NAI □
	ΟΧΙ □

20.5 Πόσοι άνθρωποι καπνίζουν στο σπίτι σας εκτός από εσάς;...............................

Έπειτα ακολουθεί το SF-36 – ένα δείγμα του SF-36 (στα Αγγλικά) μπορεί να αναζητηθεί στον διαδικτυακό τόπο του SF-36 : http://www.sf-36.org/tools/pdf/SF-36v1_Standard_Sample.pdf

Φανταστείτε αυτή τη σκάλα σαν μία αναπαράσταση της κοινωνίας. Στο πάνω-πάνω σκαλί της σκάλας είναι οι άνθρωποι που έχουν την καλύτερη θέση στη κοινωνία – έχουν τις καλύτερες δουλείες, τα περισσότερα χρήματα και την καλύτερη εκπαίδευση. Στο κατώτερο σκαλί της σκάλας είναι οι άνθρωποι που έχουν τη χειρότερη θέση στην κοινωνία – έχουν τις χειρότερες δουλείες (ή καθόλου δουλεία), τα λιγότερα χρήματα και τη χειρότερη εκπαίδευση.

Εσείς σε ποιό σκαλοπάτι της σκάλας τοποθετείτε τον εαυτό σας;

Παράδειγμα:
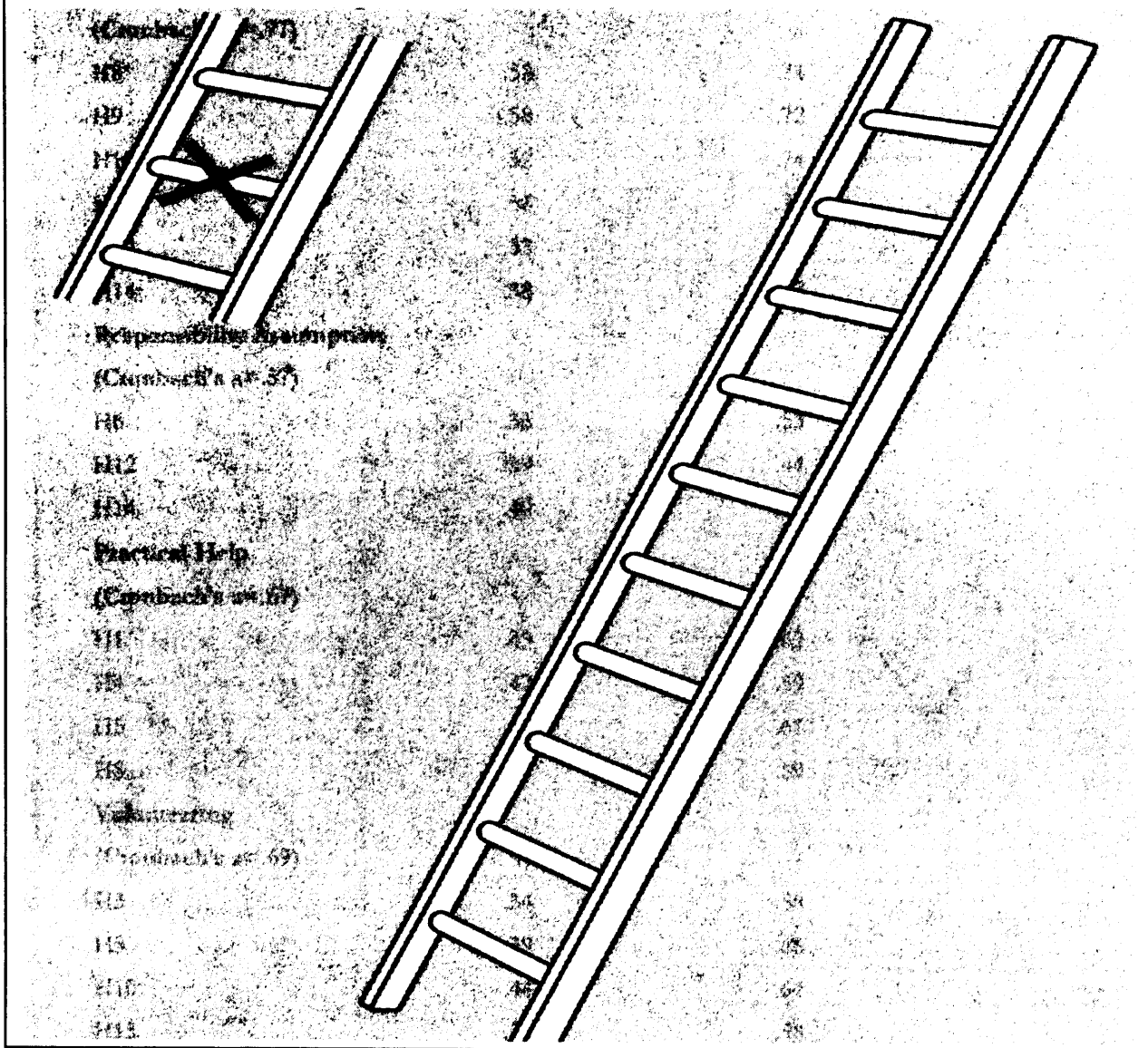
Appendix 5. Initial indication for the reliability of the ten psychosocial factors/determinants of social relationships

All items which loaded greater than .3 on a factor thought to be important parts of it and were included in reliability analysis as constituent variable of it.

1.3.1 Altruism

Scale	Corrected Item-total correlation	Cronbach's Alpha if item deleted
Altruism		
(Cronbach's a=.77)		
H8	.52	.74
H9	.58	.72
H10	.52	.74
H11	.58	.72
H12	.53	.74
H14	.38	.77
Responsibility Assumption		
(Cronbach's a=.57)		
H6	.33	.53
H12	.39	.44
H14	.40	.42
Practical Help		
(Cronbach's a=.67)		
H1	.43	.62
H4	.47	.59
H5	.44	.61
H8	.47	.59
Volunteering		
(Cronbach's a=.69)		
H3	.54	.58
H5	.39	.68
H10	.44	.64
H13	.54	.58

1.3.2 Individualism – collectivism

Scale	Corrected Item-total correlation	Cronbach's Alpha if item deleted
Vertical Individualism (Cronbach's a=.70)		
VI12.1_R	.43	.66
VI12.3_R	.50	.63
VI12.4_R	.41	.67
VI12.5_R	.40	.68
VI12.6_R	.55	.61
Horizontal Collectivism (Cronbach's a=.66)		
VC12.15_R	.35	.65
VC12.18_R	.42	.60
HC12.22_R	.37	.62
HC12.23_R	.49	.59
HC12.24_R	.43	.61
HC12.25_R	.36	.63
Sense of Uniqueness (Cronbach's a=.81)		
HI12.11_R	.68	.
HI12.12_R	.68	.
Collectivism Dependency (Cronbach's a=.64)		
HC12.22_R	.33	.63
HC12.25_R	.36	.62
HC12.27_R	.51	.51
HC12.28_R	.52	.51
Horizontal Individualism (Cronbach's a=.57)		
VI12.5_R	.28	.67
HI12.9_R	.43	.43

HI12.10_R	.48	.32
Vertical Collectivism		
(Cronbach's a=.52)		
VC12.14_R	.34	.41
VC12.15_R	.28	.47
VC12.16_R	.35	.41
VC12.20_R	.26	.49

Appendix 6. Unrotated "diagnostic" Exploratory Factor Analysis (EFA) of the altruistic data (14-item scale)

The unrotated EFA of the 14 altruistic items: the items' initial communalities

	Initial	Extraction
H1	1.000	.665
H2	1.000	.929
H3	1.000	.770
H4	1.000	.843
H5	1.000	.685
H6	1.000	.703
H8	1.000	.700
H9	1.000	.690
H10	1.000	.622
H11	1.000	.641
H12	1.000	.710
H13	1.000	.705
H14	1.000	.605
H15	1.000	.927

Extraction Method: Principal Component Analysis

Appendix 7. Initial rotated Exploratory Factor Analysis (EFA) of the altruistic data (14-item scale)

Initial rotated EFA of the altruistic factors - total variance explained (rotated non-orthogonal design)

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% of Variance	Cumulative % of Variance	Total	% of Variance	Cumulative % of Variance	Total
1	4.615	32.966	32.966	4.615	32.966	32.966	2.764
2	1.169	8.352	41.318	1.169	8.352	41.318	1.949
3	1.084	7.740	49.058	1.084	7.740	49.058	1.896
4	.987	7.049	56.108	.987	7.049	56.108	1.539
5	.887	6.335	62.442	.887	6.335	62.442	2.352
6	.742	5.301	67.744	.742	5.301	67.744	1.637
7	.710	5.070	■■■	.710	5.070	72.813	2.178
8	.681	4.866	77.679				
9	.660	4.717	82.396				
10	.590	4.211	86.607				
11	.535	3.819	90.426				
12	.478	3.413	93.840				
13	.467	3.336	97.176				
14	.395	2.824	100.000				

Extraction Method: Principal Component Analysis

Initial rotated EFA of the altruistic factors - Pattern Matrix

Component

	1	2	3	4	5	6	7
H1	0.19	-0.22	-0.56	-0.09	0.05	0.28	0.23
H2	0.03	0.08	0.07	0.04	-0.03	0.95	0.00
H3	0.05	-0.09	0.04	0.05	-0.83	0.06	0.10
H4	-0.07	-0.02	-0.12	0.09	-0.02	0.04	0.88
H5	-0.18	0.24	-0.53	-0.10	-0.45	-0.03	0.12
H6	-0.23	0.78	-0.05	0.04	-0.05	0.20	0.04
H8	0.24	0.19	-0.63	0.25	0.03	-0.07	0.04
H9	0.65	0.10	-0.30	0.14	0.08	0.15	-0.10
H10	0.65	-0.11	-0.04	-0.08	-0.30	0.02	0.07
H11	0.69	0.03	0.00	-0.03	-0.12	0.04	0.15
H12	0.39	0.33	0.25	0.04	-0.04	-0.03	0.51
H13	0.26	0.13	0.00	0.25	-0.62	0.05	-0.13
H14	0.27	0.68	-0.02	0.04	0.05	-0.08	0.04
H15	-0.12	-0.07	0.00	0.97	-0.06	0.04	0.08

Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.
Rotation converged in 16 iterations.
Shade denotes the two unique factors and highlighting the core item of each factor

Appendix 8. Unrotated "diagnostic" Exploratory Factor Analysis (EFA) of the individualism & collectivism data (28 item scale)

The unrotated EFA of the 28 individualism and collectivism items: the items' initial communalities

	Initial	Extraction
VI12.1	1.000	.352
VI12.2	1.000	.█
VI12.3	1.000	.378
VI12.4	1.000	.426
VI12.5	1.000	.391
VI12.6	1.000	.492
VI12.7A	1.000	█
HI12.8	1.000	
HI12.9	1.000	.522
HI12.10	1.000	.568
HI12.11	1.000	.472
HI12.12	1.000	.430
HI12.13	1.000	.█
VC12.14	1.000	.437
VC12.15	1.000	.432
VC12.16	1.000	.442
VC12.17	1.000	.█
VC12.18	1.000	.305
VC12.19A	1.000	█
VC12.20	1.000	.334
HC12.21	1.000	█
HC12.22	1.000	.351
HC12.23	1.000	.375
HC12.24	1.000	.336
HC12.25	1.000	.332
HC12.26	1.000	█
HC12.27	1.000	.481
HC12.28	1.000	.482

Extraction Method: Principal Component Analysis
Shade denotes items with communalities below the set
criterion of .3

Appendix 9. Initial Rotated Exploratory Factor Analysis (EFA) of the individualism and collectivism data (20-item scale)

Initial rotated EFA of the individualism and collectivism data - total variance explained (rotated orthogonal design)

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative % of Variance	Total	% of Variance	Cumulative % of Variance	Total	% of Variance	Cumulative %
1	3.467	17.335	17.335	3.467	17.335	17.335	3.120	15.601	15.601
2	2.634	13.169	30.504	2.634	13.169	30.504	2.313	11.565	27.166
3	1.565	7.823	38.327	1.565	7.823	38.327	1.858	9.289	36.455
4	1.334	6.611	44.998	1.334	6.611	44.998	1.708	8.542	44.998
5	1.252	6.260	51.258						
6	1.049	5.244	56.501						
7	.887	4.434	60.935						
8	.856	4.278	65.213						
9	.812	4.058	69.271						
10	.751	3.756	73.027						
11	.714	3.570	76.596						
12	.695	3.473	80.069						
13	.644	3.219	83.288						
14	.610	3.050	86.338						
15	.557	2.783	89.121						
16	.544	2.721	91.842						
17	.478	2.390	94.232						
18	.439	2.194	96.425						
19	.416	2.078	98.503						
20	.299	1.497	100.000						

Extraction Method: Principal Component Analysis

Shade denotes the variance explained by the tested four-factor solution

Rotated Component Matrix

Component

	1	2	3	4
VI12.1_R	.13	▪	-.05	-.08
VI12.3_R	.10	▪	.04	.03
VI12.4_R	-.09	▪	.21	.19
VI12.5_R	.07	▪	▪	.01
VI12.6_R	-.01	▪	.12	.09
HI12.9_R	.25	.11	▪	-.14
HI12.10R	.17	.17	▪	-.09
HI12.11R	▪	.20	▪	*.37*
HI12.12R	▪	.11	▪	*.41*
VC12.14R	.14	.10	.12	▪
VC12.15R	▪	-.04	.07	▪
VC12.16R	.13	-.02	-.07	▪
VC12.18R	▪	.00	.23	.18
VC12.20R	.08	.07	-.24	▪
HC12.22R	▪	.10	.13	-.02
HC12.23R	▪	-.05	.17	.03
HC12.24R	▪	-.04	*.30*	.03
HC12.25R	▪	004	-.04	.08
HC12.27R	▪	.15	-.11	.15
HC12.28R	▪	.14	-.07	.28

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.Rotation converged in 11 iterations.
Shade denotes loadings above the set criterion of .3, Bold italic characters denote deviations from what was expected

Appendix 10. The Confirmatory Factor Analysis of the individualism/collectivism (self-construal) scale – Imputation of missing cases using Full information Maximum Likelihood (FIML)

A) CFA of the four-factor model of individualism and collectivism - Full information Maximum Likelihood models (imputation of missing cases)

The goodness-of-fit results for the four-factor model of individualism and collectivism

Sample size = 926

Fit Measure

	▮	Saturated	Independence
Discrepancy	1317.477	0	29449.8
Degrees of freedom	164	0	210
P	0		0
Number of parameters	66	230	20
Discrepancy / df	8.033		140.237

RMR

GFI   -

Adjusted GFI

Parsimony-adjusted GFI

Normed fit index	0.955	1	0
Relative fit index	0.943		0
Incremental fit index	0.961	1	0
Tucker-Lewis index	0.949		0
Comparative fit index	▮	1	0

Parsimony ratio	0.781	0	1
Parsimony-adjusted NFI	0.746	0	0
Parsimony-adjusted CFI	0.75	0	0

Noncentrality parameter estimate	1153.477	0	29239.8
NCP lower bound	1041.532	0	28679.41
NCP upper bound	1272.871	0	29806.48
FMIN	1.424	0	31.838
F0	1.247	0	31.611
F0 lower bound	1.126	0	31.005
F0 upper bound	1.376	0	32.223
RMSEA	▮		0.388
RMSEA lower bound			0.384

