Predictors of Loneliness

Yosef Koffler

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Thesis declaration form

I confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

Signature: 

Name: Yosef Koffler

Date: 19/06/2020

Overview

This thesis explores how interpersonal behavioural patterns, internal working models, personality traits, and positive and negative emotional characteristics interact and impact human behaviour.

Part one consists of a systematic review and a meta-analysis exploring the relationship between Attachment and Personality through an examination of the literature in English that examine this relationship. Personality was operationalised through the Big Five model, and Attachment through the standard three Attachment styles. 15 different analyses were conducted in order to explore all the possible combinations of the three Attachment styles and the five Personality traits. The literature was scrutinised through a thorough quality assessment and risk of biases assessment.

Part two is an empirical research paper exploring different predictors of Loneliness through the prism of interpersonal behavioral patterns, and an internal working model. These were explored through Attachment, Interpersonal problems, Compassion, and Shame. The aim of this study was to understand better how maladaptive patterns of emotional and behavioural functions can lead an individual to be and feel lonely. This is a quantitative study utilising a battery of five different measures with data from 92 participants.

Part three is a critical appraisal offering a reflection on both preceding parts. It emphasizes an overview of the whole process and ends with a reflection on the conclusions of both studies. During the reflection issues regarding Loneliness and better care for clients are raised.

Impact statement

The findings from this research have potential clinical and academic implications for the fields of developmental psychology and psychopathology. Part one of the thesis offers a first attempt to systematically analyse the relationship between Attachment and Personality. For clinical purposes, the findings from this review indicate what emotional resources the individual might have based on their Attachment style and Personality traits. These may be expressed more clearly in times of stress.

For academic purposes this review emphasises the important role that the interplay of environmental and psychological factors has on our emotional development, and how they can contribute to, or hamper, this process.

In addition, this review showed that more work is needed, with more rigourous academic standards, in order to understand the nature and extent of these relationships, and how exactly they effect our perception and behaviour.

The empirical paper provides a contribution to the understanding of the factors that influencing Loneliness most profoundly. Similar to previous research, the current study found that interpersonal problems and Attachment styles could explain Loneliness well. In addition, and similar to previous research, the current study found that adding Self-compassion and external Shame to the former model could increase its explanatory power. Unlike previous research, which emphasised the role and effect of Compassion, and especially Self-compassion, in explaining Loneliness, the current study found that Shame, and especially internal Shame, had the biggest relative contribution in explaining loneliness.

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Part 1: Systematic review and Meta-Analysis,

The relationship between Attachment and Personality

Abstract

Aims: Attachment and personality are multifaceted constructs considered to be rooted in the early stages of development and continue that shaped throughout life. While they have been studied in detail, a thorough investigation of the relationship between the dimensions of both constructs is lacking.

The aim of the current work is to meta-analyse the relationships between the different dimensions of attachment and personality.

Method: We conducted a systematic review and a meta-analysis of the literature on attachment and personality. Studies measuring attachment styles (secure, anxious and avoidant) and the Big Five personality traits (extraversion, agreeableness, openness to experience, conscientiousness, and neuroticism) were included.

Papers were assessed for risk of bias and publication bias. A random effects model was used to estimate the pooled correlation between dimensions.

Results: We identified 23 samples from 20 eligible studies (as some studies included more than one sample).

We found small to medium effect sizes for the relationships between the three attachment styles and the five personality traits and found heterogeneity to be significant in the analysis. Secure attachment was found to have a positive correlation with extroversion (p = 0.38, 95% CI 0.19 to 0.55) and negative correlation with neuroticism (p = -0.32, 95% CI -0.49 to -0.12). Anxious attachment was found to have a positive correlation with neuroticism (p = 0.40, 95% CI 0.36 to 0.45). Avoidant attachment was found to have small correlations with all five Personality traits.

Of the five personality traits, openness to experience was found to have the weakest and smallest correlations with all attachment styles.

We found evidence of a significant publication bias. In addition, we found a high risk of selection bias and attrition bias, and an unclear risk of reporting bias.

Conclusions: Maladaptive aspects of personality traits correlated with insecure attachment styles, while adaptive aspects of personality traits correlated with secure attachment styles (e.g. neuroticism correlated positively with an anxious attachment style, while extroversion correlated positively with a secure attachment style). Further work is needed in order to improve the quality of research in this field, and to understand better the nature of the relationship between these constructs and how they impact our life and well-being.

Introduction

Attachment theory is a biopsychosocial model referring to people's characteristic methods of interaction in close relationships, e.g. with parents or romantic partners. (Lorenzini & Fonagy, 2013). Personality is defined as a largely stable set of behaviours, cognitions, and emotional dimensions that evolve through interaction with bio-social factors (Corr & Matthews, 2009).Both of these constructs are considered to greatly influence our behaviour, perception, and choices. In addition, research shows that these constructs can interact with each other (Backstrom & Holmes, 2001; Diehl, Bourbeau, Elnick & Labouvie-Vief, 1998; Onishi, Block & Gjerde,, 2001; Shaver & Brennan, 1992).

Personality and attachment are multi-faceted constructs and the connections between them have not been thoroughly scrutinised in the literature. This work aims to systematically review the research exploring the relationship between attachment and personality, and to analyse the patterns arising from those interactions.

Attachment

Bowlby argued (1975) that people's patterns of behaviour are heavily impacted by internal working models/cognitive-affective representations of their repeated experiences between the self and important others from childhood onwards. These internal working models are the basis for our attachment styles. For example, people who experienced a parenthood style sensitive to their physical and emotional needs tend to develop positive representations of themselves and others, which later tend to result in a secure attachment style. On the contrary, constant negative experiences of relationships can cause complications in the attachment development in one of two forms: an hyperactivated attachment style that

can result in high anxiety and excessive seeking of attention and care from others; or a deactivated attachment style that can result in the avoidance of closeness and a strong reliance on the self (Mikulincer & Shaver, 2007, 2009).

Different combinations of these dimensions yielded three different attachment styles: Secure attachment, where low levels of both anxiety and avoidance are observed; Anxious attachment, where high levels of anxiety and low levels of avoidance are observed; and avoidant attachment, where low levels of anxiety and high levels of avoidance are observed (Ainsworth et al., 1978). Later, a fourth attachment style was acknowledged: Anxious-avoidant attachment, where high levels of both anxiety and avoidance are observed (Bartholomew & Horowitz, 1991).

Securely attached individuals tend to develop positive mental representations and inner models of themselves and others. They tend to see themselves as friendly and capable, and experience other people as willing to help them when needed i.e. responsive to their needs and worthy of their trust. It is therefore easier for individuals with a secure attachment style to develop intimate relationships and preserve their interdependence (Bartholomew & Horowitz, 1991a; Mikulincer & Shaver, 2009a).

Anxiously attached individuals tend to develop negative models of themselves, and positive models of others. They feel unworthy of others' affection, whereas they perceive other people as good and attractive. Individuals with an anxious attachment style worry that other people will lose interest in maintaining intimate relationships with them. They worry about being unwanted and can often feel abandoned; they therefore seek proximity to others and approval from them (Bartholomew & Horowitz, 1991b; Collins & Read, 1990; Mikulincer & Shaver, 2009b).

Avoidant Attached individuals tend to have positive models of themselves and negative models of others. They may feel capable on their own but mistrust others (Bartholomew & Horowitz, 1991c; Mikulincer & Shaver, 2012). By avoiding social interactions, they try to avoid all information that activates the attachment system, and feel uncomfortable with others (Collins & Read, 1990a).

It has been found that individuals with either one of the two insecure attachment styles (Anxious or Avoidant) see others as less responsive and expect low levels of social support (Mikulincer & Shaver, 2009c; Morrison et al., 1997; Segal & Fraley, 2016; Vogel & Wei, 2005).

Brennan, Clark and Shaver (1998) showed that we could measure attachment using only two overarching categories: Anxiety (the degree to which individuals worry that key people in their life will be unavailable or unsupportive in stressful situations, and that their love and care is not genuine), and Avoidance (the degree to which individuals desire to remain psychologically or emotionally independent, and seek limited intimacy).

Personality and Attachment

Personality refers to long-standing traits and patterns that cause individuals to consistently think, feel and behave in specific ways. These long-standing traits can be clustered into underlying personality dimensions on which individuals vary (Westen, Burton, & Kowalski, 2014). These dimensions are greatly shaped by the interaction between innate dispositions and social and cultural relations (McCrae & Costa, 1992).

Bowlby (1975) emphasised the role of social relationships in shaping our internal working models, and claimed that the infant's social environment and personality interact with each other during early development. Furthermore, it was found that attachment relationships underpin infant personality (Hagekull & Bohlin, 2003; Kobak, 1994).

The most empirically confirmed theory of personality is The Five Factor Model (Costa & McCrae, 2008; Digman, 1990, 1997), which is structured around five personality traits. This model received great support in research, including across different cultural settings (Ispas, Iliescu, Ilie, & Johnson, 2014; McCrae at el., 2005; McCrae & Allik, 2002). These five different personality traits, which were identified through factor analyses across a variety of studies, are: Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness-to-Experience (John, Naumann & Soto, 2008). Extraversion indicates an energetic demeanour and the tendency to actively seek others company. Agreeableness is the tendency to be cooperative, compassionate and empathetic rather than suspicious and antagonistic. Conscientiousness reflects the tendency to act in a task and goal-oriented manner, and the ability to delay gratification and impulse control. Neuroticism refers to the disposition to experience negative threat emotions such as anxiety, and sadness, to the point it opposes the individual's emotional stability. Openness-to-Experience reflects the complexity and depth of the individual's experiential life, by referring to creativity, curiosity, and a variety of experience (Shiner & Caspi, 2003).

Studies have already established a relationship between aspects of the Big Five Model (i.e. Extraversion, Agreeableness, and Neuroticism) and different attachment styles (Fransson et al., 2013; Shaver & Brennan, 1992; Surcinelli et al., 2010). More specifically, anxious and avoidant attachment styles were found to have positive relationships with Neuroticism and negative relationships with other factors of the Big Five (Noftle & Shaver, 2006).

Individuals with secure attachment demonstrated low Neuroticism, high Extraversion, and a higher level of Agreeableness than those with anxious and avoidant attachment (Shaver & Brennan, 1992a). Neuroticism appears to be the most important personality dimension for anxious attachment style, whereas low levels of Extroversion and Agreeableness are the most important correlates for avoidant attachment (Noftle & Shaver, 2006b).

These patterns of correlates between personality and attachment style were found again in a recent study by Both and Best (2017), in which individuals with secure attachment showed low Neuroticism and high Extroversion; individuals with avoidant attachment showed high Neuroticism and low Agreeableness; and individuals with avoidant attachment showed low Agreeableness (Both & Best, 2017).

These patterns have also been demonstrated in children. A positive relationship between secure attachment, Extroversion, and Openness-to-Experience in childhood was found by Fransson et al. (2013). These patterns seemed to stay stable over time, with individuals with secure attachment in childhood showing high Agreeableness and Conscientiousness and low Neuroticism in adulthood. In contrast, for individuals with either one of the two insecure attachment styles this pattern was inverted (Young et al, 2019).

Personality research generally subscribes to a more diverse approach towards the nature and origin of personality traits (i.e. personality origin is not rooted solely in the attachment style), ranging from purely descriptive to biologically based causal concepts (Saucier & Goldberg, 2001).

The link between personality and attachment seems to be established, although, as seen previously, its origin, impact and implications are still under debate.
Personality and attachment are multi-faceted constructs and the connections between them was not thoroughly scrutinise in the literature.

This work aims to systematically review the research exploring the relationship between attachment and personality, and to analyse the different interactions between these two constructs.

Method

Literature search and strategy

We conducted a systematic literature search (up to November 2019) of PsycINFO, EMBASE, and MEDLINE for studies describing the association between attachment and personality.

Personality and attachment are both multifaceted constructs; each include a number of different models and different approaches. Choosing a specific model could result in difficulties understanding these constructs in their entirety. Therefore, in order not to lose any data during the search, personality and attachment were defined as what personality, and attachment measures, measure.

Thus, an initial literature review was used to identify the measures most commonly used to examine attachment and personality. The search targetted any study that examined either personality and/or attachment and retrieved the different tools used during these analyses. Most of this research used subscales, rather than the complete tools (e.g. focussed on Neuroticism rather than the whole Big 5). The search results are summarised in the Appendix (appendix A1), which shows all the measures used to examine attachment and personality.

The subsequent review aimed to identify the relationship between attachment and personality (on their different models) by focusing on the measures that were captured in the initial search.

Since personality could be a broad construct, and in order to keep our search focused on the initial aim (the relationship between personality and attachment), the personality measures we focused on the second search were tools that captured personality traits and measures that includes some element of personality within them (e.g. the Inventory of Interpersonal Problems, IIP), while attachment measures were fitted within the three styles model.

For this second search the attachment search terms were: AHQ (the Attachment History Questionnaire); AAQ (the Adult Attachment Questionnaire); ECR (Experiences in Close Relationships); RQ (the Relationship Questionnaire); RSQ (the Relationship Scales Questionnaire); 9AP (9 Attachment Profile); AAS (Adult Attachment Scale); and ASQ (the Attachment Styles Questionnaires).

For personality, the search terms were: BFI (the Big Five Inventory); EPQ (the Eysenck Personality Questionnaire); BFQ (the Big Five Questionnaire); NEO PI (NEO Personality Inventory); IPIP (International Personality Item Pool); B5T (Big Five Personality traits); BFPI (Big Five Personality Inventory); TIPI (Ten-Item Personality Inventory); and FFPI (the Five Factor Personality Questionnaire).
One investigator did this literature search.

Selection criteria

Articles were included in the systematic review if they: 1) examined the relationship between attachment and personality; 2) were original peer-reviewed studies (i.e., not review articles, or meeting abstracts); 3) used measures that aim to capture attachment and personality as independent concepts, and did not view them as facets of a greater overarching

construct (thus the IIP was disqualified); and 4) were published in English. We only included articles that met all of these criteria.

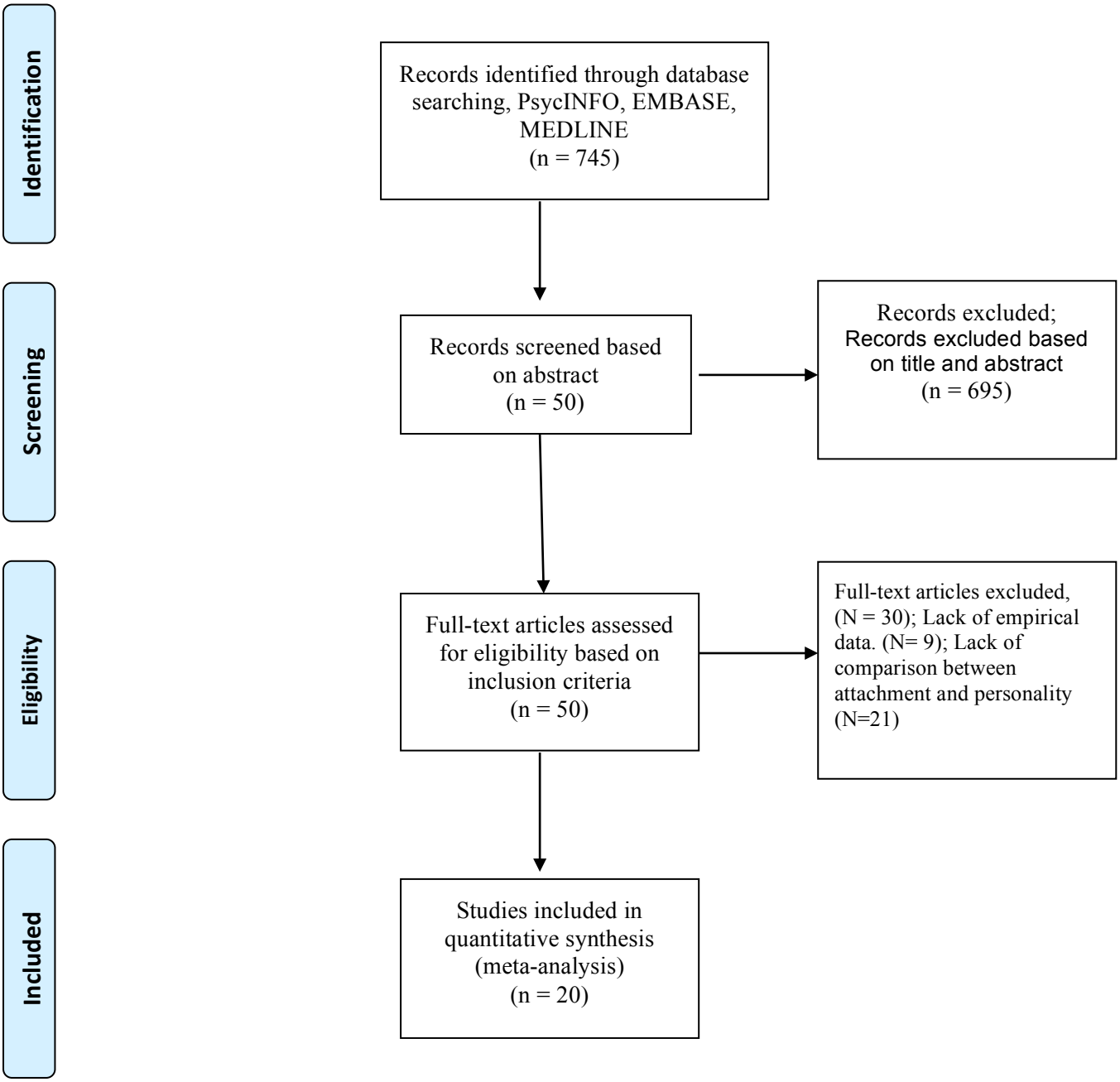
Selection of studies

The initial search yielded 745 articles. After review of their abstracts, 50 had the potential to meet the first inclusion criterion (examining directly the relationship between attachment and personality). 21 of these articles were excluded due to lack of direct comparison between attachment and personality. For the full PRISMA flowchart please see Figure 1.

A further nine articles were excluded due to missing data. While these articles suggested they might focus their examination on attachment and personality, no supporting data were included. Authors were contacted for the missing data but did not reply.

Therefore, 20 articles were eligible for review, representing 23 different samples (several studies included separate trials with different samples in each article) and generating 201 different effect sizes. Based on this, 15 different comparisons were made (three attachment styles vs. five personality traits) for the purpose of the current meta-analysis (see Table 1).

Figure 1: *PRISMA for inclusion and exclusion in meta-analysis*



The studies included in the meta-analysis are listed in Table 2.

All the studies included in this work reported the relationship between the different attachment styles and the different personality traits, though they did not necessarily use the same measures, or examine all possible combinations of attachment styles and personality traits (for example, they might have examined the link between one attachment style and one personality trait only).

Measures of Attachment and Personality

Attachment was measured using the following scales: Experiences in Close Relationships (ECR), used in eight articles; Experience in Close Relationships - revised (ECR-R), used in three articles; Relationships Questionnaire (RQ), used in four articles; Relationship Scales Questionnaire (RSQ), used in one article; Adult Attachment Scale (AAS), used in two articles; and Attachment Styles Questionnaire (ASQ), used in one article. For the full list please see Table 2.

Personality was measured using the following inventories: the NEO Personality Inventory (NEO-PI), used in three articles, and the revised Neo Personality Inventory (NEO-PI-R) used in three articles; the Eysenck Personality Questionnaire (EPQR), used in two articles; the Brief Personality Questionnaire (EPQ), used in four articles; the Five Factor Personality Questionnaire (FFPI), used in one article; the Big Five inventory (BFI), used in five articles; the Big Five Questionnaire (BFQ); and the International Personality Item Pool

(IPIP), used in one article. For the full list please see Table 2.

Although the publications reviewed in this study use different tools, they all measure the same constructs. Despite this, due to the use of different tools and models, a strategy to bridge the gap between the different approaches was needed. Slight differences in terminology (e.g. the BFQ uses different categories from the NEO-PI) and conception of the constructs (the RQ has four attachment styles instead of the usual three), are all addressed using the standards already present in the literature. For example, the two different categories the RQ defines as fearful-avoidant and preoccupied attachment styles can be unified to match the more common anxious-avoidant attachment style (Ulu & Tezer, 2010). As a result, when necessary we generated anxious and avoidant attachment styles scores by using these formulas:

Avoidance = (fearful + dismissive) − (preoccupied + secure).

Anxiety = (preoccupied + fearful) − (secured + dismissing).

Quality assessment

The quality of our studies was assessed using tools from the National Heart, Lung, and Blood Institute, Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies (NHLBI, 2017). The NHLBI tools were chosen to complement the correlational designs of our studies as they assess internal validity and risk of bias. Items were evaluated as 'yes', 'no', 'not applicable', or 'cannot determine'.

The results of the quality assessment for all the studies that are included, are presented in Table 1. The methodological limitations of the included studies are discussed in Section 3.6. Overall, most studies in the review were found to have a relatively high risk of bias. As a

whole the studies found suitable for our review were all non-randomised and lacked a report of a power calculation.

Most of our cohort was made up of cohort and cross-sectional observational studies (Andrews, 2011; Bakker, 2004; Boelen, 2011; Clark, 2012; Donnellan, 2008; Ferenczi , 2013; Holmberg, 2013; Jenkins-Guarnieri, 2012; Kimmes, 2017; Marrero-Quevedo, 2019; Noftle, 2006; Surcinelli, 2010; Ulu, 2010; Zeleskov & Djoric, 2011). The main limitations identified were: no data on the rate of participation of eligible persons; lack of a power calculation or justification of sample size.

Additional limitations that are not included in the NHLBI were: only a few of the studies that were included were classed as case-control or uncontrolled before-and-after studies (Barnes, 2019; Galdiolo, 2018; Kawamoto, 2016; Picardi, 2005; Shaver, 1992; Wijngaards-de Meij, 2007).

None of the studies considered the relationship between researchers and participants.

Table 1: Risk of Bias Assessment. Quality appraisal using the Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies (NHLBI, 2017).

	Andrews, 2011	Bakker, 2004	Barnes, 2019	Boelen, 2011	Clark, 2012	Donnellan, 2008	Ferenczi 1, 2013	Ferenczi 2, 2013	Galdiolo, 2018	Holmberg, 2013	Jenkins-Guarnieri, 2012	Kawamoto, 2016	Kimmes, 2017	Marrero-Quevedo, 2019	Noftle 1 2006	Noftle 2 2006	Picardi, 2005	Shaver, 1992	Surcinelli, 2010	Ulu, 2010	Wijngaards-de Meij, 2007	Zeleskov & Djoric, 2011
1. Research question clearly stated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
2. Study population clearly defined	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	N	Y	Y	Y	N
3. Participation rate of eligible persons >50%?	CD	Y	CD	CD	CD	Y	CD	CD	Y	CD	CD	CD	CD	CD	CD	CD	CD	CD	CD	CD	Y	CD
4. Subjects selected from similar populations	N	N	N	N	N	N	N	N	N	Y	Y	N	Y	N	Y	Y	N	N	Y	Y	N	Y
5. Was sample size justified	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N
8. Different levels of exposure examined	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
9. Exposure measures clearly defined	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
10. Exposure(s) assessed over time	N	N	Y	NA	NA	NA	NA	NA	Y	NA	NA	Y	NA	NA	NA	NA	Y	Y	NA	NA	Y	NA
11. Outcome measures clearly defined	Y	NA	Y	NA	NA	NA	NA	NA	NA	NA	NA	Y	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
13. Loss to follow-up after baseline <20%	NA	NA	CD	NA	NA	NA	NA	NA	CD	NA	NA	CD	NA	NA	NA	NA	N	N	NA	NA	Y	NA

Grey shading indicates potential quality concerns

Effect size coding

All of the constructs in the reviewed studies reported their findings by reporting their associated correlations coefficients.

