



Compulsive Buying Behavior in Virtual Worlds: An Exploratory Study

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ABSTRACT: *Virtual worlds such as second life have been growing in popularity, as it provides a platform for social networking and virtual communications. As a result millions of regular participants spend more time in the digital society than in real world.*

Although there are many publications, the majority of previous studies on virtual world have focused on legal issues or an economic point of view. There is a lack of literature on negative consumption behavior. Previous research has demonstrated that compulsive buying behavior can have an impact on well being of society and individuals (Hirschman 1992; Wells 1993). Although abundant literature exists to assess this negative behavior of consumers in the real world, to our knowledge, no literature exists for virtual world consumers.

The present work is designed to be the first to consider compulsive buying behavior in virtual world via use of established scales as reference (Faber, R. J., & O'Guinn, T. C., 1992 and Edwards, E. A., 1993)

1. Introduction

In the past few years, virtual worlds have become a herald for both engaging in social activities and business opportunities. This new platform has demonstrated the potential to become a novel online transaction medium, which has surpassed web-based contexts. Through their Avatars (A 3D projection of the user's image), millions of participants are not only able to interact with each other and their surroundings, but are also able to buy and sell virtual items in a virtual environment.

Virtual worlds can be simply defined as three-dimensional; computer generated setting that offer rich and diverse geographical environments which appears similar to the "real" world. Presently, 3-D virtual worlds are mainly divided into two categories, namely: Socially Oriented virtual worlds (i.e. Second Life, There, Cybertown) and Game-Oriented Virtual Worlds (i.e. World of Warcraft, RuneScape, and Halo) (Guo & Barnes, 2007).

The major difference between the two types of platforms is that a game oriented virtual world provides a linear story line (which can be slightly altered) with fixed content, while a Socially-Oriented virtual world attempts to provide nearly unlimited freedom in a simulated world which participants use their imaginations to create their own desired world contents (Guo & Barnes, 2009). This "free-form" in Socially Oriented Virtual worlds provides the user

with limitless possibilities to mimic real world activities through the use of avatars, thus allowing them to create and design their own houses, clothing and possessions in the virtual worlds (Quarmby, B., 2009).

These virtual worlds are not only limited to provide a platform for social networking and online chatter; they offer a place to an alternative life where there are business opportunities, prospects of accumulating property and pursuing overall health and happiness (Nuara Leonard T., 2008). Studies of Second Life (socially oriented virtual world) have illustrated that they are the closest term of replicating real life economy; SL show the opportunities for cross-border social and commercial transactions presented to the users because of its diverse nature. The relative strength of the Second Life economy has made it financially feasible for users to start full-time businesses online (Craig, K., 2006). Therefore, it is important to conduct research on virtual worlds due to their impact on the real world.

Currently, there is an abundant amount of publication on this phenomenon. However, majority of previous studies in this area have focused on legal issues with regard to virtual item transactions (e.g. Lastowka & Hunter 2004, Lederman 2007) or have explored the impact of virtual worlds on the real world from a purely economic point of view (e.g. Castronova 2001, 2002).

Research is also being conducted on consumer behaviorism and the psychology of the virtual consumer. However there is a lack of literature dedicated solely on negative consumption behaviors, such as drug addiction (Hirschman 1992) and compulsive buying (Faber, O'Guinn and Krych 1987; Scherhorn, Raab and Reisch 1990).

The study of compulsive buying is important since the behavior can cause harm to the individual and/or others and can be a drain on society (d'Astous 1990; Faber and O'Guinn 1992). In extreme cases, compulsive buyers can spend more money than they have, destroying their lives and the lives of their families (d'Astous 1990; Faber and O'Guinn 1992; Rindfleisch, Burroughs, and Denton 1997). The most widely used compulsive buying scales have been developed by Faber & O'Guinn (1992) and Edwards (1993) where the authors have developed instruments to assess consumer's tendency to engage in compulsive buying behavior in the real world.

Though the subject matter is the same, each researcher has taken a different approach to development their respective scales.

This paper has therefore adapted the two different compulsive buying scales (Faber & O'Guinn and Edwards) and employed them as a single survey, targeting users (residents) of Second Life (SL). The authors have focused the study on Second Life (developed by Linden Labs, 2003) since it is a Socially Oriented Virtual world or "Open Ended Virtual Interaction"; where goals are not predetermined or prescribed.

The outcome of the survey will determine if the users of Second Life are portraying traits of compulsive buying behavior (tendencies of compulsive buying). The questionnaire has been formatted as follows: Part A of the survey comprises of the Compulsive Buying Screening Scale developed by Faber and O'Guinn (Faber, R. J., & O'Guinn, T. C. (1992). "A *Clinical Screener for compulsive buying*", *Journal of Consumer Research* 19, 459-469). Part B of the questionnaire is an extension of the Compulsive buying measurement which contains the Compulsive Buying Scale developed by Edwards, E. A. [Edwards, E. A. (1993). "Development of a new scale for measuring compulsive buying behavior", *Financial Counselling and Planning* 4, 67-84] and Part C includes questions relating to participant's demographic characteristics.

The final result of this paper is an extension to the existing behavioral and compulsive theories in the realm of virtual worlds.