RMSEA upper bound	███████		0.392
P for test of close fit	0		0
Akaike information criterion (AIC)	1449.477	460	29489.8
Browne-Cudeck criterion	1452.544	470.686	29490.73
Bayes information criterion			
Consistent AIC			
Expected cross validation index	1.567	0.497	31.881
ECVI lower bound	1.446	0.497	31.275
ECVI upper bound	1.696	0.497	32.493
MECVI	1.57	0.509	31.882
Hoelter .05 index	137		8
Hoelter .01 index	147		9

Regression weights in the four-factor model of individualism and collectivism

Pair of variables:		Regression Estimate	Standardized Regression Estimate	S.E.	p
VI12.1	Vertical_Individualism	1	.539		
VI12.3	Vertical_Individualism	1.128	.604	.1	.000
VI12.4	Vertical_Individualism	1.026	.506	.1	.000
VI12.5	Vertical_Individualism	.791	.508	.1	.000
VI12.6	Vertical_Individualism	1.385	.679	.1	.000
HI12.9	Horizontal_Individualism	.65	.636	.1	.000
HI12.10	Horizontal_Individualism	1	.79		
HI12.11	Horizontal_Individualism	.346	.177	.1	.000
HI12.12	Horizontal_Individualism	.177	.089	.1	.024
VC12.20	Vertical_Collectivism	1	.271		
VC12.18	Vertical_Collectivism	1.037	.501	.2	.000
VC12.16	Vertical_Collectivism	1.121	.314	.2	.000
VC12.15	Vertical_Collectivism	1.664	.575	.3	.000
VC12.14	Vertical_Collectivism	1.265	.395	.2	.000
HC12.28	Horizontal_Collectivism	1	.617		
HC12.27	Horizontal_Collectivism	.919	.569	.1	.000
HC12.25	Horizontal_Collectivism	.791	.501	.1	.000
HC12.24	Horizontal_Collectivism	.507	.495	0	.000
HC12.23	Horizontal_Collectivism	.59	.556	0	.000
HC12.22	Horizontal_Collectivism	.539	.488	0	.000

B) CFA of the six -factor model of individualism and collectivism Full information Maximum Likelihood models (imputation of missing cases)

The goodness-of-fit results for the six-factor model of individualism and collectivism

Sample size =926
Fit Measures

Fit Measure		Saturated	Independence
Discrepancy	422.433	0	29449.8
Degrees of freedom	151	0	210
P	0		0
Number of parameters	79	230	20
Discrepancy / df	2.798		140.237
RMR			
GFI	-		
Adjusted GFI			
Parsimony-adjusted GFI			
Normed fit index	0.986	1	0
Relative fit index	0.98		0
Incremental fit index	0.991	1	0
Tucker-Lewis index	0.987		0
Comparative fit index		1	0
Parsimony ratio	0.719	0	1
Parsimony-adjusted NFI	0.709	0	0
Parsimony-adjusted CFI	0.712	0	0
Noncentrality parameter estimate	271.433	0	29239.8
NCP lower bound	213.941	0	28679.41
NCP upper bound	336.573	0	29806.48
FMIN	0.457	0	31.838
F0	0.293	0	31.611
F0 lower bound	0.231	0	31.005
F0 upper bound	0.364	0	32.223
RMSEA			0.388
RMSEA lower bound			0.384
RMSEA upper bound			0.392
P for test of close fit	0.975		0

Akaike information criterion (AIC)	580.433	460	29489.8	
Browne-Cudeck criterion	584.103	470.686	29490.73	
Bayes information criterion				
Consistent AIC				
Expected cross validation index	0.627	0.497	31.881	
ECVI lower bound	0.565	0.497	31.275	
ECVI upper bound	0.698	0.497	32.493	
MECVI	0.631	0.509	31.882	
Hoelter .05 index	396		8	
Hoelter .01 index	426		9	

Regression weights in the six-factor model of individualism and collectivism

Pair of Variables:		Regression Estimate	Standardized Regression Estimate	S.E.	p
VI12.1	Vertical_Individualism	1	.527		
VI12.3	Vertical_Individualism	1.121	.587	.099	.000
VI12.4	Vertical_Individualism	1.088	.525	.102	.000
VI12.5	Vertical_Individualism	.671	.422	.075	.000
VI12.6	Vertical_Individualism	1.466	.703	.121	.000
HI12.9	Horizontal_Individualism	.71	.669	.073	.000
VC12.20	Vertical_Collectivism	1	.36		
VC12.16	Vertical_Collectivism	1.364	.509	.208	.000
VC12.15	Vertical_Collectivism	.68	.313	.128	.000
VC12.14	Vertical_Collectivism	1.411	.586	.216	.000
HI12.10	Horizontal_Individualism	1	.761		
HI12.12	Individualism__Uniqueness	1	.744		
HI12.11	Individualism__Uniqueness	1.206	.908	.114	.000
VI12.5	Horizontal_Individualism	.316	.208	.064	.000
VC12.15	Horizontal_Collectivism	1.054	.333	.139	.000
VC12.18	Horizontal_Collectivism	1.186	.524	.107	.000
HC12.27	Collectivism__Dependency	.913	.677	.072	.000
HC12.24	Horizontal_Collectivism	1	.573		
HC12.22	Horizontal_Collectivism	.788	.419	.112	.000
HC12.23	Horizontal_Collectivism	1.131	.626	.092	.000
HC12.25	Horizontal_Collectivism	.842	.313	.151	.000
HC12.28	Collectivism__Dependency	1	.739		
HC12.22	Collectivism__Dependency	.114	.123	.05	0.024
HC12.25	Collectivism__Dependency	.308	.234	.072	.000

Appendix 11. The Confirmatory Factor Analysis of the individualism/collectivism (self-construal) scale – Listwise deletion of missing cases using

A) CFA of a four-factor model of individualism and collectivism (listwise deletion of missing cases)

The goodness-of-fit results of the four-factor model of individualism and collectivism
Sample size = 831
Fit Measures

Fit Measure		Saturated	Independence
Discrepancy	1232.304	0	3351.96
Degrees of freedom	164	0	190
P	0		0
Number of parameters	46	210	20
Discrepancy / df	7.514		17.642
RMR	0.155	0	0.252
GFI	■■■■■■■	1	0.632
Adjusted GFI	0.834		0.594
Parsimony-adjusted GFI	0.68		0.572
Normed fit index	0.632	1	0
Relative fit index	0.574		0
Incremental fit index	0.665	1	0
Tucker-Lewis index	0.609		0
Comparative fit index	■■■■■■■	1	0
Parsimony ratio	0.863	0	1
Parsimony-adjusted NFI	0.546	0	0
Parsimony-adjusted CFI	0.572	0	0
Noncentrality parameter estimate	1068.304	0	3161.96
NCP lower bound	960.418	0	2977.812
NCP upper bound	1183.645	0	3353.431
FMIN	1.485	0	4.039
F0	1.287	0	3.81
F0 lower bound	1.157	0	3.588
F0 upper bound	1.426	0	4.04
RMSEA	■■■■■■■		0.142
RMSEA lower bound	■■■■■■■		0.137
RMSEA upper bound	■■■■■■■		0.146
P for test of close fit	0		0

Akaike information			
criterion (AIC)	1324.304	420	3391.96
Browne-Cudeck criterion	1326.693	430.902	3392.998
Bayes information criterion	1679.349	2040.856	3546.327
Consistent AIC	1587.545	1621.752	3506.412
Expected cross validation			
index	1.596	0.506	4.087
ECVI lower bound	1.466	0.506	3.865
ECVI upper bound	1.735	0.506	4.317
MECVI	1.598	0.519	4.088
Hoelter .05 index	132		56
Hoelter .01 index	141		59

**Modification index (based on LaGrange multiplier test)
highlighting cases of pairs of variables where important
residual covariance existed**

Pair of variables:			M.I.	Par Change
e24	<-->	Horizontal_Individualism	7.581	0.049
e24	<-->	e23	23.498	0.056
e27	<-->	Vertical_Collectivism	7.798	-0.041
e27	<-->	Horizontal_Individualism	5.956	-0.072
e27	<-->	e23	16.528	-0.077
e27	<-->	e24	6.305	-0.044
e28	<-->	e23	5.084	-0.041
e28	<-->	e24	28.416	-0.09
██████████				0.234
e14	<-->	Horizontal_Collectivism	9.934	-0.088
e14	<-->	Vertical_Individualism	8.224	0.105
e15	<-->	Vertical_Individualism	5.197	-0.069
e15	<-->	e23	4.368	0.045
e15	<-->	e24	5.349	-0.047
e15	<-->	e27	12.327	-0.116
e16	<-->	Horizontal_Collectivism	7.522	-0.084
e16	<-->	Vertical_Collectivism	5.793	0.052
e16	<-->	Horizontal_Individualism	4.144	-0.09
e16	<-->	e22	4.559	-0.065
e16	<-->	e14	41.182	0.387
e18	<-->	Horizontal_Collectivism	21.574	0.08
e18	<-->	Vertical_Collectivism	12.252	-0.041
e18	<-->	e23	7.552	0.045
e18	<-->	e24	40.234	0.096
e18	<-->	e28	7.915	-0.067
e18	<-->	e14	15.459	-0.134
e18	<-->	e16	7.507	-0.103

300

e20	<-->	Horizontal_Collectivism	4.502	-0.069
e20	<-->	Vertical_Collectivism	4.797	0.05
e20	<-->	Horizontal_Individualism	14.256	-0.176
e20	<-->	e23	21.714	-0.142
e20	<-->	e24	5.443	-0.066
e20	<-->	e27	4.141	0.094
e20	<-->	e16	16.931	0.288
e12	<-->	Horizontal_Collectivism	45.975	-0.239
e12	<-->	Vertical_Individualism	24.005	0.225
e12	<-->	e22	12.224	-0.122
e12	<-->	e23	5.381	-0.077
e12	<-->	e25	9.648	-0.154
e12	<-->	e20	6.59	0.206
e11	<-->	Horizontal_Collectivism	25.513	-0.174
██				0.292
e11	<-->	e22	4.92	-0.076
e11	<-->	e23	4.302	-0.067
e11	<-->	e25	12.645	-0.172
e11	<-->	e14	5.154	0.153
e11	<-->	e15	4.184	-0.114
██				1.661
e10	<-->	e22	6.421	0.047
e10	<-->	e16	4.111	-0.082
e10	<-->	e20	6.92	-0.112
e9	<-->	e24	4.968	0.03
e9	<-->	e25	5.246	0.049
e9	<-->	e28	8.004	-0.06
e9	<-->	e18	5.68	0.045
e9	<-->	e12	9.257	-0.115
e9	<-->	e11	14.444	-0.141
e6	<-->	Horizontal_Individualism	5.611	-0.097
e6	<-->	e16	4.258	0.127
e6	<-->	e12	5.473	0.165
e6	<-->	e11	15.682	0.274
e6	<-->	e10	12.051	-0.131
e5	<-->	Horizontal_Individualism	23.713	0.164
e5	<-->	Vertical_Individualism	4.413	-0.063
e5	<-->	e22	7.115	0.062
e5	<-->	e24	5.772	0.049
e5	<-->	e12	5.772	0.139
e5	<-->	e11	5.896	0.138
e5	<-->	e10	11.51	0.105
e4	<-->	e23	7.144	-0.077
e4	<-->	e24	5.126	-0.061
e4	<-->	e27	4.52	0.094
e4	<-->	e14	16.698	0.248
e4	<-->	e12	13.788	0.283
e4	<-->	e11	27.017	0.387

e3	<-->	e14	5.28	0.122
e1	<-->	Horizontal_Individualism	6.614	-0.102
e1	<-->	e14	11.932	-0.187
e1	<-->	e10	5.387	-0.084
e1	<-->	e5	16.268	-0.182
e1	<-->	e4	4.897	-0.131
e1	<-->	e3	21.941	0.242

Shade denotes indication of high residual covariance

B) CFA of a six-factor model of individualism and collectivism (listwise deletion of missing cases)

The goodness-of-fit results of the six-factor model of individualism and collectivism

Fit Measure		Saturated	Independence
Discrepancy	398.863	0	3351.96
Degrees of freedom	151	0	190
P	0		0
Number of parameters	59	210	20
Discrepancy / df	2.641		17.642
RMR	0.064	0	0.252
GFI		1	0.632
Adjusted GFI	0.936		0.594
Parsimony-adjusted GFI	0.686		0.572
Normed fit index	0.881	1	0
Relative fit index	0.85		0
Incremental fit index	0.923	1	0
Tucker-Lewis index	0.901		0
Comparative fit index		1	0
Parsimony ratio	0.795	0	1
Parsimony-adjusted NFI	0.7	0	0
Parsimony-adjusted CFI	0.732	0	0
Noncentrality parameter estimate	247.863	0	3161.96
NCP lower bound	192.498	0	2977.812
NCP upper bound	310.895	0	3353.431
FMIN	0.481	0	4.039
F0	0.299	0	3.81

F0 lower bound	0.232	0	3.588
F0 upper bound	0.375	0	4.04
RMSEA			0.142
RMSEA lower bound			0.137
RMSEA upper bound			0.146
P for test of close fit	0.956		0
Akaike information criterion (AIC)	516.863	420	3391.96
Browne-Cudeck criterion	519.926	430.902	3392.998
Bayes information criterion	972.246	2040.856	3546.327
Consistent AIC	854.498	1621.752	3506.412
Expected cross validation index	0.623	0.506	4.087
ECVI lower bound	0.556	0.506	3.865
ECVI upper bound	0.699	0.506	4.317
MECVI	0.626	0.519	4.088
Hoelter .05 index	376		56
Hoelter .01 index	405		59

Modification index (based on LaGrange multiplier test) highlighting cases of pairs of variables where important residual covariance existed

Pair of variables:			M.I.	Par Change
e25	<-->	Individualism__Uniqueness	7.633	-0.106
e27	<-->	Vertical_Collectivism	6.583	-0.054
e28	<-->	Vertical_Collectivism	5.876	0.05
e28	<-->	e23	4.423	0.036
e28	<-->	e24	5.25	-0.036
e14	<-->	Horizontal_Individualism	8.065	0.109
e15	<-->	e24	14.943	-0.075
e15	<-->	e27	10.193	-0.101
e15	<-->	e28	11.898	0.105
e18	<-->	Vertical_Collectivism	4.409	0.039
e18	<-->	e24	5.37	0.033
e18	<-->	e25	4.865	-0.052
e18	<-->	e15	6.716	0.072
e20	<-->	Collectivism__Dependency	5.996	0.1
e20	<-->	Horizontal_Individualism	10.173	-0.145
e20	<-->	e23	11.116	-0.098
e20	<-->	e14	4.563	-0.129
e20	<-->	e18	4.212	0.078
e12	<-->	Collectivism__Dependency	4.2	-0.068
e12	<-->	Horizontal_Individualism	5.382	-0.086

e12	<-->	e22	7.78	-0.071
e12	<-->	e20	7.936	0.164
e10	<-->	e28	6.255	0.061
e10	<-->	e14	6.861	0.093
e10	<-->	e20	4.533	-0.089
e10	<-->	e12	4.29	-0.07
e10	<-->	e11	9.241	0.1
e9	<-->	Individualism__Uniqueness	7.579	-0.08
e9	<-->	e28	4.871	-0.044
e6	<-->	e25	4.046	0.08
e6	<-->	e10	6.296	-0.093
e5	<-->	Individualism__Uniqueness	4.975	0.098
e5	<-->	e22	5.836	0.055
e4	<-->	Individualism__Uniqueness	11.528	0.198
e4	<-->	Horizontal_Collectivism	11.311	-0.065
e4	<-->	Vertical_Collectivism	4.323	0.07
e4	<-->	Horizontal_Individualism	6.74	0.113
e4	<-->	Vertical_Individualism	4.945	-0.083
e4	<-->	e14	11.263	0.195
e4	<-->	e11	7.599	0.149
e4	<-->	e10	6.067	0.099
e3	<-->	Individualism__Uniqueness	8.228	-0.149
e3	<-->	e14	4.911	0.114
e1	<-->	Individualism__Uniqueness	6.971	-0.139
e1	<-->	Horizontal_Collectivism	6.827	0.046
e1	<-->	Vertical_Collectivism	5.795	-0.073
e1	<-->	e14	10.86	-0.173
e1	<-->	e15	4.227	0.093
e1	<-->	e5	9.603	-0.138
e1	<-->	e4	6.062	-0.145
e1	<-->	e3	27.24	0.272