Analytic procedure

All analyses were carried out using techniques from Meta-Essentials for Excel (Suurmond, Hak & van Rhee, 2017). In order to investigate the relationship between the different attachment styles and the five personality traits, pooled correlation coefficients were calculated for each possible pairing (three attachment styles by five personality traits).

Meta-analytic model

The heterogeneity of effect sizes was assessed using the Q statistic. The Q statistic approximates a chi-square distribution, testing whether the distribution of effect sizes around the mean is significantly greater than expected as a result of sampling error. In addition, the I^2 statistic was calculated to provide an estimate of the total variance attributable to between-study variance; 25%, 50% and 75% are considered to be cut-offs for low, medium and high heterogeneity (Higgins, Altman, Deeks &Thompson, 2003). It is recommended that where between-study variance is anticipated to be substantial, random effects models are used, integrating between-study variance and within-study random sampling error into the model (Borenstein, Higgins, & Rothstein, 2011). Given the heterogeneous sampling and measurement differences it was decided *a priori* to use a random effects analysis. Where moderate or high heterogeneity is observed, the confidence intervals will be used to report the effect size.

Results

Common measures

The measures most frequently used to assess personality were the NEO Personality Inventory (NEO-PI) and the Eysenck Personality Questionnaire (EPQ). The measures most frequently used to assess attachment were the Experience in Close Relationship (ECR), The Relationships Questionnaire (RQ), and the Adult Attachment Scale (AAS). For full details please see Table 2.

Table 2. *Articles included in the current review and meta-analysis.*

Article	Sample size	Statistical model	Attachment measure	Personality measure
Noftle at el., 2006	8318	Regression	ECR	BFI
Noftle at el., 2006	285	Regression	ECR	NEO-PI-R
Zeleskov & Djoric at el., 2011	203	Stepwise backward regression	ECR	NEO-PI-R
Andrews at el., 2011	82	Pearson correlation analyses, independent measures t-tests	RQ	EPQR A
Boelen at el., 2011	348	Bias-corrected and accelerated bootstrap interval	RQ	EPQ RRS
Ferenczi at el., 2013	263	Hierarchical linear modelling	RSQ	EPQ BV
Ferenczi at el., 2013	253	Confirmatory factor analysis	ECR S	EPQR S
Kimmes at el., 2017	542	Latent profile analysis (LPA)	ECR R	EPQ BV
Wijngaards-de Meij at el., 2007	438	Multilevel regression analysis	AAS	EPQ RSS
Bakker at el., 2004	847	Multivariate analysis of variance (MANOVA), regression	ASQ	FFPI
Barnes at el., 2019	4374	Factor analysis, confirmatory factor analysis	ECR	BFI
Clark at el., 2012	216	Hierarchical multiple regression	ECR S	IPIP
Donnellan at el., 2008	273	Multivariate behavioural genetic analysis	AAS	NEO FFI
Galdiolo at el., 2018	408	Comparative Fit Index (CFI)	ECR R	NEO 60
Holmberg at el., 2013	160	Multiple regression analysis	RQ	BFI
Jenkins-Guarnier at el.i, 2012	463	Hierarchical multiple linear regression	ECR R	BFI
Kawamoto at el., 2016	1000	Hierarchical linear modelling	ECR	BFPI
Marrero-Quevedo at el., 2019	1403	Multiple regression	ASS	NEO-PI-R
Picardi at el., 2005	115	Multiple linear regression	ECR	BFQ

Shaver at el., 1992	242	ANOVA, multiple regression analysis	Hazan and Shaver	NEO PI
Surcinelli at el., 2010	274	Multivariate analysis of variance (MANOVA), Multivariate Analysis of Covariance (MANCOVA)	RQ	BFQ
Ulu at el., 2010	604	Multivariate analysis of variance (MANOVA), Multiple Regression Analysis	604	BFI

Table 2. Studies included in the meta-analysis and assessment tools used: Experiences in Close Relationships Scale (ECR); Experiences in Close Relationships Scale Revised (ECR R), Experiences in Close Relationships Scale Short (ECR S), The Big Five Inventory (BFI), The Big Five Personality Inventory (BFPI), The Big Five Questionnaire (BFQ), Five Factor Personality Questionnaire (FFPI), NEO Personality Inventory Revised (NEO-PI-R), The NEO-Five Factor Inventory (NEO FFI), NEO Personality Inventory 60-items, The Eysenck Personality Questionnaire Brief Version (EPQ BV), Eysenck personality questionnaire revised and short scale version (EPQ RRS), Adult Attachment Scale (AAS), Relationship questionnaire (RQ), The Relationship Scales Questionnaire (RSQ), Attachment Styles Questionnaire (ASQ), International Personality Item Pool (IPIP), Hazan and Shaver, 1987.

Meta-analyses of Attachment and Personality traits (for full results see Table 3).

The analysis found that secure attachment style had its strongest positive correlation with Extrovert personality 0.38 (95% CI 0.19 to 0.55) and its strongest negative correlation with Neuroticism -0.32 (95% CI -0.49 to -0.12). However, these were weak to moderate relationships and analysis suggests that the papers were considerably heterogeneous (I^2 = 88.36%, and 95.08% respectively).

The analysis found that anxious attachment style had a moderate positive correlation with Neuroticism 0.40 (95% CI 0.36 to 0.45), although analysis suggests that the papers were considerably heterogeneous (I^2 = 85.51%).

Finally, the analysis found that avoidant attachment style had weak positive correlation with Neuroticism 0.19 (95% CI 0.12 to 0.25). In addition, it had fairly weak negative correlations with Agreeableness and Extroversion (respectively -0.20, 95% CI -0.28

to -0.13; and -0.19, 95% CI -0.29 to -0.09). Again, there was considerable heterogeneity (I^2 = 90.22%, 91.56%, and 97.24% respectively).

Table 3. *Pooled effect sizes found between attachment styles and personality traits*

Attachment style/ Personality trait	Agreeableness	Conscientiousness	Extroversion	Neuroticism	Openness-to-experience
Secure	0.19 (95% CI 0.05 to 0.32; I^2 75.74%; p<.0001)	0.11 (95% CI 0.05 to 0.18; I^2 23.06%; p<.0001)	0.38 (95% CI 0.19 to 0.55; I^2 88.36%; p<.0001)	-0.32 (95% CI -0.49 to -0.12; I^2 95.08%; P<.0001)	0.10 (95% CI -0.02 to 0.21; I^2 70.72%; P<.005)
Anxious	-0.14 (95% CI -0.18 to -0.09; I^2 80.78%; p<.0001)	-0.15 (95% CI -0.22 to -0.08; I^2 89.56%; p<.0001)	-0.17 (95% CI -0.22 to -0.13; I^2 69.09%; p<.0001)	0.40 (95% CI 0.36 to 0.45; I^2 85.51%; p<.0001)	-0.08 (95% CI -0.15 to 0.01; I^2 86.29%; p<.005)
Avoidant	-0.20 (95% CI -0.28 to -0.13; I^2 91.56%; p<.0001)	-0.13 (95% CI -0.20 to -0.06; I^2 90.11%; p<.0001)	-0.19 (95% CI -0.29 to -0.09; I^2 97.24%; p<.0001)	0.19 (95% CI 0.12 to 0.25; I^2 90.22%; p<.0001)	-0.07 (95% CI -0.12 to -0.02; I^2 74.36%; p<0.001)

Forest plots dedicated to each meta-analysis can be found at the end of the appendix (appendix A2).

Sensitivity analysis

I assessed whether any one study could significantly reduce heterogeneity (leave-one-out analysis). No single study significantly explained heterogeneity within each meta-analysis.

Publication bias

Non-significant findings tend to remain unpublished, which can distort or bias the way we understand the concepts we research (Mlinarić at el., 2017; Vera-Badillo at el., 2016). In this study, a publication bias was assessed both through the visual inspection of the study funnel plots and through statistical procedures. In order to assess a publication bias I

conducted a publication bias test for each of the analyses that included above 10 studies (Deeks, Higgins & Altman, 2019), meaning all attachment styles Vs. personality traits analyses apart from secure attachment (as these included four studies each). The articles that were used in the analyses were: Bakker, 2004; Barnes, 2019; Clark , 2012; Donnellan, 2008; Gsldiolo, 2018; Holmberg, 2013; Kawamoto, 2016; Marrero-Quevedo, 2019; Noftle, 2006; Picardi, 2015; Shaver, 1992; Surcinelli, 2010; Ulu, 2010.

For dedicated Funnel plots for each analysis please see the Appendix (appendix A2).

The plot (standard error against effect size - Fisher's z) forms a symmetrical funnel shape in the absence of a publication bias. Following are reports of dedicated visual inspections and statistic tests (Egger's Regression, Begg & Mazumdar's Test) for each of the ten analyses (attachment style and personality trait):

Anxious and agreeableness

Visual analysis of the current plot suggested the existence of publication bias (i.e. an asymmetrical distribution of samples).

Egger's Regression ($P_v = 0.22$) and Begg & Mazumdar's Test (tau = 0.16, $P_z = 0.392$).

Anxious and conscientiousness

Visual analysis of the current plot suggested the existence of publication bias (i.e. an asymmetrical distribution of samples).

Egger's Regression ($P_v = 0.68$) and Begg & Mazumdar's Test (tau = 0.01, $P_z = 0.964$).

Anxious and extroversion

Visual analysis of the current plot suggested the existence of publication bias (i.e. an asymmetrical distribution of samples).

Egger's Regression ($P_v = 0.41$) and Begg & Mazumdar's Test (tau = -0.18, $P_z = 0.347$).

Anxious and neuroticism

Visual analysis of the current plot suggested the existence of publication bias (i.e. an asymmetrical distribution of samples).

Egger's Regression ($P_v = 0.79$) and Begg & Mazumdar's Test (tau = -0.01, $P_z = 0.955$).

Anxious and openness

Visual analysis of the current plot suggested the existence of publication bias (i.e. an asymmetrical distribution of samples).

Egger's Regression ($P_v = 0.80$) and Begg & Mazumdar's Test (tau = -0.13, $P_z = 0.499$).

Avoidant and agreeableness

Visual analysis of the current plot suggested the existence of publication bias (i.e. an asymmetrical distribution of samples).

Egger's Regression ($P_v = 0.50$) and Begg & Mazumdar's Test (tau = 0.01, $P_z = 0.964$).

Avoidant and conscientiousness

Visual analysis of the current plot suggested the existence of publication bias (i.e. an asymmetrical distribution of samples).

Egger's Regression ($P_v = 0.49$) and Begg & Mazumdar's Test (tau = -0.13, $P_z = 0.499$).

Avoidant and extroversion

Visual analysis of the current plot suggested the existence of publication bias (i.e. an asymmetrical distribution of samples).

Egger's Regression ($P_v = 0.92$) and Begg & Mazumdar's Test (tau = 0.14, $P_z = 0.444$).

Avoidant and neuroticism

Visual analysis of the current plot suggested the existence of publication bias (i.e. an asymmetrical distribution of samples).

Egger's Regression ($P_v = 0.19$) and Begg & Mazumdar's Test (tau = -0.09, $P_z = 0.526$).

Avoidant and openness

Visual analysis of the current plot suggested the existence of publication bias (i.e. an asymmetrical distribution of samples).

Egger's Regression ($P_v = 0.48$) and Begg & Mazumdar's Test (tau = -0.14, $P_z = 0.444$).

Visual analysis of the above plots suggested the existence of a publication bias (i.e. an asymmetrical distribution of samples). In order to research this conclusion further two statistical tests were preformed (Egger's Regression, Begg & Mazumdar's Test) both in all cases were insignificant, thus no evidence of asymmetry was provided, this finding contradict the former.

I addressed this contradiction (asymmetry that was identified by funnel-plots but not through the statistical tests) as follows:

Since statistical tests used for funnel plot asymmetry are typically considered to have low power, bias in the results of these tests cannot be excluded (Sterne at el, 2011).

In addition, the quality assessment showed high risk for different biases, these biases could also lead to a funnel plot asymmetry (Deeks at el., 2019). Since each bias could have a different impact on the data, one cannot determine how strong this effect had been, if at all. More so, high levels of heterogeneity were discovered in each of the ten analyses (see Table 3). High levels of heterogeneity are known to be capable of leading to a funnel plot asymmetry (Deeks at el., 2019a). Though here again it is impossible to know what is the exact size of this effect.

To conclude, due to all of the above and based on the data expressed in the funnel plots, it seems that there is a high chance of a publication bias. Though it is unclear how the high levels of heterogeneity and other biases impact this bias, if at all.

Discussion

The current meta-analysis aimed to review the academic literature exploring the relationship between personality and attachment, and to analyse the relationship between these two constructs. Generally, the lack of available data and its low quality all lead to the conclusion that the relationship between personality and attachment was not thoroughly scrutinised in the literature.

Regarding the findings themselves, it was shown that the most common method for assessing personality was the Big 5 model. The most common method to assess attachment was to assess for anxious and avoidant attachment styles. Secure attachment style was found to have a weak to strong and positive correlation with Extraversion, and a moderate negative correlation with Neuroticism. In addition it had weak and positive correlations with the rest of the personality traits. Anxious attachment style was found to have a moderate and positive correlation with Neuroticism, and a weak negative correlation with the rest of the personality traits. Finally, avoidant attachment was found to have a weak positive correlation with Neuroticism, and a weak and negative correlation the rest of the personality traits..

Heterogeneity (I^2) was high in most analyses we made, meaning that the effect size varies substantively across the studies. It was therefore impossible to discuss specific effects and instead we considered their confidence intervals (CI's). Few of these CI's are extremely wide (Secure vs. Neurotic -0.49 to -0.12; Secure vs. Extroversion 0.19 to 0.55), and so it is hard to conceive an accurate picture of how strong the effect actually is. Possible reasons for this heterogeneity could range from interpersonal differences to different methodological issues (e.g. randomization, publication bias).

Attachment styles and personality traits both indicate potential behavioural patterns and possible strengths and limitation, and are representative of the emotional resources

available to an individual when facing life challenges. Attachment theory states that individuals learn their emotion regulation strategies and skills through the attachment relationships they experience during their development (Bowlby, 1982; DeKlyen & Greenberg, 2008). Facing distress, the individual will rely on these strategies and skills to regulate their behaviours, thoughts, and emotions (Pascuzzo, Moss & Cyr, 2015). Individuals with different attachment style responds to distress with associated strategies: Anxiously attached individuals tend to use hyper-activating strategies such as exaggeration of threats, over-dependence, and hyper-vigilance (Mikulincer & Florian, 1995; Mikulincer & Shaver, 2007, 2008).

Avoidantly attached individuals tend to use de-activating strategies such as denial of emotion-related thoughts and information, as well as suppression of emotional expressivity (Kobak et al., 1993).

The findings may shed light on why Anxiously attached individuals use hyper-activating strategies. We have seen evidence that Neuroticism is the most dominant personality trait for this attachment style, and that other personality traits have only minor correlation with it. It is natural for the individual to display neurotic tendencies, becoming hypervigilant and exaggerating threats. In addition, since anxiety could dominate their experience, it is easier to become dependent on others to help with emotional regulation. Relying on these strategies may intensify negative effects such as stress, anger, and helplessness, and can increase the risks of depression, anxiety and other psychopathologies (Cantazaro & Wei, 2010; Hankin & Abramson, 2001; Lopez et al., 2001).

This line of thought is supported by previous research emphasising how attachment-related anxiety and Neuroticism might tap into a similar biological system – one which is sensitive to the experience of aversive and/or negative emotions such as anxiety and fear

(Clark & Watson, 1999; Crawford et al., 2007; Watson & Clark, 1984; Watson, Wiese, Vaidya, & Tellegen, 1999).

Similarly, it may be understood why avoidantly attached individuals use de-activating strategies such as denial of emotion and suppression of its expression. Our evidence suggests that no personality trait is dominant in avoidantly attached individuals. Neuroticism is weakly positively correlated, while Agreeableness and Extroversion have negative and weak correlations. Thus, in times of stress due to the positive correlation with Neuroticism a hyper-activation response might present; this should not be as dominant as with Anxious attachment. In addition, due to the small negative correlations of the other personality traits, individuals might be inclined to respond in a non-Extrovert way (e.g. with suppressing their emotions, or a quieter emotional expression) or in a non-Agreeable way (e.g. with social distance).

Although such emotional avoidance strategies (i.e. denial of emotional states and inhibition of emotional expressivity) may in the short term be adaptive, in the long term, since negative emotions are not explicitly communicated and are deprived accurate evaluation, they can contribute to a range of psychopathologies such as: anxiety disorders, eating disorders, and even antisocial behaviour (Rosenstein & Horowitz, 1996; van Emmichoven et al, 2003; Ward et al, 2001).

This line of thought is supported by previous research that emphasised that attachment-related avoidance and Extroversion tap into biologically based differences in the willingness to seek out rewards from social situations and to approach situations (Depue & Collins, 1999; Lucas, Diener, Grob, Suh, & Shao, 2000; Watson & Clark, 1984b; Watson et al., 1999b).

In addition, based on this evidence it can be understood why research has constantly suggested that Securely attached individuals tend to cope better during times of stress (Arend,

Gove & Sroufe, 1979; Matas, Arend & Sroufe, 1978; Sroufe, Fox & Pancake, 1983; Weinfield, 1999). Unlike individuals with insecure attachment styles, securely attached individuals will tend not to respond to life stressors with hyper-activation or de-activation of their emotional schemata and internal working models (Mikulincer & Shaver, 2012). They therefore have a reduced the chance of reacting disproportionally and negatively to life stresses.

All of the above gives support to the bio-psycho-social model, an expression of how temperamental characteristics, personality traits, attachment internal working models, social context and life events interact over the course of development in gene-person-environment transactions to underpin and reinforce our behavior (Caspi & Shiner, 2006; Scarr & McCartney, 1983).

An interesting insight from our analysis is that Openness-to-Experience is not associated with any attachment style, since it was found to have insignificant or small correlations with all attachment styles. Openness-to-Experience is an aspect of personality that influences how receptive a person is towards various experiences of both internal and external origin (Goldberg, 1993; McCrae & John, 1992). Thus, while Openness-to-Experience is a fairly reliable dimension of personality in the Big Five Model, it has little or no connection with traits that constitute our attachment style.

Nevertheless, our findings can help understand better the relationship between attachment style, Openness to experience, and social functioning. Bakker (2014) pointed out that immigrants with anxious attachment style experienced greater hardships trying to socially adjust to their new culture than immigrants who were considered to be Securely attached. A possible explanation for this may be found in the interaction between Openness to Experience personality trait and anxious attachment style. Openness to experience refers to

the level of engagement the individual has with their experience (Goldberg, 1993b; McCrae & John, 1992b). Following the above, a person who tends to possess behaviors and personality traits that typically characterise anxious attachment style (such as Neuroticism or hyper-vigilance) also has tendency to form a catastrophic interpretation of their experiences, especially in a social relationship context (which is the focus of attachment theory). Such a person would be likely to have difficulty adjusting to new social behaviours and relationships, especially in a new and unfamiliar environment. It seemed that in times of stress (i.e. immigration) anxious attachment style limits the capability of the individual to be really open to their experience, hence immigrants with anxious attachment style tend to less socially assimilate, and keep themselves among the familiar and similar origin cultural groups.

Another interesting insight from this study is that our meta-analysis identified a publication bias, specifically a positive-results bias. This bias occurs when authors were more likely to submit, or editors were more likely to accept, positive results than negative or inconclusive ones (Sackett, 1979).

This could put ours and all other findings reviewed for this study in a different light, although we cannot know the size and form of this impact. In addition, our study detected a potential risk of bias around the sampling method of the studies we reviewed, since most of them used convenience sampling. Most of the studies we reviewed were correlational studies, conducted as surveys with university students. The samples used were therefore quite homogenic, which could hurt the validity of their findings since we can never be sure how well they reflect the situation in the general population.

Limitations and future research

Our quality assessment found number of different potential biases, specifically publication and sampling biases. The data that our analysis and results are based upon might therefore be inaccurate or unrepresentative. Future research should always aspire to generate more methodologically strict studies.

Finally, most of the research that we examined did not explore secure attachment, but rather focused on attachment styles that are considered maladaptive. Psychological research has previously been criticized for focusing too much on psychopathology and abnormal emotional processes, rather than on the broader human experience which could be considered in part adaptive and in part maladaptive (Seligman, Rashid & Parks, 2006; White, Uttl & Holder, 2019).

Unlike the five personality traits that include some adaptive and some maladaptive traits, the focus on insecure/maladaptive attachment styles in attachment research cannot cover all aspects of the attachment phenomena. One could say that participants with low marks on both insecure attachment styles could be considered as Securely attached, and that existing research might therefore be sufficient. This approach, in the opinion of the author of this study, is insufficient. Is secure attachment an attachment style on its own right, or is it the lack of insecure attachment styles? Or in a broader sense, is mental well-being a lack of ill symptoms/emotional difficulties, or is it a defined (and definable) condition with its own merit? According to Seligman (2006b) and White (2019b) it is the latter, rather than the former, but research is yet to answer these questions firmly.

Future research should therefore study secure attachment in more depth. This could help attain a broader perspective on attachment, and the nature of the relationship between attachment styles and personality traits.

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Part 2: Empirical paper,

Predictors of Loneliness

Abstract

Aims: Loneliness is a major problem both worldwide and domestically. Multiple causal pathways can lead to social isolation and loneliness across the lifespan. This study aimed to explore the relationship between loneliness and the social and personal factors that promote it (such as Interpersonal problems, insecure attachment styles and shame) and potential remedial factors (compassion to and from others, and self-compassion). It was hypothesised that external shame and self-compassion would be even better predictors of loneliness than attachment style and interpersonal problems.

Methods: A sample made of mainly educated women from three different countries (n = 92) were recruited via social media and asked to complete an online survey that examined loneliness, attachment style, problematic interpersonal behaviour patterns, external and internal shame, and compassion (self-compassion and compassion to and from others). We conducted a hierarchical regression analysis to compare two models predicting loneliness. The first model included attachment style and interpersonal behaviour patterns, while the second model added two additional variables, shame (external shame) and compassion (self-compassion). Secondly, we conducted a relative importance analysis with all covariates.

Results: Attachment style and interpersonal problems explained 27% of the variance., adding in external shame and self-compassion to model 2 explained an additional 4% (R^2 change = 0.0515 $p<0.001$). Relative importance analysis indicated that internal shame and compassion from others were the strongest predictors of loneliness, while the relative contributions of all variables to the model total explanatory value was 47% of the variance.

Conclusions: Internal shame was found to be the strongest predictor of loneliness. A negative image of the self appears to promote social seclusion more than any other social or

emotional factor. In addition, unlike most previous literature's findings, self-compassion was not found to be a good predictor of loneliness with compassion from others being a more important predictor. Suggestions for future research and the limitations of the current research are discussed.