2. Introduction on Second Life

Virtual worlds have been growing in popularity and a number of them are readily available in the Internet. Among these numerous virtual worlds, Second Life (SL) remains the top ranked and widely used medium by users. Since its launch in 2003 by Linden Research Labs (Linden Labs), Second Life has rapidly increased with an estimated 15 million registered users 2009 (Linden Labs, 2009). Second life serves as a powerful social platforms of intense human interaction gather millions of users worldwide, producing massive economies of their own, giving rise to the birth of complex social relationships and the formation of virtual communities (Andrade, N. N. G.. 2009). The medium of the conversations includes instant messaging and a voice communication system (Nuttal, 2007). According to a report, nearly 1.3 million people ran the official software and logged-in to Second Life in March 2007(ComScore 2007).

With their avatars (a digital manifestation of the user), users (residents) can communicate and interact with other residents as well taking part in a wide range of activities. Residents can be of any ethnicity, gender; they can modify hair and eye colour or body shape as the user deems fit. They are not bound to conventional humanoid shapes, therefore avatars can appear in the shape of an in-automate object, a white glow representing a humans' soul. Residents are further given the ability to customize their avatars by mimicking real world activities such as shopping, socializing, driving and conducting business or simply relaxing at home. In a commercial website, avatars enhance a shopping experience by serving as guides, conversation partners, and personal shopping assistants (Holzwarth, Janiszewski, & Neumann, 2006).

Second Life also has a well established commerce system. Residents engage in commerce through Second Life's internal currency known as Linden dollar (L\$). Linden dollar is the basic and only medium of transaction in second life. It can be used to buy, sell, rent or trade land or goods and services within the world. Linden Dollar (or L\$) are used to trade virtual land, goods or services and can be bought and sold instantly and they also allow residents to convert Linden Dollars to US Dollars (and vice-versa). Rates fluctuates based on supply and demand but remained constant at 250 Linden Dollars (L\$) to the US Dollars in the past few years (SL website). This ability to exchange U.S. dollars into Linden dollars (and vice versa), has attracted private enterprises to venture in Second Life.

Virtual goods include buildings, vehicles, clothing, skin, hair, jewellery, etc or other types of devices are

available on SL. Residents also have the option to “cash out” and exchange their Lindens for offline currencies, such as the US dollar.

Many entrepreneurs and renowned brands therefore have claimed a piece of the virtual world. Brands from all sectors are present on Second Life including Footwear (Nike), Computers & IT (IBM), Entertainment (MTV, SKY, Warner Music), Automotive (Toyota, Pontiac, Ferrari, Mercedes), Fashion Wear (Armani), Communication (Vodafone) are all present in second life and are thriving.

2.1 Impact of Virtual world on real world

Second Life does not only provide a platform for social networking and online chatter; they offer a place to an alternative life where there are business opportunities, prospects of accumulating property and pursuing overall health and happiness (Nuara, Leonard T., 2008).

The relative strength of the Second Life economy has made it financially feasible for users to start full-time businesses online. Many residents have already made a mark in Second Life and become successful in-world entrepreneurs (Craig, Kathleen, 2006). These businesses are becoming more viable due to increasing participation by Second Life users who use it as an alternative spending time and money in-world (Quarmby, B, 2009).

Two kinds of businesses are pursued in virtual worlds: small businesses that grow up organically, and bigger companies that try to establish their own virtual presence. In-world business is done by selling user-created content to other users, by renting virtual land to other users, and by selling services (in-world). These businesses were successful as residents spend money on purchasing virtual items. Residents have turned towards virtual world businesses either as a supplement or as a primary source of income.

The success of Aeilen Graef (Second life avatar “Anshe Chung”) and Alyssa LaRooche (Second Life avatar Aimee Weber), best demonstrates this. Aeilen Graef is said to have a net worth of US\$1 million made entirely from profits earned inside virtual worlds, mainly from real estate and content creation. The top 10 individual entrepreneurs within Second Life are currently earning an average of approximately \$200,000 (U.S. dollars) per year (SL website).

Many big businesses existing outside virtual worlds have also begun to find niches – for example, Disney, Reebok, Dell and Cisco have or had a presence in Second Life. Coca-Cola ran a well received contest encouraging users to create Coca-Cola branded vending machines (Duranske, B. T., 2008).

3. Aims of the research

The overall objective of this study is to answer two (2) questions: 1. Do residents of second life display signs of compulsive behavior? 2. Does Brand (Branded Product) serves as a medium in enhancing this negative behavior?

4. Literature Review

The previous sections of this paper have illustrated that virtual worlds are thriving as more and more users are logging in to take part in this growing community. Virtual world such as second life are also a place of commerce as virtual items are bought and sold using in-house currency (linden dollars). As mentioned on section 2, consumer buying and selling of virtual items has triggered development of many business enterprises as well as convinced brands to take part in virtual world transaction. The issue however is, if the Brands can be an indicator to determine compulsive buying behavior among avatars?

With the help of existing compulsive buying scales, this paper will measure and determine the degree of consumer behaviorism currently present on consumer of virtual world items. Furthermore, this research will also establish if brands as well as demographics (of the respondents), can be a determining factor in triggering compulsive buying behavior among consumers of virtual items.