Appendix 12. Frequencies distributions of the indices of social relationships

The frequency distribution of Family Relationships Index

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	3	.3	.4	.4
	1.00	1	.1	.1	.5
	1.50	2	.2	.2	.7
	3.00	3	.3	.4	1.1
	4.50	2	.2	.2	1.3
	5.00	1	.1	.1	1.4
	5.50	1	.1	.1	1.5
	6.00	1	.1	.1	1.6
	6.50	1	.1	.1	1.8
	7.00	3	.3	.4	2.1
	7.50	1	.1	.1	2.2
	8.00	4	.4	.5	2.7
	8.50	5	.5	.6	3.3
	9.00	1	.1	.1	3.4
	9.50	4	.4	.5	3.9
	10.00	4	.4	.5	4.4
	10.50	4	.4	.5	4.8
	11.00	9	1.0	1.1	5.9
	11.50	5	.5	.6	6.5
	12.00	4	.4	.5	6.9
	12.50	9	1.0	1.1	8.0
	13.00	8	.9	.9	8.9
	13.50	4	.4	.5	9.4
	14.00	10	1.1	1.2	10.6
	14.50	9	1.0	1.1	11.6
	15.00	4	.4	.5	12.1
	15.50	23	2.5	2.7	14.8
	16.00	20	2.2	2.4	17.2
	16.50	5	.5	.6	17.8
	17.00	25	2.7	2.9	20.7
	17.50	18	1.9	2.1	22.8
	18.00	17	1.8	2.0	24.8
	18.50	26	2.8	3.1	27.9
	19.00	14	1.5	1.6	29.5
	19.50	21	2.3	2.5	32.0
	20.00	30	3.2	3.5	35.5
	20.50	21	2.3	2.5	38.0
	21.00	24	2.6	2.8	40.8

21.50	30	3.2	3.5	44.4
22.00	15	1.6	1.8	46.1
22.50	33	3.6	3.9	50.0
23.00	22	2.4	2.6	52.6
23.50	25	2.7	2.9	55.5
24.00	25	2.7	2.9	58.5
24.50	17	1.8	2.0	60.5
25.00	23	2.5	2.7	63.2
25.50	11	1.2	1.3	64.5
26.00	21	2.3	2.5	66.9
26.50	21	2.3	2.5	69.4
27.00	16	1.7	1.9	71.3
27.50	8	.9	.9	72.2
28.00	15	1.6	1.8	74.0
28.50	19	2.1	2.2	76.2
29.00	17	1.8	2.0	78.2
29.50	19	2.1	2.2	80.5
30.00	20	2.2	2.4	82.8
30.50	9	1.0	1.1	83.9
31.00	17	1.8	2.0	85.9
31.50	4	.4	.5	86.4
32.00	17	1.8	2.0	88.4
32.50	9	1.0	1.1	89.4
33.00	7	.8	.8	90.2
34.00	23	2.5	2.7	92.9
34.50	2	.2	.2	93.2
35.00	3	.3	.4	93.5
35.50	13	1.4	1.5	95.1
36.00	3	.3	.4	95.4
36.50	1	.1	.1	95.5
37.00	19	2.1	2.2	97.8
37.50	3	.3	.4	98.1
39.00	5	.5	.6	98.7
40.00	1	.1	.1	98.8
40.50	4	.4	.5	99.3
41.00	1	.1	.1	99.4
42.00	5	.5	.6	100.0
Total	850	91.8	100.0	
Missing System	76	8.2		
Total	926	100.0		

The frequency distribution of the Friendship Index

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	.1	.1	.1
	1.00	1	.1	.1	.2
	2.00	1	.1	.1	.4
	3.00	2	.2	.2	.6
	5.00	5	.5	.6	1.2
	6.00	8	.9	1.0	2.2
	7.00	4	.4	.5	2.7
	8.00	15	1.6	1.9	4.6
	9.00	12	1.3	1.5	6.1
	10.00	33	3.6	4.1	10.2
	11.00	56	6.0	7.0	17.1
	12.00	62	6.7	7.7	24.8
	13.00	74	8.0	9.2	34.0
	14.00	87	9.4	10.8	44.8
	15.00	68	7.3	8.4	53.3
	16.00	86	9.3	10.7	64.0
	17.00	68	7.3	8.4	72.4
	18.00	57	6.2	7.1	79.5
	19.00	40	4.3	5.0	84.5
	20.00	35	3.8	4.3	88.8
	21.00	31	3.3	3.9	92.7
	22.00	18	1.9	2.2	94.9
	23.00	11	1.2	1.4	96.3
	24.00	5	.5	.6	96.9
	25.00	7	.8	.9	97.8
	26.00	5	.5	.6	98.4
	27.00	4	.4	.5	98.9
	28.00	9	1.0	1.1	100.0
	Total	805	86.9	100.0	
Missing	System	121	13.1		
Total		926	100.0		

307

Appendix 13. The distributions of all ten psychosocial factors/determinants of social relationships

1) Altruistic factors

The EFA of the altruistic (Helping Behaviour) scale resulted in the creation of four factors (Altruism, Responsibility Assumption, Practical Help and Volunteering).

Altruism

Altruism factor is one of the four altruistic factors that emerged from the factor analysis of the Helping Behaviour items. Its distribution is normal with both its mode (.25) and its median (.07) close to the zero. Its particularity compared to the other three altruistic factors is that it has a considerable larger range (6.6 compared to approximately 5.5 of the other three altruistic factors).

The distribution of the Altruism factor

N=833

308
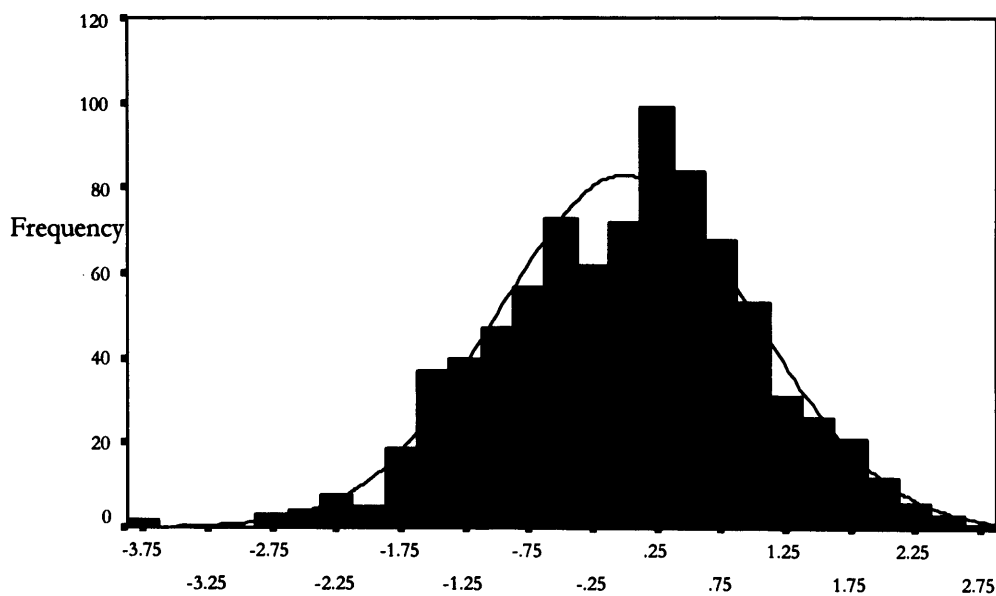
Responsibility Assumption

Responsibility Assumption is also a normally distributed factor which unlike the distributions of other altruistic factors has a positive – faint, though – skewness and a slightly negative median (-.04). The slight positive skewness of its distribution somewhat differentiates Responsibility Assumption from the rest of the altruistic factors which all are (to a minor extent) negatively skewed. Although this differentiation is not important in terms that all altruistic factors medians are around zero, still signals the conceptual particularity of the Responsibility Assumption as the only altruistic factor that clearly refers to high cognitive abilities and high levels of moral development.

The distribution of the Responsibility Assumption factor

N=833
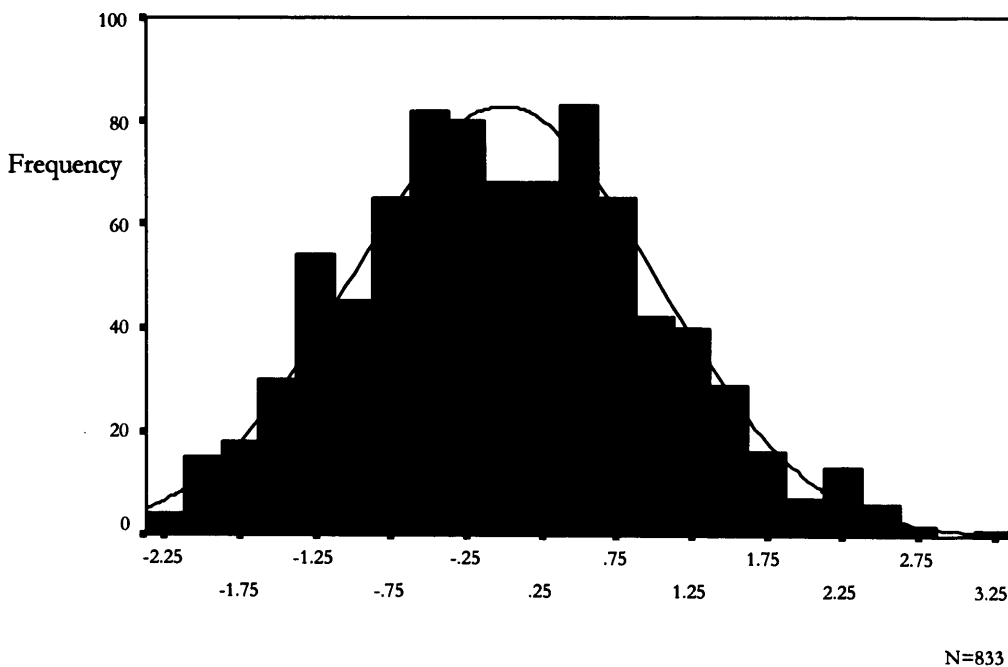
Provision of Practical Help and Volunteering

As regards the Provision of Practical Help and Volunteering factors, both are normally distributed without any considerable deviations. Their range is rather similar (5.7 and 5.6, respectively) and in general their distributions look similar.

The distribution of the Practical Help factor

N=833
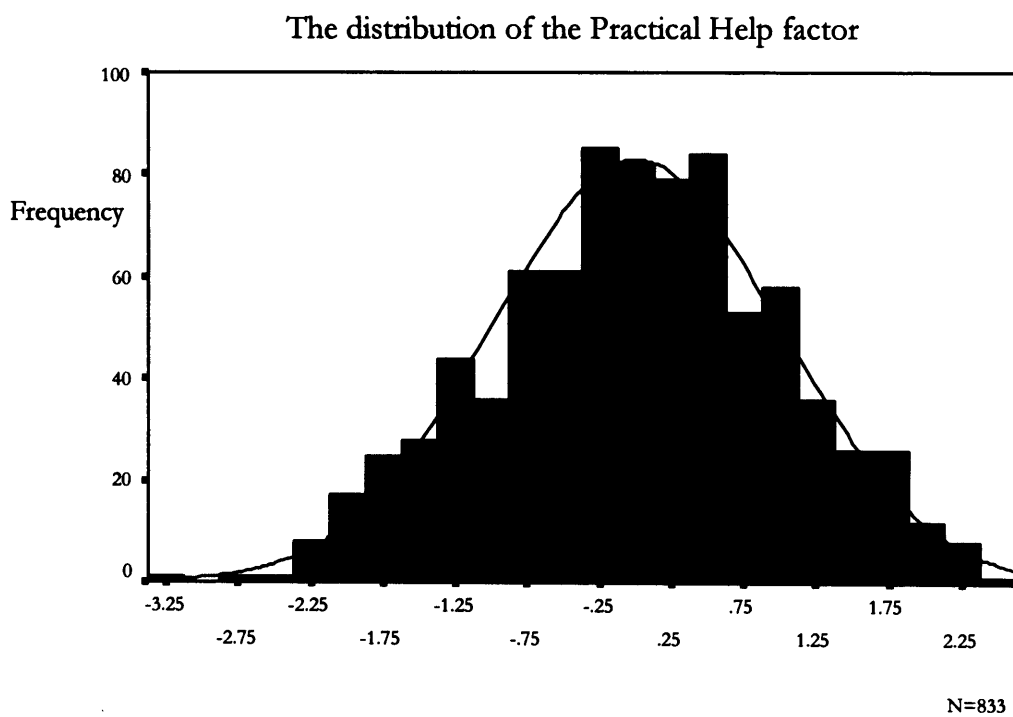
The distribution of the Volunteering factor

N=833
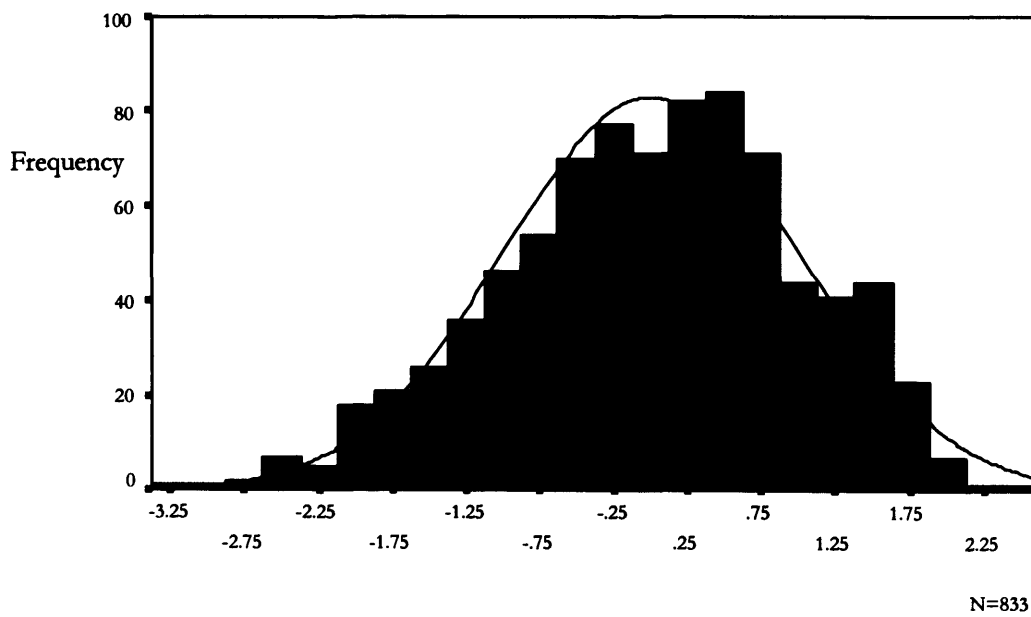
2) Individualistic – Collectivistic factors

Vertical Individualism

Vertical Individualism distribution is a negatively skewed factor. The most interesting attribute of that factor is the abrupt manner in which its positive (right-hand side) end of the distribution finishes which indicates a lack of cases having scored high on Vertical Individualism and probably signals the "intolerance" of the respondents to excessive antagonism-related individualism. Nevertheless the majority of the sample did not score low on this factor. This is a sign that the respondents did have an individualistic viewpoint and most importantly this can co-exist with predominantly collectivistic self attributes.