Introduction

In recent years loneliness has been recognised as a significant problem worldwide. A UK survey (British Red Cross Society, 2016) found that across adults of all ages, nine million people in the UK are often, or always, alone.

Similarly, research in the USA (Anderson & Oscar, 2010) found that a third of Americans above the age of 45 feel lonely. In addition, this study pointed out that people suffering from different mental illnesses have experience of loneliness in common. Two recent meta-analyses (Holt-Lunstad, 2015; Rico-Uribe, 2018) have suggested loneliness could lead to a major deterioration of mental and physical health and that it is associated with a range of negative mental and physical conditions. It has also been found to increase the risk of depression, cognitive decline and dementia (Global Council on Brain Health, 2017). Research views loneliness as a burden on our emotional life and distinguishes between two forms: emotional and social (Weiss, 1973). Emotional loneliness results from a lack of close attachment relationships (characterized by close and emotional bonds). Social loneliness arises from a limited social network.

Both emotional and social loneliness are dependent on the quantity and quality of our relationships, and what happens when we feel a lack in one of these areas. Although emotional and social loneliness seem similar there are subtle differences between them. Weiss (1994) argued that friendships rarely compensate for a lack of attachment relationships, since these often offer intimate and emotional bonds, and, without them, we will feel emotional loneliness.

Emphasising these differences further, it was shown that people who had experienced the recent death of a loved one could still feel lonely, despite admitting that they had a big, supportive social network. Similarly, people who said that they had a strong and loving

romantic relationship could still feel lonely when they moved into a new area and away from their supportive social network (Weiss, 1973).

Looking further into loneliness, it was suggested that it could be influenced by a range of external and internal factors rooted in the interaction between society and the individual. Shame, as a reaction to a potential or concrete social rejection, could promote social seclusion, and, by extension, loneliness (Mereish & Poteat, 2016).

In addition, problematic social interaction patterns can lead to a social seclusion and therefore loneliness (Jordan, 2009). Under this framework, insecure attachment styles limit the capabilities to engage in meaningful social relationships, and by that can result in loneliness (Tommaso, Brannen-McNulty, Ross & Burgess, 2003).

Finally, compassion and especially self-compassion due to its potential remedial effects on shame, can have a positive impact on social seclusion and loneliness (Akin, 2010).

To conclude, loneliness is a phenomenon that is influenced by different aspects of our emotional lives (e.g. attachment, shame) and our social lives (e.g. interpersonal relationships), the following parts will try to show the relationship between these different aspects to loneliness in more detail.

Attachment

Attachment theory argues that infants have an innate system that motivates them to seek proximity to a carer in order to survive (Bowlby, 1958). In addition, it suggests that carers have an innate system that motivates them to give care, i.e. to provide protection and support to those who are in need, either chronically or temporarily (Bowlby, 1975). By 'care giving', Bowlby refers to a range of behaviours which aim to respond to another person's signals of needs (which are expressed through their attachment style).

A key feature of the attachment system is its complementary fashion of care giving and receiving of care. Thus, in the context of the parent-child relationship, signals of increased security from the child should reduce the parent's caregiving behaviours. To that end the aims of both these attachment systems (care giving and care receiving ones) are similar: to help reduce the infant's stress (Mikulincer & Shaver, 2005).

Based on the quality and availability of carers' responses, infants and adults develop their 'working models of attachment' (Bowlby, 1958). These models are sets of expectations and beliefs about the self, others, and the relationship between the self and others, which are based on the accumulated experience of different relationships between care givers and care-seekers. These, in turn, inform the infant's or adult's beliefs in and expectations from relationships (Van Buren & Cooley, 2002), what care they expect to give and to receive, and what a lack or existence of this care signifies about the relationships and themselves.
In the ideal development process, children around the age of adolescence relinquish their parents as attachment figures and form attachment bonds with their peers. Later in adulthood people tend to form these attachment bonds in romantic relationships and long-term friendships (Bartholomew, 1993; Marshall, 1989; Smallbone & Dadds, 1998).

According to attachment theorists, children who experience early caregiving relationships as negative (i.e. unpredictable, harsh, and/or negligent) will likely develop an internal working model where others are expected to be cruel, dismissive and unreliable and a view of themselves as unlovable or not having personal qualities that other people will find attractive. (Bowlby, 1975). Negative working models can foster anxious or avoidant patterns of behaviour, which in turn could lead to a development and perpetuation of insecure attachment styles that can last their whole lifetime (Mikulincer & Shaver, 2001).

From all of the above it may be derived that social relationships (especially if characterised by a close and emotional bond) are vital for a more adaptive development of our inner working models, which in later life forms the basis of our attachment styles. The inverse is also true. Since good social relationships are vital for a more adaptive development, loneliness (a lack of good relationships in quantity and quality) can hamper its development and promote the formation of negative inner working models that could lead to insecure attachment styles, and negative emotional states. Research supports these assumptions and shows positive correlations between insecure attachment and loneliness, and between secure attachment and satisfying social relationships and skills (DiTommaso at el., 2003; Erozkan, 2011; Hazan & Shaver 1987).

Moreover, extreme loneliness (a lack of sense of belonging/connectedness) can have a large negative impact on our well-being, and was shown to be a strong predictor of negative mental health conditions such as depression and anxiety (Baumeister & Leary, 1995; Chipuer, 2001; Hagerty & Williams, 1999), even when controlling for environmental factors (Sargent at el. 2001).

Attachment style is a way to describe the quality of the emotional bond between the individual and the main figures in their life. But what happens when the individual loses the love and attention of the other? Or believe that they are about to lose it through their own fault? Such a dynamic could give rise to shame, which in turn could potentially disturb their whole emotional and social life.

Shame

Certain theories of shame (Bowlby, 1969; Gilbert, 1992, 1997, 1998, 2003; Kohut, 1977; Vincent, 1903) see shame as being conceived from the experience of the self in the mind of the other.

The knowledge that others value us creates a sense of security in our social life (Gilbert, 1989, 1997a, 2005). The notion that we exist positively in the mind of others contributes to a positive sense of self (Leary, 1995).

We seek to be liked, desired and seen as competent by our social peers and want them in return to choose to invest in our relationship with them for their better self-interests (Etcoff, 1999; Gilbert, 1997a, 2002, 2003a).

Shame is therefore linked to the loss (or threatened loss) of the ability to create desirable images in the mind of the other, which might result in the other rejecting the self (Gilbert, 1998a).

It is common (Gilbert, 1997a, 1998b, 2002a, 2003b, 2007) to make a distinction between two types of shame. External shame relates to the way our evaluation and attention are attuned externally, to what we appreciate exists in the minds of others about us. Internal shame relates to the way our evaluation and attention are attuned inwardly, to our perceptions and feelings. Nonetheless, this inner evaluation is still very heavily contextualized by social definitions of what is attractive and desirable (Irons & Gilbert, 2005). Thus, internal shame is underpinned by a perception that the self is unattractive to others, and not just by failing to reach internal standards (Gilbert, 1992a, 1997b, 2002b).

Shame is such a powerful feeling that shame memories alone (e.g. from childhood and adolescence) can function as traumatic memories in adulthood, with similar symptoms to PTSD, such as intrusions, avoidance, and hyper-arousal (Matos and Pinto-Gouveia, 2009).

In addition, shame memories were found to have such a profound influence on the individual that they can become central to one's identity and narrative (Pinto-Gouveia & Matos, 2010), and recorded as self-defining memories in the self-memory system (Conway, 2005; Conway & Pleydell-Pearce, 2000; Matos, Pinto-Gouveia, & Gilbert, 2013; Singer & Salovey, 1993). Following attachment theory, these self-defining shame memories could facilitate negative internal working models of the self (i.e. the individual feels unworthy and/or undesirable) and others (i.e. others could be depicted as threatening to the point that they might criticize, reject and even harm the individual). These in turn can underpin the individual's emotional and social responses to negative self-defining events (Baldwin & Dandeneau, 2005).

Shame was found to be associated with contradictory maladaptive interpersonal responses. On the one hand, shame is associated with hostile deeds such as aggressive behaviour (Gilbert, 1997c, 2003c; Gilligan, 2003; Tangney & Dearing, 2002). On the other hand, shame is associated with passive behaviours such as social withdrawal, avoidance, social isolation and loneliness (Haidt, 2003; Keltner & Harker, 1998; Lewis, 1971, 1992; Tangney, 1991).

Shame (internal and external) is highly affected by social factors. As a result, social isolation can be viewed as a potential coping strategy: it promotes detachment from social norms or the events that encourage shame to arise in the first place, and thus potentially reduces the shame. However, shame promotes social seclusion and loneliness (Gilbert, 1998c) as well. This in turn can add a secondary risk factor to the emotional pain, since two recent meta-analyses (Holt-Lunstad, 2015; Rico-Uribe at el., 2018) have found loneliness to cause great deterioration of mental and physical health and promote a range of negative mental and physical conditions.

Thus, the individual could be locked in a negative cycle of shame and maladaptive responses (e.g. hostile behaviour, social seclusion) where each reinforces and enhances the other.

Compassion

Compassion is defined as 'a sensitivity to suffering in self and others, with a commitment to try to alleviate and prevent it' (Gilbert, 2014, p.1). This definition contains two aspects**.** The first involves the motives and ability to notice and engage with suffering in self and others, rather than avoid or deny it. The second involves the capability to do something about it (Germer & Siegel, 2012).

Compassion was initially researched as a means of overcoming obstacles in therapy, and specifically negative feelings such as high shame and self-criticism that targeted the self and prevented progress in therapy even when patients were fully engaged (Gilbert, 2000, 2010). Such patients struggled to generate positive self-referring inner working models, and this seemed to prevent them from positive progress in therapy (Bulmarsh et al. 2009; Rector et al. 2000)

More specifically, early negative life events can lead to an over-sensitisation of the threat system and to the development of negative emotional memories. These in turn could lead to maladaptive inner working models, and weak emotional regulation skills. Those could promote a tendency for threat detection and protection that, if persistent enough, could institute negative core-beliefs through which the individual perceives and interprets their world and experience (Gilbert, 2002).

Compassion Focused Therapy emphasises that the tendency for threat detection and protection can be facilitated through the operation of conditioned emotional memories and

maladaptive beliefs, as well as being a result of rumination and worry (Brewin, 2006; Rosen & Schulkin, 1998). The impact of rumination and worry is that they act as constant internal stimulators of the threat system (Fisher & Wells, 2009; Wells, 2000). While Gilbert (2002) emphasised a more psycho-developmental view when considering negative emotional experiences and memories (i.e. their contribution to the emergence of maladaptive internal working models that could lead to, and maintain, a psychopathology), Fisher and Wells (2009) emphasised the role of these experiences and memories on the aetiology of an emotional psychopathology (i.e. serve as internal stimulators that can trigger, enhance and reinforce psychopathology) regardless of their potential developmental impact.

Constant hyperactivity in the threat system is correlated with maladaptive/negative inner-working models and high self-criticism. High self-criticism and constant hyperactivity in the threat system both correlated with social isolation behaviour, and in extreme cases could lead to complete social avoidance and even social anxiety/phobia.

The evidence shows that compassion is a very powerful agent that can decrease self-criticism, encourage revision in maladaptive core-beliefs/working models, and reduce behaviours that were consistent with such traits like social isolation, and loneliness (Gilbert, 2010).

The reason for compassion being such a strong facilitator of positive change is hypothesised to be rooted in our physical and emotional development, as individuals and social beings. Successful development requires strategies for survival and reproduction. These can cover harm avoidance, attracting potential mates, caring for offspring, and engaging with group variation. Some of these strategies (e.g. care for offspring, social relationships) require dynamic and reciprocal interactions through coordinated social communications.

Thus, if a parent and a child repeatedly fail to respond well to each other's social cues, the course of the child's development (emotional and physical) will be hindered.

The evidence we have so far supports these ideas, as we know that attachment, emotional investment, and care all evolved as part of a wider repertoire of reproductive strategies in mammals (Geary, 2000; Martin, 2016) facilitated by a range of physiological processes where the parent and infant co-regulate each other (Hofer, 1994; Mayseless, 2016).

Compassion stemmed from the above since it is rooted in caring behaviour, but with one major addition: the ability to direct caring behaviour in new directions (Gilbert, 2017).

As research developed, compassion was being recognised to flow in three directions: first, compassion we feel for others; second, compassion we feel from others to ourselves; and finally, compassion we feel towards ourselves, aka self-compassion (Leaviss & Uttley, 2015).

These different orientations of compassion are inter-related. It was shown (Hermanto & Zuroff, 2016) that high caregiving with high ability to receive care indicated high self-compassion, while high caregiving with low careseeking indicated low self-compassion.

In addition, it seemed that being open to compassion from others protects against the negative effect self-criticism has on depression (Hermanto at el., 2016). Following this, it was shown (Gilbert et al., 2011) that the fear of receiving compassion from others was strongly associated with resistance to being self-compassionate, but was not associated with being compassionate to others.

Hence, in order to understand compassion, we need to consider its social aspects as well as our experience of compassion, on the giving and the receiving, care-seeking and care-giving (Hermanto & Zuroff, 2016).

A thorough meta-analysis by Macbeth & Gumley (2012) emphasised that although several models of compassion exist, they all propose a negative relationship between

compassion and psychopathology. It reported a large effect size for the relationship between compassion and psychopathology (depression, anxiety and stress), with high levels of compassion associated with lower levels of psychopathology.

Self-compassion was found to be correlated with symptom severity and quality of life (Van Dam et al., 2011), wellbeing (Neff et al., 2007; Neely et al., 2009), maternal support, and family functioning (Neff & McGehee, 2010). An increase in self-compassion was found to be correlated with a decrease in psychiatric symptoms, interpersonal problems, and social isolation (Schanche et al., 2011). These positive effects might be rooted in the positive impact compassion has on feelings of shame, guilt and self-criticism that were all correlated greatly with psychopathology and loneliness (Gilbert, 1992; Gilbert at el., 2007; Dearing & Tangney, 2011).

These negative feelings promote two main challenges for people's wellbeing**.** Firstly, they promote loneliness, since our emotional systems evolved to be regulated through social relationships with others that we feel connected to; people that suffer from psychopathologies are often socially isolated (Gilbert, 2017). Secondly, shame and self-criticism can stimulate physiological systems related to threat at the expense of those related to soothing and caring (Gilbert, 2010).

Social isolation can potentially have a detrimental impact on a range of emotional and cognitive functions, on emotional development, and ultimately on wellbeing. Social interaction on its own is not enough to prevent loneliness. Intimate and close bonds are essential and cannot be replaced with shallow social relationships. Social isolation and loneliness can be promoted by insecure attachment styles, criticism and shame. These can create problematic patterns of social interaction, to the point of complete avoidance. Compassion (in its different orientations) can help coping with feelings of criticism and

shame, and their derivatives, such as social isolation and loneliness. The development of Compassion is impacted by social interaction, or lack thereof, and how compassion can potentially serve as a remedy for the negative effects of social isolation and loneliness.

To conclude, loneliness is a phenomenon that arises from a lack of meaningful social relationships. From all of the above it seems that compassion (specifically self-compassion) and shame (specifically external shame) both have a great impact on loneliness. This study set out to examine how strong this impact is, beyond the more accepted factor for loneliness of maladaptive social patterns (i.e. insecure attachment, and interpersonal problems). In addition, this work sought to gain a wider perspective on the factors that influence loneliness by measuring their relative contribution to this phenomenon. From the issues covered in the introduction to this work, it can be assumed that insecure attachment styles, external shame and self-compassion could all have a strong contribution to this phenomenon.
Therefore this study aimed to determine:

1) To what extent do attachment style and interpersonal problems predict loneliness?
2) To what extent do external shame and self-compassion predict loneliness after controlling for attachment style and interpersonal problems?
3) What could be the relative importance of a broad range of psychological variables on loneliness (including additional dimensions of shame and compassion)? Where it is predicted that attachment avoidance, attachment anxiety, external shame and self-com passion will be the most important variables.

Methods

Participants

Participants were adults aged 18 upwards with no known psychiatric diagnosis (known psychiatric diagnoses were excluded in order to prevent an error of the measurement due to intervening variables such as psychopathologies). All participants were recruited using a convenience sampling method through social media, and required to have a command of English sufficient to complete the questionnaires and to be able to give informed consent.

Data from 92 participants were included in the analysis. 73% were between 18-49, about 79% defined themselves as white, and 69% defined themselves as females. 59% were married and 31% were single. 77% had an academic degree (21% BA, 37% MS.C, 19% Ph.D), and 41% had a professional occupation. 50% lived in the U.K., 30% lived in the U.S.A, and 20% lived in Israel. For full details please see Table 1.

Table 1, *demographic data of participants*

Area	Category	Percentage
Age group	18-29	23.60%
	30-39	23.60%
	40-49	27%
	50-59	12.40%
	60-69	10.10%
	70-79	1.10%
	80-89	2.20%
Ethnic group	Any mix race	6.70%
	Black Caribbean	1.10%
	Chinese	4.50%
	Indian	1.10%
	White and Asian	2.20%
	White Irish	2.20%
	White	76.40%
	Declined to respond	5.60%

Gender	Female	68.50%
	Male	31.50%
Marital status	Divorced	6.70%
	Married	58.40%
	Single	30.30%
	Widowed	2.20%
	Declined to respond	2.20%
Education	A levels/AST/Bagrot/Baccalurial	5.60%
	B.A./B.Sc and equiivalent qualification	21.30%
	M.A/M.Sc and equivalent qualification	37.10%
	P.hD/Doctorate and equivalent qualification	19.10%
	Professional qualification	13.50%
	Declined to respond	3.40%
Occupation	Administrative and secretarial Occupations	2.20%
	Associate professional and Technical Occupations	2.20%
	Caring, Leisure and other	3.40%
	Elementary Occupations	2.20%
	Managers, Directors and Senior Officials	15.70%
	Other	16.90%
	Prefer not to say	1.10%
	Professional Occupations	41.60%
	Retired	7.90%
	Other	4.50%
	Declined to respond	2.20%
Place of residence	Israel	20.20%
	The U.K.	49.40%
	The U.S.A	30.30%

Procedure

Ethical approval was granted by the University College London Ethics Committee. The questionnaires pack was hosted online at qualtrics.com. People who showed interest in the research received a link to the study webpages. Participants who met the inclusion criteria

were given the information sheet and asked to complete the consent form. If they completed the consent form they could start completing the study pack containing the questionnaires. See Appendix C for the full material. The data on qualtrics.com and the final derived dataset were fully encrypted.

Measures

The following measures were used:

The Compassionate Engagement and Action Scales (Gilbert et al, 2017). This questionnaire examines self-compassion, compassion from others, and compassion towards others. The questionnaire measures awareness of when self and others are suffering, and willingness to help in such cases. The subscales assess Engagement (being sensitive and empathetic towards others suffering) and Actions (taking appropriate actions to prevent/elevate suffering). Gilbert et al. (2017) reported internal consistencies that ranged between fair and excellent, with all of the scales' Cronbach's alpha values between 0.89 and 0.91, except for the self-compassion Engagement scale, where Cronbach's alpha value was 0.77. Gilbert et al further reported correlations with measures predicted to relate to compassion, which provides some initial evidence for construct validity for The Compassionate Engagement and Action Scales.

Inventory of Interpersonal Problems 32 (IIP-32; Horowitz, Alden & Wiggins, et al., 2000). The IIP-32 is a shortened version of the Inventory of Interpersonal Problems (Horowitz et al., 2000). It contains 32 self-report items which measure difficulties in interpersonal relationships. Items are scored on a five-point scale ranging from 0 (not at all) to 4 (extremely). Across two clinical samples (McEvoy et al, 2014; Mackintosh et al, 2018), Cronbach's alpha was found to be 0.88 and 0.82 respectively.

The Experiences in Close Relationships-Revised (ECR-R; Fraley et al. 2000). This is a 36-item self-report measure of adult romantic attachment using two subscales: anxious-attachment (fear of abandonment and rejection) and avoidance-attachment (fear of closeness and discomfort with dependence on others). Items are scored on a seven-point Likert scale ranging from 1 (disagree strongly) to 7 (agree strongly) regarding how accurately each item describes the respondent's experience of close relationships. Good internal consistency was reported (Raque-Bogdan et al., 2011; Mackintosh at. el., 2018) for both subscales with Cronbach's alpha of 0.92 and 0.78 for the avoidance subscale, and 0.94 and 0.91 for the anxiety subscale.

External and Internal Shame Scale (Ramos, Ferreira, Matos & Galhardo, 2016). This is a 16-item self-report measure of internal and external shame. Respondants are asked to rate how they feel in relation to several aspects of their life on a five-point scale ranging from 'never' to 'always'. The EISS psychometrics scores showed good performance (Ferreira, Moura-Ramos, Matos & Galhard, 2020) where: factor analysis scores revealed good fit to the data $X^2_{(19)}$=126.73; p<0.01. Inter-reliability revealed good scores with a total scale Cronbach's alpha of 0.89. Relation with other relevant measures was strong and significant (r=0.56, p<0.001).

The UCLA Loneliness Scale (Russell,1996). The UCLA Loneliness Scale (Version 3) was originally developed to evaluate loneliness (Russell, 1996) and has been widely used since then. It consists of 20 items (nine positively worded and eleven negatively worded) rated on a four-point Likert scale ranging from 'never' to 'always' (thus, higher scores indicate greater loneliness). The internal consistencies were found to range between 0.89 and

0.94. Test-retest reliability (one-year period) was 0.73.

The scale showed satisfactory concurrent validity when it was measured against other loneliness measures (NYU Loneliness Scale, the Differential Loneliness Scale).

The full questionnaire is contained in the appendix (appendix B2).

Analysis

All analyses were carried out using R with the Performance package (Viechtbauer, 2010) In order to investigate the relationship between the different constructs a hierarchal regression was conducted, based on two models. The first model included attachment style and Interpersonal behavior patterns, while the second model further included external shame and self-compassion. A relative importance analysis was conducted between all of the study's variables and subscales, apart from the IIP 32 subscales.

Results

Descriptive statistics

The means and standard deviations for attachment and shame are similar to previous studies (Ferreira, Moura-Ramos, Matos & Galhardo, 2020; Wei , Russell, Mallinckrodt & Vogel, 2007). Despite this, the means and standard deviations for compassion, loneliness and interpersonal problems were different from previous studies (Horowitz at el., 1988; Gilbert at el., 2017; Russell, 1996;). For the full details please see Table 2.