4.1 Compulsive Buying

Negative consumption behaviors must be studied in order to more fully understand the effects of the consumption process on society and the well-being of others; one such negative consumption behavior is compulsive buying (Hirschman 1992; Wells 1993).

“Compulsive buying can be thought of as a chronic tendency to purchases products far in excess of a person’s needs and resources”

(Mittal, Holbrook, Beatty, Raghubir, & Woodside, 2008)

Like other addictions, compulsive buying is characterized by lack of impulse control and denial of negative consequences (Desarbo & Edwards, 1996). Impulsive buying is closely related to compulsive purchase behavior. The presence of lack of volitional control and pre-purchase planning present in impulsive purchasing is similar to that of compulsive buying (Rook and Hoch 1984). However, unlike impulsive purchases, compulsive behavior attributes negative consequences. Unlike Impulse Buying, where a consumer makes an unplanned purchase (usually in expensive in nature), compulsive buying can have lasting financial debts. Compulsive Buying is an

abnormal form of consumer spending habit and individuals, who are characterized by this lack of self control, usually find themselves in debt.

O'Guinn and Faber view compulsive buying as an addictive behavior with the following definitions:

"A response to an uncontrollable drive or desire to obtain, use or experience a feeling, substance, or activity that leads an individual to repetitively engage in a behavior that will ultimately cause harm to the individual and/or others" (O'Guinn & Faber, 1989).
 "Chronic, repetitive purchasing that becomes a primary response to negative events or feelings" (Faber & O'Guinn, 1989).

Compulsive Buying Behavior is viewed in a similar manner by Edwards (1993) as she describes this behavior stating: "Consumers have an overpowering, uncontrollable, chronic and repetitive urge to shop and spend" (Edwards, 1993). Edwards goes on to describe that compulsive buying is both "an addictive process and experience"; Addictive process whereby one tries to escape from stress and resulting anxiety via the compulsive buying activity itself and as an addictive experience such that one tries to escape from anxiety and tension by preoccupying him/herself (Edwards, 1992). Addiction to spending occurs progressively when the recreational buyer (who may occasionally shop and spend as an escape), finds the "high" to be an easy way to deal with stress or negative emotions (Desarbo & Edwards, 1996).

Other authors such as Desarbo and Edwards (1996) describes compulsive buying as: "A crisis causing anxiety overload then triggers the individual to buy compulsively. Experiencing less relief with each spending spree, the person requires "re-dosing" and comes to depend on shopping and spending as the primary means of coping with anxiety" (Desarbo & Edwards, 1996).

To better understand this phenomenon, existing scales of measuring compulsive buying behavior (Faber & O'Guinn 1992; Edwards 1993) will be investigate in this paper. The methods as well as previous results of these scales will also be illustrated. Finally these compulsive buying scales, along with their methodology, will be adapted in this paper to examine compulsive behavior, relating to uncontrollable purchasing activity of consumers, in virtual worlds.

4.2 Measuring Compulsive Buying

Measuring compulsive buying is not a straightforward process, yet the ability to accurately measure it is important if researchers are to clearly understand and perhaps predict this growing consumer phenomenon

(Hassay & Smith, 1996).

In response to this need, researchers such as Faber and O'Guinn as well as Edwards developed measuring scales to identify compulsive buyers and to understand what factors can trigger this negative purchase behavior.

Faber and O'Guinn (1992) developed their "compulsive buying screener scale" to identify (screen) compulsive buyers and differentiate them from the general population. The pair of researchers constructed this seven-item clinical screener based on their previous work as well as works of others (Faber & O'Guinn, 1989; Faber, O'Guinn, & Krych, 1987). The authors defined compulsive buying as "chronic, repetitive purchasing that becomes a primary response to negative events or feelings" (Faber & O'Guinn, 1989). The authors' scale was initially developed by selecting a 29 items clinical screener (from previous studies). Combined with in-depth interviews of self-reported compulsive buyers, they started gathering data to construct their modelled scale. The 29 items were entered directly into a logistic regression in order to develop the best predictive model.

They suggested that various constructs such as self-esteem, materialism and credit usage are associated with compulsive buying (Faber & O'Guinn, 1992). The dependent measure was divided in two categories (dichotomous); i.e. variable which classified each respondent as either a compulsive buyer or a member of the general population (Faber & O'Guinn, 1992). Faber and O'Guinn also established a classification (using logistic regression), in order to determine the compulsive tendencies of the subject by setting a cut-off score. The value for the cut off score was fixed at -1.34 by the authors'. Therefore any respondent who scored less than -1.34 was considered as a compulsive buyer and those who scored above -1.34 was classified as being part of the general population (non-compulsive buyer). This cut-off was approximated at two standard deviations above the normal population mean on the compulsive buying scale (See Appendix for scale and scoring equation).

The authors "hope this was accomplished by their use of preliminary qualitative and survey studies, a psychiatric literature review, and consultation with psychiatrists and therapists experienced in dealing with compulsive buying and impulse control disorders" (Faber & O'Guinn, 1992).