The distribution of the Vertical Individualism factor

N=834
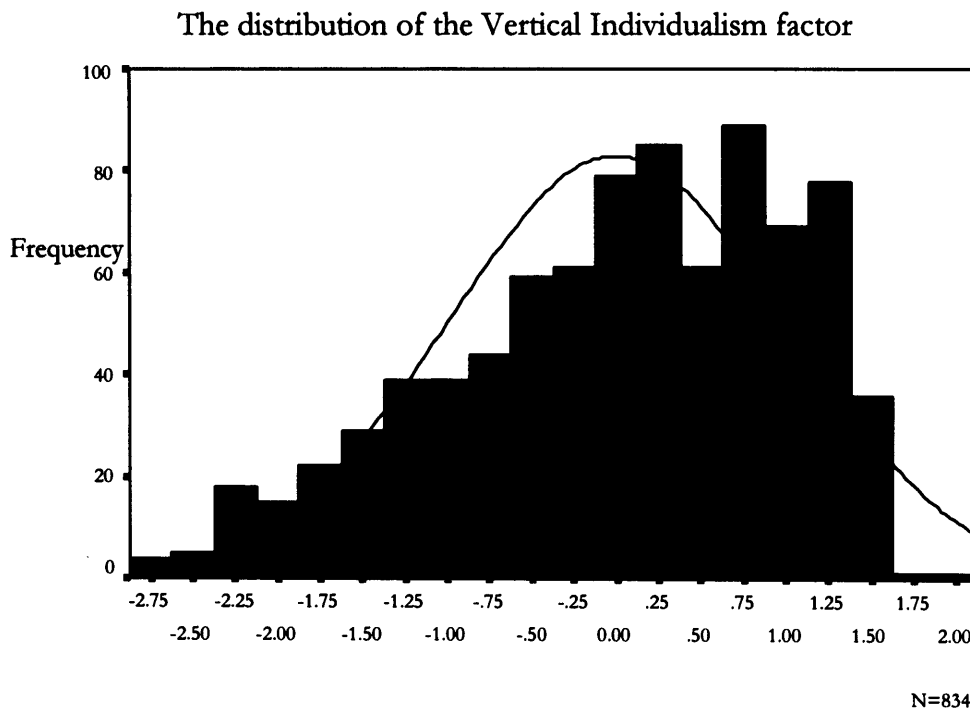
Horizontal Collectivism

Horizontal Collectivism (HC) is the scale with the widest scores range (7.27) and the greatest median value (.28). Most of the participants are concentrated on the positive (right-hand side) edge of the distribution. Those people who reported not being collectivist spreading across the long negative (left-hand side) edge of it. What is apparent even at a first glance of the distribution of the Horizontal Collectivism factor is that the majority of the participants shared a positive view on collectivism and probably have an developed collectivistic self-construal.

The distribution of the Horizontal Collectivism factor

N=834

313
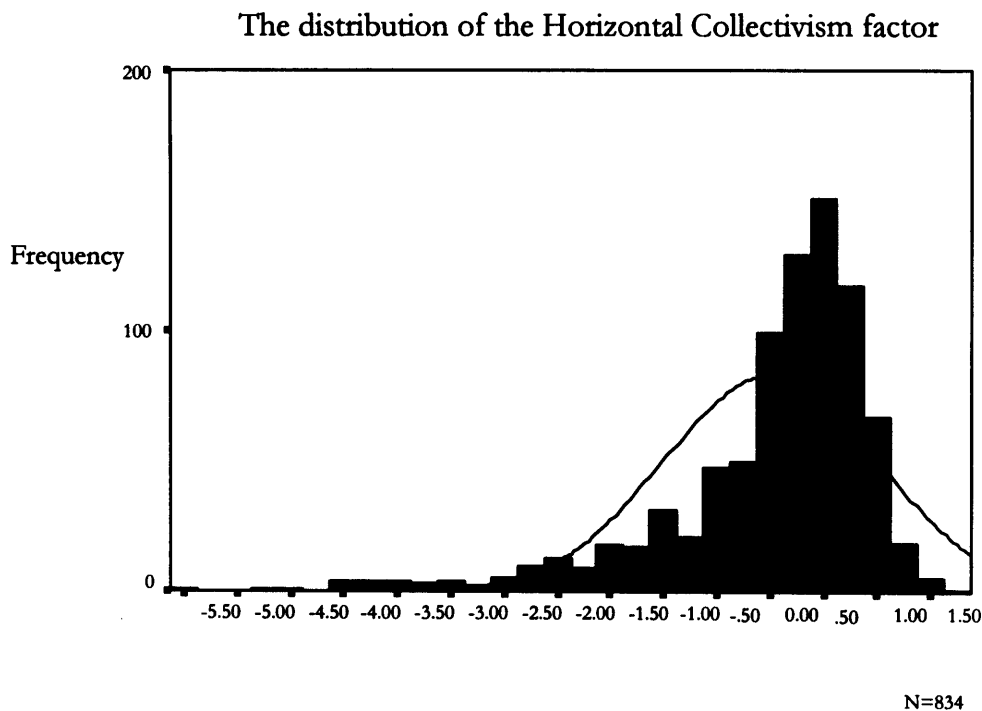
Sense of Uniqueness

Sense of Uniqueness factor has several features that make it looks different from all other factors. It has the smallest range (4.07), the most negative mode (-1.20) and a negative median (-.04). Its narrow range and the relative lack of cases in both ends of the distribution indicate that the respondents considered themselves as neither very unique nor not at all unique compared neither to other people. Its negative mode and median (positive skewness) are signs that probably reflects our study participants (middle-age and older Greek people from both rural and urban areas) did feel utterly unique and separate from other people.

The distribution of the Sense of Uniqueness factor

N=834

314
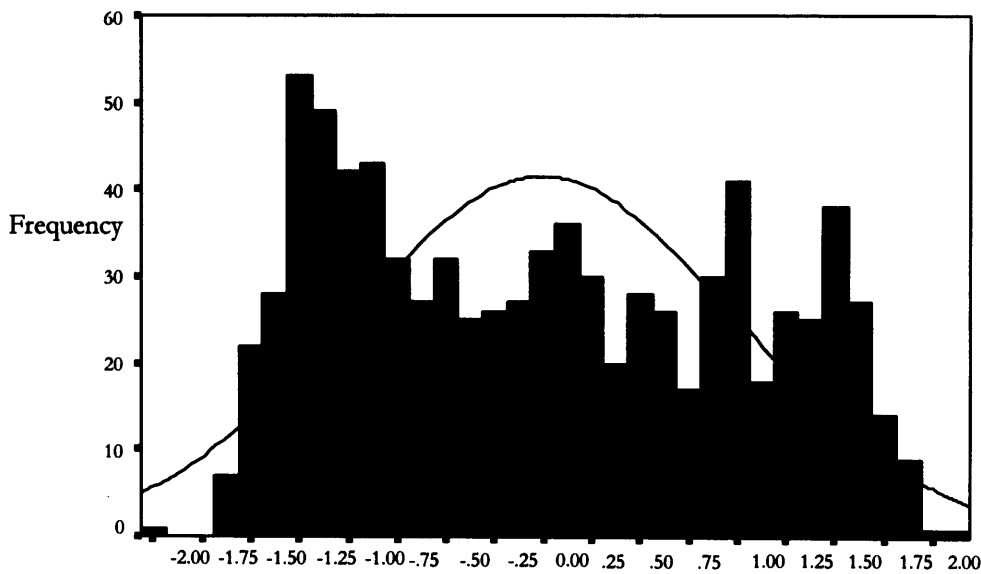
Collectivism-Dependency

Collectivism-Dependency factor has a distribution negatively skewed with most of people concentrating to the right edge of it. The similarities with the distribution of the Horizontal Collectivism factor are obvious. The majority concentrated on the positive end of the curve and a minority spread towards left-hand side with attitudes ranging from slightly negative to being dependent on other people to extreme negation of the need to depend on any other person.

The distribution of the Collectivism-Dependency factor
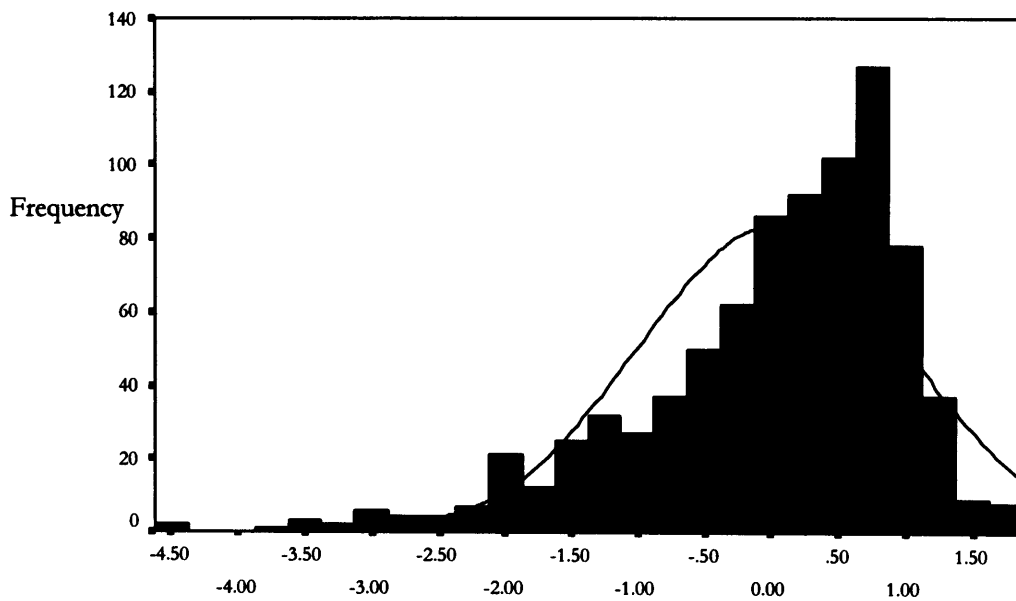
N=834

Horizontal Individualism

Horizontal Individualism is a factor with a negatively skewed distribution (similar to those of collectivistic factors like Horizontal Collectivism and Collectivism-Dependency). Horizontal Individualism's distribution indicates the existence of a majority reporting high levels of equality-based (horizontal) individualism and of a minority with negative - ranging from extreme negative to mild disagreement - attitudes towards being individualistic. The similarity of the distribution of this individualistic factor with those of the collectivistic factors (Horizontal Collectivism and Collectivism-Dependency) constitute a confirmation for the point of view that individualism and collectivism can co-exist and they should not be conceived as mutually exclusive and opposites.

The distribution of the Horizontal Individualism factor

N=834
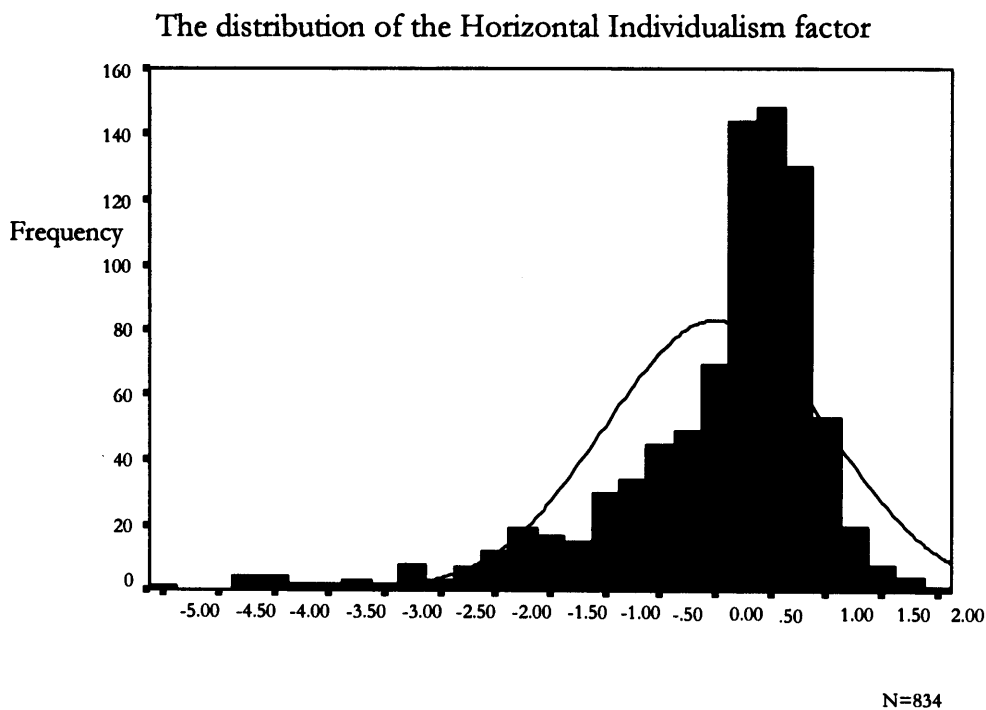
Vertical Collectivism

Vertical Collectivism does not constitute an exception to the typical "collectivistic distribution" - it is negatively skewed with a long left-hand side tail. The observable distinct feature of this factor is its milder kurtosis compared to the all other factors with similar distribution (Horizontal Collectivism, Collectivism-Dependency) suggesting a greater variation in people attitudes towards the more authoritative traditional type of collectivism.

The distribution of the Vertical Collectivism factor

N=834
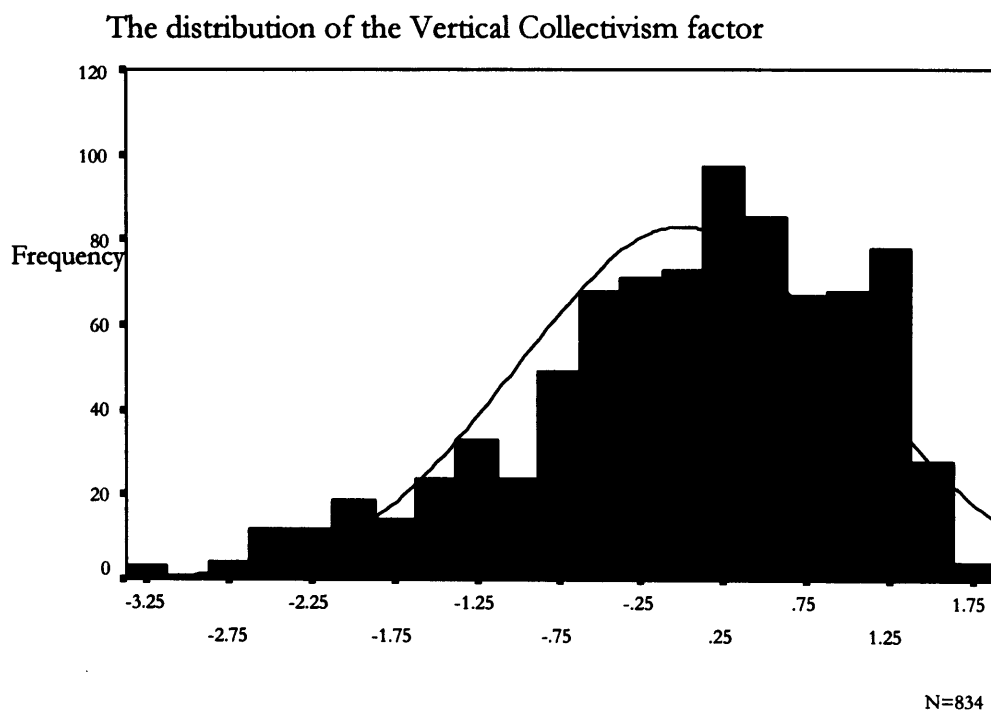
Appendix 14. The frequencies of all social relationships variables (raw data)

Frequencies

Family Relationships

Table of missing cases

	Having any relatives (YES-NO)	Direct contacts with relatives	Indirect contacts with relatives	No relatives met monthly	N of very close relatives
Valid	924	913	912	912	901
Missing	2	13	14	14	25

Tables of frequencies

"Have you got any relatives?"