Table 2. *Comparison of Means and standard deviations between current and past work*

Similarity	Measure		Current study	Previous studies
Similar	*Attachment*[3]	Anxious[3]	20.68 (6.21)	22.33 (7.01)
		Avoidant[3]	14.97 (6.70)	15.52 (6.53)
	Shame[2]		1.29 (0.65)	1.24 (0.93)
Different	*Compassion*[1]	Comp to others[1]	75.1 (12.89)	35.78 (8.26)
		Comp from others[1]	58.93 (15.96)	29.74 (8.76)
		Self comp[1]	67.61 (13.96)	24.91 (6.90)
	Loneliness[5]		49.28 (4.92)	33.73 (7.76)
	Interpersonal problems[4]		40.04 (17.70)	1.42 (0.56)

Similar – similar to past work; Different – different from past work. Comp to other – compassion to others; Comp from others – compassion from others; Self comp – self compassion. Attachment – ECR; Shame – EISS; Compassion - Compassionate engagement and action scales; Loneliness – UCLA Loneliness scale; Interpersonal problems – IIP 32. Superscript refers to: [1] Compassionate Engagement and Action Scales (Gilbert at el., 2017); [2] EISS (Ferreira at el., 2020); [3] ECR (Brennan, Shaver & Shaver, 1998); [4] IIP 32 (Barkham, Hardy & Startup, 1996); [5] UCLA loneliness scale (Russell, 2010)

For inter-correlations, means, and standard deviations for the all study variables please see Table 3 *(all results presented after a Bonferroni correction)*. Most inter-correlations ranged between 0.3 to 0.8, thus keeping acceptable levels of inter-reliability and multicollinearity. Very low or very high levels of multicollinearity (<.3, >.8) means that variables measure phenomena that are either too close or too different, hence it is recommended to remove these variables. Except for one of variable (EISS) none of the other variables in the study fell out of the range <.3 to >.8, thus all variables were left in the study. Despite its very low inter-

correlations the EISS was not omitted, since the data supplied (e.g. measuring shame) was essential for the study.

Table 3. *Means, standard deviations among the study variables (all results presented after a Bonferroni correction)*

	M	S.D.	1	2	3	4	5	6	7	8
1. UCLA Loneliness Scale	49.28	4.927	1	0.715	0.435	0.479	0.398	-0.485	-0.111	-0.473
2. EISS	1.296	0.6518		1	0.55	0.505	0.435	-0.416	-0.158	-0.675
3. IIP 32	40.04	17.703			1	0.403	0.263	-0.179	-0.165	-0.475
4. ECR Anxious	20.68	6.212				1	0.377	-0.304	-0.014	-0.378
5. ECR Avoidance	14.97	6.706					1	-0.426	-0.269	-0.354
6. Compassion from	58.93	15.963						1	0.175	0.228
7. Compassion to	75.1	12.892							1	0.281
8. Self-compassion	67.61	13.96								1

EISS – External Internal Shame Scale; IIP 32 – Inventory of Interpersonal Problems; ECR Anxious – Experience in Close Relationships Anxious scale; ECR Avoidance – Experience in Close Relationships Avoidance Scale; Compassion from – Compassion and Engagement Scales, Compassion from others; Compassion to – Compassion and Engagement Scales, Compassion to others; Self-compassion – Compassion and Engagement Scales, Self-compassion.

Outliers

Three participants were removed as outliers based on a composite outlier score (see the ’check_outliers’ function in the ’performance’ R package; Lüdecke et al., 2019) obtained via the joint application of multiple outlier detection algorithms (Z-scores, Iglewicz & Hoaglin, 1993; Interquartile range (IQR); Mahalanobis distance, Cabana, Lillo & Laniado, 2019; Robust Mahalanobis distance, Gnanadesikan & Kettenring, 1972; Minimum Covariance Determinant, Leys et al., 2018; Invariant Coordinate Selection, Archimbaud et al., 2018; OPTICS, Ankerst et al., 1999; Isolation Forest, Liu et al. 2008; and Local Outlier Factor, Breunig et al., 2000). We excluded three participants classified as outliers by at least half of the methods used.

Hierarchical Regression

Predicting loneliness from attachment, interpersonal problems, shame and compassion.

Assumptions for regression were met (For graphs describing homoscedasticity, normality, and multicollinearity in the data please see figures 3, 4, 5, 6 in Appendix B1).

A two-stage hierarchical multiple regression analysis was conducted with loneliness as the dependent variable. Attachment style and interpersonal problems were entered at stage one of the regression analysis to control for their responding.

Shame and compassion (external shame and self-compassion) were entered at stage two.

Intercorrelations between the multiple regression variables were reported in Table 2.

The hierarchical multiple regression analysis revealed that at Stage one, attachment style and interpersonal problems contributed significantly to the regression model, $F(3,85) = 11.91$, $p < .0001$) and accounted for 28% of the variation in loneliness.

Adding external shame and self-compassion explained 31% of variation in loneliness $F(5,85) = 8.843$, $p < .001$. This change in R^2 was significant as well with R^2 change = 0.0515, $F(2,83) = 3.2805$, $p<0.001$.

To test the difference between the two models even further we conducted a model performance comparison, which showed that model two was significantly better than model one (Figure 1).

Figure 1. *m1 = Model 1; m2 = Model 2; RMSE = Root Mean Square Error; AIC = Akaike's Information Criteria; BIC = Bayesian Information Criteria. A spiderweb plot, where the different indices are normalised and larger values indicate better model performance. Points closer to the centre indicate worse fit indices.*

In order to assess the relative importance of all predictors, a variance decomposition-based importance assessment was conducted (Grömping, 2009; LMG: Lindeman, Merenda, & Gold, 1980). This method quantifies the relative contributions of the regressors to the model's total explanatory value (unweighted average of sequential explained variances over all possible orderings of regressors). Internal shame had the highest relative importance, with 15% of the response variance. R^2 for the overall model was 47%, indicating a large effect. See Figure 2.

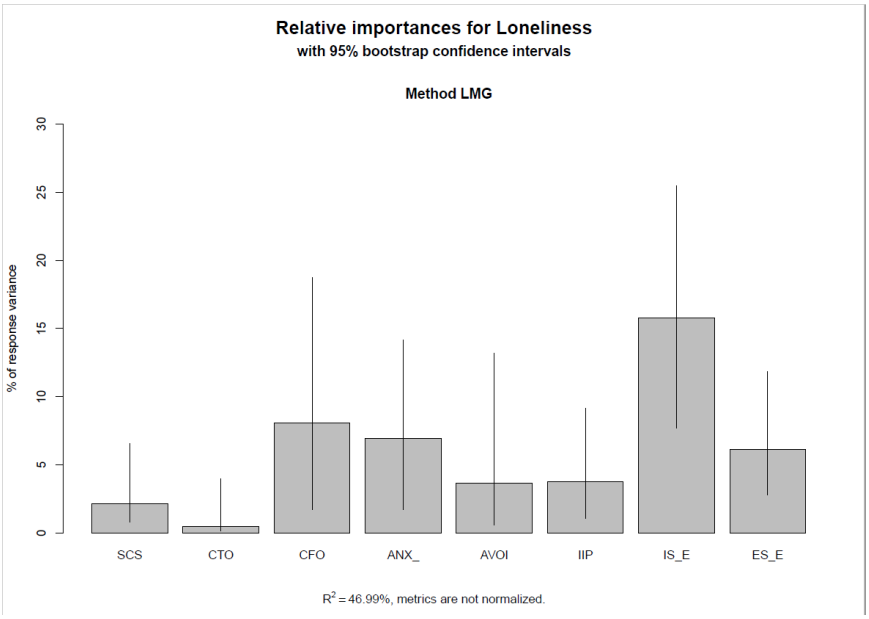

Figure 2. *Relative importance chart for Loneliness. LMG - Lindeman, Merenda and Gold's method; SCS – Self compassion Scale; CTO – Compassion to others; CFO – Compassion from others; ANX – Anxiety attachment style; AVOI – Avoidant attachment style; IIP – IIP-32, Inventory of Interpersonal Problems; IS_E – Internal Shame; ES_E – External Shame.*

Discussion

This work has attempted to explore how different factors and models relate to loneliness. Since loneliness can be looked at as a lack or absence of social relationships (Russell, Peplau & Cutrona, 1980) we have explored it through variables that impact our social life: shame, attachment styles, social relationship patterns, and compassion. Each of these variables is multifaceted and can be broken into several distinct subcategories, and each relates to loneliness differently.

Our first research question explored how variables such as attachment style and social relationship patterns relate to loneliness. The analysis showed that interpersonal problems, and anxious and avoidant attachment Styles, may explain a loneliness to some degree (R^2 = 27%).

Our second research question explored how additional variables such as external shame and self-compassion might explain loneliness further. We hypothesised that external shame and self-compassion would indicate more causality than the initial model alone. The analysis results support this hypothesis, indicating that external shame and self-compassion helped boost the explanatory power of the model even further (R^2= 31%), and that the difference between the two models was significant (R^2 change = 0.0515)

Finally, a model exploring the relative importance of each variable in explaining loneliness (R^2 = 47%) indicated that Internal shame was the primary predictor, comparatively greater than all other variables. The next most important variables were compassion from others followed by anxious attachment style.

Our findings regarding the negative impact that shame has on loneliness are similar to what is known in the filed. The correlation between shame and decreased social behaviour is well established, as shame has been found to be related to feelings of loneliness, social alienation, and social isolation (Gilbert 1998, 2007; Nathanson 1994; Tangney & Dearing, 2002). Furthermore, the social element has such a great influence over shame that social norms and cultural values have been found to shape its expression (Fessler, 2007; Leeming & Boyle, 2004).

Further reading of the research on the relationship between shame and social seclusion can support and explain our findings on the central role that shame, and specifically internal shame, has in predicting loneliness.

Social rejection has been suggested to predict shame (Leary & Baumeister, 2000; Scheff, 2014). This effect was also observed in cross-cultural design (Sznycer et al., 2016). Furthermore, people tend to feel more ashamed when they are socially secluded than when they feel like a failure (Twenge et al., 2003). Thus, inadequate performance (i.e. failure) that

is usually considered as a precursor for shame (e.g. one can often feel ashamed due to bad performance), in reality generates less shame than social isolation (Twenge et al., 2003a). Shame related cognitions and emotions (SRCEs) have also been shown to mediate the effect of social evaluation on rumination, while other negative emotions such as anger, sadness, and fear do not (Zoccola et al, 2012). Shame may keep our mind focused on social context more than any other negative emotion, to the extent that shame has been found to fully mediate the relationship between rumination and depression (Cheung et al., 2004; Rice & Fallon, 2011).

A possible explanation for this relationship between internal shame and loneliness could be found in the negative self-image associated with internal shame, given it has been shown that internal shame is not caused by falling short of hypothetical inner standards of the ideal self, but rather by a feeling of closeness to the undesired self (Ogilive, 1987). Put differently: it is not about being not good or not beautiful, but rather about feeling bad, ugly, and unwanted (Hartz, de Rivera & Mascolo, 1995). The individual feels such disgust from their self that they cannot believe anyone, themselves included, could love them and hence feel ashamed (Gilbert, 2003). The individuals feel such disgust from themselves that a pathological shame arises (Glibert, 2003a).

In fact, it has been found that shame caused by social exclusion can create such a strong response that the individual chooses to ignore the self completely (Twenge et al., 2003), by actively blocking their feelings, to the point that it hurts their capacity for self-awareness and emotion-regulation (as emotion regulation requires a level of insight into one's emotional state) (Baumeister et al., 2005). This finding was repeated as social rejection was found to increase shame and decrease self-awareness (Twnege et al, 2003).

In light of the former discussion it is worth focusing on the possible clinical implications of shame and loneliness, and how they can impact one's wellbeing. As

mentioned before, shame was indicated initially by Gilbert (2000a, 2010a) as an obstacle to positive progress in therapy. Shame in its most toxic form as internal shame, maintains a highly negative and highly persistent self-image that can potentially overshadow any attempt to improve one's wellbeing (Hahn, 2004; Gilbert & Procter, 2006). Thus, it could be useful to consider shame in clinical formulations even if it is not mentioned directly as an issue for therapy.

In addition as mentioned before, loneliness is a very common experience (especially now during the Covid-19 pandemic) and as this study shows, can have several different phenomena contribute to its development. Loneliness caused by different types of shame could require different types of interventions. While loneliness caused by external shame could be eased by changing social circles (i.e. an individual that feels ashamed from their friendship group could change their social group to one who will accept them), loneliness caused by internal shame requires a work that focuses on self-compassion and acceptance (Gilbert & Procter, 2006). Following this, the author of this work recommends identifying the exact origin of the social isolation behaviour before trying to design an intervention in therapy.

While our findings on shame are in line with previous research, finding it to have a strong influence over loneliness, self-compassion in the current study was not as strongly related to loneliness as expected and appears to be at odds with prior research. Self-compassion, which in previous research (Akin, 2010; Gilbert, 2015; Lyon, 2015; López, Sanderman & Schroevers, 2018; Ypsilanti, 2018) is considered to be almost a panacea that can counter the negative influences loneliness and social isolation have on our well-being, was not found to predict loneliness strongly. The intuitive assumption that stood supporting these previous findings was that self-compassion could help the self to resist the negative

influences of self-criticism and shame, thereby decreasing low mood, social isolation and loneliness.

According to the current findings, compassion from others was the most important variable when explaining loneliness. A lack of actual feeling of compassion from others, or an emotionally cold environment towards the individual, can trigger feelings of loneliness.

The next finding showed that attachment style, and anxious attachment style in particular, could also be a good predictor of loneliness. This supports previous research in this field, which has shown for a long time that an unpredictable environment in childhood makes a strong contribution to the development of insecure attachment in general, and anxious attachment style in particular (Barbaro & Shackelford, 2017; DeGangi, 2017; Ellis at el., 2009; Simpson, Griskevicius, Kim, 2011). A constant inability to predict what type of attention an individual will receive from their environment, if at all, especially in times of need, could over time promote and entrench feelings of loneliness.

Limitations and future research

This study sampling method was convenience sampling, and the current cohort was made from a significant majority of white educated women. Thus, the results might reflect best this group and not so much other groups in the population. Future research should aspire to expand its sample to more diverse groups. Though there is an approach in research that argues that homogeneous convenience samples could be useful (Jager, Putnick & Bornstein, 2017). They too recognize that in order to keep a good general validity we should aspire to find more heterogeneous and diverse samples.

Due to the large number of subscales, and since we tried to keep a parsimonious approach towards analysis, we did not consider all available subscales of the IIP-32, but only

its total score. The IIP-32 includes certain subscales that may align with the feeling of loneliness (e.g. the subscale on social inhibition/avoidance) and others that may not (e.g. the subscale on vindictiveness/self-centeredness). This possibly contradictory relationship which the different IIP-32 subscales might have with loneliness could mask an existing effect. Future research should therefore aspire to examine all of the IIP-32 subscales in relation to loneliness, if practicable.

Following the former point, mood and relationship status were not considered or controlled. Adding additional conditions to the analysis was not recommended with the current sample size (N=92). This prevented some interesting data and its potential implications to be examined in this study (i.e. how relationship status or current mood can impact loneliness). Future studies should aspire to focus on these areas as well.

The UCLA loneliness scale that was used in this study, though being the most researched tool used to assess loneliness, was critisiced for being unidimensional, thus not sensitive towards different types of loneliness i.e. emotional and social loneliness (Cramer & Barry, 1999; Yanguas, Pinazo-Henandis & Tarazona-Santabalbina, 2018). The current study examined a range of psycho-social (compassion for and from others, interpersonal problems, external shame, attachment style) and emotional (self-compassion, internal shame) variables, thus a potential masking of the results could happen due the inability of the UCLA loneliness scale to differentiate between emotional and social loneliness. Due to the size of this study (a DClinPsy dissertation) it was not possible to add additional measures to widen the scope of the analysis. Thus, future research should aspire to use additional measures such as the Gierveld Loneliness Scale (2006), and the Social and Emotional Loneliness Scale for Adults (SELSA) (DiTommaso & Spinner, 1993) that are able to differentiate between social and emotional loneliness.

Conclusion

The current study has aimed to explore how different factors can relate to loneliness. We looked at interpersonal problems, attachment style, shame, and compassion. We found that interpersonal problems and attachment styles may be considered as good predictors for loneliness. Furthermore, additional factors like shame (external shame) and compassion (self-compassion) may add to the predictor value of the former model.

However, contrary to the initial hypothesis, it appears that internal shame and compassion from others were stronger predictors.

According to the current findings, internal shame, was the main factor impacting how lonely the individual will feel. In addition, the experience of a lack of compassion from others (e.g. an emotionally cold environment) and anxious attachment style (promoted by the inability to predict the environment emotional availability in times of need) may both have a strong impact on how lonely we feel.

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Part 3: Critical appraisal

Introduction

The following passage will try to describe the author's experiences and reflections writing his DClinPsy dissertation. This work is an introspection examining the processes and decisions behind writing a doctoral thesis. It includes background material, a detailed impression of each of the writing steps for each paper, general reflections and conclusions.

Since starting clinical work, I have always been interested in better understanding what the fundamental reason for the differences between the people I work with could be; why some people progressed while others regressed, why people have different decision-making processes, and why seemingly similar circumstances and life experience produced different consequences for different people.

Trying to solve this dilemma I turned to the bio-psycho-social model (Borrell-Carrió, Suchman & Epstein, 2004; Engel, 1977, 1980;) as an attempt to explain how different factors interact to influence life and behaviour. Until the present moment there has been no clear sense from research as to how these factors interact with each other, to what extant, whether or not there is a hierarchy of importance between them, and how exactly they impact our behaviour.

I was always more interested in the 'psycho' part of the model; how personal characteristics can help people navigate between different social and genetic influences, that are often out of their control, to promote a more meaningful life.

In order to gain insight into this part of the bio-psycho-social model, I wanted to research the self, as I believe that the self is the elephant in the room in the field of psychology. In my mind, the different disciplines that study and research the human mind and characteristics (whether it is clinical psychology, psychiatry, psychoanalysis, and the different neurosciences) are all studying the self, while each holds its own unique perspective

of it. I believe that when we use terms such as personality disorders, emotional difficulties, depressive position, consciousness and identity, we are actually referring to different aspects of the self, or the way it functions.

But what is the self?

While trying to define what the self is, William James (1890) used a conceptual distinction between "Me" and "I", between the self as an object of experience (me), and the self as a subject of experience (I). In recent years this classic definition is going through a certain renaissance in cognitive sciences (e.g., Christoff et al., 2011; Liang, 2014; Sui & Gu, 2017; Truong & Todd, 2017), and numerous ways have been suggested relating to how to scientifically study the self.

Some proposed that the self is autobiographical knowledge associated with the left hemisphere (Turk et al., 2002). Others suggested that the self is self-related information (e.g., autobiographical memory, self-face identification, theory of mind), related to neuronal activity in the right frontal cortex (Devinksy, 2000; Lou et al., 2004; Miller et al., 2001; Platek, Myers, Critton, & Gallup, 2003).

Others suggested that the self is actually related to the neural activity in the medial prefrontal cortex in both hemispheres and is expressed by sense of agency, feelings of continuity, and body-centred perspective (Fossati et al.,2003; Frith & Frith, 1999; Gusnard at el., 2001; Johnson et al., 2002; Kelley et al., 2002; Wicker at el., 2003).

From a purely psychological perspective, the self was studied through the concepts of identify (Cote & Levine 2002; Weinreich & Saunderson, 2003), consciousness (Hameroff & Kaszniak, 1999; Rochat, 2003), self-awareness (Demetriou & Kazi, 2001; Duval, Silvia & Lalwani, 2001; Duval & Wicklund, 1972), and personality (Corr & Matthews, 2009).

Shift of focus, research personality and attachment

The attempt to understand what the self is, is still in debate between and within each of the different disciplines. Beyond these different perspectives I chose to approach my study of the self through the construct and theory of personality, since it was extensively studied in relation to perceptions, behavior, and our decision making process (Alarcon, Eschleman & Bowling, 2009; Connor-Smith, 2007; Gaddis & Foster, 2013; Goreis & Voracek, 2019; Kraus, 1995; Kline at el, 2017; Parks-Leduc, Feldman & Bardi, 2014; Rauch & Frese, 2006; Smith & Blumstein, 2008; Thielmann, Spadaro & Balliet, 2020).

These concepts are all relevant to my initial question, what caused the personal differences I had noticed between my clients.

As I read more about personality, I decided to add another construct that is heavily associated with our personality and behaviour - attachment. There is a whole field of research that studies the relationship between attachment and personality, and even implies that attachment relationships underpin our personality (Blatt & Levy, 2003; Fraley, 2002; Hagekull & Bohlin, 2003; Levy at el., 2015). In order to better understand these constructs and the relationship between them, I decided to conduct a systematic review and a meta-analysis of them. Since attachment or personality are two complex and multi-faceted constructs, and in order not to lose any information during the operationalisation process, I decided as a first step to map the different models and research tools commonly used in order to conceptualise and understand how best to measure these two factors.

I found that most research on personality focused on the big five model and measured it mainly through the use of the NEO Personality Inventory (NEO-PI), and the Eysenck Personality Questionnaire (EPQ), via their different versions. Most research on attachment

used a three attachment styles model (secure, anxious and avoidant), though mainly focused on two of them (anxious and avoidant). In order to measure attachment in the context of personality research, most research used the Experience in Close Relationship scale (ECR), which is a measure used to assess adult attachment in the context of romantic relationships.

I found that the correlation between the different attachment styles and different personality traits suggested an interesting insight into our emotional function. It illustrated some of the emotional resources that are available to us in times of stress, and what emotional difficulties we might experience, all are related to our personality traits and attachment style.

Following this, my findings indicated that among all five-personality traits, Neuroticism is the most dominant personality trait for a person with an anxious attachment style. Lack of Neuroticism and the presence of Extroversion will tend to characterise people with a secure attachment style, and a lack of any dominant trait (and negative correlations with all personality traits apart from Neuroticism) will be typical of an avoidant attachment style.

The findings above allow us to conclude that the difference between people is not due to their different personalities, but rather it is due to the way the different personality traits impact each person differently. In my study this difference was linked to people's attachment style. For example it is natural for an individual that displays neurotic tendencies to use hyper-activating strategies and become hypervigilant and exaggerate threats, and these may intensify negative affect such as stress, anger, and helplessness (Hankin & Abramson, 2001; Lopez et al., 2001; Cantazaro & Wei, 2010).

Similarly, avoidantly attached individuals use de-activating strategies such as denial of emotion and suppression of its expression (Rosenstein & Horowitz, 1996). Although such emotional avoidance strategies (i.e. denial of emotional states and inhibition of emotional

expressivity) may in the short term be adaptive, in the long term, since negative emotions are not explicitly communicated and are deprived of accurate evaluation, these avoidance strategies can contribute to a range of psychopathologies such as anxiety disorders, eating disorders, and even antisocial behaviour (Ward et al, 2001; van Emmichoven et al, 2003).

Empirical paper

During my review on personality and attachment I could not stop thinking about how easy it is for individuals to find themselves socially isolated when insecure attachment and its accompanied personality traits are dominant. This reflection was also derived from my clinical experience where I saw how people who could have been diagnosed with insecure attachment experienced great loneliness and how dominant the personality traits were that encouraged such experience.

I wanted to study this further so I focused my empirical paper on predictors of loneliness. I hypothesised that attachment styles and interpersonal problems could explain loneliness well. Indeed, this assumption and model proved to explain a fair amount of the loneliness in my sample. I then decided to examine what could happen if I added two more variables, compassion and shame. I decided to focus on these two additional factors because a big part of my reading on loneliness referred to compassion, particularly self-compassion, as a factor with a strong influence on loneliness. Furthermore, my reading showed that whenever the relationship between compassion and loneliness was explored, shame was often explored as well. Thus, I therefore predicted it would add more power to the first model. My prediction was found to be correct and the second model was better in predicting loneliness than the first one.

At this point I wanted to see what the relative importance of each of these variables in explaining loneliness would be. To do this thoroughly I wanted to consider all of variables I studied. Within the measures I used, compassion had three levels (compassion to others, from others, and self-compassion), attachment had two levels (avoidant and anxious), and shame had two levels as well (internal and external shame). I did not consider all of the eight subscales included within the Interpersonal Problems Scale (IIP 32) since there was no evidence this was better than using the total score alone.