The validity of the scale was assessed by comparing three distinct groups (i.e. screened compulsive buyers, self-identified compulsive buyers, and general population members) on a 12 variables format, which was previously considered to be relevant (by the authors') for compulsive buying (O'Guinn & Faber,

1989). The variables included measures of obsessive-compulsiveness, self-esteem, fantasy, materialism, envy, object attachment, emotional lift, remorse, credit cards owned, credit cards paid in full each month, credit cards within \$100 of their limit, and percent of monthly income going to debt (O'Guinn & Faber, 1989).

Of the 12 variables examined, the screened compulsive buyers were significantly similar to the self-identified compulsive buyers. They illustrated that in all but two cases of their research, the scores for the screened compulsive buyers were significantly different from those whom the screener classified as non-compulsive (Manolis & Roberts (2007). Faber & O'Guinn concluded that, given the small sample sizes (for each sample, $N = 22$), the overall results are "extremely encouraging" (Faber & O'Guinn, 1992). The external validity of the clinical screener was tested respondents using both compulsive and non-compulsive buyers; the participants were recruited via newspaper ads. "The clinical screener correctly classified 83% of the non-compulsive buyers and 92.2% of the compulsive buyers for an overall success rate of 87.5%" (Manolis & Roberts (2007). The result of the procedure led to the development of their scale. The authors concluded that "the screening instrument and weights seem to possess a high degree of external validity" (Faber & O'Guinn, 1992).

Although the authors followed a precise analytical procedure, there are criticisms against the Faber and O'Guinn scale (e.g., Cole & Sherrell, 1995; Edwards, 1992, 1993). Faber and O'Guinn scale was criticized to have psychometric limitations (Cole & Sherrell, 1995).

The Cut-Off (-1.34) approximation of two standard deviation is the main aspect of their research to have been criticised by other authors. Most authors argue that having an approximation of two standard deviation results in exclusion of negligible respondents from the overall survey; making this scale suitable for consumers with extreme compulsive buying tendencies (Edwards, 1993).

Other researchers have also agreed with the criticism and suggested that the Faber and O'Guinn scale presents 'a limited and a overly restricted view of compulsive buying' (Cole & Sherrell, 1995; d'Astous, 1990). Manolis & Roberts (2007) describes "Questions arises of whether or not the Faber and O'Guinn scale (screener) identifies the most extreme element of compulsive buying at the exclusion of less severe and perhaps more common incidences of compulsive buying".

In response to the Faber & O'Guinn (1992) scale another researcher, Edwards, E., developed a separate

compulsive buying scale in 1993. Edwards argued that the Faber & O'Guinn (1992) scale were appropriate for "extreme" cases of Compulsive buyers and does not apply to the general population. The purpose of Edward's Compulsive Buying Scale was therefore to overcome the shortcoming of the Faber and O'Guinn (1992) scale. Edward's general compulsive buying scale was illustrated in a report on the Journal of Financial Counselling and Planning in 1993 (Development of a new scale for measuring compulsive buying behavior, Vol. 4, 1993).

However, compared with the Faber and O'Guinn instrument, the Edwards (1993) compulsive buying scale has not been used as extensively in the literature, and therefore has not seen the level of inspection associated with the Faber and O'Guinn scale (Desarbo & Edwards, 1996; Edwards, 1993).

Edwards define compulsive buying as "an abnormal form of shopping and spending in which the afflicted consumer has an overpowering, uncontrollable, chronic and repetitive urge to shop and spend as a means of alleviating negative feelings of stress and anxiety" (Edward, 1993).

Through an initial series of exploratory and confirmatory factor analyses, a 13-item, five factor compulsive buying scale was identified. The five factors include:

- (1) *Tendency to spend* - These items mostly refer to the respondent's tendency to shop and spend in binges or "buying episodes"
- (2) *Compulsion/drive to spend* - These items describe the respondent's "drive", preoccupation, compulsion, and impulsiveness in shopping and spending patterns
- (3) *Feelings about shopping and spending* - These describe how much the respondent enjoys the shopping and spending activity
- (4) *Dysfunctional spending* - These questions describe the respondent's general level of dysfunction surrounding and resulting from his or her shopping and spending behavior
- (5) *Post-purchase guilt* - Represent feelings of remorse, regret, and shame experienced after the respondent goes on a buying binge.

The factor correlations were fairly high, which according to Edwards, suggests that "a unique construct is measured by the scale and that individual subscales scores are consistent" (Edwards, 1993).

Edwards (1993) argues that Faber and O'Guinn's (1992) use of two standard deviations from the mean as a standard or cut-off for classifying an individual as a

compulsive buyer is “arbitrary at best. This cut-off allows for only a dichotomous categorization of compulsive versus non-compulsive buyers and does not discriminate between highly compulsive buyers and persons who may be somewhat compulsive or even recreational buyers who only occasionally shop for the same reasons as compulsive buyers” (Edwards 1993, quoted from Manolis & Roberts (2007)).

Edwards also suggest that a more subtle and discriminating scale will allow for enhanced identification of varying levels of compulsive buying behavior within consumers. These levels of identification would therefore be determined on a statistical basis (Edwards, 1993). “This subtle scale that allows for identification of low to high levels of compulsiveness in an individual’s buying behavior would be an improvement upon the classifications of Faber and O’Guinn scheme” (Edwards, 1993).

