Disposition of Self-Signaling and of Others-Signaling: The SSO/OSO Scales

MTG 6224 Course Project

Jinyan Xiang

Introduction and Construct Definition

In marketing literature, luxury consumption, conspicuous consumption and status consumption are sometimes used interchangeably. Traditionally, conspicuous consumption and status consumption refer to the acquisition and consumption of luxury goods and services to implicitly or explicitly display social status and wealth to others (Velben, 1899; Dubois & Odabayeva, 2015). However, recent scholars expand the concept of conspicuous consumption in the sense that any acquisition and consumption out of the motive of identity-signaling can be regarded as conspicuous consumption and the identity signaled may not be associated with status, but with other domains, such as intelligence (Gao, Wheeleer & Shiv, 2009; Kim & Gal, 2014). Recent scholars also identity another situation in which consumers acquire and consume goods and services (most likely luxury goods and services) to simulate themselves or to convey information to themselves rather than to others. They term the situation self-signaling (SS), contrary to others-signaling (OS); they even argue that acquisition and consumption can be conspicuous to oneself rather than to others, an argument change the traditional meaning of the word conspicuous (Gal, 2015; Shrum et al., 2013) Luxury consumption, on the other hand, is a broader construct that refers to any acquisition and consumption of luxury goods and services regardless of the motives. In the vein of identity-signaling behavior that is defined as "a behavior motivated by the belief that the behavior will convey particular information about the individual to the self or to others" (Gal, 2015, p.257), SS and OS are two lower-order constructs that categorize two types of identity-signaling behaviors.

Clearly, from the perspective of conspicuous consumption, status consumption and luxury consumption, SS and OS are two opposite motives for consumption whereas from the perspectives of identity-signaling behaviors, SS and OS are two opposite types of behaviors. However, the two standpoints are interrelated in terms that conspicuous consumption, status consumption and luxury consumption are means for identity-signaling when signaled identity is about status and wealth and

identity-signaling may drive consumers to engage in conspicuous consumption, status consumption and luxury consumption. I examine SS and OS from the former perspective in the context of luxury consumption. As any other motives, SS and OS are determined by both dispositional and situational factors; and I intend to develop SSO/OSO scales to examine consumers' disposition to SS and to OS.

I term disposition to SS as self-signaling orientation (SSO) whereas disposition to OS as others-signaling orientation (OSO). I further define SSO as a disposition that consumers acquire and consume luxury goods and services to stimulate themselves or convey particular information to themselves, independent from others' feedback whereas OSO as a disposition that consumers acquire and consume luxury goods and services to impress others and convey particular information to others, affected by others' feedback. SS and OS are different from identity-signaling. By definitions, SSO and OSO are not multi-dimensional items, but it is possible that there are sub-dimensions indicated by exploratory factor analysis. To make it parsimonious, I do include low-order motives, such as self-expression and self-enhancement, that drives consumers to stimulate self, to impress others, and to convey particular information to self or to others, into the definitions. However, these lower-order motives are reflected in the preliminary items. In addition, in most cases, consumers only convey desirable information to self or to other; in other words, self-enhancement are the most likely lower-order motives. As indicated, SSO and OSO are co-existing dispositions; a consumer can be high on both or low on both or more amenable to SS or OS.

Interestingly, increasing numbers of scholars pay their attention to SS, however, there is no formal scale to demonstrate that SS are essentially distinct from OS. This scale may provide preliminary evidence on the distinctions between the two from the dispositional standpoint. This scale may also benefit marketing professionals in segmentation and targeting based off latent profile analysis. For example, a consumer who are high on both SSO and OSO may be located in segment one while another consumer who are low on SSO but high on OSO may be located in segment two. It may help

future researchers predict consumers' choices between different type of luxury goods and services. For example, consumers with high SSO may prefer personalized products whereas those with high OSO may prefer high-profile products. As mentioned, this current scale is developed in the context of luxury consumption, however, SSO and OSO may be applied in other domains with revision. For example, an adapted SSO-OSO scale may be applicable to acquisition and consumption of intellectual goods and services.

Item Writing and Survey Development

Preliminary items for SSO and OSO scales are shown in List 1a and 1b. All respondents answered these questions in 9-point scale. Within each scale, all items are randomized. In this list, X refers to the self-selected luxury brand. Respondents were given examples of luxury brands, including Gucci, LV, Chanel, Fendi for fashions, Mercedes, BMW, Porsche, Maserati for automotive and Dior, Giorgio Armani YSL and Chanel for cosmetics. They were instructed to select a brand they really would like to own, and all the rest of questions would be based on the brand they chose. The key advantage of using self-selecting brands is to gain respondents' attention to the survey whereas the key disadvantage is that respondents may have various levels of brand attachment to their self-selected brand. However, there is no theory suggesting that brand attachment can affect SSO or OSO. Instead, as dispositions, SSO and OSO are supposed to be stable and free from influences of brand attachment. Nevertheless, this survey still includes a five-item scale to assess respondents' brand attachment (adapted from Park et al., 2010). Each item reflects one key attribute of SSO and OSO by definitions (Table 1a and 1b). Note, one attribute is the acquisition and consumption of luxury goods and services; it is reflected in the acquisition and consumption of the self-selected luxury brands, because any luxury goods and services are provided by particular luxury brands. Also, luxury brands are more concrete and easier to imagine, helping respondents answer questions regarding on SSO and OSO. More importantly, types of goods and services may affect SSO and SOS. For example, some products, such

as luxury tub, may never be used in public. Therefore, when a consumer self-selects this type of products, even though he is truly other-signaling oriented, his scale scores may incorrectly indicate he is self-signaling oriented, because he cannot use the tub in public to impress others or to convey any information to others. This survey also included established scales for prestige sensitivity (adapted from Lichtenstein, Ridgway& Netemeyer, 1993), material values (adapted from Richins, 2004), status consumption (adapted from Eastman, Goldsmith & Flynn, 1999) that are related to SSO and OSO scales. Inclusion of these scales helps to establish convergent and discriminate validity for SSO and OSO scales. A self-report attention check question and two questions regarding on general attitudes to luxury brand were also included. Demographic information, namely, social status, household income level, ethnicity gender and age were collected before debriefing.

