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Corresponding Author:	Hui-Yi Lo, Ph.D. National Chung Hsing University Taichung City, TAIWAN, REPUBLIC OF CHINA
Corresponding Author Secondary Information:	
Corresponding Author's Institution:	National Chung Hsing University
Corresponding Author's Secondary Institution:	
First Author:	Hui-Yi Lo, Ph.D.
First Author Secondary Information:	
Order of Authors:	Hui-Yi Lo, Ph.D.
	Nigel Harvey, Ph.D.
Order of Authors Secondary Information:	

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Compulsive Buying: Obsessive Acquisition, Collecting or Hoarding?

Hui-Yi Lo

National Chung Hsing University

Nigel Harvey

University College London

Author Note

Hui-Yi Lo, Department of Marketing, National Chung Hsing University, 250 Kuo Kuang Rd., Taichung City, 402, Taiwan. hyl@dragon.nchu.edu.tw;

Nigel Harvey, the Division of Psychology and Language Sciences, University College London, Gower Street, London, WC1E 6BT, UK. n.harvey@ucl.ac.uk.

Correspondence should be addressed to Hui-Yi Lo, Department of Marketing, National Chung Hsing University, 250 Kuo Kuang Rd., Taichung City, 402, Taiwan.

E-mail: hyl@dragon.nchu.edu.tw

TEL: +886 4 22840392 ext.765

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Compulsive Buying: Obsessive Acquisition, Collecting or Hoarding?

Abstract We report two investigations into compulsive shopping behavior. The first showed that compulsive shoppers are obsessive in acquiring certain classes of product. Compared to normal shoppers, they spend more money on these products and shop for them more frequently. The second study showed that an obsession with acquiring these products rather than a desire to collect or hoard them is a significant factor in producing compulsive shopping behavior. This is consistent with the notion that compulsive shopping is an addictive habit reinforced by the relief from craving produced by the act of purchasing particular products. In our Taiwanese but not in our British sample, compulsive shopping led to hoarding behavior. This implies that the Taiwanese are more reluctant to discard items that they do not use. We discuss cultural factors that may account for this finding.

Keywords Compulsive buying · Collecting, hoarding · Obsessive acquisition

Abnormal shopping has been discussed extensively in the literature under a variety of names, including oniomania, compulsive shopping, impulse shopping, buying mania, addictive buying, and compulsive consumption. Kraepelin (1915) originally noted “onomania” in the psychiatric literature and Bleuler (1924) also referred to oniomania or buying mania.

Researchers hold different ideas about how to define compulsive buying behavior. Essentially its symptoms are uncontrollable urges that repeatedly compel a person to buy, bringing temporary relief from psychological needs (e.g., tension and low self-esteem). After buying, individuals feel guilty about succumbing to their urges, and their behavior leads to financial harm (Faber & O'Guinn, 1989; McElroy et al., 1991; McElroy et al., 1994; Garcia, 2007; Manolis & Roberts, 2008; Lo & Harvey, 2011; Lo & Harvey, 2012).

Compulsive buyers are likely to possess low levels of self-esteem (O'Guinn & Faber, 1989; Scherhorn et al., 1990; D'Astous, 1990; Lee et al., 2000; Lo & Harvey, 2012) and possess highly materialistic attitudes (O'Guinn & Faber, 1989; Desarbo & Edwards, 1996; Lo & Harvey, 2012). Typically, they also have high levels of depression, buying things in their attempts to alleviate their negative mood (Faber et al., 1987; Desarbo & Edwards, 1996; Black, 2007; Lo & Harvey, 2011). Compulsive shoppers generally derive pleasure from their compulsive behavior and their behavior serves to alleviate their negative moods (Lo & Harvey, 2011). Although people with an obsessive compulsive disorder (OCD) suffer from both obsessive thoughts and compulsive behaviors, compulsions of OCD never seem pleasurable and individuals with OCD have intrusive thoughts that cause anxiety or distress (Leckman et al., 2010). The purpose of their actions is to carry out rituals to control the anxiety that they experience.

Lejoyeux, Bailly, Moula and Ades (2005) assessed the prevalence of compulsive buying among patients presenting with an obsessive compulsive disorder (OCD). They compared the buying style of patients with and without compulsive buying. 1,500 consecutive patients were

assessed by a general practitioner in Paris, of which 60 patients presented with OCD. These 60 patients consisted of pure OCD (N=46) and OCD with compulsive buying (N=14). They compared three groups: a control group, patients with OCD, and patients with OCD and compulsive buying. The results indicated that compulsive buying was more frequent in OCD patients than in the control group. Depression was significantly more frequent in the OCD with compulsive buying group (78%) than in either the pure OCD group (42%) or the control group (10%) (Lejoyeux et al., 2005). These findings can be interpreted as indicating that buying provides a way of relieving depression for OCD patients, and that compulsive buying and OCD share some co-morbid phenomena (i.e., depression).

Given these findings, it is possible that there are relationships between compulsive buying and behaviors that are more characteristic of OCD. These behaviors include hoarding, collecting and obsessive acquisition.

Collecting, Hoarding, and Obsessive Acquisition

Although collecting and hoarding behavior are similar, they can be distinguished. Belk (1995, p479) defines collecting as a process of actively, selectively, and passionately acquiring and possessing things removed from ordinary use and perceived as part of a set of non-identical objects or experiences. It is an acquisitive, possessive, and materialistic pursuit. It indicates that an individual is motivated to accumulate a series of similar objects, and that he or she does not plan to immediately dispose of those objects. Collecting is an ongoing process and collectors may reevaluate their collecting goals according to their motives (McIntosh & Schmeichel, 2004).

Hoarding is different from collecting. It is a behavior related to the acquisition of but the failure to use or discard a large number of seemingly useless possessions (Frost & Gross, 1993; Frost, Tolin, Steketee, Fitch, & Selbo-Bruns, 2009). Collections are organized (Clifford, 1985, p238): producing them involves seeking, acquiring, organizing, cataloging, or

maintaining whatever items are of interest to the individual collector. Hoards are not organized in this way. Also, whereas collections (e.g., of Icelandic coins or stamps before 1950) may be complete (and the aim of collectors may be to reach completion), hoards (e.g., of old newspapers) never are. Collections can often be traded with other collectors; their value is often explicit. Hoarders do not trade with other hoarders; any value a hoard has is incidental. Finally, collectors may reassess their collecting goals, decide to collect other things (e.g., Japanese stamps) and stash their old collections. Hoarding is not such a controlled activity: stashed collections are organized in a way that hoards are not.