I was surprised to find that out of the above, internal shame had the biggest relative importance when explaining loneliness. Second to that, with a very big difference came compassion from others, and subsequent to that, anxious attachment style. It seemed that the need to isolate the self while experiencing shame, and especially the type of shame where the individual identified with the criticism it implied, was associated with loneliness over and above any other factor in my study.

These findings made me think how social isolation can sometimes be a defense mechanism and in other times a negative result. In relation to external shame, social isolation can have an adaptive purpose, as it can help to avoid potential social criticism, whereas in relation to internal shame, social isolation is the result of internalised social criticism. This might be the reason why internal shame made the biggest contribution in my study in explaining loneliness. Since an individual is not just experiencing social isolation (lack of social relationships) but they also actually feel ashamed and not worthy of love (including self-love) they then deprive themselves of any type of attention (and so feel lonely)

Reflections

In line with my systematic review this made me wonder whether people cope differently with shame, according to their attachment style and/or personality traits. Do

people with avoidant attachment style tend to experience more or different types of shame? Could their tendency to suppress emotions mean that they feel less shame? Or do they tend to feel less internal shame specifically, since internal shame requires the individual to identify with a potential criticism, and emotional avoidance decreases the chance for such a process to happen (i.e. less emotional engagement decreases the opportunity for internalising shame). On the other hand, do people with a secure attachment style tend to experience less internal shame? As people with secure attachment tend to be more confident and feel more confidence in social situations, could it be that they tend to internalise shame less? Or in other words, is there an inverse relationship between self-confidence/secure attachment and internal shame?

More so, these thoughts brought me to reflect on the social isolation we were all subjugated to during Covid-19 times, and how different people, with different personality traits and attachment styles, experienced it. Perhaps people with anxious attachment (due to the high association of this style with Neuroticism and threat exaggeration) tend to feel worse than people who suppress their emotions (as has been suggested is a typical coping strategy for people with an avoidant attachment style). Could it be that people with a secure attachment (which is usually associated with extroversion) tend to somehow search for social relationships even in times of social isolation, in order to help them go through this crisis better?

More so, do people with avoidant attachment style tend to feel more comfortable and less external shame in times of social isolation, as now the social decree urges us all to avoid opportunities to use our social skills? Following this, since I live in a block of flats with many families, I wondered how people's social context interacts with people's attachment style and

personality traits. Do people with avoidant attachment style find it harder to stick to a strategy of emotional avoidance now that they have to spend most of their days surrounded by people? Do people with secure attachment style find the constant proximity to the people of their own household enough, or, since their attachment style is associated with pro-social personality traits, do they have to find more opportunities for social interactions? Finally, do people with anxious attachment style find these times of lockdown easier, since people have to stay together most of the time, so their social environment is more stable?

Unfortunately the span of my work did not allow me to engage with all of these questions, but these brought me back to thinking about my clients; to think back to what formulations I used to work with, and how they all lacked any reference to my client's possible personality traits and attachment style. Only during my work with children (under the Child and Adolescent Mental Health Services placement during my training), did we consider the possible impact of the child and parent attachment relationship, and even then, only when treatment encountered difficulties progressing.

I reflected back on a time when I was working with a client who experienced social anxiety, and formulated their difficulty according to the classic Clark & Wells social anxiety formulation (Clark & Wells, 1995; Wells, 1997). It makes me wonder now whether during our work it was worth also considering my client's behaviours which resembled an anxious attachment style, or, considering that their anxiety derived from a tendency to catastrophise their experience, as a personality trait (Neuroticism), and not just as an issue that should be resolved through exposure. Using the full Big Five Model could potentially help us to see the emotional resources that were available for this client, besides focusing solely on the

dominant neurotic trait. It might be that formulating using these additional aspects could help us give the client a more holistic view of herself, even if we would not end up using it for treating her social anxiety per se.

In another case, I worked with an eight year old child who complained of (chronic) pain. Our formulation understood that his increased focus on the body during pain increased the painful sensation. Reflecting back, we could have included the attachment relationship between him and his mother in our formulation, and by doing so we could have considered the nature of the help he could acquire from his mother to better support the treatment (meaning avoidant attachment requires a different approach and support style than secure attachment).

Conclusion

I started this work with an aspiration to learn more about my clients (and people in general), and what could be the distinct factors between them. I focused on the self, through studying personality and attachment, and continued to research what of these could lead us to social isolation. Through my work I studied the relationship between our personality and attachment style, and how negative traits like shame could bring our emotional and social functioning almost to a halt.

As mentioned earlier, this study made me reflect back on my clinical work. These reflections made me feel really bad, since I realised I missed vital information that could possibly have helped me to supply a better service to my clients. This made me realise again how practice-based evidence is such an important part of the clinical work. How the use of

reliable and valid measures (similar to the ones I used in my research) could help us gain a fuller and deeper picture of our clients, their difficulties and even possible emotional resources. I do think that completing these questionnaires in a clinical setting could be quite clumsy sometimes, but now I see better than ever the benefit they might have, even if the focus of the work and the formulation both seemed to be quite clear.

I feel a great privilege in having conducted this research, and having worked with both of my supervisors, Dr. Peter Scragg and Dr. Ciaran O'Driscoll, and believe this work helped me to boost my research and clinical skills, and for that I am grateful.

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Appendix A. Systematic review and Meta-analysis

Appendix A1:

Studies reviewed during the initial search (for research tools) and the scales/subscales they used.

Article	Attachment measure	What was measured	Personality measure	What was measured
Jo Carr, 2000	AHQ (Attachment History Questionnaire)	Security of attachment (higher scores more secured)	NEO-PI-Rs	Neuroticism, Extroversion, Openness, Agreeableness, Conscientiousness.
Noftle, 2006	Study 1: ECR Study 2: ECR	Attachment anxiety & avoidance	Study 1: BFI Study 2: NEO-PI-R	Neuroticism, Extroversion, Openness, Agreeableness, Conscientiousness
Zeleskov Djoric, 2011	ECR	Attachment anxiety & avoidance	NEO-PI-R	Neuroticism, Extroversion, Openness, Agreeableness, Conscientiousness.
Andrews, 2011	RQ (The Relationship Questionnaire)	secure, preoccupied, dismissing and fearful	EPQR-A (Eysenck)	Neuroticism, social desirability (Lie scale).
Black at el., 2005	ASQ (Attachment Style Questionnaire)	preoccupied attachment behaviours, dismissing attachment behaviours	Brief Personality Questionnaire (EPQ) (Eysenck)	Neuroticism, Extroversion.
Boelen, 2010	ECR	Attachment anxiety & avoidance	EPQ (Eysenck)	Neuroticism (1 subscale).

Boelen, 2011	RQ (The Relationship Questionnaire)	Attachment anxiety & avoidance	EPQ RRS (Eysenck)	Neuroticism (1 subscale).
Boelen, 2008	ECR	Attachment anxiety & avoidance	EPQ RRS (Eysenck)	Neuroticism (1 subscale).
Boelen, 2014	ECR	Attachment anxiety & avoidance	EPQ N (Eysenck)	Neuroticism (1 subscale).
De Smet, 2015	ECR	Attachment anxiety & avoidance	EPQ-Lie Scale (Eysenck)	Social desirability,alidity.
Ferenczi, 2013	RSQ (The Relationship Scales Questionnaire)	All attachment dimensions	EPQ-BV	Neuroticism (1 subscale).
Figueredo, 2005	Parent-Child Relationship Survey	Attachment to and investment from the Biological Father/Adult Father Figure (emotional closeness	NEO-FFI	All scales.
Iliceto, 2013	The 9 Attachment Profile (9AP) (projective)	Quality of interpersonal relationship	EPQ 90 The Eysenck Personality Questionnaire-Revised (EPQ-R)	All scales.
Kimmes, 2017	ECR R	Attachment anxiety & avoidance	EPQ-BV	Neuroticism (1 subscale).
Pennel, 2018	The Relationship Scales Questionnaire (RSQ)	secure, avoidant, anxious style	EPQR-A	Extraversion, Neuroticism, Psychoticism, Lie scale.
Wijngaards-de Meij, 2007	Adult attachment scale (AAS)	Attachment anxiety & avoidance	EPQ RSS	Neuroticism (1 subscale).

Bakker, 2004	Attachment Styles Questionnaire (ASQ)	Secure, ambivalence (fearful, preoccupied), dismissive styles	Five Factor Personality Questionnaire (FFPI)	All five subscales: Extraversion, Agreeableness, conscientiousness, Emotional Stability, Autonomy.
Barnes, 2019	ECR R	Attachment anxiety & avoidance	Big Five inventory (BFI)	Extraversion, Agreeableness, Conscientiousness, Neuroticism, Openness to experience
Clark, 2012	ECR S	Attachment anxiety & avoidance	IPIP	Openness, Conscientiousness, Extraversion, Agreeableness, Emotional Stability.
Donnellan, 2008	AAS (Adult Attachment Scale)	Attachment anxiety & avoidance	NEO FFI (The NEO–Five Factor Inventory)	Neuroticism, Extraversion, Openness, Agreeableness, Conscientiousness.
Fino, 2014	9AP (The 9 Attachment Profile)	18 bipolar scales regarding psychological and emotional constructs, 9 self-related and 9 other-related	ZKA-PQ (The Zuckerman-Kuhlman-Aluja Personality Questionnaire)	Aggressiveness, Activity, Extraversion, Neuroticism, Sensation Seeking.

Frederick, 2016	RQ (the Relationship Questionnaire)	Secure, Preoccupied, Dismissive-Avoidant, and Fearful-Avoidant	the Five Item Personality Inventory	Openness, Conscientiousness, Extraversion, Agreeableness, Neuroticism.
Galdiolo, 2018	ECR-R	Attachment anxiety & avoidance	NEO-60	Neuroticism, Extraversion, Agreeableness, Openness to Experience, Conscientiousness.
Galinha, 2016	Adult Attachment Scale (AAS-R)	Attachment styles: Close, Depend, anxiety	BFI (Big Five Inventory)	Extroversion, Conscientiousness, Agreeableness, Neuroticism, Openness to Experience.
Gyuris, 2010	s-EMBU retrospective attachment	Emotional Warmth and the Rejection	BFQ (Big Five Questionnaire)	Energy, Agreeableness, Conscientiousness, Emotional Stability, Openness.
Hart, 2017	ECR-R	Attachment anxiety & avoidance	TIPI (The Ten-Item Personality Inventory)	Neuroticism, Extroversion, Openness, Agreeableness, Conscientiousness.

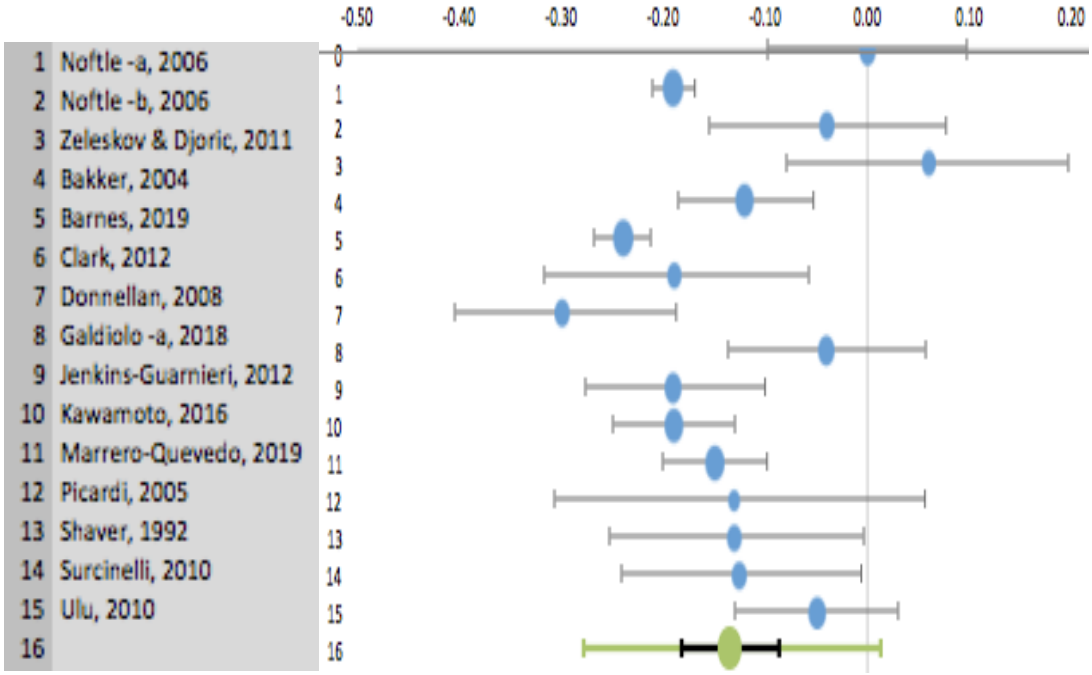
Holmberg, 2013	RQ (Relationship Questionnaire)	Four dimensions that converted to two (avoidant and anxious)	BFI (Big Five Inventory)	Neuroticism, Conscientiousness.
Jarvinen, 2017	Hazan and Shaver, 1987	avoidant, anxious-ambivalent, secure	BFI -10 (Big Five Inventory)	Openness scale
Jenkins-Guarnieri, 2012	ECR-R	Attachment anxiety & avoidance	BFI	Neuroticism, Extraversion, Openness, Agreeableness, Conscientiousness.
Kawamoto, 2016	ECR (Japanese version)	Attachment anxiety & avoidance	BFPI (70-item Big-Five Personality Inventory)	Extraversion, Agreeableness, Conscientiousness, Emotional Stability, Openness.
Marrero-Quevedo, 2019	AAS (Adult Attachment Scale)	avoidant attachment, anxious attachment, and close/secure attachment	NEO-PI-R	Neuroticism, Extroversion, Openness, Agreeableness, Conscientiousness.
Münch, 2016	AAS (Adult Attachment Scale)	Closeness, Dependence and Anxiety	B5T (Big-Five Personality Test)	Extraversion, Neuroticism.
Noftle, 2006	1st&2ndstudy: ECR	Attachment anxiety & avoidance	1st study: BFI (44-item Big Five Inventory).	Neuroticism, Extraversion, Openness, Agreeableness, Conscientiousness.

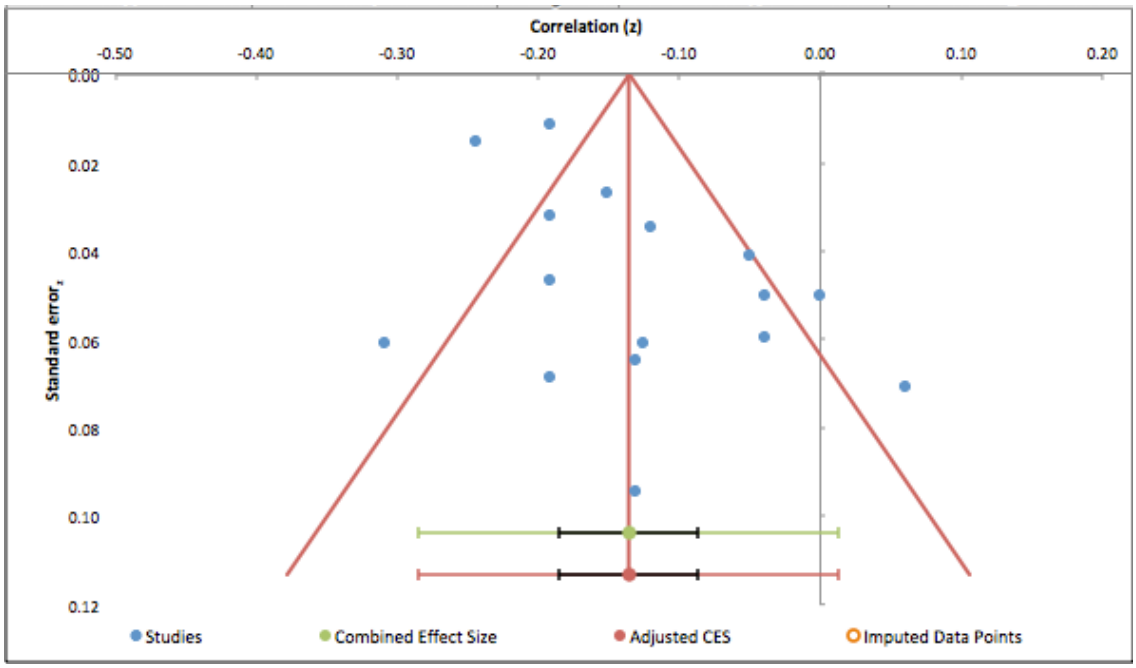
			2nd study: NEO-PI-R	
Picardi, 2005	ECR	Attachment anxiety & avoidance	BFQ (the Big Five Questionnaire)	Energy (Extraversion), Friendliness (Agreeableness), Conscientiousness, Emotional Stability (Neuroticism), Openness.
Şengül-İnal, 2018	ECR R	Attachment anxiety & avoidance	BFI (Big Five Inventory)	Neuroticism, Extraversion, Openness, Agreeableness, Conscientiousness.
Shafer, 1992	Hazan and Shaver, 1987	Security, avoidance, anxious-ambivalence	NEO-PI	Neuroticism, Extraversion, Openness, Agreeableness, Conscientiousness.
Shiota, 2006	ECR, RQ	Attachment anxiety & avoidance; secure, dismissing, preoccupied, fearful	NEO-PIR, BFI	Neuroticism, Extroversion, Openness, Agreeableness, Conscientiousness.

Sibley, 2010	AAQ (Adult Attachment Questionnaire)	Attachment anxiety & avoidance (towards close family, friends and romantic partners)	IPIP (International Personality Item Pool)	Neuroticism, Extroversion, Openness, Agreeableness, Conscientiousness.
Surcinelli, 2010	RQ (relationship questionnaire)	secure, dismissing, preoccupied, fearful	The BFQ (Big Five Questionnaire)	Energy (Extraversion), Friendliness (Agreeableness), Conscientiousness (Self-Regulation), Emotional Stability (Neuroticism), Openness (Openness-to-Experience/culture/intellect).
Ulu, 2010	(RSQ) The Relationship Scales Questionnaire	Attachment anxiety & avoidance	(BFI)The Big Five Inventory	Neuroticism, Extroversion, Openness, Agreeableness, Conscientiousness.

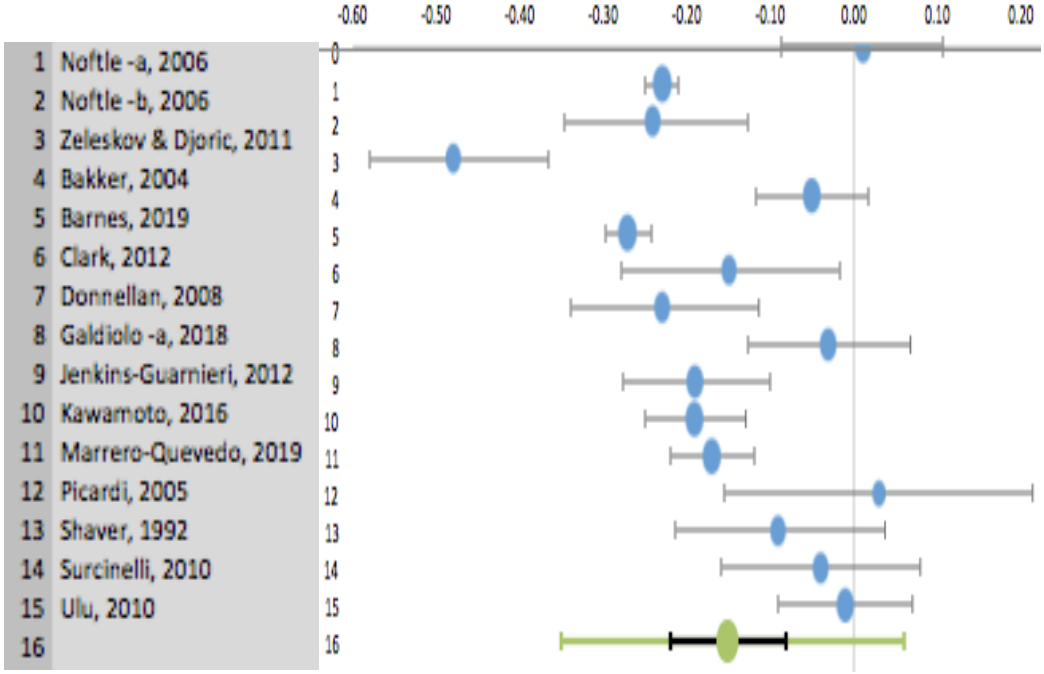
Appendix A2: *Dedicated Forest Plots and Funnel plots for each correlation between individual Attachment Styles and Personality traits (secure attachment does not have funnel plots since each analysis included four studies only):*