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	916	98.9	99.1	99.1
	no	8	.9	.9	100.0
	Total	924	99.8	100.0	
Missing	System	2	.2		
Total		926	100.0		

Direct contacts (e.g. visits) with relatives not living with the participants

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not even once yearly or never	22	2.4	2.4	2.4
	1-2 times per year	103	11.1	11.3	13.7
	Every other month	44	4.8	4.8	18.5
	1-2 times per month	179	19.3	19.6	38.1
	1-2 times per week	289	31.2	31.7	69.8
	almost everyday	276	29.8	30.2	100.0
	Total	913	98.6	100.0	
Missing	System	13	1.4		
Total		926	100.0		

Indirect contacts (e.g. over the phone) with relatives not living with the participants

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not even once yearly or never	20	2.2	2.2	2.2
	1-2 times per year	19	2.1	2.1	4.3
	Every other month	15	1.6	1.6	5.9
	1-2 times per month	93	10.0	10.2	16.1
	1-2 times per week	334	36.1	36.6	52.7
	almost everyday	431	46.5	47.3	100.0
	Total	912	98.5	100.0	
MissingSystem		14	1.5		
Total		926	100.0		

N of relatives met monthly

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	none	45	4.9	4.9	4.9
	1-2	195	21.1	21.4	26.3
	3-5	309	33.4	33.9	60.2
	6-10	158	17.1	17.3	77.5
	more then 10	205	22.1	22.5	100.0
	Total	912	98.5	100.0	
Missing	System	14	1.5		
Total		926	100.0		

N of very close relatives

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	38	4.1	4.2	4.2
	1	89	9.6	9.9	14.1
	2	164	17.7	18.2	32.3
	3	132	14.3	14.7	46.9
	4	90	9.7	10.0	56.9
	5	103	11.1	11.4	68.4
	6	50	5.4	5.5	73.9
	7	23	2.5	2.6	76.5
	8	16	1.7	1.8	78.2
	9	6	.6	.7	78.9
	10	106	11.4	11.8	90.7
	11	5	.5	.6	91.2
	12	12	1.3	1.3	92.6
	13	2	.2	.2	92.8
	14	1	.1	.1	92.9
	15	24	2.6	2.7	95.6
	18	1	.1	.1	95.7
	20	21	2.3	2.3	98.0
	25	5	.5	.6	98.6
	30	7	.8	.8	99.3
	50	5	.5	.6	99.9
	60	1	.1	.1	100.0
	Total	901	97.3	100.0	
Missing	System	25	2.7		
Total		926	100.0		

Friendships

Table of missing cases

		"Have you got any friends?" (YES-NO)	Direct contacts with relatives	Indirect contacts with relatives	No relatives met monthly
Valid	923	841	839	838	824
Missing	3	85	87	88	102

Tables of frequencies

"Have you got any friends?"

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	80	8.6	8.7	8.7
	yes	843	91.0	91.3	100.0
	Total	923	99.7	100.0	
Missing	System	3	.3		
Total		926	100.0		

Direct contacts (e.g. visits) with friends

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not even once yearly or never	7	.8	.8	.8
	1-2 times per year	33	3.6	3.9	4.8
	every other month	15	1.6	1.8	6.5
	1-2 times per month	128	13.8	15.2	21.8
	1-2 times per week	298	32.2	35.4	57.2
	almost everyday	360	38.9	42.8	100.0
	Total	841	90.8	100.0	
Missing	System	85	9.2		
Total		926	100.0		

Indirect contacts (e.g. over the phone) with friends

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not even once yearly or never	40	4.3	4.8	4.8
	1-2 times per year	27	2.9	3.2	8.0
	every other month	22	2.4	2.6	10.6
	1-2 times per month	125	13.5	14.9	25.5
	1-2 times per week	359	38.8	42.8	68.3
	almost everyday	266	28.7	31.7	100.0
	Total	839	90.6	100.0	
Missing	System	87	9.4		
Total		926	100.0		

N of friends met monthly

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	none	13	1.4	1.6	1.6
	1-2	202	21.8	24.1	25.7
	3-5	322	34.8	38.4	64.1
	6-10	137	14.8	16.3	80.4
	more then 10	164	17.7	19.6	100.0
	Total	838	90.5	100.0	
Missing	System	88	9.5		
Total		926	100.0		

N of close friends

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	106	11.4	12.9	12.9
	1	123	13.3	14.9	27.8
	2	193	20.8	23.4	51.2
	3	135	14.6	16.4	67.6
	4	83	9.0	10.1	77.7
	5	93	10.0	11.3	89.0
	6	24	2.6	2.9	91.9
	7	6	.6	.7	92.6
	8	6	.6	.7	93.3
	10	40	4.3	4.9	98.2
	12	1	.1	.1	98.3
	15	5	.5	.6	98.9
	20	7	.8	.8	99.8
	30	1	.1	.1	99.9
	45	1	.1	.1	100.0
	Total	824	89.0	100.0	
Missing	System	102	11.0		
Total		926	100.0		

Appendix 15. The description of the friendless group

"Having friends or not" – the frequencies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	80	8.6	8.7	8.7
	yes	843	91.0	91.3	100.0
	Total	923	99.7	100.0	
Missing	System	3	.3		
Total		926	100.0		

The mean age of the friendless group vs. those who reported having any friends

Having friends or not	Mean	N	Std. Deviation
no	68.39	80	11.340
yes	62.17	842	13.381
Total	62.71	922	13.326

The breakdown of "having any friends or not" by sex

SEX			Having Friends		Total
			no	yes	
	male	Count	23	393	416
		%	28.8%	46.6%	45.1%
	female	Count	57	450	507
		%	71.3%	53.4%	54.9%
Total		Count	80	843	923
		%	100.0%	100.0%	100.0%

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The breakdown of "Having friends or not" by area of residence

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Perama/urban/low SES	27	33.8	33.8	33.8
Helioupoli/urban/medium SES	16	20.0	20.0	53.8
Psychiko/urban/high SES	4	5.0	5.0	58.8
Eyrytania/rural/mountainous area	19	23.8	23.8	82.5
Korinthia/rural/low-line area	10	12.5	12.5	95.0
Ikaria/rural/island	4	5.0	5.0	100.0
Total	80	100.0	100.0	

The breakdown of "Having friends or not" by education

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid not at all education	10	12.5	12.5	12.5
less than 6 years	19	23.8	23.8	36.3
6-8 years	34	42.5	42.5	78.8
9-11 years	9	11.3	11.3	90.0
12 years-completed 2ary education	5	6.3	6.3	96.3
university degree	2	2.5	2.5	98.8
postgraduate studies	1	1.3	1.3	100.0
Total	80	100.0	100.0	

The mean of Family Relationships Index by "Having friends or not"

"Having friends or not"		Family Relationships Index
no	Mean (SD)	21.8 (8.8)
	N	74
yes	Mean (SD)	23.3 (7.4)
	N	773
Total	Mean (SD)	23.2 (7.5)
	N	847

ANOVA: the assessment of the observed difference on the Family Relationships Index between "lacking and having friends"

		Sum of Squares	df	Mean Square	F	Sig.
Family Relationships Index	Between Groups	142.302	1	142.302	2.527	.112
	Within Groups	47588.126	845	56.317		
	Total	47730.429	846			

Appendix 16.The linear regressions among the ten psychosocial factors and the two indices of social relationships

1) Selected psychosocial factor vs. Friendship-related sociability index

Linear Regression Models: Altruism vs. Friendship Index							
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Altruism	.094*	.089*	.089*	.102*	.102**	.048	.047
Sex		-.126**	-.126**	-.106**	-.116**	-.094*	. -.096**
Age			-.005	.046	.018	-.019	-.029
Family income (log)				.084*	N/A	.162**	N/A
Education					.064	N/A	.150**
Area of residence						.244**	.244**
(R²)	.009	.025	.025	.028	.028	.068	.069

*p≤ .05, **p≤ .01. Model 1 is the unadjusted relation between Altruism and Friendship Composite Index, Model 2 is adjusted for sex, Model 3 is adjusted for sex and age, Model 4 is adjusted for sex, age and family income (log), Model 5 is adjusted for sex, age and education, Model 6 is adjusted for sex, age, family income (log) and area of residence (urban vs. rural) and Model 7 is adjusted for sex, age, education and area of residence (urban vs. rural).

Linear Regression Models: Responsibility Assumption vs. Friendship Index							
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Responsibility Assumption	.125**	.122**	.123**	.119**	.121**	.105**	.101**
Sex		-.126**	-.125**	-.111**	-.120**	-.097*	-.097**
Age			.014	.052	.025	-.017	.024
Family income (log)				.050	N/A	.143**	N/A
Education					.029	N/A	.131**
Area of residence						.249**	.247**
(R²)	.016	.032	.032	.033	.032	.077	.077

*p≤ .05, **p≤ .01. Model 1 is the unadjusted relation between Responsibility Assumption and Friendship Composite Index, Model 2 is adjusted for sex, Model 3 is adjusted for sex and age, Model 4 is adjusted for sex, age and family income (log), Model 5 is adjusted for sex, age and education, Model 6 is adjusted for sex, age, family income (log) and area of residence (urban vs. rural) and Model 7 is adjusted for sex, age, education and area of residence (urban vs. rural). If models 6 and 7 instead of being adjusted for area of residence using the dichotomous variable "urban vs. rural area of residence" are adjusted for the six areas where the data collection occurred (six dummy variables representing the six different areas) the standardized beta coefficient for the family relationships composite index will become for model 6 .111** (R²=.084) and for model 7 .102** (R²=.084).

Linear Regression Models: Provision of Practical Help vs. Friendship Index

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Provision of Practical Help	.195**	.188**	.188**	.172**	.191**	.114**	.131**
Sex		-.118*	-.117*	-.105**	-.109**	-.095*	-.093*
Age			.088	.049	.028	-.010	-.015
Family income (log)				.070m	N/A	.147**	N/A
Education					.053	N/A	.132**
Area of residence						.215**	.206**
(R²)	.038	.052	.052	.048	.054	.078	.082

*p≤ .05, **p≤ .01, m denotes 1>p>.05. Model 1 is the unadjusted relation between Practical Help and Friendship Composite Index, Model 2 is adjusted for sex, Model 3 is adjusted for sex and age, Model 4 is adjusted for sex, age and family income (log), Model 5 is adjusted for sex, age and education, Model 6 is adjusted for sex, age, family income (log) and area of residence (urban vs. rural) and Model 7 is adjusted for sex, age, education and area of residence (urban vs. rural). If models 6 and 7 if instead of being adjusted just for area of residence using the dichotomous variable "urban vs. rural area of residence" are adjusted for all six areas where the data collection occurred (six dummy variables representing the six different areas) the standardized beta coefficient for the family relationships composite index will become for model 6 .105** (R²=.081) and for model 7 .118** (R²=.086).

Linear Regression Models: Volunteering vs. Friendship Index

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Volunteering	.193**	.193**	.193**	.208**	.201**	.142**	.139**
Sex		-.129**	-.130**	-.111**	-.119**	-.100**	-.089*
Age			-.009	.040	.015	-.009	-.022
Family income (log)				.094*	N/A	.154**	N/A
Education					.067m	N/A	.086m
Area of residence						.191**	.196**
(R²)	.037	.054	.054	.060	.058	.082	.081

*p≤ .05, **p≤ .01, m denotes 1>p>.05. Model 1 is the unadjusted relation between Volunteering and Friendship Composite Index, Model 2 is adjusted for sex, Model 3 is adjusted for sex and age, Model 4 is adjusted for sex, age and family income (log), Model 5 is adjusted for sex, age and education, Model 6 is adjusted for sex, age, family income (log) and area of residence (urban vs. rural) and Model 7 is adjusted for sex, age, education and area of residence (urban vs. rural). If models 6 and 7 if instead of being adjusted for area of residence using the dichotomous variable "urban vs. rural area of residence" are adjusted for all six areas where the data collection occurred (six dummy variables representing the six different areas) the standardized beta coefficient for the family relationships composite index will become for model 6 .143** (R²=.088) and for model 7 .125** (R²=.086).

Linear Regression Models: Collectivism-Dependency vs. Friendship Index							
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Collectivism-Dependency	.127**	.134**	.139**	.154**	.149**	.122**	.116**
Sex		-.133**	-.135**	-.128**	-.125**	-.114**	-.103**
Age			-.022	.014	.002	-.037	-.031
Family income (log)				.068m	N/A	.147**	N/A
Education					.069m	N/A	.154**
Area of residence						.222**	.222**
(R²)	.016	.034	.034	.041	.038	.076	.074

*p≤ .05, **p≤ .01, m denotes 1>p>.05. Model 1 is the unadjusted relation between Collectivism-Dependency and Friendship Composite Index, Model 2 is adjusted for sex, Model 3 is adjusted for sex and age, Model 4 is adjusted for sex, age and family income (log), Model 5 is adjusted for sex, age and education, Model 6 is adjusted for sex, age, family income (log) and area of residence (urban vs. rural) and Model 7 is adjusted for sex, age, education and area of residence (urban vs. rural). In case of models 6 and 7 if instead of being adjusted just for area of residence using the dichotomous variable "urban vs. rural area of residence" are adjusted for all six areas where the data collection occurred (six dummy variables representing the six different areas) the standardized beta coefficient for the family relationships composite index will become for model 6 .123** (R²=.082) and for model 7 .119** (R²=.081).

2) Selected psychosocial factors vs. Family Relationships Index

Linear Regression Models: Altruism vs. Family Relationships Index						
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Altruism	.092*	.091*	.086*	.059	.065^m	-.020
Sex		-.018	-.014	-.031	-.034	-.005
Age			.061^m	.044	.022	-.042
Family income (log)				-.108**	N/A	N/A
Education					-.112**	.014
Area of residence						.363**
(R^2)	.008	.009	.012	.024	.023	.116
*p$\leq$ .05, **p$\leq$ .01, m denotes 1>p>.05. Model 1 is the unadjusted relation between Altruism and Family Relationships Composite Index, Model 2 is adjusted for sex, Model 3 is adjusted for sex and age, Model 4 is adjusted for sex, age and family income (log), Model 5 is adjusted for sex, age and education and Model 6 is adjusted for sex, age, education and area of residence (urban vs. rural).						