Obsessive acquisition refers to a need to obtain items rather than to possess or keep them. This distinguishes it from collecting or hoarding. Although items that are obsessively acquired may be bought, they may also be obtained without payment because they are free or are stolen. If items are obsessively acquired but fail to be discarded, hoarding may occur as a result.

What Is Compulsive About Compulsive Buying?

People may compulsively buy products because they have a compulsion to acquire, collect, or hoard items. There is some previous research on relations between compulsive buying, hoarding and obsessive acquisition.

Frost, Steketee and Williams (2002) investigated the relationship between scores on the compulsive buying scale (Faber & O'Guinn, 1992) and the compulsive acquisition scale (Frost & Steketee, 1998). They found that compulsive buyers had significantly higher scores on the compulsive acquisition scale than controls (Frost et al., 2002). As mentioned earlier, studies have also found that hoarders suffer from high levels of compulsive buying (Frost, Kim, Morris, Bloss, Murray-Close and Steketee, 1998; Mueller et al., 2007; Mueller, Mitchell, Crosby, Glaesmer, & de Zwaan, 2009). Finally, both compulsive buying and obsessive acquisition correlated with hoarding in these studies (Frost et al., 1998; Frost et al., 2002).

We are not aware of any studies relating compulsive buying to collecting. However, Pearce (1992) proposed 17 motivations to explain why people engage in collecting behavior and suggested that all of them derive from a need for self-enhancement or self-fulfillment. Also, Belk (1995) suggests that collecting behavior reduces tension, produces a surge of positive affect and increases self-esteem. Given that compulsive shopping appears to be driven by a need to reduce tension, alleviate depression, and increase self-esteem, these studies suggest that there may be a relation between compulsive buying and collecting behavior.

Compulsive buying has also been interpreted as a behavioral addiction. One of its symptoms is an uncontrollable urge that repeatedly compels a person to buy. This craving to buy may be reinforced by habit. Herrnstein and Prelec (1992) pointed out that an addiction is a habit that has resulted from a long stream of choices. The enjoyment derived from the act of purchasing a particular type of product (e.g., handbags, books, or clothing) may reinforce a compulsive buying habit (Valence, d'Astous, & Fortier, 1988; Lo & Harvey, 2011; Lo & Harvey, 2012). Compulsive shoppers' desire to obtain those products then becomes an addiction.

In fact, there is some evidence that compulsive shoppers are particularly likely to buy certain types of item. Thus, whereas female compulsive shoppers tend to spend more on clothes and jewellery, male compulsive shoppers tend to spend more on cars and electronics (O'Guinn & Faber, 1989). More generally, compulsive shoppers are likely to buy items associated with designer products and prestigious brand names (Lejoyeux et al., 2007; Lo & Harvey, 2011).

Here, we aim 1) to identify the kinds of product that trigger compulsive buying behavior, 2) to study whether this buying behavior relates to a need to collect those products, 3) to understand the relations between obsession with acquisition, collecting or hoarding behavior

and compulsive buying behavior, and 4) to determine whether these relations are culture-specific. However, before describing our studies, we need outline how we identified compulsive buying.

Identifying Compulsive Buying

Faber and O'Guinn's (1992) Compulsive Buying Scale (CBS) was used in this study because their screening device was expressly designed to distinguish individuals who have a tendency to make purchases compulsively from the normal population. The CBS consists of seven items, and uses a 5-point Likert scale to assess frequency or degree of agreement with items such as "*If I have any money left at the end of the pay period I just have to spend it*". Two of the seven items pertain to emotional reactions to shopping (e.g., *make oneself feel better, feeling anxious when not buying*). The remaining five relate to financial aspects of buying. The seven items represent specific behaviors, motivations and feelings associated with compulsive buying. The five-point scales for the seven items result in overall scores that range from seven to 35, with *lower* scores indicating greater compulsive buying tendencies.

We employed Faber and O'Guinn's (1992) Compulsive Buying Scale (CBS). It reliably distinguishes compulsive buyers from other shoppers (Magee, 1994; Faber et al., 1995; Roberts, 1998; Roberts & Jones, 2001, Manolis & Roberts, 2008; Lo & Harvey, 2011, Lo & Harvey, 2012, Lo, Harvey & Thomson, 2012) and has been externally validated against shopping behaviors characteristic of compulsive buying (Lo & Harvey, 2011).

Study 1

This study used online questionnaires. A web-link to the questionnaires was placed on Taiwanese and British discussion forums and on web-based experiment websites (college subject pools, the Google discussion forum, the Yahoo knowledge forum, community overview-ebay, the campus discussion forum, online psychology research UK, psychological research on the net, etc.). Data were gathered from participants who visited these forums and

were willing to complete to the questionnaires.

Method

Before our main study, we conducted two pilot studies. The first one was to eliminate any problems associated with language translation. A sample of 20 Taiwanese participants who knew both English and Traditional-Chinese was obtained from three British universities. They first filled in a Traditional-Chinese version of the questionnaires, and then completed the English version a week later. The outcomes of two versions were compared and found to be very similar.

A second pilot study was carried out in order to improve the questionnaire by identifying and eliminating potential problems. It was carried out on 160 Taiwanese respondents. The prevalence of compulsive buying in this investigation was 12% (18 of 160). Cronbach's coefficient alpha was at a significant level ($\alpha = 0.85$).

Materials The main online questionnaire consisted of two sections. The first comprised Faber and O'Guinn's (1992) compulsive buying scale (CBS). It was used to distinguish compulsive shoppers from the rest of population.