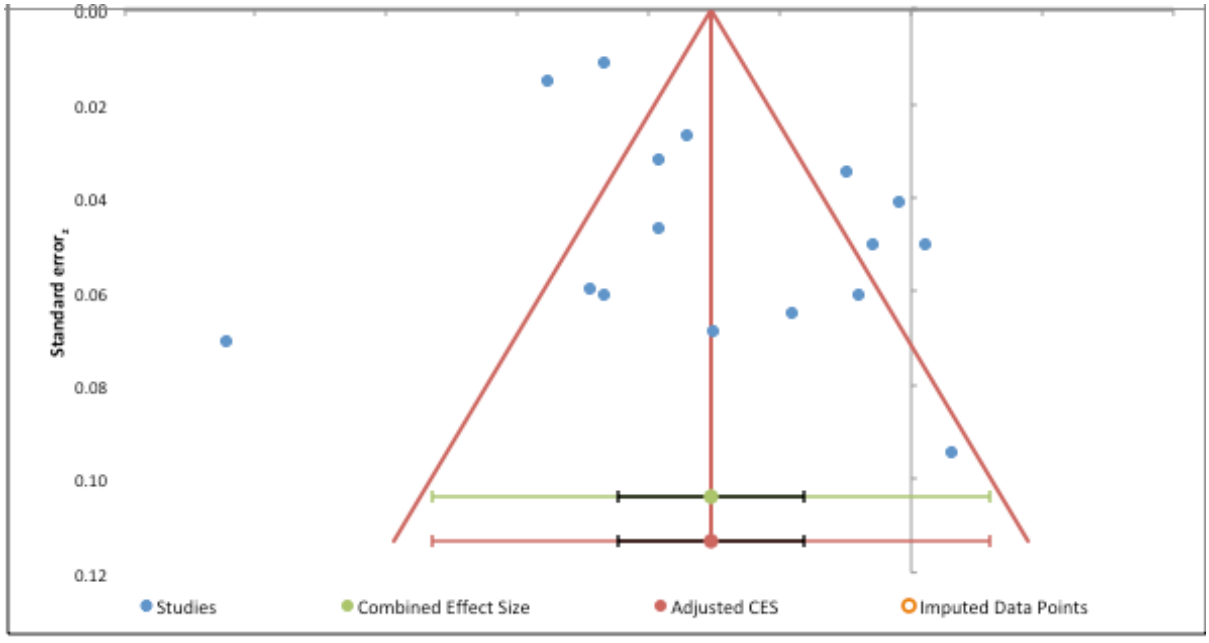
Anxious vs. Agreeableness



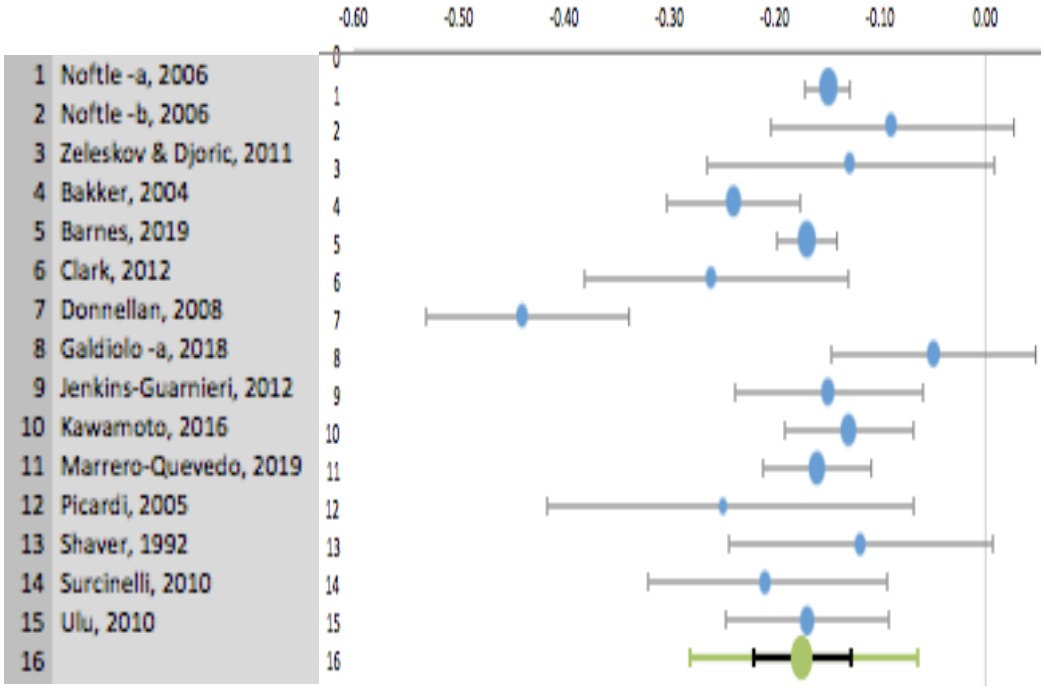


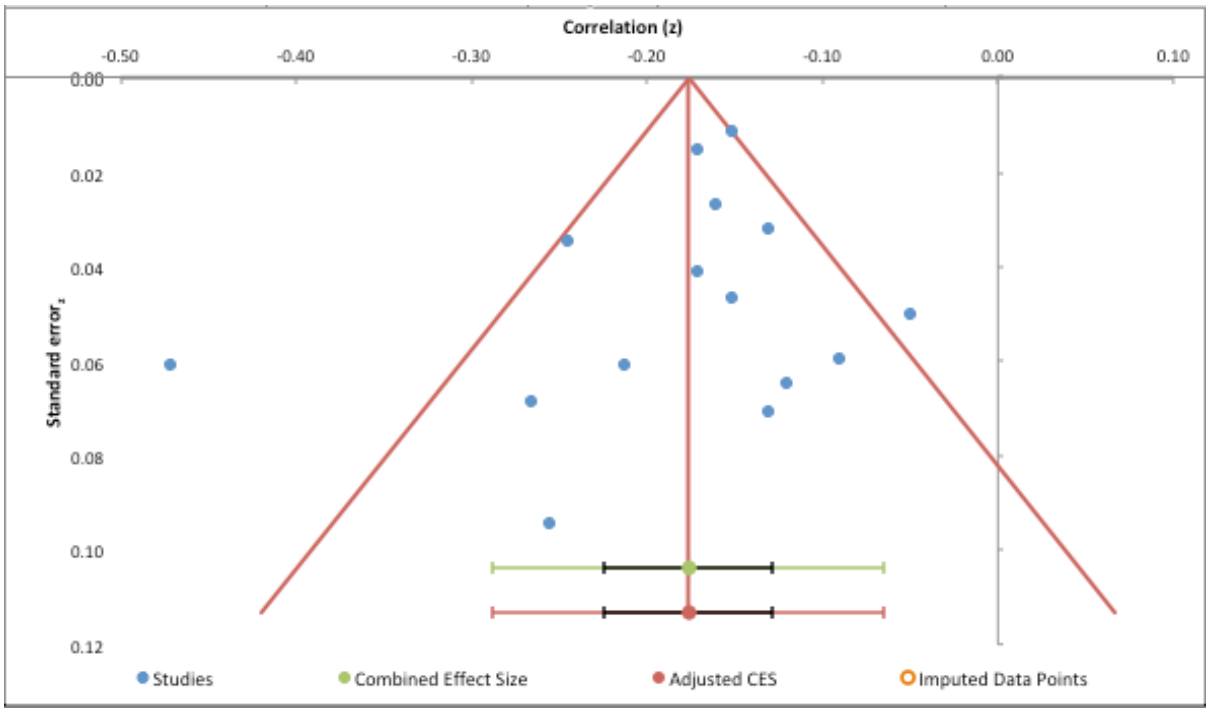
Anxious vs. Conscientiousness



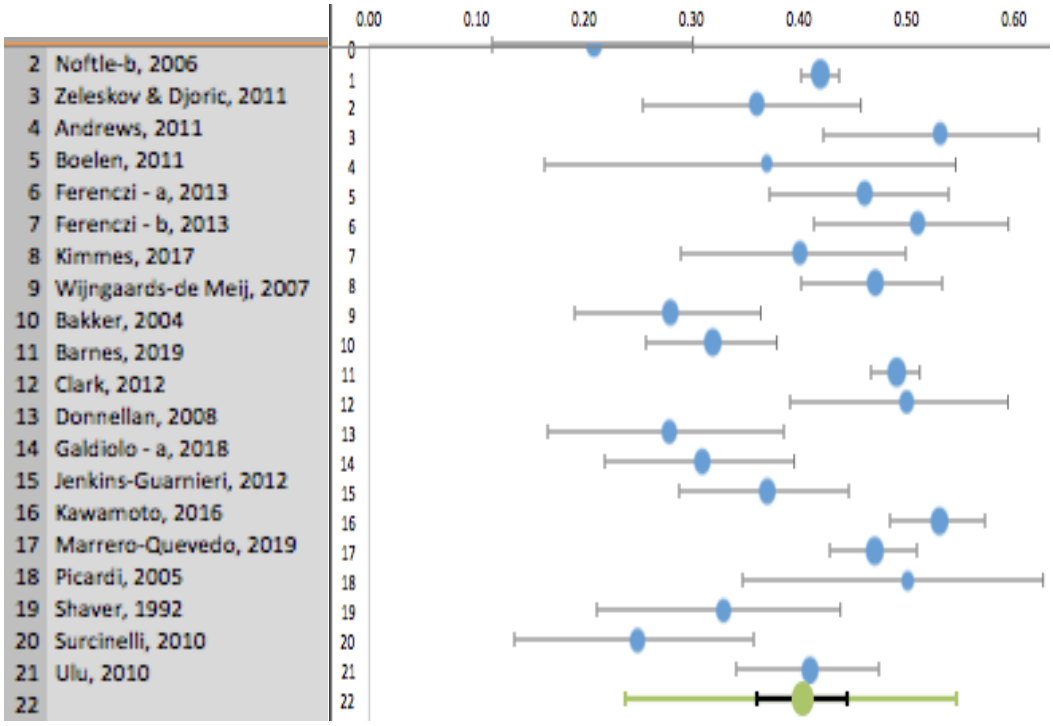


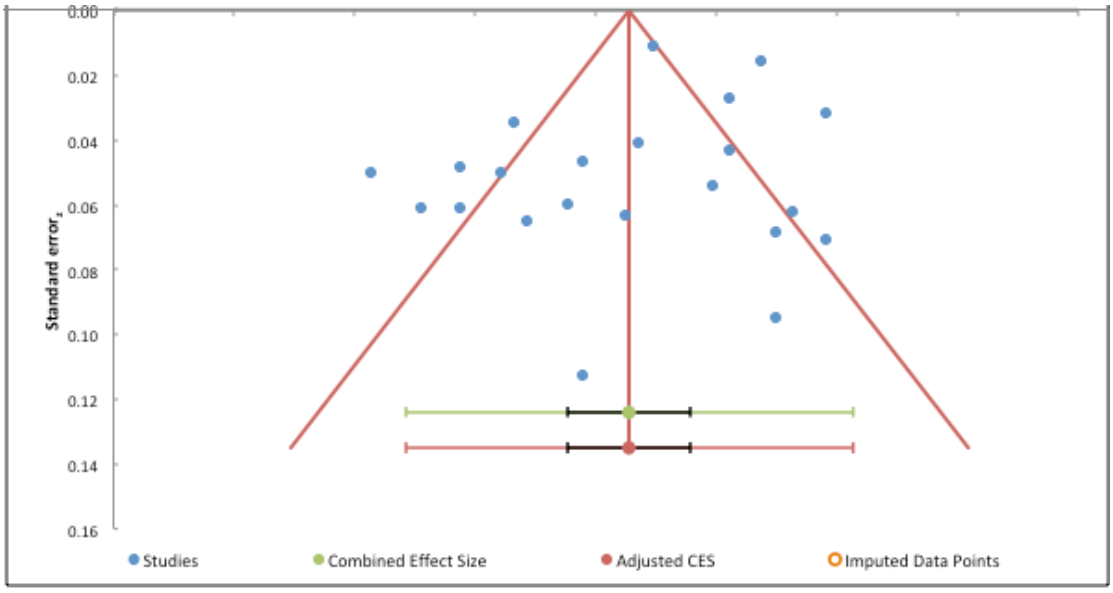
Anxious vs. Extroversion



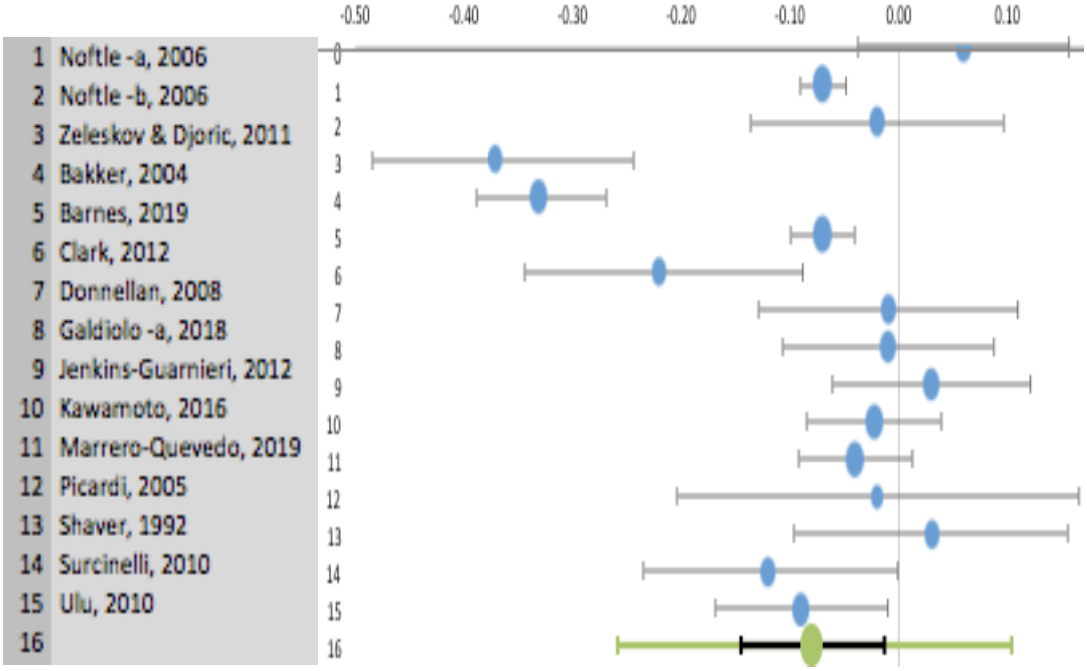


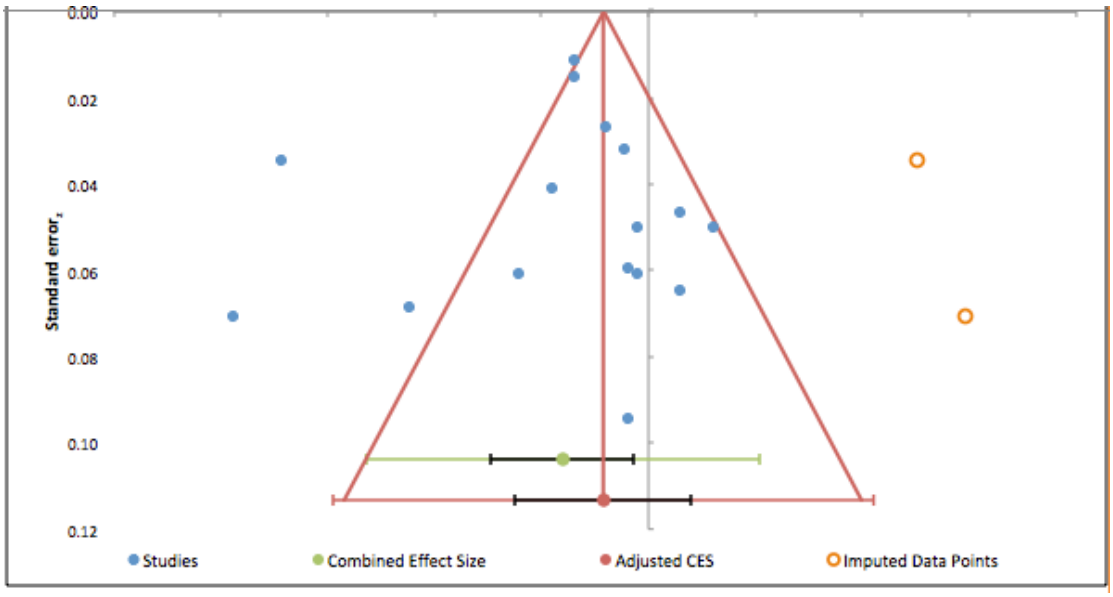
Anxious vs. Neuroticism



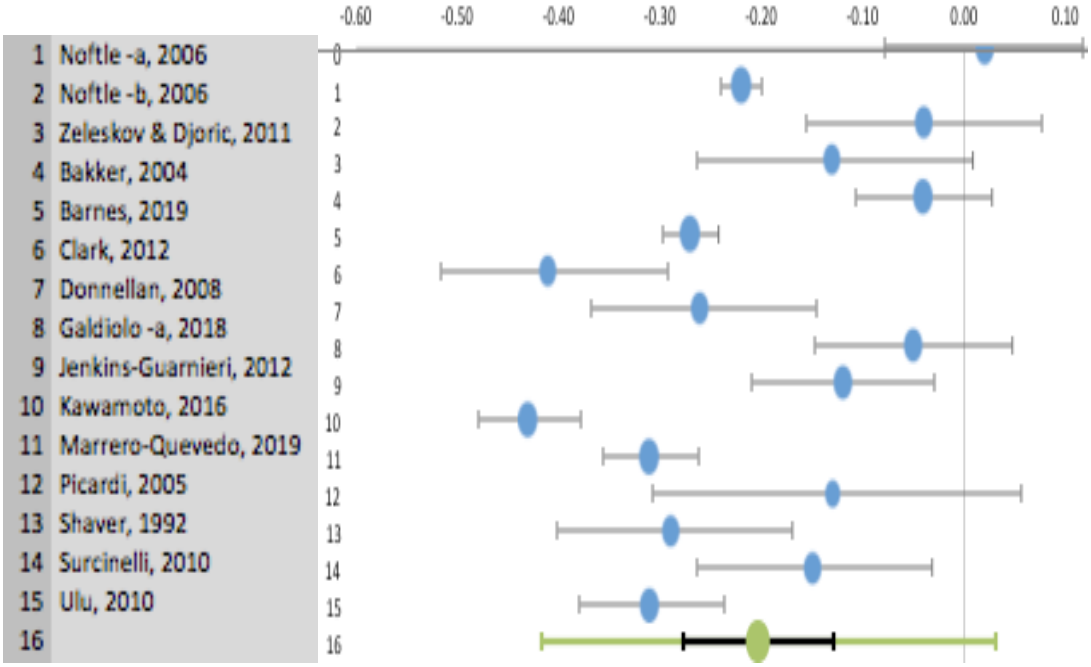


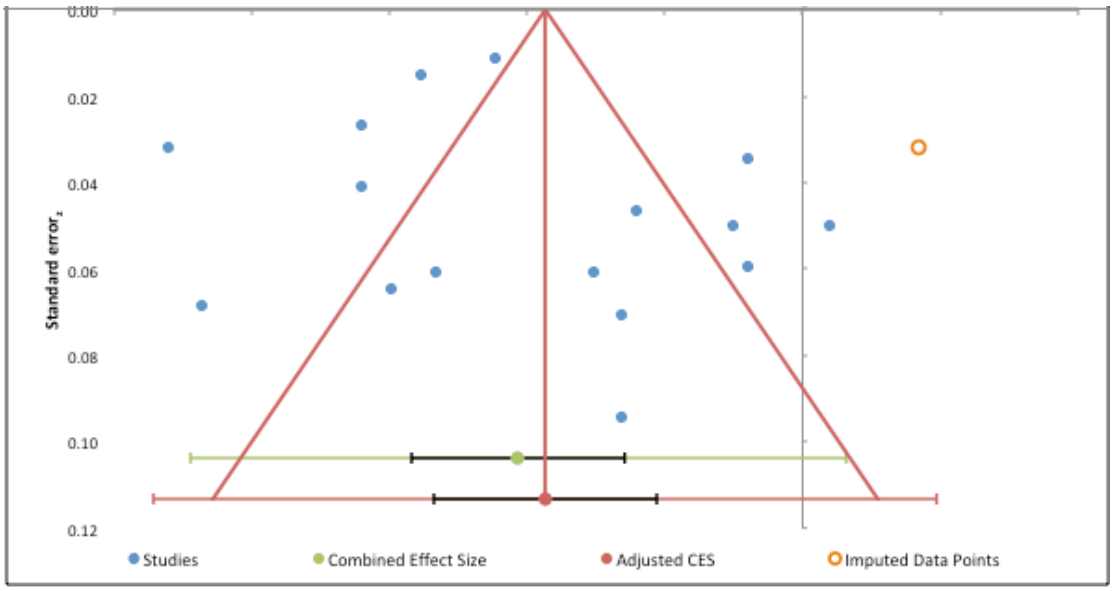
Anxious vs. Openness to Experience



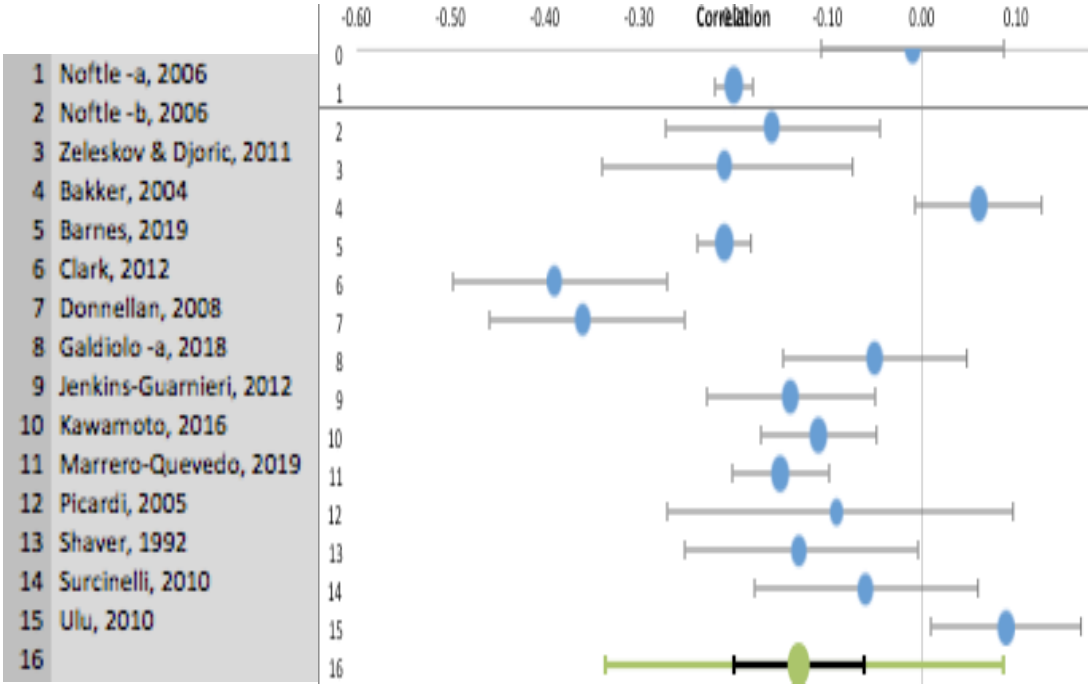


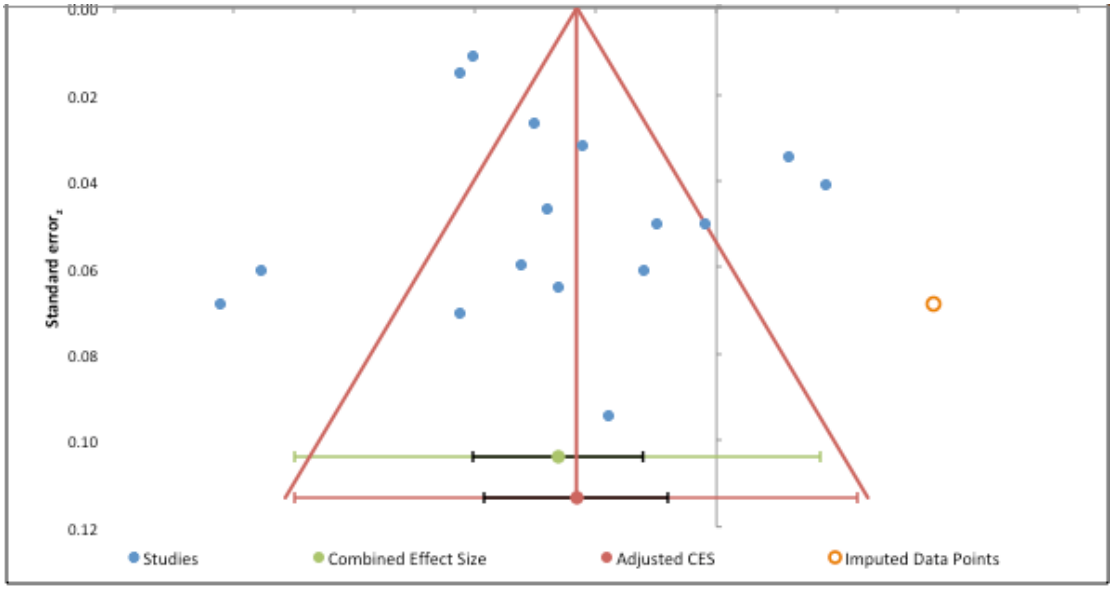
Avoidant vs. Agreeableness



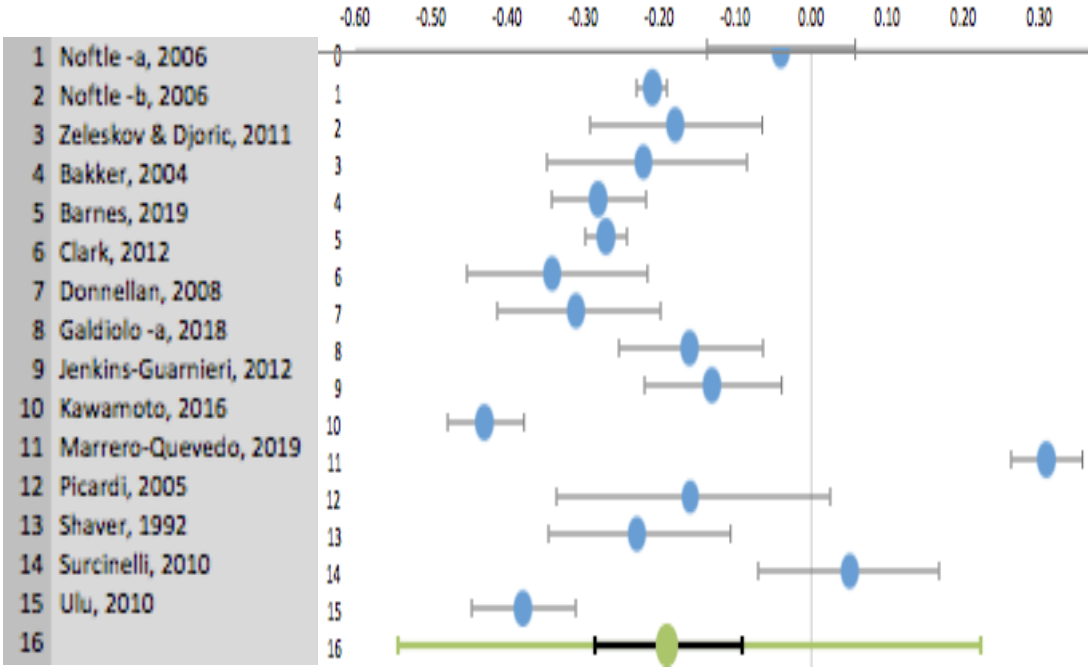


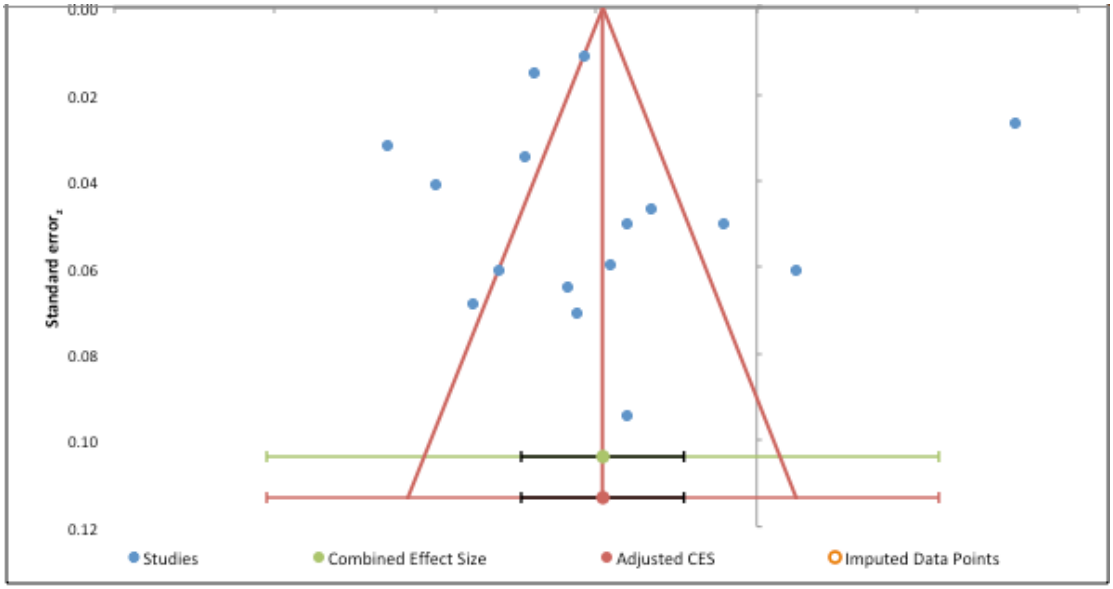
Avoidant vs. Conscientiousness



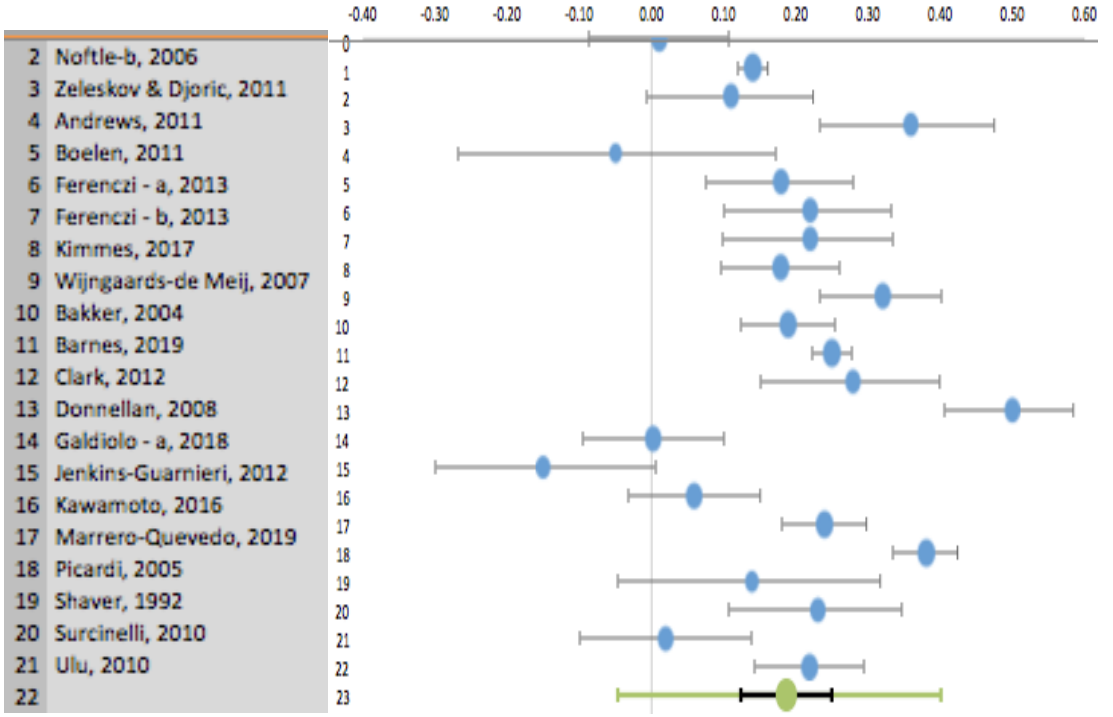


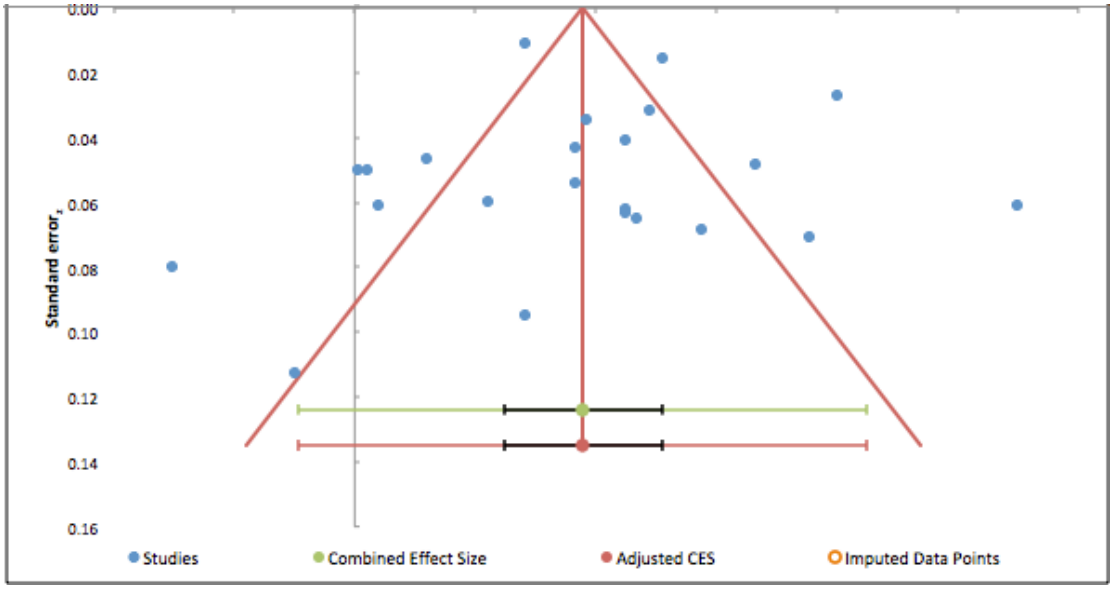
Avoidant vs. Extroversion



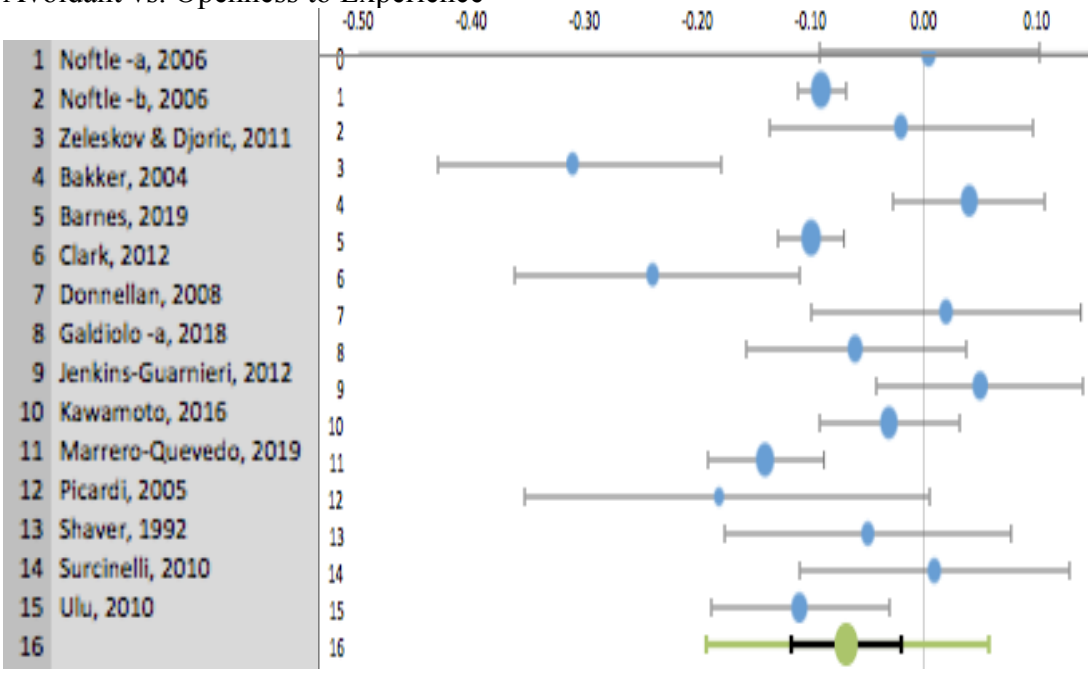