In one of the few studies to utilize Edwards’ (1993) 13-item compulsive buying scale (Desarbo & Edwards, 1996) looked at whether or not the motivation to compulsively buy varies across people. The different level of compulsive buying was investigated using *constrained maximum likelihood cluster wise regression* (Manolis & Roberts (2007)). “This empirical analysis revealed two groups or clusters of compulsive buyers in terms of differential drivers of their compulsive buying behavior” (Edwards, 1993).

Cluster one was labelled the “internal compulsive buying group”. The results of the cluster suggested that compulsive buying appears to be driven by low self-esteem, dependence, and anxiety; All indicating a more diagnostic or psychological reason for the behavior (Edwards, 1993 quoted from Manolis & Roberts (2007)).

Cluster two was labelled the “external compulsive buying group”. This group exhibited behavior motivated by materialism, coping, isolation, denial, and impulsiveness; these aspects were driven more by the participant’s environment rather than by deep-seated psychological problems (Edwards, 1993, quoted from Manolis & Roberts (2007)).

The results “lead to the conclusion that there may be more than one path to compulsive buying behavior, or that there may be more than one manifestation of compulsive buying behavior, each with different motivations for and tendencies toward the behavior” (Desarbo & Edwards, 1996).

Authors Desarbo and Edwards (1996) states “this provides support for the premise that compulsive buying lies on a continuum describing varying levels

of the tendency as well as allowing for characterization of individuals at different stages of the compulsive buying process”.

Consistent with Edwards (1993), Desarbo and Edwards linked compulsive buying to addiction. “A behavior triggered by internal psychological tension and accompanied by relief and frustration or as a disruptive consumer behavior performed repeatedly despite negative consequences” (quoted from Manolis & Roberts (2007)).

“Viewing compulsive buying on a continuum suggests that alternative and/or complementary measures to Faber & O’Guinn’s compulsive buying screener and could broaden our understanding of compulsive buying. Additionally, there appears to be multiple routes to or “alternative motivations for compulsive buying” (Manolis & Roberts (2007)).

4.3 Validity of the Scales

Researchers such as Manolis, C. and Roberts, J.A. (2007) have compare and contrast the validity and reliability of the Faber and O’Guinn (1992) and Edwards (1993) compulsive buying behavior scales.

In addition to the Edwards and Faber and O’Guinn compulsive buying scales the authors’ utilized four other scales to measure constructs associated with compulsive buying, including i) attitudes toward money, (Yamauchi and Templer, 1982), ii) credit card use/misuse (Roberts and Jones 2001), iii) 18-item measure of materialism (Richins and Dawson’s, 1992) and iv) five-item scale to measure status consumption (Kilsheimer, 1993).

Their sample consisted of college students (young adults) which was randomly selected from a private university with an enrolment of 13,000 students in the southwest US. “The questionnaire was presented with independent samples of both students and faculty to ensure the clarity of the questions and that few ambiguities existed” (Manolis & Roberts (2007)). Their sample consisted of 406 college students of which approximately 48.5% female (with average age of 19 years); the rest were males of the same age category.

After comparing the responses among both compulsive buying scales, the results of the study indicated that the scales were significantly correlated, yet behaved differently when tested with variables known to be associated with compulsive buying. “Faber and O’Guinn’s measure was not affected by materialism and negatively impacted credit card misuse. Both compulsive buying measures were significantly (and positively) correlated with status consumption but only the Faber and O’Guinn scale was significantly

correlated with money attitudes” (Manolis & Roberts (2007).

The scales ranged from ranges from non-compulsive to compulsive and the findings of the authors’ paper were consistent both with Cole and Sherrell (1995) and Desarbo and Edwards (1996) that the Faber and O’Guinn scale measures the more extreme cases of compulsive buying (Manolis & Roberts (2007).

Manolis, C. and Roberts, J.A., (2007) concluded there is more than one path to compulsive buying, or that there may be more than one manifestation of such behavior each with different motivations and tendencies toward compulsive buying (pp. 570).

5. Methodology

The study was conducted to identify compulsive buyers in virtual world via the two underlying Compulsive Buying Scale and assess the scale’s predictive validity. To collect the needed information, a questionnaire was used and distributed to Second Life Users containing the scales developed by Faber and O’Guinn (1992) and Edwards, E. A. (1993).

5.1 Measures, data collection and sample

Both Compulsive Buying Scales of Faber and O’Guinn (1992); and Edwards (1993) have a multi-item measuring format via a five point Likert Scale, ranging from (1) “strongly agree” to (5) “strongly disagree”. Respondents were instructed to respond how they behaved in a certain manner. Part B of the questionnaire comprised of 13 questions (5 point Likert type) developed by Edwards (1993). These questions have been distributed into five factors, describing the stages of the compulsive buying stages (i.e. 1. tendency to spend, 2. compulsion/drive to spend, 3. feelings about shopping and spending, 4. dysfunctional spending and 5. post-purchase guilt). Aside from these four questions, standards demographic queries were also asked to be filled out by the respondents.