The second section was related to collecting behavior and included five questions. We first asked participants which of many presented product categories they currently enjoyed buying. Then we asked them three sub-questions: 1) In comparison with your peers, how much money do you spend on the most enjoyable product. Participants gave their answer by selecting a pull-down menu (This ranged from "Less than your peers" to "More than your peers".) 2) If you own such products, how often do you usually purchase them? (Participants selected a pull-down menu that ranged from "Once a month or less" to "Nearly every day".); 3) Do you collect any of these products? (Participants clicked the "Yes"-button or the "No"-button.)

In this first study, we made no attempt to distinguish between collecting, hoarding, and

obsessive acquisition and we did not expect our participants to do so. We anticipated that a tendency towards any of these behaviors would increase the likelihood that respondents would say that they collected the product that they enjoyed most.

Participants We collected data from Taiwanese and UK participants. If both reveal similar behavioral tendencies, the obtained symptoms of compulsive buying (and its associated factors) are more likely to be general ones that are common to different cultures. The two samples of respondents were gathered over one month. Respondents were classified as invalid if they failed to complete the experiment or had already completed it previously. The total number of British respondents (707) included 521 valid respondents and 186 invalid ones, thereby giving a response rate of 73.69%. The total number of Taiwanese participants (250) consisted of 200 valid respondents and 50 invalid ones, thereby providing a response rate of 80%.

The valid British respondents were 38% male and 62% female and the percentage of them who were compulsive shoppers was 12% (4% Male and 8% Female). Most annual incomes of British compulsive shoppers were in categories £ 9,999 and below (56 of 64). The valid Taiwanese respondents were 40% male and 60% female and the percentage of them who were compulsive shoppers was 16% (6% Male and 10% Female). The monthly income of most Taiwanese compulsive shoppers was either in below NTD 25000 category or in the “NTD 35001-45000” category.

Both samples had demographic characteristics that are consistent with the literature: compulsive buying behavior tends to be restricted to middle-income or low-income individuals (Faber et al., 1987; Faber & O'Guinn, 1992; Lo & Harvey, 2011, Lo & Harvey, 2012, Lo et al., 2012) and, with rare exceptions (Koran et al., 2006), most studies have found that women tend to exhibit it more often than men (O'Guinn & Faber, 1989; Schlosser et al., 1994).

Results

Products that people enjoy buying vary not only between individuals but also between different nationalities. Therefore, in this study, we analyzed data from British participants and Taiwanese participants separately.

Product Categories That People Enjoyed Buying First we report our analysis of the British participants. A multiple regression analysis was used to reveal how much variance in the dependent variable (compulsive buying acts) was explained by the 26 product categories that participants enjoyed buying (e.g., audio and video application, jewellery, etc.). A revised regression model eliminated 23 insignificant categories in order to produce an optimal regression model (Table 1).

Although the multiple R coefficient for this model was only 0.28 and therefore indicated that the correlation between compulsive buying behavior and the three categories was quite weak, there were statistically significant negative relationships between the compulsive buying score and enjoyment of jewellery, electronic components, and wallets. (Relations are negative because people with a higher compulsive buying tendency have a *lower* CBS score.) Jewellery made the largest contribution with the highest beta value of -0.26.

[Table 1 about here]

A similar analysis was carried out on the Taiwanese participants. The revised regression model eliminated 20 insignificant categories to produce the optimal regression model shown in Table 2. The multiple R coefficient (0.64) indicated that the correlation between compulsive buying behavior and the six categories was strong. Art collections and electronic components made the largest contribution with the highest beta values (respectively -0.33, -0.32; Table 2).

[Table 2 about here]

Monetary Spending and Buying Frequency We asked participants: “*In comparison with*

your peers, how much money do you spend on the most enjoyable product?". Although enjoying buying certain things may lead all consumers to spend more money on those products than on general goods, the amount of money spent on those products may be greater for compulsive shoppers than for normal shoppers. Compulsive shoppers may also buy purchase those products more frequently than normal shoppers.

First, we analyzed data from the British participants. A Chi-Square test showed that compulsive shoppers were significantly more likely to say that they spent more than their peers on the products they enjoyed most (Fig. 1: upper panel). They were also significantly more likely to say that they bought them frequently (at least three times per month) than infrequently (once a month or less) (Fig. 2: upper panel).

[Figs. 1 and 2 about here]

We carried out a similar analysis on data from the Taiwanese sample. The effects obtained for British participants were present even more strongly in Taiwanese respondents (Figs. 1 and 2: lower panels). Taiwanese compulsive shoppers spent more money on products that gave them most enjoyment and bought them more frequently than the general population.

Collecting Behavior Compulsive shoppers were significantly more likely than normal shoppers to say that they collected products that they enjoyed buying (e.g. handbags, jewellery, electronic components, etc.). Table 3 shows that similar behavioral tendencies were present in participants from Britain ($t(1, 74.13) = 2.54, p = .013$) and Taiwan ($t(1, 48.88) = 6.15, p < .001$).

[Table 3 about here]

To sum up, this study showed that compulsive shoppers are more likely than the general population to say that they spend more money on the products that they enjoy, that they buy those products more frequently, and that they collect those products. In the next investigation, we make an explicit distinction between obsessive acquisition behavior, collecting behavior,

hoarding behavior and compulsive buying behavior, and examine the relationships between those factors. We hypothesize that compulsive shoppers' behavior is triggered by an obsession with acquiring certain products. As a result, they may show hoarding behavior or obsessive collecting behavior of these products.

Study 2

We have seen that previous research suggests that obsessive acquisition and hoarding behavior are somehow related to compulsive buying behavior (Frost et al, 1998, 2002). Our first study cast some light on this relationship. It showed that compulsive shoppers tend to 'collect' certain products. They purchase these products because they are the ones that can satisfy their craving. In the long term, acquiring these items becomes a habit. Consequently, they may find themselves systematically collecting or hoarding those products. In other words, collecting (or hoarding) behavior is a *consequence* of addictive purchasing rather than driven by a primary desire to save things (or not discard them).

Method

With these arguments in mind, we focused on two main factors: obsessiveness and collecting/hoarding. The design of the investigation included two sections: the CBS section and a questionnaire containing questions on obsessive acquisition and collecting/hoarding.