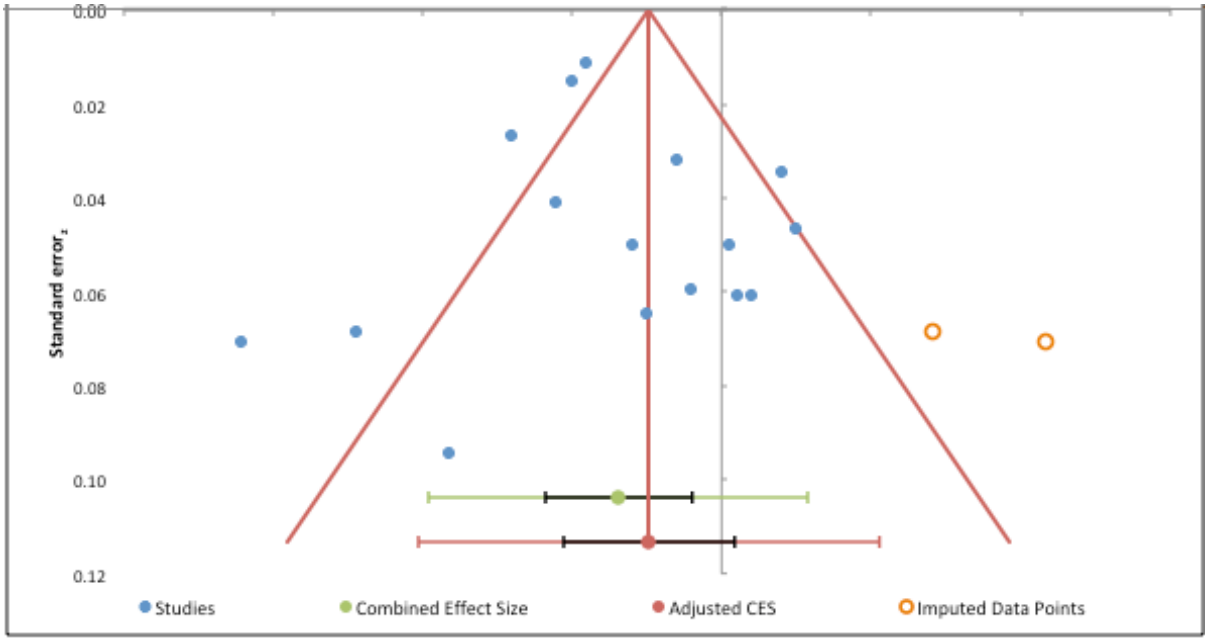
Avoidant vs. Neuroticism



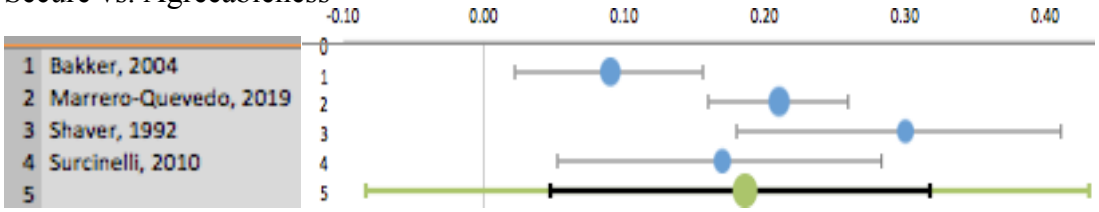


Avoidant vs. Openness to Experience

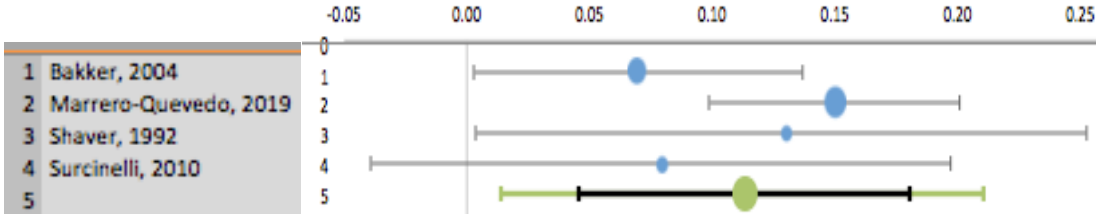




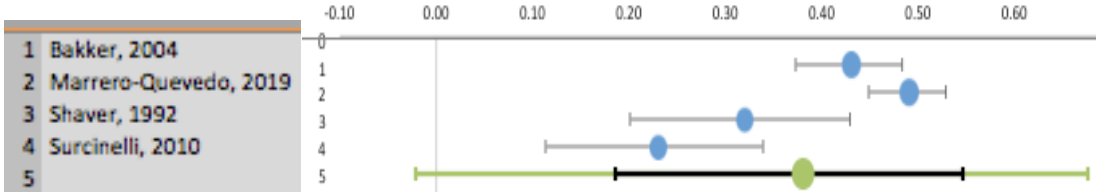
Secure vs. Agreeableness



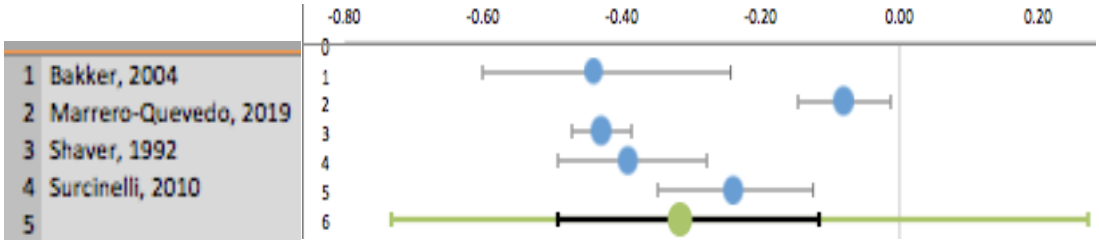
Secure vs. Conscientiousness



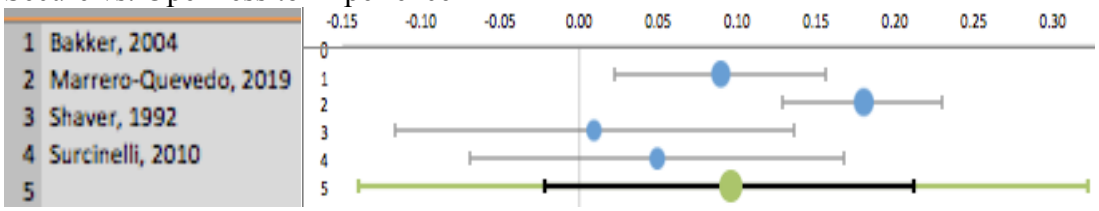
Secure vs. Extroversion



Secure vs. Neuroticism



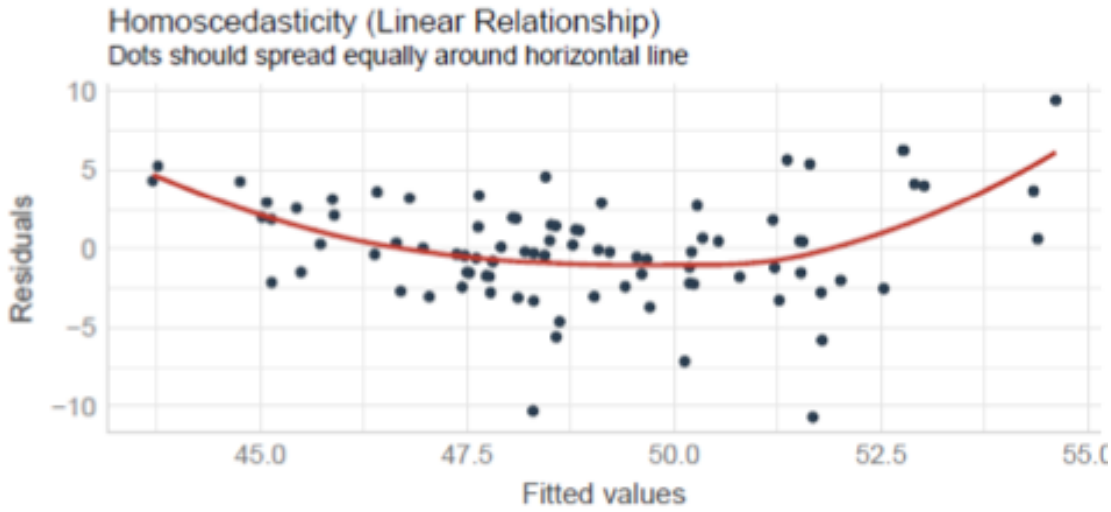
Secure vs. Openness to Experience



Appendix B. Empirical paper

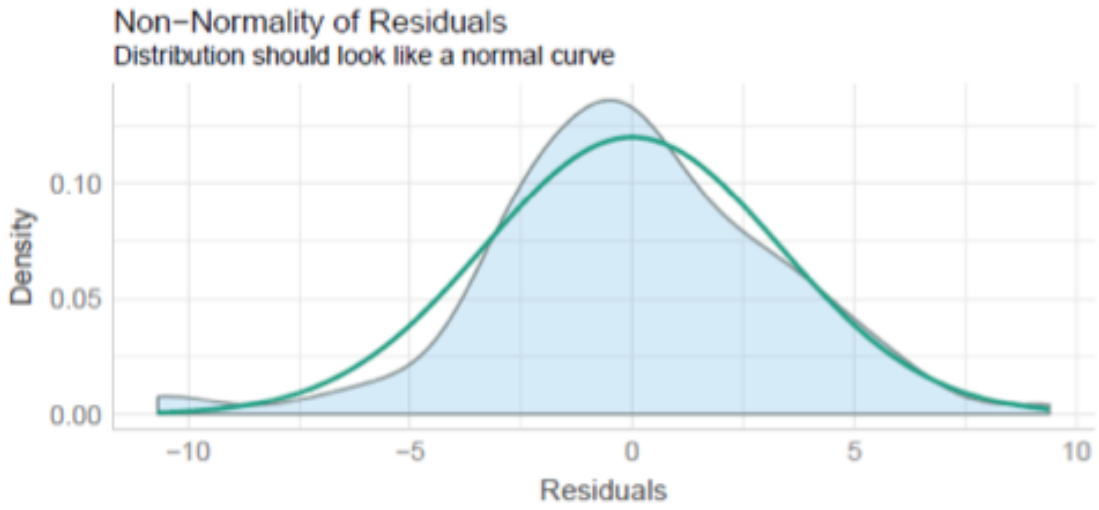
Appendix B1: Figures

Figure 3, Homoscedasticity



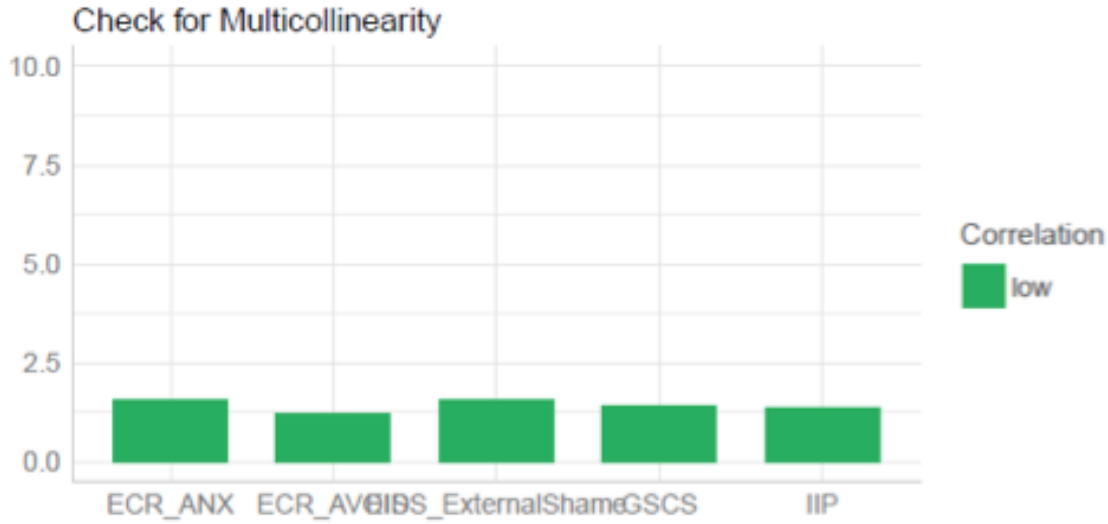
Residuals Vs. Fitted values There was homoscedasticity, as attested by visual inspection of this plot of residuals spread roughly equal around

Figure 4, Normality:



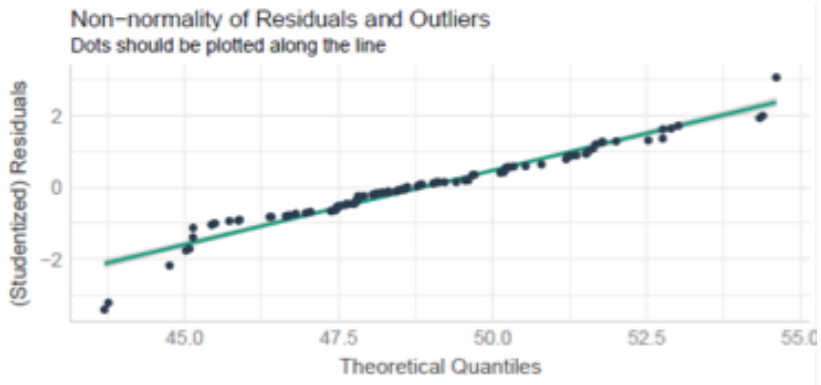
The assumption of normality is met as shown by the following histogram.