Linear Regression Models: Provision of Practical Help vs. Family Relationships Index							
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Provision of Practical Help	.200**	.199**	.203**	.183**	.197**	.085**	.093**
Sex		-.011	-.005	-.028	-.026	-.015	-.003
Age			.078*	.050	.035	-.036	-.028
Family income (log)				-.116**	N/A	.001	N/A
Education					-.116	N/A	.005
Area of residence						.328**	.325**
(R^2)	.040	.040	.046	.055	.057	.124	.123
*p$\leq$ .05, **p$\leq$ .01, m denotes 1<p<.05. Model 1 is the unadjusted relation between Practical Help and Family Relationships Composite Index, Model 2 is adjusted for sex, Model 3 is adjusted for sex and age, Model 4 is adjusted for sex, age and family income (log), Model 5 is adjusted for sex, age and education, Model 6 is adjusted for sex, age, family income (log) and area of residence (urban vs. rural) and Model 7 is adjusted for sex, age, education and area of residence (urban vs. rural). In case of models 6 and 7 if instead of being adjusted just for area of residence using the dichotomous variable "urban vs. rural area of residence" are adjusted for all six areas where the data collection occurred (six dummy variables representing the six different areas) the standardized beta coefficient for the family relationships composite index will become for model 6 .097** (R^2=.139) and for model 7 .107** (R^2=.137).							

Linear Regression Models: Volunteering vs. Family Relationships Index

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Volunteering	.137**	.137**	.135**	.104**	.124**	-.022	-.004
Sex		-.021	-.016	-.033	-.036	-.015	-.005
Age			.063m	.044	.023	-.048	-.042
Family income (log)				-.106**	N/A	.012	N/A
Education					-.113	N/A	.016
Area of residence						.373**	.359**
(R²)	.019	.019	.023	.032	.034	.119	.116

$*p \leq .05$, $**p \leq .01$, m denotes $1 < p < .05$. Model 1 is the unadjusted relation between Volunteering and Family Relationships Composite Index, Model 2 is adjusted for sex, Model 3 is adjusted for sex and age, Model 4 is adjusted for sex, age and family income (log), Model 5 is adjusted for sex, age and education, Model 6 is adjusted for sex, age, family income (log) and area of residence (urban vs. rural) and Model 7 is adjusted for sex, age, education and area of residence (urban vs. rural).

Linear Regression Models: Horizontal Collectivism vs. Family Relationships Index

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Horizontal Collectivism	.143**	.144**	.146**	.141**	.156**	.091*	.100**
Sex		-.010	-.004	-.024	-.028	-.002	.007
Age			.074*	.059	.024	-.024	-.030
Family income (log)				-.117**	N/A	.008	N/A
Education					-.136**	N/A	.002
Area of residence						.341**	.335**
(R²)	.021	.021	.026	.040	.042	.125	.125

$*p \leq .05$, $**p \leq .01$, m denotes $1 < p < .05$. Model 1 is the unadjusted relation between Volunteering and Family Relationships Composite Index, Model 2 is adjusted for sex, Model 3 is adjusted for sex and age, Model 4 is adjusted for sex, age and family income (log), Model 5 is adjusted for sex, age and education, Model 6 is adjusted for sex, age, family income (log) and area of residence (urban vs. rural) and Model 7 is adjusted for sex, age, education and area of residence (urban vs. rural). In case of models 6 and 7 if instead of being adjusted just for rurality and urbanism (using the dichotomous variable "urban vs. rural area of residence") they were adjusted for all six areas where the data collection occurred (six dummy variables representing the six different areas) the standardized beta coefficient for the family relationships composite index will change slightly. For model 6 it becomes .096** (R²=.138) and for model 7 is .101** (R²=.137).

Linear Regression Models: Horizontal Individualism vs. Family Relationships Index						
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Horizontal Individualism	.082*	.082*	.081*	.044	.061^m	.014
Sex		.001	-.007	-.012	-.014	.015
Age			.068^m	.056	.027	-.032.
Family income (log)				-.106*	N/A	N/A
Education					-.110**	.021
Area of residence						.354**
(R^2)	.007	.007	.011	.022	.021	.116
*p≤ .05, **p≤ .01, m denotes 1>p>.05. Model 1 is the unadjusted relation between Horizontal Individualism and Family Relationships Composite Index, Model 2 is adjusted for sex, Model 3 is adjusted for sex and age, Model 4 is adjusted for sex, age and family income (log), Model 5 is adjusted for sex, age and education and Model 6 is adjusted for sex, age, education and area of residence (urban vs. rural).						

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Appendix 17. The symbols used in confirmatory factor analysis and structural equation modelling and their denotations

A rectangle denotes an observed (measured) variable

A circle denotes a latent (unobserved) variable

An encircled e denoted the (unobserved)error term

(or unexplained variance) of the observed variables

A one-way arrow denotes Regression

A two-way arrow denotes Correlation

Appendix 18. The full results for the structural equation models of Family-related sociability and Mental Health

A) The final integrated structural equation model for the relationships between Family-related sociability and Mental Health (unadjusted version)

The final integrated model for Mental Health: the regression weights

| Pair of variables : | | Regression | Standardized Regression | | |
Dependent	Predictor	Estimate	Estimate	S.E.	p
			.184		.000
			.137		.005
HC12.23R	HORIZONTAL _COLLECTIVISM	1	.654		
HC12.24R	HORIZONTAL _COLLECTIVISM	.801	.543	.068	.000
H1	PROVISION OF PRACTICAL HELP	1	.558		
H4	PROVISION OF PRACTICAL HELP	1.123	.577	.101	.000
HC12.22R	HORIZONTAL _COLLECTIVISM	.768	.48	.071	.000
VC12.18R	HORIZONTAL _COLLECTIVISM	.974	.51	.086	.000
H5	PROVISION OF PRACTICAL HELP	1.017	.554	.093	.000
H8	PROVISION OF PRACTICAL HELP	.982	.643	.085	.000
VC12.15R	HORIZONTAL _COLLECTIVISM	1.112	.414	.115	.000
HC12.25R	HORIZONTAL _COLLECTIVISM	1.09	.478	.101	.000
MENTAL HEALTH	PROVISION OF PRACTICAL HELP	-.265	-.009	1.365	0.846
			.118		0.001
				.245	0.056

**The goodness-of-fit results of the final integrated model for Mental Health**

N= 916

Fit Measure		Saturated	Independence
Discrepancy	166.248	0	31795.05
Degrees of freedom	50	0	78
P	0		0
Number of parameters	40	90	12
Discrepancy / df	3.325		407.629
RMR			
GFI			
Adjusted GFI			
Parsimony-adjusted GFI			
Normed fit index	0.995	1	0
Relative fit index	0.992		0
Incremental fit index	0.996	1	0
Tucker-Lewis index	0.994		0
Comparative fit index	████	1	0
Parsimony ratio	0.641	0	1
Parsimony-adjusted NFI	0.638	0	0
Parsimony-adjusted CFI	0.639	0	0
Noncentrality parameter estimate	116.248	0	31717.05
NCP lower bound	80.891	0	31133.96
NCP upper bound	159.211	0	32306.42
FMIN	0.182	0	34.749
F0	0.127	0	34.663
F0 lower bound	0.088	0	34.026
F0 upper bound	0.174	0	35.308
RMSEA	████		0.667
RMSEA lower bound	████		0.66
RMSEA upper bound	████		0.673
P for test of close fit	0.453		0
Akaike information criterion (AIC)	246.248	180	31819.05
Browne-Cudeck	247.401	182.594	31819.4

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criterion
Bayes information criterion
Consistent AIC
Expected cross

validation index	0.269	0.197	34.775
ECVI lower bound	0.23	0.197	34.138
ECVI upper			
bound	0.316	0.197	35.419
MECVI	0.27	0.2	34.775
Hoelter .05 index	372		3
Hoelter .01 index	420		4

Figure 16. The final integrated model of Mental Health and Family-related sociability (unadjusted)
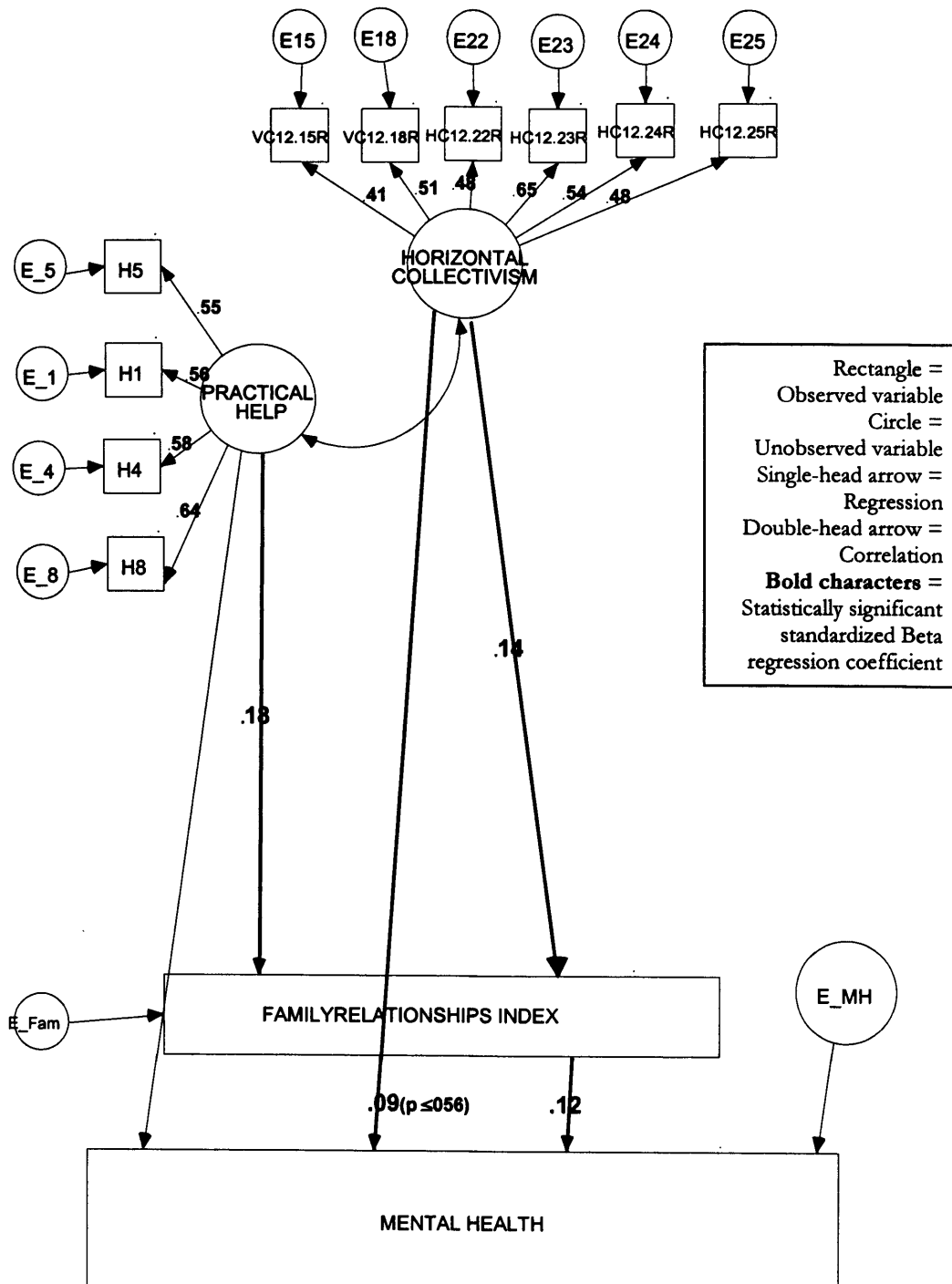
B) The final integrated models for the relationships between Family-related sociability and mental health (fully adjusted version)

The final integrated model for Mental Health: the regression weights

Pair of variables : Dependent	Predictor	Regression Estimate	Standardized Regression Estimate	S.E.	p
FAMILY RELATIONSHIPS INDEX	PROVISION OF PRACTICAL HELP	.71	.068	.568	.211
FAMILY RELATIONSHIPS INDEX	AGE	-.008	-.015	.022	.708
FAMILY RELATIONSHIPS INDEX	SEX	-.098	-.006	.527	.852
FAMILY RELATIONSHIPS INDEX	SES	.029	.005	.324	.93
			.104		.028
			.261		.000
HC12.23R	HORIZONTAL COLLECTIVISM	1	.645		
HC12.24R	HORIZONTAL COLLECTIVISM	.816	.546	.068	.000
H1	PROVISION OF PRACTICAL HELP	1	.559		
H4	PROVISION OF PRACTICAL HELP	1.201	.618	.1	.000
HC12.22R	HORIZONTAL COLLECTIVISM	.79	.487	.071	.000
VC12.18R	HORIZONTAL COLLECTIVISM	.972	.502	.086	.000
H5	PROVISION OF PRACTICAL HELP	1.014	.554	.089	.000
H8	PROVISION OF PRACTICAL HELP	.923	.606	.078	.000
VC12.15R	HORIZONTAL COLLECTIVISM	1.111	.409	.116	.000
HC12.25R	HORIZONTAL COLLECTIVISM	1.144	.494	.102	.000

EDUCATION	SES		1	.804		.000
FAMILY INCOME	SES	.124		.735	.007	.000
				.223		.000
MENTAL HEALTH	AGE		.053	.034	.059	.377
				-.134		.000
				.364		.000
				.092		.05
MENTAL HEALTH	PROVISION OF PRACTICAL HELP	-1.775		-.063	1.508	.239
				.117		.001

The goodness-of-fit results of the final integrated model for mental health

N= 916

Fit Measure		Saturated	Independence
Discrepancy	301.633	0	42284.8
Degrees of freedom	98	0	153
P	0		0
Number of parameters	72	170	17
Discrepancy / df	3.078		276.371

RMR
GFI
Adjusted GFI
Parsimony-adjusted GFI

Normed fit index	0.993	1	0
Relative fit index	0.989		0
Incremental fit index	0.995	1	0
Tucker-Lewis index	0.992		0
Comparative fit index		1	0

Parsimony ratio	0.641	0	1
Parsimony-adjusted NFI	0.636	0	0
Parsimony-adjusted CFI	0.637	0	0

Noncentrality parameter estimate	203.633	0	42131.8
NCP lower bound	155.11	0	41459.09

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NCP upper bound	259.782	0	42810.8
FMIN	0.33	0	46.213
F0	0.223	0	46.046
F0 lower bound	0.17	0	45.31
F0 upper bound	0.284	0	46.788
RMSEA	██████		0.549
RMSEA lower bound	██████		0.544
RMSEA upper bound	██████		0.553
P for test of close fit	0.727		0
Akaike information criterion (AIC)	445.633	340	42318.8
Browne-Cudeck criterion	448.523	346.823	42319.49
Bayes information criterion			
Consistent AIC			
Expected cross validation index	0.487	0.372	46.25
ECVI lower bound	0.434	0.372	45.515
ECVI upper bound	0.548	0.372	46.992
MECVI	0.49	0.379	46.251
Hoelter .05 index	371		4
Hoelter .01 index	405		5