Materials The questionnaire in the second section was designed to emphasize an organized acquisitive obsession. Questions focused on behavior relating to seeking, acquiring, cataloging or maintaining items of interest to the individual collector. The questionnaire comprised 10 questions concerned with obsessiveness and 10 questions dealing with collecting/hoarding.

The obsessiveness questions put stress on emotional reactions to the acquisition or stashing of particular objects (e.g., I have an enthusiasm for things of a particular type). The collecting/hoarding behavior questions emphasized a motive-related goal of accumulating a

series of similar objects with the aim of retaining them (e.g., I like to store up a group of similar things systematically. I regularly buy lots of the same type of things). All questions were developed for this study, and used a 5-point scale (5: *strongly agree*; 1: *strongly disagree*). They are listed in Appendix 1.

Although valid instruments to measure hoarding and acquisition tendencies already exist, these screening devices either put stress on problematic saving behavior (e.g., the Saving Inventory-Revised developed by Frost et al., 2004) or focus on people's feelings of being compelled to acquire possessions (e.g., the Compulsive Acquisition Scale developed by Frost et al., 1998). Their use was inappropriate here because, as we mentioned earlier, our concern was with identifying a generalized acquisitive obsession and systematic collecting behavior.

Participants Samples of respondents were gathered over a period of 31 days. In order to control participants' collecting patterns, an invitation email was used to recruit participants who had participated in Study 1. The samples were again drawn from Taiwanese and British populations.

Data from 125 British participants were collected. There were 89 valid data sets and 36 invalid data sets, a response rate of 71.2%. The 130 Taiwanese respondents comprised 93 valid respondents and 37 invalid respondents, a response rate of 71.5%.

The valid British respondents were 44% male and 56% female. The percentage of the British compulsive shoppers in this experiment was 18% of which 6% were male and 12% were female. Annual incomes of compulsive shoppers were in categories £ 9,999 and below (16 of 16). The valid Taiwanese respondents were 62% male and 38% female. The percentage of compulsive shoppers was 18% of which 6% were male and 12% were female. The monthly income of most compulsive shoppers was either in the "NTD 35001-45,000" category (5 of 17) or in the "NTD 45001-55000" category (5 of 17)

Results

First, an exploratory factor analysis was employed to extract factors from the questionnaire and determine their construct validity. The Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity were used to assess the appropriateness of the correlation matrices for factor analysis. Principal component factor analysis with Varimax rotation and a factor loading of 0.40 was run on the data. A regression analysis was then used to examine the relation between compulsive buying behavior and these factors. The results for the British population group and the Taiwanese population group are presented separately below.

British Participants Factor analysis extracted five factors from the 20 questions (Table 4). A scale reliability test showed that two factors were unreliable. The other three factors were measured by 13 questions. More specifically, four of the 13 questions predicted systematic collecting behavior, five of the 13 questions predicted obsession with acquisition, and four of the 13 questions predicted hoarding behavior. Thus our factor analysis suggested that collecting and hoarding are likely to relate to different dimensions. This finding supports our view that collecting, hoarding, and obsessive acquisition behavior are all distinct.

The three factors were used in a regression analysis to predict compulsive buying behavior. The upper panel of Fig. 3 shows that there was a statistically significant relation between compulsive buying behavior and obsession with acquisition, and that the beta value was -0.37. The multiple R coefficient indicated that the correlation between compulsive buying behavior and obsession with acquisition was moderate to strong (R value= 0.55). These results imply that people with a higher compulsive buying tendency (a lower compulsive buying score) tend to have a greater obsession with acquiring certain possessions.

[Table 4 and Fig. 3 about here]

Taiwanese Participants For these participants, the factor analysis extracted four factors from the 20 questions (Table 5). These four factors included obsession with acquisition

(predicted from nine of the 20 questions), hoarding behavior (predicted from six of the 20 questions), resembling/pair collections (predicted from three of the 20 questions), and factor four (predicted from one of the 20 questions). All factors were reliable, except Factor 4 for which reliability could not be accessed because it was derived from a single question.

The four factors were used to predict compulsive buying behavior in a regression analysis. The lower panel of Fig. 3 shows that compulsive buying behavior was significantly predicted by both obsession with acquisition and hoarding behavior. In terms of the relative importance of the dimensions in estimating compulsive buying behavior, hoarding behavior made the largest contribution with the highest beta value of -0.69. The multiple R coefficient indicated that the correlation between compulsive buying behavior, obsession with acquisition, and hoarding behavior was very strong (R value= 0.82). These results imply that Taiwanese people who had a stronger tendency to shop compulsively were prone not only to being more obsessive in acquiring certain types of item but also to exhibiting a high degree of hoarding behavior.

A linear structural equation model (SEM) is a hypothesized pattern of linear relationships amongst a set of variables and its purpose is to provide a meaningful and parsimonious explanation for observed relationships among a set of measured variables. Because we found Taiwanese compulsive shoppers exhibit hoarding behavior, they were different from our British sample. Therefore, we used the SEM approach to test possible patterns of causal dependency between variables in order to understand the causal paths between obsession with acquisition, hoarding behavior and compulsive buying behavior in this group. Tests were based on whether the models fitted better than rival specifications and whether they provided a good absolute fit to the data. Although we cannot be certain of the conclusions, the pattern that emerged is a useful guide for understanding the causal processes relating the predictor variables to the criterion variable in the regression model.

Chi-square goodness-of-fit tests were used to assess the overall fit of the models and to compare competing models, and indices based on derivatives of the fitting function were used to suggest better-fitting models. Under the assumptions justifying Maximum Likelihood (ML) estimation, a chi-square goodness-of-fit measure allowed a test of the null hypothesis that a given model provides an acceptable fit of the observed data. The Normal Theory Weighted Least Square (WLS) chi-square value should not be significant if there is a good model fit.