5.2 Scale Evaluation & Data Analysis

The first part of the research was aimed to identify and distinguish compulsive buyers from the non compulsive buyers among the respondents of the survey.

The respondents were distinguished and placed in their respected categories via the Faber and O’ Guinn Compulsive Buying Scale (Part A of the Questionnaire). After collecting the data, the respondents were classified in two categories; compulsive buyer and non-compulsive buyers. The

cut off score of -1.34 (developed by the authors) was the key indicator in determining whether the respondent was compulsive buyer or not. If a participant scored (according to their responses) less than -1.34, they were considered as a compulsive buyer.

Similar test could be administered to the Edward’s as no scoring factor was developed or mentioned by the author.

The second part of the study aimed to determine the relationship (if any) between compulsive buying behavior with respect to brands and demographic factors of the respondents. The aim of this phase of the study was to determine if brands (brand names) can change the compulsive tendencies of the participants and the degree of change. However, since the questions regarding brands were self developed, no format equation or score is established to determine brand loyalty within the participants.

Therefore, to determine the importance of brands among the responses, a binomial format was used to tally the answers. This binomial format has a value of either “1” or “0” and was used to distinguish between the respondents who had attributed strong feelings towards brands (branded products) from the overall general respondents. Therefore any respondent whose answer portrayed strong feelings towards branded products was given a value of “1” otherwise a value of “0” was assigned to the answer. All four branded questions were tested using the binomial format and the answers were later merged into one single branded factor. After tabulating all the data, the results of branded questions were tested with the results of compulsive buying scale via Regression Analysis.

Part B of the questionnaire consisted of the compulsive scale developed by Edwards (1993). Unlike the Faber & O’Guinn scale, the Edwards scale did not indicate a cut-off score to distinguish compulsive buyers. In order to assess Edwards’ scale with respect of the second part of this research (branding as a factor of compulsive buying behavior) via the second scale, the above mentioned binomial format was administered to the responses. All 13 questions were given a value of “1” or “0” according to the respondents answer. Similar to the Brands Variable, these questions were later combined as a single factor (Edwards scale). Although this is not a formal way to measure the Edward’s scale, however we believe that this method will serve the overall objective of this paper.

5.3 Brief introduction to Regression Analysis

Regression Analysis is a statistical tool that can develop a model to predict the values of a numeric variable based on the value of other variables

[Benerson, Levine, Krehbiel, 2009]. In regression analysis there are two variables, the dependent [Y] variable and the independent variable [X]. The dependent variable is the variable that one wishes to predict and the independent variable is the variable that is used to compute the prediction. The regression model is expressed in the following manner:

Simple Linear Regression Model

$$Y_i = b_0 + b_1X_i + \epsilon_i$$

Where,

b_0 = Y intercept for the population

b_1 = Slope of the population

ϵ_i = random error in Y for observation i

Y_i = dependent variable (response variable) for observation i

X_i = independent variable (explanatory variable) for the observation i

For the purpose of this research, we will use regression analysis to determine if the brands (Independent variable, X) can change the compulsive buying behavior of the respondents (dependent Variable Y) and the extent of the change.

Furthermore, we will use other independent variables (i.e. medium income, lindens spent and age) to determine significance compared to the dependent variable (Y).

A list of the dependent and independent variables are below:

Dependent Variable (Y)	Independent Variable (X)
Faber & O'Guinn Scale	Brands (x_1)
Edwards Scale	Medium Income ⁵ (x_2)
	Medium Lindens ⁵ (x_3)
	Young ⁵ (x_4)

6. Results

A total of 33 responses were gathered within a time frame of a seven day period. Eight of the participant's responses were omitted from the final count due to inconsistency of their answers.

The remaining 25 responses were tallied and tested according to the prescribed classification of the Faber & O'Guinn (1992) compulsive buying scale. As a result, 21 of the participants' responses scores below the cut off score of -1.34, indicating that these 21 respondents attributes compulsive buying tendencies. These results answer the first question of this research by confirming that compulsive buyers are present in

Virtual Worlds (i.e. Second Life).

The Edwards scale was measured using the binomial format and the results indicated that only 10 of the 25 respondents attributed compulsive buying behavior. This paper have not dismissed the results of the Edward's scale because unlike the Faber & O'Guinn scale, the binomial classification only considers answers of either "strongly agree" or "slightly agree". The result of the second scale was also tested via regression analysis along with several independent variables.

The second phase of the research was to determine that whether brands can change compulsive buying behavior of the respondents. This question was answered using linear regression analysis (via Excel 2007). As mentioned earlier, the Independent variable [Y] is the compulsive buying scales (Faber & O'Guinn and Edwards) and the independent variable [X] is the brands.

It should be noted that the principle condition of the Faber & O'Guinn scale is to obtain a negative value from the responses. This is due to the established cut off score of -1.34 developed by the authors. Therefore, it can be reasonably assumed that the co-efficient of the intercept will also have a negative value, indicating compulsive buyers within our respondents. After inputting and analysing the data (Faber & O'Guinn scale), the resulting P value of the intercept was 0.000 and the P value of Brands had a value of 0.034. The coefficient of the intercept had a value of -3.842, while the Brand Variable had a coefficient value of -1.459. Both co-efficient of Brands and Compulsive Buying Behavior has a negative value, indicating that if X is 1 unit, then the mean value of Y is estimated to decrease by 1.46 units. In order words, if Brands increases by 1, then the overall compulsive buying behavior of the respondents will increase by 1.46*.