The final integrated model of Mental Health and Family-related sociability (fully-adjusted)
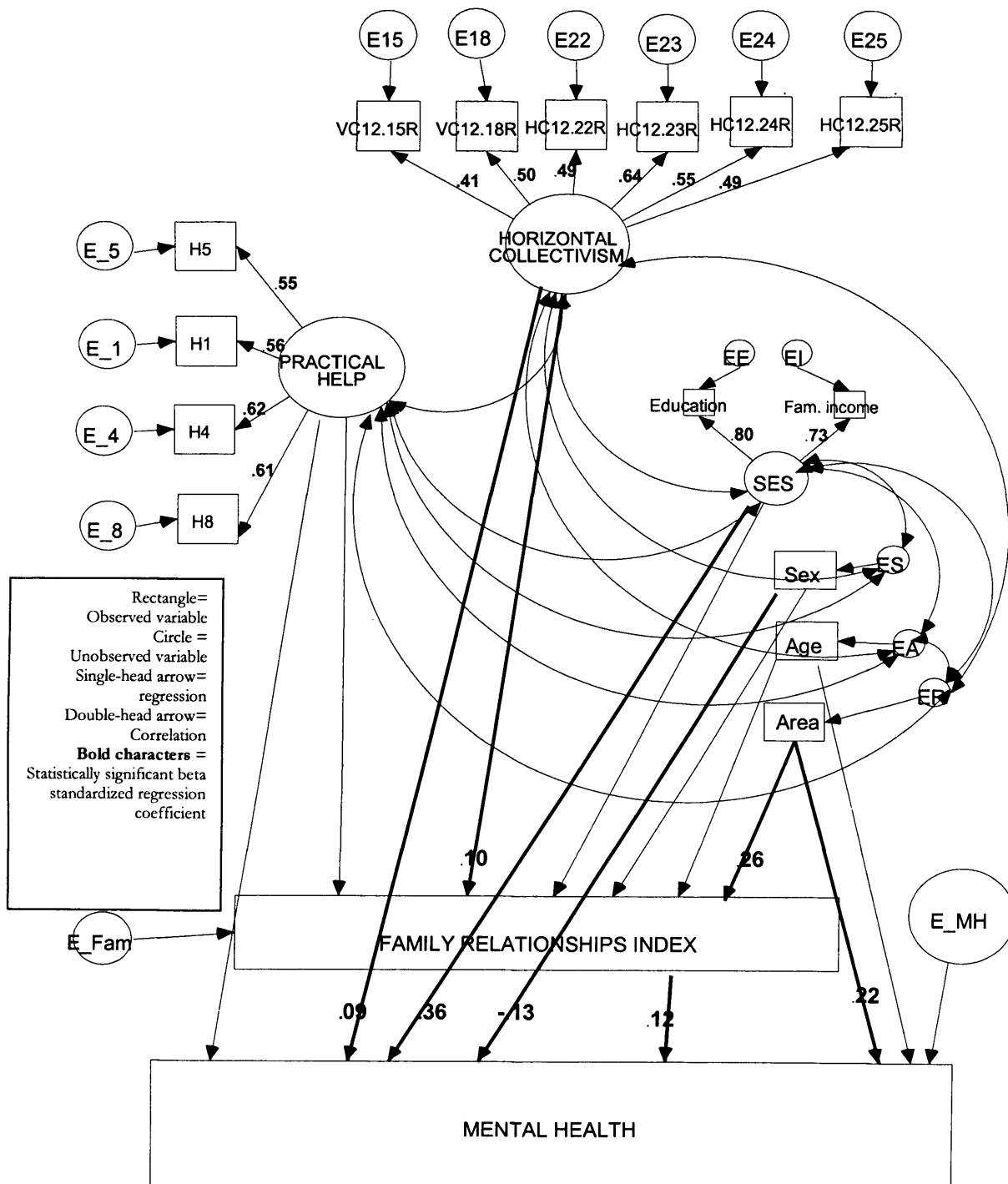
Appendix 19. The final integrated structural equation models for friendship-related sociability and General Health

A) The final integrated structural equation model for the relationships between friendship-related sociability and General Health (unadjusted version)

The final integrated model for General Health: the regression weights

Pair of variables: Dependent	Predictor	Regression Estimate	Standardized Regression Estimate	S.E.	p
▓▓▓▓▓	▓▓▓▓▓	▓▓▓▓▓	.288	▓▓▓	.048
FRIENDSHIP INDEX	VOLUNTEERING	-.089	-.016	.593	.88
▓▓▓▓▓	▓▓▓▓▓	▓▓▓▓▓	▓▓▓▓▓	▓▓▓	▓▓▓
FRIENDSHIP INDEX	RESPONSIBILITY _ASSUMPTION	-.481	-.051	1.145	.674
H6	RESPONSIBILITY _ASSUMPTION	1	.376		
H12	RESPONSIBILITY _ASSUMPTION	1.905	.697	.224	.000
H14	RESPONSIBILITY _ASSUMPTION	1.369	.516	.174	.000
H13	VOLUNTEERING	.986	.675	.074	.000
H3	VOLUNTEERING	1	.617		.000
H10	VOLUNTEERING	.867	.593	.07	.000
HC12.27R	COLLECTIVISM _DEPENDENCY	1	.676		
HC12.28R	COLLECTIVISM _DEPENDENCY	1.043	.711	.086	.000
H1	PROVISION OF PRACTICAL HELP	1	.463		
H4	PROVISION OF PRACTICAL HELP	1.403	.587	.136	.000
H8	PROVISION OF PRACTICAL HELP	1.126	.611	.107	.000
HC12.25R	COLLECTIVISM _DEPENDENCY	.581	.415	.062	.000
HC12.22R	COLLECTIVISM _DEPENDENCY	.403	.409	.044	.000
H5	PROVISION OF	1.302	.577	.127	.000

	PRACTICAL HELP				
███████	████████			.153	.000
GENERAL HEALTH	PROVISION OF PRACTICAL HELP	2.635	.066	5.633	.64
GENERAL HEALTH	VOLUNTEERING	2.17	.07	3.149	.491
███████	████████			-.111	.037
GENERAL HEALTH	RESPONSIBILITY _ASSUMPTION	-4.705	-.092	6.102	.441

The goodness-of-fit results of the final integrated structural equation model for friendship-related sociability and General Health

N=843

Fit Measure:	████████	Saturated	Independence
Discrepancy	301.871	0	33924.42
Degrees of freedom	91	0	136
P	0		0
Number of parameters	61	152	16
Discrepancy / df	3.317		249.444

RMR
GFI
Adjusted GFI
Parsimony-adjusted GFI

Normed fit index	0.991	1	0
Relative fit index	0.987		0
Incremental fit index	0.994	1	0
Tucker-Lewis index	0.991		0
Comparative fit index	████████	1	0
Parsimony ratio	0.669	0	1
Parsimony-adjusted NFI	0.663	0	0
Parsimony-adjusted CFI	0.665	0	0
Noncentrality parameter estimate	210.871	0	33788.42
NCP lower bound	161.953	0	33186.26

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NCP upper bound	267.396	0	34396.87
FMIN	0.359	0	40.29
F0	0.25	0	40.129
F0 lower bound	0.192	0	39.414
F0 upper bound	0.318	0	40.851
RMSEA	■		0.543
RMSEA lower bound	■		0.538
RMSEA upper bound	■		0.548
P for test of close fit	0.259		0
Akaike information criterion (AIC)	423.871	304	33956.42
Browne-Cudeck criterion	426.385	310.264	33957.08
Bayes information criterion			
Consistent AIC			
Expected cross validation index	0.503	0.361	40.328
ECVI lower bound	0.445	0.361	39.613
ECVI upper bound	0.571	0.361	41.051
MECVI	0.506	0.368	40.329
Hoelter .05 index	319		5
Hoelter .01 index	350		5

The final integrated model of General Health and Friendship-related sociability (unadjusted)

Rectangle=
Observed variable
Circle =
Unobserved variable
Single-head arrow=
Regression
Double-head arrow=
Correlation
Bold characters =
Statistically significant
beta standardized
regression coefficient

343
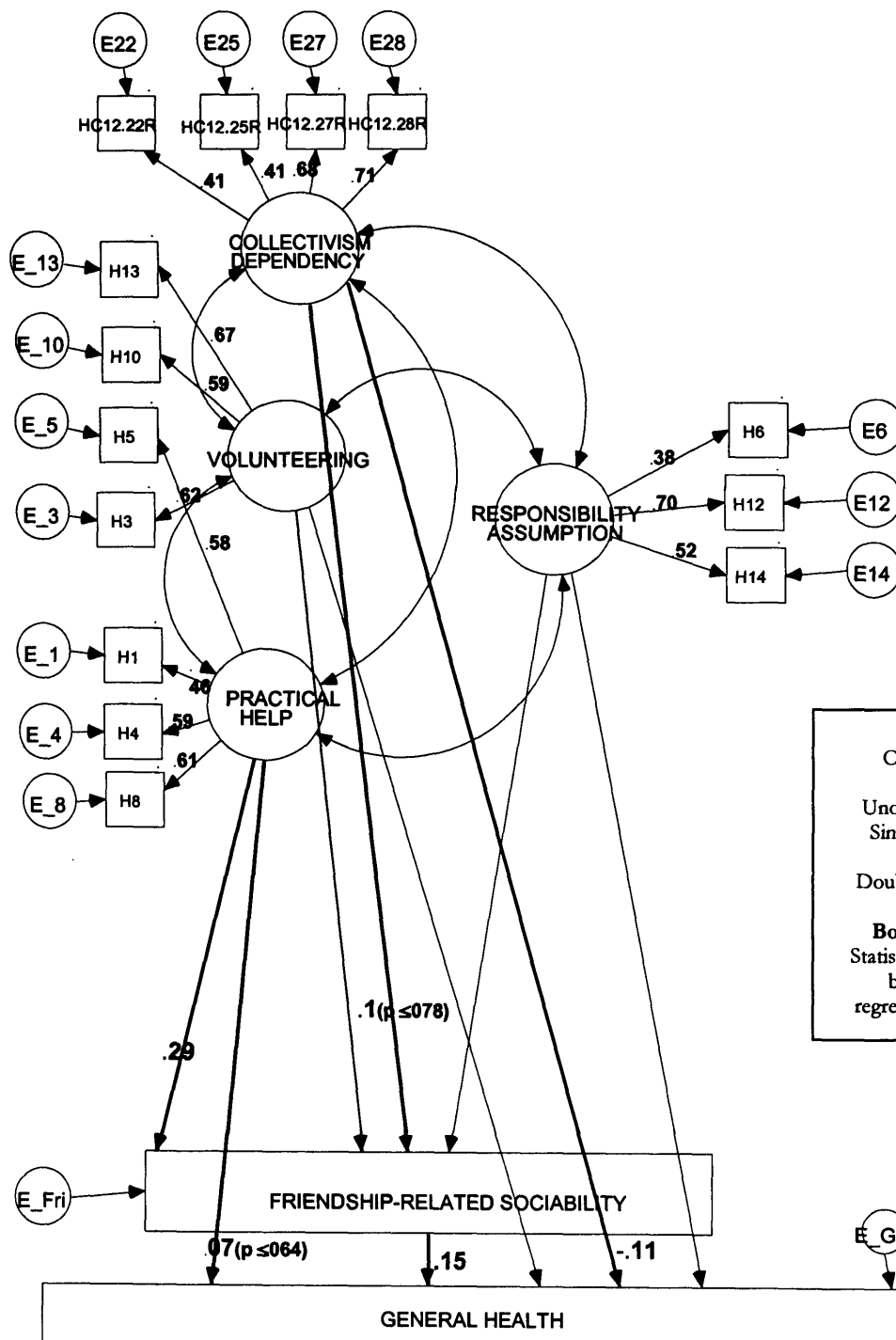
B) The final integrated structural equation model for the relationships between friendship-related sociability and General Health (fully adjusted version)

The final integrated structural equation model for General Health: the regression weights

Pair of variables: Dependent	Predictor	Regression Estimate	Standardized Regression Estimate	S.E.	p
████████	████████	████	████	1.161	.072
FRIENDSHIP INDEX	VOLUNTEERING	.243	.043	.656	.712
████████	████████	████	.142	████	.018
FRIENDSHIP INDEX	RESPONSIBILITY ASSUMPTION	-1.019	-.111	1.282	.427
████████	████████	████	.15█	████	.007
████████	████████	████	.12	████	.002
FRIENDSHIP INDEX	AGE	.007	.022	.014	.62
FRIENDSHIP INDEX	AREA	.123	.049	.128	.338
H6	RESPONSIBILITY ASSUMPTION	1	.387		
H12	RESPONSIBILITY ASSUMPTION	1.82	.686	.208	.000
H14	RESPONSIBILITY ASSUMPTION	1.337	.518	.165	.000
H13	VOLUNTEERING	.942	.644	.07	.000
H3	VOLUNTEERING	1	.618		
H10	VOLUNTEERING	.908	.621	.069	.000
HC12.27R	COLLECTIVISM DEPENDENCY	1	.669		
HC12.28R	COLLECTIVISM DEPENDENCY	1.069	.72	.081	.000
H1	PROVISION OF PRACTICAL HELP	1	.468		
H4	PROVISION OF PRACTICAL HELP	1.411	.597	.134	.000
H8	PROVISION OF PRACTICAL HELP	1.104	.605	.104	.000
HC12.25R	COLLECTIVISM DEPENDENCY	.591	.418	.062	.000
HC12.22R	COLLECTIVISM	.411	.413	.043	.000

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H5	DEPENDENCY PROVISION OF PRACTICAL HELP	1.269	.569	.123	.000
EDUCATION	SES	1	.823		
FAMILY INCOME	SES	.603	.675	.047	.000
███████	███████	███████	.089	███████	.012
GENERAL HEALTH	PROVISION OF PRACTICAL HELP	.939	.024	5.555	.866
GENERAL HEALTH	VOLUNTEERING	4.882	.157	3.299	.139
GENERAL HEALTH	COLLECTIVISM DEPENDENCY	1.397	.04	1.902	.463
GENERAL HEALTH	RESPONSIBILITY ASSUMPTION	-7.625	-.152	6.408	.234
███████	███████	███████	.241	███████	.000
███████	███████	███████	-.167	███████	.000
███████	███████	███████	.296	███████	.000
███████	███████	███████	.123	███████	.007

The goodness-of-fit results of the final integrated model for General Health
N=843

Fit Measure	███████	Saturated	Independence
Discrepancy	486.52	0	43431.85
Degrees of freedom	151	0	231
P	0		0
Number of parameters	101	252	21
Discrepancy / df	3.222		188.017

RMR
GFI
Adjusted GFI
Parsimony-adjusted GFI

Normed fit index	0.989	1	0
Relative fit index	0.983		0
Incremental fit index	0.992	1	0
Tucker-Lewis index	0.988		0

Comparative fit index	▮▮▮▮▮▮	1	0
Parsimony ratio	0.654	0	1
Parsimony-adjusted NFI	0.646	0	0
Parsimony-adjusted CFI	0.649	0	0
Noncentrality parameter estimate	335.52	0	43200.85
NCP lower bound	272.591	0	42519.33
NCP upper bound	406.059	0	43888.66
FMIN	0.578	0	51.582
F0	0.398	0	51.307
F0 lower bound	0.324	0	50.498
F0 upper bound	0.482	0	52.124
RMSEA	▮▮▮▮▮▮		0.471
RMSEA lower bound	▮▮▮▮▮▮		0.468
RMSEA upper bound	▮▮▮▮▮▮		0.475
P for test of close fit	0.321		0
Akaike information criterion (AIC)	688.52	504	43473.85
Browne-Cudeck criterion	693.94	517.522	43474.98
Bayes information criterion			
Consistent AIC			
Expected cross validation index	0.818	0.599	51.632
ECVI lower bound	0.743	0.599	50.822
ECVI upper bound	0.901	0.599	52.449
MECVI	0.824	0.615	51.633
Hoelter .05 index	313		6
Hoelter .01 index	337		6