Model 1 interprets both obsession with acquisition and hoarding behavior as causes of compulsive buying (Fig. 4). As the figure shows, the WLS chi-square was significant for this model. Carmines and McIver (1981, p80) state that relative chi-square (χ^2/df) should be in the two-to-one or three-to-one range for an acceptable model. Kline (1998) argues that three or less is acceptable. However, here the χ^2/df was 3.26. Also, the Root Mean Square Error of Approximation (RMSEA) values for Model 1 are greater than 0.10, the value that Steiger (1990) suggests indicates a bad fit to the data. Thus, according to all the above criteria, Model 1 is not a good fit to the data.

[Table 5 and Fig. 4 about here]

We next used confirmatory path analysis to develop Model 2. This model indicates that obsession with acquisition affects compulsive buying behavior, and then compulsive buying behavior affects people's hoarding behavior. The fit indices showed better goodness fit for Model 2 (Fig. 4). They show that it meets all of the above criteria.

In sum, Study 2 showed that compulsive shoppers are prone to be obsessive in acquiring certain particular items (both samples) and that those from Taiwan also tend to exhibit hoarding behavior that derives from their compulsive shopping.

General Discussion

Compulsive shoppers reported that they are obsessive in acquiring certain particular items.

They may also report that they exhibit hoarding behavior with certain types of items (Taiwanese sample). These findings are consistent with the suggestions that compulsive buying and obsessive acquisition (or hoarding) are correlated (e.g., Frost & Hartl, 1996; Frost & Steketee, 1998; Frost et al., 2002; Mueller et al., 2007; Mueller, Mitchell, Crosby, Glaesmer, & de Zwaan, 2009). However, compulsive shoppers obtain certain classes of items to satisfy their craving and, as this provides them with reinforcement via a surge of positive affect (Lo & Harvey, 2011), it eventually this becomes a habit. Their aim is not to collect those items. However, failure to discard them may result in them being hoarded (Model 2).

Our results indicate that compulsive buying is driven by an obsessive need to acquire certain products rather than by a desire to collect or hoard those products. Compulsive shoppers reported that they spend more money on their favorite products than their peers did. They also reported that they bought them more frequently. This is consistent with the view that acquisition of these particular products provides reinforcement (e.g., relief from stress, anxiety or depression) of buying habits and that a positive feedback cycle results in these habits becoming compulsive. This is the type of process that Herrnstein and Prelec (1992) characterize as being responsible for the development of behavioral addictions.

Why did compulsive buying result in hoarding behavior in the Taiwanese sample but not the UK sample? Why were Taiwanese compulsive shoppers more reluctant to discard items that they had bought? Wong and Ahuvia's (1998) research may help to answer these questions. Their study indicated that the consumption culture in Confucian societies is based on an interpersonal construal of the self. Members of these societies tend to behave in ways that emphasize their social roles and public perception of them. As a result, their consumers tend to place more emphasis on public or visible possessions than Western consumers (Lo et al., 2012). They more often use products symbolically to lay claim to a desirable position within the socioeconomic hierarchy (Wong & Ahuvia, 1998; Lo & Harvey, 2011; Lo et al.,

2012). Our first study showed that both Taiwanese male and female compulsive shoppers equally enjoyed buying jewellery, a highly conspicuous possession. According to this point of view, it is not surprising that Taiwanese compulsive shoppers hoard luxury items. They are more reluctant to discard possessions that could be viewed as extension of themselves (Frost et al., 1995).

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Appendix 1 Measurement of collection and hoarding behavior (Study 2)

Obsessive Acquisition Section (O Questions)

- Q1. I enjoy getting a group of “special things”.
- Q2. I feel disgust at myself when I store up many very similar things*.
- Q3. I have an enthusiasm for things of a particular type.
- Q4. I am passionate about acquiring items of a particular kind even though I have had lots of them already.
- Q5. I am not interested in buying things that I have already.*
- Q6. I am exciting to have a complete set of whatever I buy.
- Q7. It is really boring to acquire a set of similar items*.
- Q8. A group of “special things” that I have acquired make me proud.
- Q9. I crave storing up similar things even if I don’t use them.
- Q10. I hate to buy things that match, if I have already had them*.

Collecting/ Hoarding Section (H Questions)

- Q1. I looked for similar items or items belonging to a particular theme.
- Q2. I like throwing things away*.
- Q3. I continually build up things of a particular type because I am interested in them.
- Q4. I like to store up a group of similar things systematically.
- Q5. I can never throw anything away.
- Q6. I regularly buy lots of the same type of things.
- Q7. I only buy what I really need*.
- Q8. Purchasing things systematically makes me feel good.
- Q9. Acquiring items belonging to a particular theme stops me from being bored.
- Q10. It would be a waste of money, if I bought too many things which were all the same.*

NOTE.* Reverse score: when a respondent answers strongly agree, a record of data will code “1”.

Figure Captions

Fig. 1 Study 1: Spending on the most enjoyable products — Upper panel: British participants (N=536); Lower panel: Taiwanese participants (N=203)

Fig. 2 Study 1: Frequency of purchase — Upper panel: British participants (N=536); Lower panel: Taiwanese participants (N=203)

Fig. 3 Study 2: Upper panel: Regression model for British participants. Lower panel: Regression model for Taiwanese participants

Fig. 4 Study 2: Fit indices for two models of Taiwanese participants.

Table 1 Study 1: Summary of revised regression of compulsive buying scale on to products that shoppers enjoy buying (British participants, N=536)

Predictor variables	B	SE B	Beta	T	Sig.
Jewellery	-0.84	0.14	-0.26	-6.00	<i>p</i> <.001
Electronic components	-0.50	0.19	-0.11	-2.59	<i>p</i> <.01
Wallet	-0.53	0.23	-0.10	-2.30	<i>P</i> <.05
(Constant)	1.30	0.10		12.66	<i>p</i> <.001
Multiple R	0.28				
R-square	0.08				
Adjust R-square	0.08				
Standard Error of the Estimate	1.57				
F (3,532)=15.481 <i>p</i> < .001					

Note. Dependent variable: Compulsive buying score

Table 2 Study 1: Summary of revised regression of compulsive buying scale on to products that shoppers enjoy buying (Taiwanese participants, N=203)