The Y intercept represents the mean value of Y when X equals 0. If it were so, then the value of Y would be -3.84. However all the respondents had to answer from either "1" to "5" in the questionnaire, therefore Brands cannot be 0. Both coefficients of compulsive buying behavior (Y) and Brands (X) have a negative slope. This model studies the expectation of the compulsive buying scale (Y) on the condition of Brand (X). Therefore, we can see that if brand increases then the compulsive buying behavior will also increase.

$$\hat{Y} = -3.842 - 1.459*Brands + 0.863*Mediumincome$$

(0.5646) (0.6409) (0.7625)

Equation 1

$$\hat{Y}_2 = 0.6251 + 0.368 * \text{Brands} + -0.791 * \text{Mediumincome} - 0.557 * \text{Mediumlindens} - 0.237 * \text{young}$$

(0.1604) (0.1821) (0.2167) (0.1919) (0.1817)

n = 25

R² = 0.2683

Equation 2

*We have stated that compulsive behavior will increase even though the results of both Y and X are negative. This is due to the measurement of the compulsive scale, which requires participants to have a negative score less than -1.34.

Moreover, having the P value less than 0.05 (P<0.05) indicates that the variable is significant, as this allows us to reject the Null hypothesis (H₀). The rest of the independent variables were not significant.

The overall coefficient of determination (R²) had a value of 0.2683 and adjusted R had a value of 0.1219, which was not very high. However as mentioned above, we are interested in the determinants of Y (i.e. if Brands were affecting compulsive buying behavior) and their significance. The significance of F had a value of 0.1621, which indicated that there is a 16.21% change that our output was obtained by chance (refer to Appendix for details).

The first regression equation is expressed in Equation 1 (refer to Appendix).

Next we analyzed the Edwards scale and the resulting P value of the intercept was 0.000 and the P value of Brands had a value of 0.057. The coefficient of the

intercept had a value of 0.6251, while the Brand Variable had a coefficient value of 0.3679, indicating that if X is 1 unit, then the mean value of Y is estimated to decrease by 1.46 units. In order words, if Brands increases by 1, then the overall compulsive buying behavior of the respondents will increase by 0.368.

The Y intercept represents the mean value of Y when X equals 0, however similar to the Faber & O'Guinn results, Brands cannot be 0. Both coefficients of compulsive buying behavior (Y) and Brands (X) have a positive slope. Therefore, we can see that if brand increases then the compulsive buying behavior will also increase.

Among the rest of the independent variables, two were significant having P values of 0.0016 & 0.009 and coefficient values of -0.07911 & 0.5568 respectively. The last variable was not significant. However, these conditions of X (variables) had an inverse expectation of the compulsive buying scale (Y), as they had negative coefficient values.

The overall coefficient of determination (R²) had a value of 0.4587 and adjusted R had a value of 0.3948. This result was higher than that of Faber & O'Guinn results.

The standard error measures the variability of the actual Y from the predicted Y values (which is similar to Standard deviation). The standard error estimates the measures variability around the predicted line. The standard error of the Edwards's scale is equal to 0.3948. Therefore the difference between actual compulsive buying behavior and the predicted compulsive buying behavior of a respondent (using regression equation) is 0.3948.

Also, the significance of F had a value of 0.0121, which indicated that there is a 1.21% change that our output was obtained by chance (refer to Appendix for details).

These results are in sync with the second part of this research, indicating that Brands can influence compulsive behavior of a virtual shopper.

Therefore, the second regression equation is expressed in Equation 2 (refer to Appendix).

7. Discussions

The results of both Faber & O'Guinn (1992) and Edwards (1993) compulsive buying scale suggests that residents of Second Life portrays compulsive buying behavior in the virtual world. The model we used studies the expectation of Y conditioned on Brand (X).

As a result, both scales revealed that brands can also affect compulsive behavior. Although the coefficient of determination of the Faber & O'Guinn scale was relatively lower than the Edward's scale, we were more interested in the determinates of Y and their significance. This was illustrated by the P value of brands, which less than 0.05, allowing us to reject the null hypothesis.

The Edwards scale also determined that respondents with medium income (£10-15K), spending medium amount of lindens and being young also attributed to compulsive behavior. However the impact on Y was negative for lindens and young, indicating Y (compulsive behavior) would decrease if the respondent spent medium amount of lindens (L\$50-350) and were at a certain age category (i.e. 18-25). Respondents with medium income has to be over age of 25 and spend more than L\$ 350 in order to be classified as compulsive.

7.1 Limitations

A total 33 respondents had participated in our survey. 8 of the responses had to be omitted due to inconsistency. The sample size is low due to the fact that participants whom take part in interview or survey are given an incentive of an estimated (L\$) 2500 (approximately US \$10.00). The participants of our survey didn't not receive any incentive, due lack of resources. Rather, a website was created for the collect the necessary data; the respondents voluntarily answered the survey. The website had a lack of distribution, hence confining the findings of the research.