The final integrated model of General Health and Friendship-related sociability (fully adjusted)
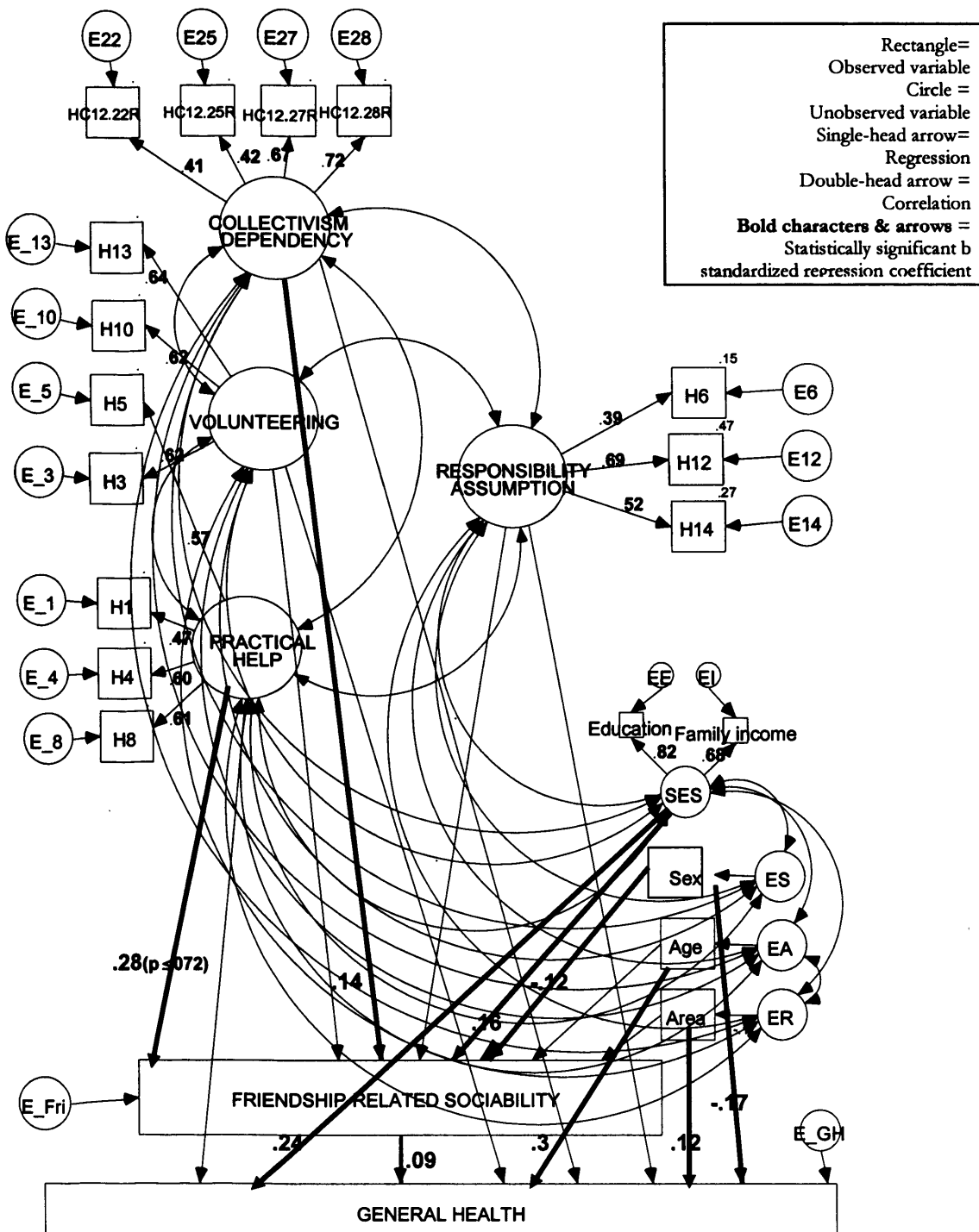
Appendix 20. Final integrated models tested with multiple linear regression analysis

The final integrated model of Family-related sociability and Mental Health

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Practical Altruism	.033	.026	.023	■	■	■	-.015	-.009
Horizontal Collectivism	.077*	.084*	.083*	■	■	■	.066ᵐ	.054
Family Relationships Index	.098*	.095*	.097**	■	■	■	.077ᵐ	.084*
Sex		-.179**	-.181**	-.170**	-.153**	-.180**	-.160**	-.142**
Age			-.025	.036	.030	-.040	-.003	.006
Family income (log)				.194**	▨	▨	.252**	▨
Education					.166**	▨	▨	.215**
Area of residence						.052	.176**	.140**
(R²)	.021	.053	.054	.091	.077	.056	.111	.089

*p≤ .05, **p≤ .01 and m denoted p≤.1. Model 1 is the unadjusted relation between Altruism and Friendship Composite Index, Model 2 is adjusted for sex, Model 3 is adjusted for sex and age, Model 4 is adjusted for sex, age and family income (log), Model 5 is adjusted for sex, age and education, Model 6 is adjusted for sex, age and area of residence (urban vs. rural), Model 7 is adjusted for sex, age, family income (log) and area of residence (urban vs. rural) and Model 8 is adjusted for sex, age, education and area of residence (urban vs. rural). In case of models 7 and 8 if instead of being adjusted for area of residence using the dichotomous variable "urban vs. rural area of residence" are adjusted for all six areas where the data collection occurred (six dummy variables representing the six different areas of data collection) the standardized beta coefficients for the independent variables in question are for model 7: Family Relationships Composite Index .080*, for Practical Altruism -.004 and for Horizontal Collectivism .060 (R²=.130) and for model 8 Relationships Composite Index .085*, for Practical Altruism .001 and for Horizontal Collectivism .058 (R²=.109).

The final integrated model of Friendship-related sociability and General Health

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Responsibility Assumption	.012	.008	-.030	■	■	■	-.049	-.037
Practical Altruism	.073m	071m	.057	■	■	■	.028	.035
Volunteering	.051	.055	.078*	■	■	■	.071m	.052
Collectivism-Dependency	-.110**	-.100**	-.008	■	■	■	.006	-.001
Friendship Index	.191**	.162**	.152**	■	■	■	.122**	.127**
Sex		-.146**	-.191**	-.193**	-.177**	-.188**	-.185**	-.166**
Age			-.337**	-.308**	-.301**	-.355	-.337**	-.324
Family income (log)				.127**	▨	▨	.169**	▨
Education					.125**	▨	▨	.170**
Area of residence						.070	.140**	.138**
(R²)	.057	.078	.180	.189	.193	.184	.200	.204

*p≤ .05, **p≤ .01. Model 1 is the unadjusted relation between Altruism and Friendship Composite Index, Model 2 is adjusted for sex, Model 3 is adjusted for sex and age, Model 4 is adjusted for sex, age and family income (log), Model 5 is adjusted for sex, age and education, Model 6 is adjusted for sex, age and area of residence (urban vs. rural), Model 7 is adjusted for sex, age, family income (log) and area of residence (urban vs. rural) and Model 8 is adjusted for sex, age, education and area of residence (urban vs. rural). In case of models 7 and 8 if instead of being adjusted just for area of residence using the dichotomous variable "urban vs. rural area of residence" are adjusted for all six areas where the data collection occurred (six dummy variables representing the six different areas of data collection) the four independent factors remained non-significant (Volunteering though in model 7 becomes significant at a 90% level of statistical significance, B=.070). On the contrary Friendship Composite Index remained in both models significant .129** and .132**, respectively. Both models explained 21% of the dependent variable variance.

Appendix 21. ANOVA: The two health outcomes by education and family income

ANOVA: The two health outcomes by family income

		Sum of Squares	df	Mean Square	F	Sig.
GH	Between Groups	30393.864	5	6078.773	11.436	.000
	Within Groups	432677.574	814	531.545		
	Total	463071.438	819			
MH	Between Groups	9877.147	5	1975.429	4.804	.000
	Within Groups	334693.077	814	411.171		
	Total	344570.224	819			

ANOVA: The two health outcomes by education

		Sum of Squares	df	Mean Square	F	Sig.
GH	Between Groups	50521.400	6	8420.233	16.633	.000
	Within Groups	464719.991	918	506.231		
	Total	515241.390	924			
MH	Between Groups	15299.905	6	2549.984	6.360	.000
	Within Groups	368492.077	919	400.971		
	Total	383791.983	925			

Appendix 22. The indirect (over the phone) contacts with friends by age quartiles

Case Processing Summary						
	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
AGE * Indirect contacts with friends	838	90.5%	88	9.5%	926	100.0%

The indirect (over the phone) contacts with friends by age			
Frequency:	AGE		
	Mean	N	Std. Deviation
not even once yearly or never	71.0	40	12.0
1-2 times per year	67.7	27	11.9
every other month	66.4	22	11.5
1-2 times per month	65.0	125	12.5
1-2 times per week	61.7	358	13.3
almost everyday	59.0	266	13.2
Total	62.1	838	13.3

Quartiles of age
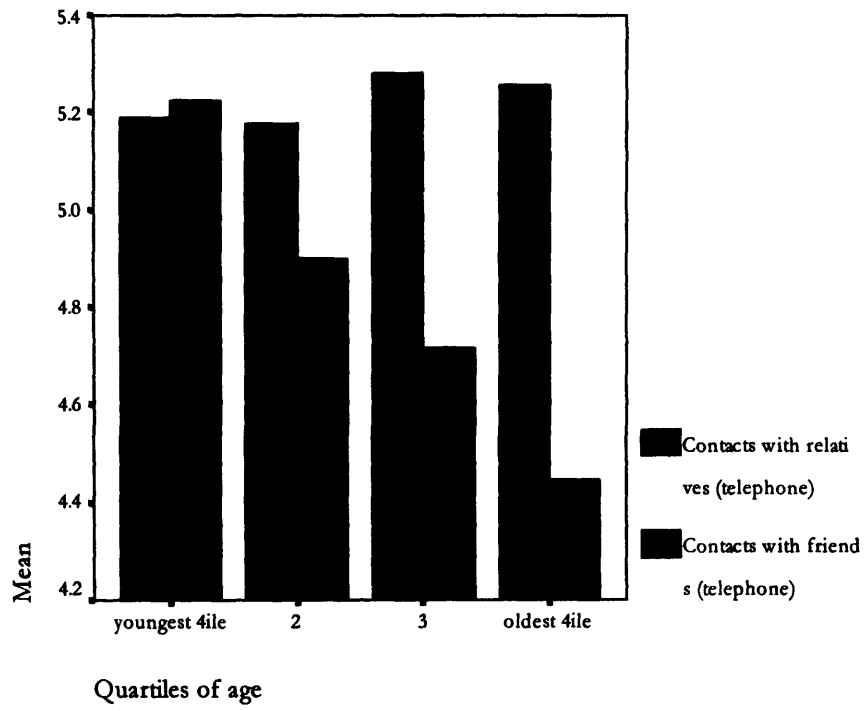
Appendix 23. The frequencies distributions (valid percent) of altruistic and individualistic-collectivistic scales

The frequencies of all altruistic items (N of cases)							
Item:	Response scale:					Cases:	
	Never	Rarely	Sometimes	Often	Very Often	Valid	Missing
H1 I give information to a stranger	128	170	214	■	164	922	4
H2 I give money to a stranger who needs it (or asks me for it)	242	215	■	122	65	923	3
H3 I offer voluntary work for a good purpose	125	137	252	■	134	910	16
H4 I lend an item of some value (e.g. a tool) to a neighbour or an acquaintance whom I do not know well	■	164	162	196	112	915	11
H5 Consciously I buy a little more expensive from the store of someone who I think I should support	200	131	■	227	123	923	3
H6 I assume responsibility for an acquaintance's or colleague's mistake when he/she needs this kind of help	■	197	248	131	51	898	28
H7 I share credit for something I have done with others when easily I could have kept it all for myself	126	95	216	■	121	822	■
H8 I help someone with something he/she does not know well although it is not my responsibility	64	82	204	■	177	914	12
H9 I help a stranger in the street	55	103	259	■	189	919	7
H10 I take care of a neighbor of mine	52	68	177	■	289	922	4

	when he/she is ill				■			
H11	I defend a stranger in the street who is in danger	92	119	228	■	190	916	10
H12	I risk my position to help a colleague, acquaintance or neighbor	180	214	■	186	90	911	15
H13	I volunteer to help in any way an effort for the common good	57	98	213	■	195	910	16
H14	I do something against my own rules to help someone exit a difficult situation	177	182	■	181	80	912	14
H15	Whenever I offer money or help I do it anonymously	67	76	153	223	■	919	7

Subscale:	Item:		Response scale:					Cases:	
			Completely agree	Partially agree	Neither agree nor disagree	Partially disagree	Completely disagree	Valid	Missing
Vertical Individualism	VI12.1	Competition is the law of nature and life	389	232	104	56	122	903	23
	VI12.2	It annoys me when other people perform better than I do	36	66	100	91	628	921	5
	VI12.3	Without competition it is not possible to have a good society	355	197	151	75	121	899	27
	VI12.4	Winning is everything in life	200	196	141	118	253	908	18
	VI12.5	It is important that I to do my job better than others	466	255	89	50	58	918	8
	VI12.6	I like competing with others	249	215	132	82	219	897	29
	VI12.7	Some people emphasize winning I am not one of them	159	91	127	176	299	852	■
Horizontal Individualism	HI12.8	I do "my own thing" irrespectively of what others think	323	202	100	114	180	919	7
	HI12.9	I'd rather depend on myself than on others	719	129	37	23	16	924	2
	HI12.10	I rely on myself most of the time, I rarely rely on others	623	176	53	36	33	921	5
	HI12.11	I enjoy feeling unique and different from others	176	170	122	114	331	913	13
	HI12.12	I am a unique person, separate	163	150	108	98	392	911	15

The frequencies of all individualistic and collectivistic items (N of cases)

		from others							
	HI12.13	One should live one's life independently of others	258	187	97	113	249	904	22
Vertical Collectivism	VC12.14	I would do what pleases my family even if I detest that activity	516	200	62	59	82	919	7
	VC12.15	I could sacrifice my self-interest for the benefit of my group	443	249	114	61	51	918	8
	VC12.16	I would sacrifice an activity that I enjoy much if my family did not approve of it	434	197	81	85	122	919	7
	VC12.17	Children should be taught to place duty before pleasure	599	159	84	33	40	915	11
	VC12.18	It is important to me that I respect the decisions made by my groups	659	174	50	15	19	917	9
	VC12.19	It annoys me if I have to sacrifice activities that I enjoy to help others	277	150	127	219	146	919	7
	VC12.20	I usually do if I others want me to do even if I would like to do something else	166	201	129	158	261	915	11
Horizontal Collectivism	HC12.21	The well-being of others is important to me	608	178	90	22	23	921	5
	HC12.22	If a colleague or fellow-villager or neighbour gets a prize, I would feel proud	719	130	57	6	8	920	6
	HC12.23	If a relative were in financial difficulty, I would help within my	726	143	32	10	8	919	7

		means						
HC12.24	It is important to me to maintain balance within the my group	755	103	35	9	7	909	17
HC12.25	I like sharing things with other people (e.g. neighbours or fellow-villagers)	536	235	87	35	27	920	6
HC12.26	It is important to consult close friends and get their ideas before making a decision	408	279	89	48	93	917	9
HC12.27	My happiness depends on the happiness of those around me	548	220	89	32	32	921	5
HC12.28	To me, pleasure is devoting time to others	453	282	117	38	30	920	6