Predictor variables	B	SE B	Beta	T	Sig.
General collections	-1.72	0.59	-0.17	-2.92	<i>p</i> <.01
Jewellery	-1.12	0.37	-0.18	-3.04	<i>p</i> <.01
Handbags	-1.32	0.29	-0.26	-4.51	<i>p</i> <.001
Coats	-0.91	0.30	-0.17	-2.98	<i>p</i> <.01
Electronic components	-3.19	0.56	-0.32	-5.76	<i>p</i> <.001
Art collections	-3.92	0.70	-0.33	-5.63	<i>p</i> <.001
(Constant)	14.10	1.25		11.25	<i>p</i> <.001
Multiple R	0.64				
R-square	0.41				
Adjust R-square	0.39				
Standard Error of the Estimate	1.82				
F (6,196)=22.429 <i>p</i> < .001					

Note. Dependent variable: Compulsive buying score

Table 3 Study 1: Collecting specific items

Participants	CS/NCS	N	Mean	SD	t-value	df	Sig.(2-tailed)
All populations (N=739)	CS	97	1.45	0.50	5.12	113.93	<i>p</i> < .001
	NCS	642	1.18	0.39			
British (N=536)	CS	65	1.28	0.45	2.54	74.13	<i>P</i> = .013
	NCS	471	1.13	0.34			
Taiwanese (N=203)	CS	32	1.81	0.40	6.15	48.88	<i>p</i> < .001
	NCS	171	1.33	0.47			

Note. NCS=Non-Compulsive shoppers; CS=Compulsive shopper; Mean score: No collecting (1) → collecting (2)

Table 4 Study 2: Factor analysis (British participants, N=89)

Factor 1: Systematic collecting	Factor Loading	Reliability: α-value
H8. Purchasing things systematically makes me feel good.	0.860	0.77
H9. Acquiring items belonging to a particular theme stops me from being bored.	0.791	
H4. I like to store up a group of similar things systematically.	0.656	
O1. I enjoy getting a group of “special things”	0.491	
Factor 2: Obsession with acquisition	Factor Loading	Reliability: α-value
O3. I have an enthusiasm for things of a particular type	0.815	0.81
O10. I hate to buy things that match, if I have already had them.	0.789	
O4. I am passionate about acquiring items of a particular kind even though I have had lots of them already	0.626	
O6. I am exciting to have a complete set of whatever I buy.	0.572	
O8. A group of “special things” that I have acquired make me proud	0.561	
Factor 3: Hoarding behavior	Factor Loading	Reliability: α-value
O5. I am not interested in buying things that I have already.	0.768	0.77
H10. It would be a waste of money, if I bought too many things which were all the same.	0.709	
H7. I only buy what I really need.	0.660	
O9. I crave storing up similar things even if I don't use them.	0.615	
Factor 4	Factor Loading	Reliability: α-value
H3. I continually build up things of a particular type because I am interested in them.	0.816	0.67 (unreliable)
H6. I regularly buy lots of the same type of things.	0.604	
H1. I looked for similar items or items belonging to a particular theme.	0.530	
O7. It is really boring to acquire a set of similar items.	0.443	
Factor 5	Factor Loading	Reliability: α-value
H2. I like throwing things away.	0.698	0.17
O2. I feel disgust at myself when I store up many very similar things.	-0.650	(unreliable) If delete O2, α -value=0.68
H5. I can never throw anything away.	0.617	

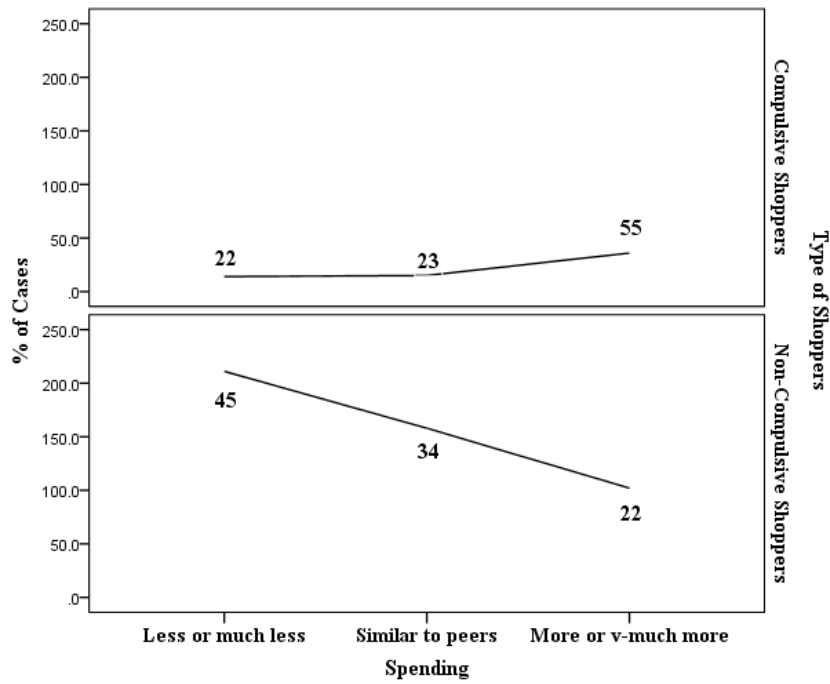
Note. H1-H10: Hoarding/Collecting Section; O1-O10: Obsessive Acquisition Section

Table 5 Study 2: Factor analysis f (Taiwanese participants, N=93)