Furthermore, there are no existing scales to measure (or evaluate) the compulsive buying behavior exclusively for consumers in the virtual world. The scales of Faber and O'Guinn and Edward were designed to measure the compulsive buying behavior of consumers in real world and had their own

limitations; i.e. one question on Faber and O' Guinn scale stated "Wrote a check when I knew I didn't have enough money in the bank to cover it". Cheques are used in Second Life; therefore the question had to be modified in order to relate to the virtual world scenario. The use of the above scales was prudent in gaining an insight of potential compulsive buying behavior among virtual world residents.

7.2 Prospect for future studies

There is an increasing amount of Virtual World There is an increasing amount of Virtual World participation by users, as it new world filled with opportunities. However, even with this new "freedom", the users still portrays their beliefs, practices and habits, even in a virtual environment. This paper has conducted a pilot study and found that negative consumption is present in Second Life and that Brands can and do have an effect on compulsive buying. Therefore it is vital to conduct further research to better understand and predict on this phenomenon. Development of a proper scale to measure compulsive buying behavior exclusively for consumer in virtual world is therefore needed and required.

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Appendix

SUMMARY OUTPUT

Regression Statistics

Multiple R	0.5180
R Square	0.2683
Adj. R Square	0.1219
Std Error	1.3895
Observations	25

ANOVA

					<i>Significance</i>
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>F</i>
Regression	4	14.1566	3.5391	1.8332	0.1621
Residual	20	38.6127	1.9306		
Total	24	52.7693			

Upper

<i>faberoguin</i>	<i>Coefficients</i>	<i>Std Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>95%</i>
Intercept	-3.7154	0.5646	-6.5811	0.0000	-4.8930	-2.5378
Brands	-1.4590	0.6409	-2.2766	0.0340	-2.7959	-0.1222
mediumincome	0.8627	0.7625	1.1315	0.2712	-0.7278	2.4532
mediumlindens	0.7072	0.6753	1.0473	0.3075	-0.7014	2.1159
young	0.3129	0.6395	0.4893	0.6300	-1.0210	1.6467

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.6773
R Square	0.4587
Adj. R Square	0.3504
Std Error	0.3948
Observations	25

ANOVA

					<i>Significance</i>
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>F</i>
Regression	4	2.6420	0.6605	4.2366	0.0121
Residual	20	3.1180	0.1559		
Total	24	5.76			

<i>Edwards</i>	<i>Coefficients</i>	<i>Std Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	0.6251	0.1604	3.8964	0.0009	0.2904	0.9597
brands	0.3679	0.1821	2.0200	0.0570	-0.0120	0.7478
mediumincome	-0.7911	0.2167	-3.6513	0.0016	-1.2431	-0.3392
mediumlindens	0.5568	0.1919	2.9017	0.0088	0.1565	0.9571
young	-0.2371	0.1817	-1.3048	0.2068	-0.6161	0.1420

Scale references

Questionnaire I: Faber and O'Quinn compulsive buying scale [Faber, R. J., & O'Quinn, T. C. (1992). *A Clinical Screener for compulsive buying. Journal of Consumer Research* 19, 459-469]

Scoring equation: $- 9.69 + (Q1a \times 0.33) + (Q2a \times 0.34) + (Q2b \times 0.50) + (Q2c \times 0.47) + (Q2d \times 0.33) + (Q2e \times 0.38) + (Q2f \times 0.31)$
if score ≤ 1.34 , subject is classified as a compulsive buyer.

Please indicate how much you agree or disagree with each of the statements below.

1. Place an "x" on the line which best indicates how you feel about each statement (five-point Likert-type response format).
 - a. If I have any money left at the end of the pay period, I just have to spend it.
2. Please indicate how often you have done each of the following things by placing an "x" on the appropriate line (five-point Likert-type response format).
 - a) Felt others would be horrified if they knew of my spending habits.
 - b) Bought things even though I couldn't afford them.
 - c) Wrote a check when I knew I didn't have enough money in the bank to cover it.
 - d) Bought myself something in order to make myself feel better.
 - e) Felt anxious or nervous on days I didn't go shopping.
 - f) Made only the minimum payments on my credit cards.

Questionnaire II: Edwards, E. A [Edwards, E. A. (1993). *Development of a new scale for measuring compulsive buying behaviour. Financial Counselling and Planning* 4, 67-84].

These next questions ask about your attitudes toward shopping. Please circle the extent to which you agree or disagree with each statement (five-point Likert-type response format).

1. I feel driven to shop and spend, even when I don't have the time or the money.
2. I go on buying binges.
3. I feel "high" when I go on a buying spree.
4. I buy things even when I don't need anything.
5. I go on a buying binge when I'm upset, disappointed, depressed, or angry.
6. I buy things I don't need or won't use.
7. I sometimes feel compelled to go shopping.
8. I get little or no pleasure from shopping.
9. I hate to go shopping.
10. I worry about my spending habits but still go out and shop and spend money.
11. I buy things even though I cannot afford them.
12. I feel anxious after I go on a buying binge.
13. I feel guilty or ashamed after I go on a buying binge.