Figure 5, Multicollinearity



There was no evidence of multicollinearity as assessed visually and by tolerance values which were greater than 0.1.

Figure 6. Linearity:



QQ plot, *Residuals (Z score) vs. Theoretical quintiles (percentage). Residuals align along a percentile-matched line hence meet the assumptions for linear regression.*

Appendix B2: Questionnaires

Compassionate – engagement scales

Self-compassion (NOTE FOR USERS: REVERSE ITEMS (r) ARE NOT INCLUDED IN THE SCORING)

When things go wrong for us and we become distressed by setbacks, failures, disappointments or losses, we may cope with these in different ways. We are interested in the degree to which people can be compassionate with themselves. We define compassion as "a sensitivity to suffering in self and others with a commitment to try to alleviate and prevent it." This means there are two aspects to compassion. The first is the ability to be motivated to engage with things/feelings that are difficult as opposed to trying to avoid or supress them. The second aspect of compassion is the ability to focus on what is helpful to us. Just like a doctor with his/her patient. The first is to be motivated and able to pay attention to the pain and (learn how to) make sense of it. The second is to be able to take the action that will be helpful. Below is a series of questions that ask you about these two aspects of compassion. Therefore read each statement carefully and think about how it applies to you if you become distressed.

Please rate the items using the following rating scale (Never-Always, 1-10)

Section 1 – These are questions that ask you about how motivated you are, and able to engage with distress when you experience it. So:

When I'm distressed or upset by things…

1. I am motivated to engage and work with my distress when it arises.

Never 1 – Always 10

2. I notice, and am sensitive to my distressed feelings when they arise in me.

Never 1 – Always 10

(r)3. I avoid thinking about my distress and try to distract myself and put it out of my mind.

Never 1 - Always 10

4. I am emotionally moved by my distressed feelings or situations.

Never 1 - Always 10

5. I tolerate the various feelings that are part of my distress.

Never 1 – Always 10

6. I reflect on and make sense of my feelings of distress.

Never 1 – Always 10

(r)7 I do not tolerate being distressed.

Never 1 – Always 10

8. I am accepting, non-critical and non-judgemental of my feelings of distress.

Never 1 – Always 10

Section 2 – These questions relate to how you actively cope in compassionate ways with emotions, thoughts and situations that distress you. So:

When I'm distressed or upset by things…

1. I direct my attention to what is likely to be helpful to me.

2. I think about and come up with helpful ways to cope with my distress.

(r)3. I don't know how to help myself.

4. I take the actions and do the things that will be helpful to me.

5. I create inner feelings of support, helpfulness and encouragement.

Compassion to others:

When things go wrong for other people and they become distressed by setbacks, failures, disappointments or losses, we may cope with their distress in different ways. We are interested in the degree to which people can be compassionate to others. We define compassion as "a sensitivity to suffering in self and others with a commitment to try to alleviate and prevent it." This means there are two aspects to compassion. The first is the ability to be motivated to engage with things/feelings that are difficult as opposed to trying to avoid or supress them. The second aspect of compassion is the ability to focus on what is helpful. Just like a doctor with his/her patient. The first is to be motivated and able to pay attention to the pain and (learn how to) make sense of it. The second is to be able to take the action that will be helpful. Below is a series of questions that ask you about these two aspects of compassion. Therefore read each statement carefully and think about how it applies to you when people in your life become distressed. Please rate the items using the following rating scale:

Never 1 - Always 10

Section 1 – These are questions that ask you about how motivated you are, and able to engage with other people's distress when they are experiencing it. So:

When others are distressed or upset by things…

1. I am motivated to engage and work with other peoples' distress when it arises.
2. I notice and am sensitive to distress in others when it arises.
(r)3. I avoid thinking about other peoples' distress, try to distract myself and put it out of my mind.
4. I am emotionally moved by expressions of distress in others.

5. I tolerate the various feelings that are part of other people's distress.

6. I reflect on and make sense of other people's distress.

(r)7 I do not tolerate other peoples' distress.

8. I am accepting, non-critical and non-judgemental of others people's distress.

Section 2 – These questions relate to how you actively respond in compassionate ways when other people are distressed. So:

When others are distressed or upset by things…

1. I direct attention to what is likely to be helpful to others.

2. I think about and come up with helpful ways for them to cope with their distress.

(r)3. I don't know how to help other people when they are distressed.

4. I take the actions and do the things that will be helpful to others.

5. I express feelings of support, helpfulness and encouragement to others.

Compassion from others

When things go wrong for us and we become distressed by setbacks, failures, disappointments or losses, others may cope with our distress in different ways. We are interested in the degree to which you feel that important people in your life can be compassionate to your distress. We define compassion as "a sensitivity to suffering in self and others with a commitment to try to alleviate and prevent it." This means there are two aspects to compassion. The first is the ability to be motivated to engage with things/feelings that are difficult as opposed to trying to avoid or supress them. The second aspect of compassion is the ability to focus on what is helpful to us or others. Just like a doctor with his/her patient. The first is to be motivated and able to pay attention to the pain and (learn how to) make sense of it. The second is to be able to

take the action that will be helpful. Below is a series of questions that ask you about these two aspects of compassion.

Therefore read each statement carefully and think about how it applies to the important people in your life when you become distressed. Please rate the items using the following rating scale:

Section 1 – These are questions that ask you about how motivated you think others are, and how much they engage with your distress when you experience it. So:

When I'm distressed or upset by things…

1. Other people are actively motivated to engage and work with my distress when it arises.

2. Others notice and are sensitive to my distressed feelings when they arise in me.

(r)3 Others avoid thinking about my distress, try to distract themselves and put it out of their mind.

4. Others are emotionally moved by my distressed feelings.

5. Others tolerate my various feelings that are part of my distress.

6. Others reflect on and make sense of my feelings of distress.

(r)7. Others do not tolerate my distress.

8. Others are accepting, non-critical and non-judgemental of my feelings of distress.

Section 2 – These questions relate to how others actively cope in compassionate ways with emotions and situations that distress you. So:

When I'm distressed or upset by things…

1. Others direct their attention to what is likely to be helpful to me.

2. Others think about and come up with helpful ways for me to cope with my distress.

(r)3. Others don’t know how to help me when I am distressed

4. Others take the actions and do the things that will be helpful to me.

5. Others treat me with feelings of support, helpfulness and encouragement.

Experiences in Close Relationship Scale-Short Form (ECR-S)

Instruction: The following statements concern how you feel in romantic relationships. We are interested in how you generally experience relationships, not just in what is happening in a current relationship. Respond to each statement by indicating how much you agree or disagree with it. Mark your answer using the following rating scale:

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree

1. It helps to turn to my romantic partner in times of need.
2. I need a lot of reassurance that I am loved by my partner.
3. I want to get close to my partner, but I keep pulling back.
4. I find that my partner(s) don't want to get as close as I would like.
5. I turn to my partner for many things, including comfort and reassurance.
6. My desire to be very close sometimes scares people away.
7. I try to avoid getting too close to my partner.
8. I do not often worry about being abandoned.
9. I usually discuss my problems and concerns with my partner.
10. I get frustrated if romantic partners are not available when I need them.
11. I am nervous when partners get too close to me.
12. I worry that romantic partners won't care about me as much as I care about them.

External and Internal Shame Scale (EISS)

M. Moura-Ramos, C. Ferreira, M. Matos & A. Galhardo, 2016

Below are a series of statements about feelings people may have, but that might be experienced by each person in a different way. Please carefully read each statement and circle the number that best indicates how often you feel what is described in each item.

Please use the following rating scale

0 = Never	1 = Rarely	2 = Sometimes	3 = Often	4 = Always

	In relation to several aspects of my life: **I FEEL THAT**	0	1	2	3	4
1	Other people see me as uninteresting	0	1	2	3	4
2	I am disappointed in myself	0	1	2	3	4
3	I have some kind of flaw as a person	0	1	2	3	4
4	People in my life are disappointed in me	0	1	2	3	4
5	Other people don't understand me	0	1	2	3	4
6	I don't feel as part of my group of friends	0	1	2	3	4
7	People around me see me as not being up to their standards	0	1	2	3	4
8	Others are judgmental and critical of me	0	1	2	3	4
9	I am judgmental and critical of myself	0	1	2	3	4

10	I am isolated	0 1 2 3 4
11	I am different and inferior to others	0 1 2 3 4
12	I am empty as a person	0 1 2 3 4
13	People in my life move away from me or exclude me from several situations	0 1 2 3 4
14	I am unworthy as a person	0 1 2 3 4
15	People around me see me as inferior to them	0 1 2 3 4
16	Other people see me as useless	0 1 2 3 4

UCLA loneliness scale

INSTRUCTIONS: Indicate how often each of the statements below is descriptive of you.

C indicates “I often feel this way”

S indicates “I sometimes feel this way”

R indicates “I rarely feel this way”

N indicates “I never feel this way”

1. I am unhappy doing so many things alone O S R N

2. I have nobody to talk to O S R N

3. I cannot tolerate being so alone O S R N

4. I lack companionship O S R N

5. I feel as if nobody really understands me O S R N

6. I find myself waiting for people to call or write O S R N

7. There is no one I can turn to O S R N

8. I am no longer close to anyone O S R N

9. My interests and ideas are not shared by those around me O S R N

10. I feel left out O S R N

11. I feel completely alone O S R N

12. I am unable to reach out and communicate with those around me O S R N

13. My social relationships are superficial O S R N

14. I feel starved for company O S R N

15. No one really knows me well O S R N

16. I feel isolated from others O S R N

17. I am unhappy being so withdrawn O S R N

18. It is difficult for me to make friends O S R N

19. I feel shut out and excluded by others O S R N

20. People are around me but not with me O S R N

Scoring:

Make all O's =3, all S's =2, all R's =1, and all N's =0. Keep scoring continuous.

IIP – 32

Instructions: people have reported having the following problems in relating to other people. Please read the list below, and for each item, consider whether it has been a problem for you with respect to any significant person in your life. Then fill in the numbered circle that describes how distressing that problem has been.

0 not at all, 1 a little bit, 2 moderately, 3 quite a bit, 4 extremely

The following are things you find hard to do with other people

1. Say "no" to other people
2. Join in on groups
3. Keep things private from others
4. Tell a person to stop bothering you
5. Introduce myself to new people
6. Confront people with problems that come up
7. Be assertive with another person
8. Let other people know when I am angry
9. Socialize with other people
10. Show affection to people
11. Get along with people
12. Be firm when I need to be
13. Experience a feeling of love for another person
14. Be supportive of another person's goals in life
15. Feel close to other people
16. Really care about other people's problems
17. Put somebody else's needs before my own
18. Feel good about another person's happiness

19. Ask other people to get together socially with me

20. Be assertive without worrying about hurting the other person's feelings

The following are things that you do too much

21. I open up to people too much

22. I am too aggressive toward other people

23. I try to please other people too much

24. I want to ne noticed too much

25. I try to control other people too much

26. I put other people's needs before my own too much

27. I am overly generous to other people

28. I manipulate other people too much to get what I want

29. I tell personal things to other people too much

30. I argue with other people too much

31. I let other pole take advantage of me too much

32. I am affected by another person's misery too much

Appendix C: Ethics approval letter, advert for public and consent form

UCL RESEARCH ETHICS COMMITTEE
OFFICE FOR THE VICE PROVOST RESEARCH

6 November 2019

Dr Peter Scragg
Research Department of Clinical, Education and
Health Psychology
UCL

Dear Dr Scragg

Notification of Ethics Approval
Project ID/Title: 16719/001: Compassion, shame and relationships

I am pleased to confirm in my capacity as Chair of the UCL Research Ethics Committee (REC) that I have ethically approved your study until **1 May 2020.**

Ethical approval is granted subject to the following conditions:

Notification of Amendments to the Research
You must seek Chair's approval for proposed amendments (to include extensions to the duration of the project) to the research for which this approval has been given. Each research project is reviewed separately and if there are significant changes to the research protocol you should seek confirmation of continued ethical approval by completing an 'Amendment Approval Request Form'
http://ethics.grad.ucl.ac.uk/responsibilities.php

Adverse Event Reporting – Serious and Non-Serious
It is your responsibility to report to the Committee any unanticipated problems or adverse events involving risks to participants or others. The Ethics Committee should be notified of all serious adverse events via the Ethics Committee Administrator (ethics@ucl.ac.uk) immediately the incident occurs. Where the adverse incident is unexpected and serious, the Joint Chairs will decide whether the study should be terminated pending the opinion of an independent expert. For non-serious adverse events the Joint Chairs of the Ethics Committee should again be notified via the Ethics Committee Administrator within ten days of the incident occurring and provide a full written report that should include any amendments to the participant information sheet and study protocol. The Joint Chairs will confirm that the incident is non-serious and report to the Committee at the next meeting. The final view of the Committee will be communicated to you.

Final Report
At the end of the data collection element of your research we ask that you submit a very brief report (1-2 paragraphs will suffice) which includes in particular issues relating to the ethical implications of the research i.e. issues obtaining consent, participants withdrawing from the research, confidentiality, protection of participants from physical and mental harm etc.

Office of the Vice Provost Research, 2 Taviton Street
University College London
Tel: +44 (0)20 7679 8717
Email: ethics@ucl.ac.uk
http://ethics.grad.ucl.ac.uk/

UCL Research Department of Clinical, Educational & Health Psychology
1-19 Torrington Place
University College London
London
WC1E 7HB

Advert for general population:

Compassion shame and relationships

We are looking for volunteers aged 18 and above to take part in a study investigating if and how compassion correlates with different patterns of interpersonal communication styles, and personality traits. You will access the study through a website where you will have to fill in several questionnaires. The entire experiment will be conducted online and it will last approximately 20 – 30 minutes.

By taking part in this study you will help us understand how compassion to oneself and others, can modify the way we perceive, and behave towards, other and ourselves.
Requirements for participants: 18 and above with no mental condition diagnosis.

Interested? You can access the study via this link [url] and if you have any questions you can contact me via my email [yosef.koffler.10@ucl.ac.uk].

THIS FORM WILL BE DISPLAYED AS A WEBPAGE AND WILL NOT BE IN THE FORM OF A SHEET OF PAPER.

PLEASE PRINT OR DOWNLOAD THIS INFORMATION PAGE IF YOU WISH TO KEEP IT FOR YOUR RECORDS

Information Sheet (Version 2.0)
16/07/2019
We are inviting you to take part in a research project. We want to find out how compassion correlates with different patterns of interpersonal communication styles.

Before you decide whether to take part it is important that you understand why the research is being done and what this study will involve. Please take time to read the following information carefully and you may also find it helpful to discuss with relatives, friends, and colleagues. Ask us if anything is not clear or you would like more information. Contact details are provided below.

Title of Project: **Compassion shame and relationships**

Project ID No:

Student Researcher: **Yossi Koffler (Trainee Clinical Psychologist)**
UCL Clinical Psychology Doctoral Programme

Supervisor: **Dr Peter Scragg (Clinical Psychologist and Lecturer)**
UCL Research Department of Clinical, Educational & Health Psychology

This study has been approved by the Clinical, Educational and Health Psychology Research Department's Ethics Chair.

What is the purpose of this study?

The study aims to examine if and how compassion correlates with different patterns of interpersonal communication styles, and personality traits (attachment patterns, loneliness, and shame)

Why have I been invited?

You have been invited to participate in this study as you are a member of the general public of age 18 or over with no background of mental conditions.

Do I have to take part?

No. You are under no obligation to take part in this study.

What will I be asked to do?

Your participation will involve answering a few questions about yourself such as age, gender, years in education and some questionnaires about the research constructs (such as compassion, loneliness, attachment patterns etc.).
The study will last approximately 20 – 30 minutes.
If you decide to take part you are still free to withdraw at any time during the process and without giving a reason.

What are the benefits of participating in this study?

If you take part, you will be contributing to a project which is designed to help researchers understand how compassion to oneself and others, can modify the way we perceive, and behave towards, other and ourselves.

What are the risks of participating in this study?

We do not envisage any risks of taking part in the study. Details will be provided in the debrief for obtaining more information should you find any of the issues in this study distressing. You can also contact the researchers (details below) for further information.

What if I no longer want to take part in this study?

You can stop taking part in this study at any time and without giving a reason. However, if you have completed the entire study, research data that we have already collected cannot be withdrawn or recalled as it is a fully anonymous study.

How will my information be used?

To help future research and make the best use of the research data you have given us (such as answers to questionnaires) we may keep your research data indefinitely.
The data we collect may be shared as follows:

- In research publications, your research data will usually be reported as part of an average of the group of people being studied, so you cannot be identified as

an individual. If any of your individual data are reported, they will be published anonymously with your personal details completely removed.

- We may share your research data in public research databases but your data will always be anonymised. This means that a code will be used instead of your name (or other personal details), and protections applied that minimize the risk of deliberate or accidental reidentification of you as an individual.
- Personal data and any information that might identify you as an individual. Your personal data will be kept securely, and will only be kept as long as it is necessary for the research. It will be deleted if it is no longer required.
- We may share your research data with other accredited researchers, and this may include personal data necessary for the research, such as your date of birth so that your age is known for certain analyses.
- The legal basis used to process your personal data is known as the provision of public task. This means that the research you are taking part in is deemed to be in the public interest. We will follow UCL and legal guidelines to safeguard your data.

Who is the Sponsor for this Study?
University College London (UCL) is the sponsor for this study based in the United Kingdom. We will be using information from you in order to undertake this study and UCL will act as the data controller for this study. This means that we are responsible for looking after your information and using it properly.
How will my information be used on research databases?
When you agree to take part in a research study, anonymised data that does not contain any personally identifiable information may be made openly available. Your information will only be used by organisations and researchers to conduct research in accordance with the UK Policy Framework for Health and Social Care Research.
Who is organising the funding of this study?
The study is funded by UCL's Research Department of Clinical, Educational and Health Psychology. The student researcher will be liaising with UCL to organise funding for the study
Who has reviewed the study?
This study has been reviewed by *(insert name of ethics committee)* on *(date)*.
Local Data Protection Privacy Notice
The controller for this project will be University College London (UCL). The UCL Data Protection Officer provides oversight of UCL activities involving the processing of personal data, and can be contacted at data-protection@ucl.ac.uk. This 'local' privacy notice sets out the information that applies to this particular study. Further information on how UCL uses participant information can be found in our 'general' privacy notice:
For participants in health and care research studies, click here
What if there is a problem?
If you wish to complain or have any concerns about any aspect of the way the information has been gathered whilst participating in the research, then please talk to the researcher or the chief investigator (contact details below) about your complaint. If you then feel that the complaint has not been resolved satisfactorily, please contact the chair of the UCL Research Ethics Committee (ethics@ucl.ac.uk).
If you are concerned about how your personal data are being processed please contact UCL data protection officer via protection@ucl.ac.uk. If you are not satisfied with the response you receive, you may wish to contact the Information Commissioner's Office (ICO). Contact details, and details of your rights, are available on the ICO website at: [internet address which is currently https://ico.org.uk/for-organisations/data-protection-reform/overview-of-the-gdpr/individuals-rights/.]
Please let us know if anything is not clear or if you would like any further information before taking part.
Thank you for your interest in this project.

The Research Team

If you have any questions about this study, please contact:

Yossi Koffler
Doctoral Researcher
UCL Research Department of
Clinical, Educational & Health
Psychology
Psychology
1-19 Torrington Place
University College London
London WC1E 7HB
Email: yosef.koffler.10@ucl.ac.uk

Dr Peter Scragg
Chief Investigator
UCL Research Department of
Clinical, Educational & Health

1-19 Torrington Place
University College London
London WC1E 7HB
Email: p.scragg@ucl.ac.uk

[Press here to continue to the consent form]

UCL Research Department of Clinical, Educational & Health Psychology 1-19 Torrington Place University College London London WC1E 7HB

THIS FORM WILL BE DISPLAYED AS A WEBSITE AND WILL NOT BE IN THE FORM OF A SHEET

OF PAPER.

CONSENT FORM

Project Title: *Compassion shame and relationships*

I confirm that I understand that by ticking each box below I am consenting to this element of the study. I understand that it will be assumed that unticked/initialled boxes means that I DO NOT consent to that part of the study. I understand that by not giving consent for any one element that I may be deemed ineligible for the study.

Please initial box

1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason. However, if I have completed the entire study, research data that has already been collected cannot be withdrawn or recalled as it is a fully anonymous study. ☐

3. I consent to the processing of my personal data for the purposes explained to me in the information sheet. I understand that my information will be handled in accordance with all applicable data protection legislation and ethical standards in research. ☐

I give my consent for my email address to be stored securely and entered into a prize draw and to be contacted if I am selected [FOR EXPERIMENT WITH CLINICIANS]

4. I understand that it will not be possible for others to identify me in any publications. ☐

5. I understand that by agreeing to take part in this study, anonymised data that does not contain any personally identifiable information may be shared with others for future research, shared in public databases and in scientific reports. ☐

6. I understand the potential benefits and risks of participating and who to contact if I wish to lodge a complaint. ☐

7. I voluntarily agree to take part in the above study. ☐

Would you like to be informed about future UCL studies of a similar nature that you may be interested in participating in? If you indicate 'Yes', then we will keep your details on a secure database so UCL researchers can contact you. Tick or initial the appropriate box below. *Saying 'Yes' or 'No' does not affect whether you can take part in this study.*

Yes, I would be happy to be contacted in this way ☐
No, I would not like to be contacted ☐

PLEASE PRESS CONTINUE TO ACCEPT THESE TERMS

[Participant will click continue to proceed to the experiment]