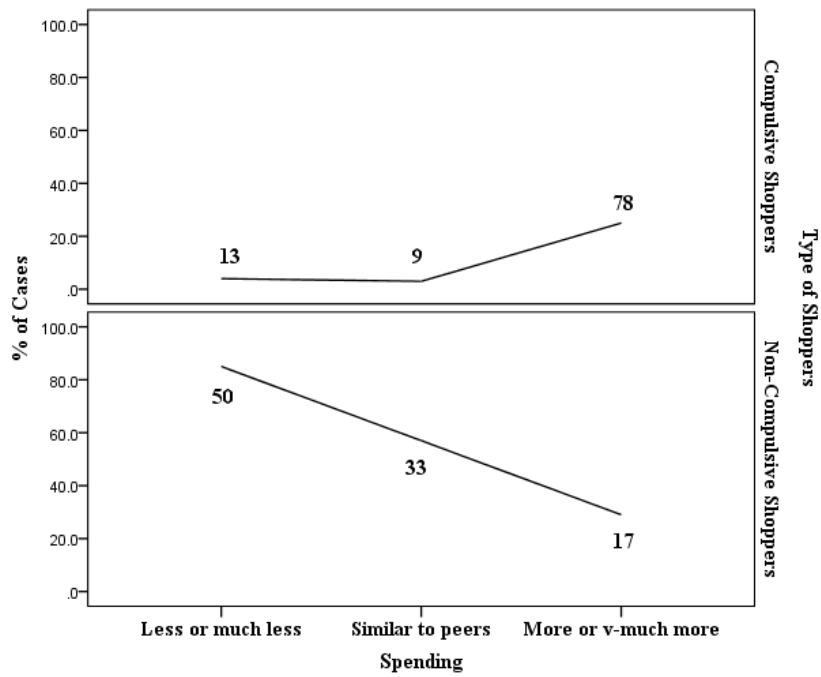
Factor 1: Obsessions with acquisition	Factor Loading	α-value
H3. I continually build up things of a particular type because I am interested in them.	0.902	0.93
O8. A group of “special things” that I have acquired make me proud	0.825	
O3. I have an enthusiasm for things of a particular type	0.801	
H1. I looked for similar items or items belonging to a particular theme.	0.791	
O6. I am exciting to have a complete set of whatever I buy.	0.775	
H9. Acquiring items belonging to a particular theme stops me from being bored.	0.747	
H4. I like to store up a group of similar things systematically.	0.736	
O1. I enjoy getting a group of “special things”	0.694	
H8. Purchasing things systematically makes me feel good.	0.658	
Factor 2: Hoarding behavior	Factor Loading	α-value
H7. I only buy what I really need*.	0.833	0.84
H10. It would be a waste of money, if I bought too many things which were all the same.	0.755	
O5. I am not interested in buying things that I have already.	0.742	
O9. I crave storing up similar things even if I don't use them.	0.731	
H6. I regularly buy lots of the same type of things.	0.609	
O4. I am passionate about acquiring items of a particular kind even though I have had lots of them already	0.602	
H2. I like throwing things away	0.442	
Factor 3: Resembling or pair collections	Factor Loading	α-value
O10. I hate to buy things that match, if I have already had them.	0.801	0.75
O2. I feel disgust at myself when I store up many very similar things	0.691	
O7. It is really boring to acquire a set of similar items.	0.628	
Factor 4	Factor Loading	α-value
H5. I can never throw anything away.	0.830	-

Note. H1-H10: Hoarding/Collecting Section; O1-O10: Obsessive Acquisition Section

Fig. 1

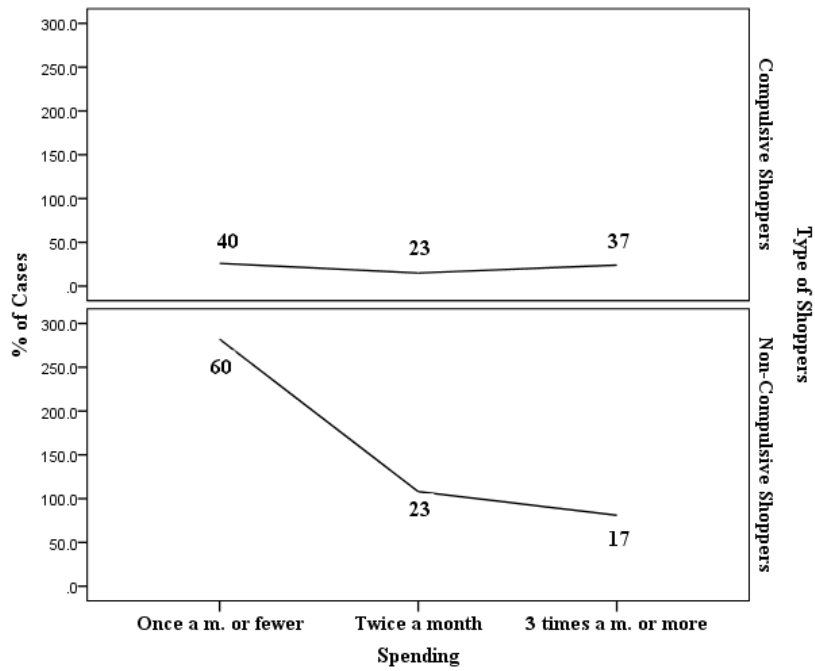


Note. $\chi^2 (2, N=536) = 34.54, p < 0.001$ (2-sided)

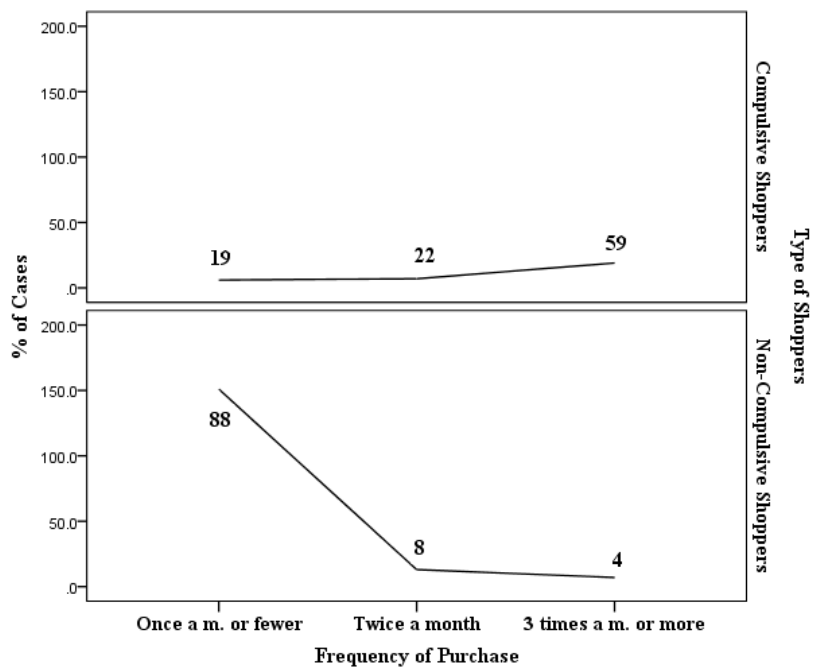


Note. $\chi^2 (2, N=203) = 51.66, p < 0.001$ (2-sided)

Fig. 2

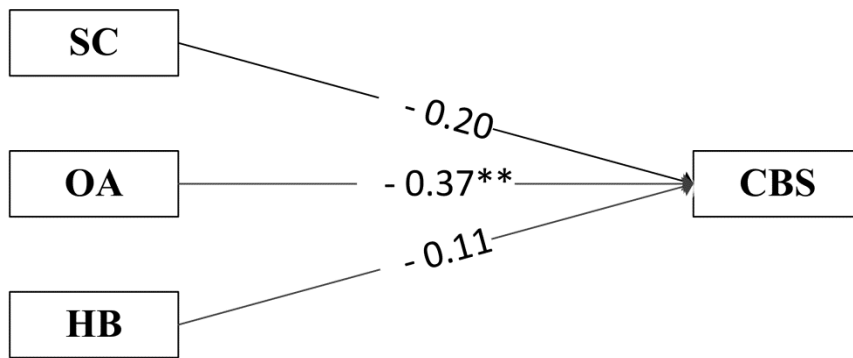


Note. $\chi^2 (2, N=536) = 15.27, p < 0.001$ (2-sided)

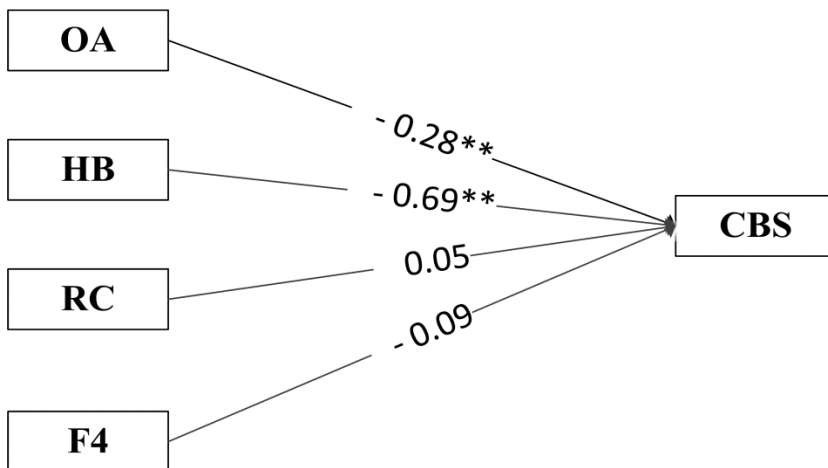


Note. $\chi^2 (2, N=203) = 86.75, p < 0.001$ (2-sided)

Fig. 3



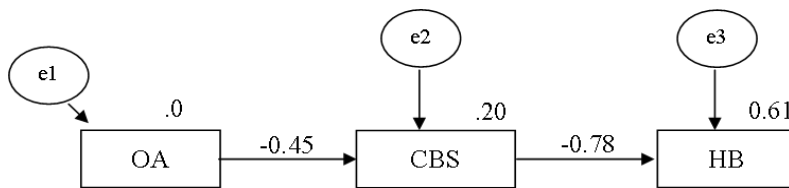
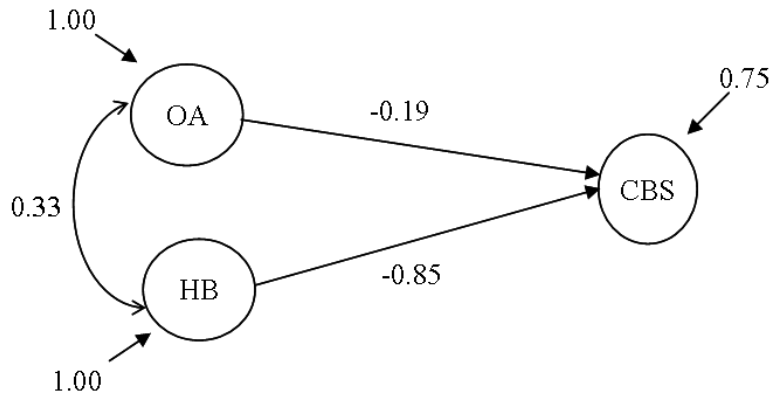
Note. Multiple R=0.55; $R^2=0.30$; Adj $R^2=0.28$, $F(3,85)=12.15$; $p<0.001$; CBS: Compulsive buying score (Independent variable: predicting compulsive buying tendency); low CBS score: high compulsive buying tendency; SC: Systematic collecting behavior (predictor 1); OA: Obsession with acquisition (predictor 2)



Note. Multiple R=0.82; $R^2=0.68$; Adj $R^2=0.66$, $F(4,88)=45.77$; $p<0.001$; CBS: Compulsive Buying Score (Independent variable: predicting compulsive buying tendency); low CBS score: high compulsive buying tendency; OA: Obsession with Acquisition; HB: Hoarding Behavior; RC: Resembling/pair Collections; F4: Factor 4

Fig. 4

Model	WLS χ^2	df	χ^2/df	<i>P.</i>	GFI	AGFI	RMSEA	NFI	CFI
Model 1	381.34	311	3.26	<.01	0.67	0.57	0.16	0.71	0.77
Model 2	1.45	1	1.45	>.05	0.99	0.94	0.07	0.99	1.00



Note. Upper panel: Model 1; Lower panel: Model 2; CBS: Compulsive buying score; OA: Obsession with Acquisition; HB: Hoarding Behavior; chi-square *p*-value, χ^2/df and RMSEA (mentioned in the text) are currently the most common indices to measure model fit. We also provide other indices for reference. These are GFI (Goodness of Fit Index), AGFI (Adjusted Goodness of Index), NFI (Normed Fit Index), CFI (Comparative Fit Index)