List 1a Self-signaling Orientation (SSO)

1. I would like to use X only in private.
2. Even if no one noticed that I owned X, I would still feel good about owning X.
3. I would like to use X to make myself happier.
4. I would like to use X to make myself more confident.
5. I would like to use X to make myself more powerful.
6. Owning X would fit my personal taste.
7. Owning X would reflect an ideal me to myself.
8. Owning X would help me generate positive thoughts about myself.
9. Owning X would help me boost my self-importance.
10. I would enjoy owning X without any admiration from others.
11. I would enjoy owning X without any compliments from others.
12. I would enjoy the private pleasures X would bring to me.
13. I would enjoy the positive views about myself when I was using X.
14. I would not bother broadcasting the fact that I owned X.
15. I would not care whether others could notice the fact that I owned X
16. I would not care whether others could appreciate X.
17. I would not care what inferences people would make on me based on the fact that I owned X.

List 1b Others-Signaling Orientation (OSO)

1. I would like to use X in public for most time.
2. The more people noticed that I was using X, the better I would feel.
3. I would like to use X to communicate who I am to others.

4. I would like to use X to promote my personal image among others.
5. I would like to use X to display my social status to others.
6. I would like to use X to brag my accomplishment to others.
7. Owning X would show the positive aspects of myself to others.
8. Owning X would reflect an ideal me to others.
9. Owning X would help me stand out from the crowds.
10. I would enjoy owning X more if I received admirations from others.
11. I would enjoy owning X more if I received compliments from others.
12. I would enjoy the public attention X would bring to me.
13. I would enjoy the positive views others would have about me when I was using X.
14. I would broadcast the fact that I owned X.
15. I wish others could notice the fact that I owned X
16. I wish others could appreciate X.
17. I wish others could make correct inferences about me based on the fact that I owned X.

Table 1a SSO Attributes and Items

Attributes	**Items**
1. independent from others' feedback	1,10,11,14-17
2. stimulating self	2,3,6,12,
3. conveying information to self	4,5,7-9,13
3a. (self-enhancement motive)	4,5,7,9
3b. (self-expression motive)	8,13
4. acquisition and consumption of luxury brands	1-17

Table 1b OSO Attributes and Items

Attributes	**Items**
1. affected by others' feedback	1,2,10,1,14-17
2. impress others	9,12,13
3. conveying information to others	3-8
3a. (self-enhancement motive)	4,6,8
3b. (self-expression motive)	3,5,7
4. acquisition and consumption of luxury brands	1-17

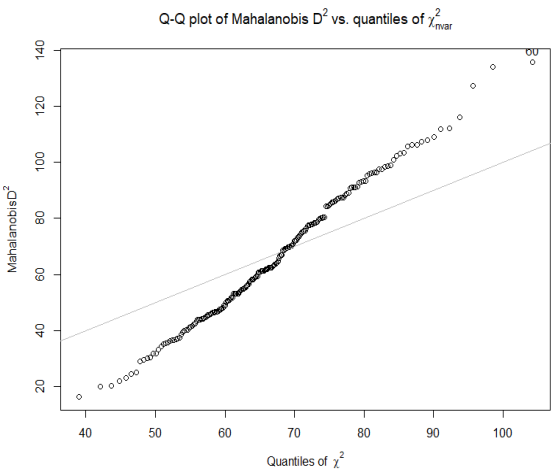
Data Collection, Cleaning and Description

205 Virginia Tech students recruited from SONA system completed the survey. I conduct careless response analysis with three basic indices, namely, even-odd-item correlation, item response variance and Mahalanobis distance. Results show most students responded carefully. There is no clear outliner (Figure 1a). However, there are 3 students who scored identically on each question; their

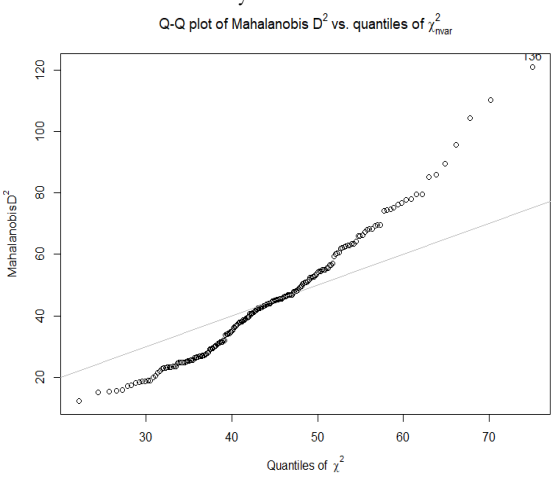
responses are excluded in further analysis. Although, responses in this sample are quite variant (all M(IRV) = 7.42), their responses do not heavily depart from distribution line (MD < 136); therefore, to ensure a decent sample size, their responses are kept for the remaining analysis. Since the large IRV could be resulted from non-focal scales, I redo IRV and MD analysis only for focal SSO/OSO scales. Results show a dramatic drop of IRV (M = 2.24), supporting the argument (Figure 1b). Per their self-report attention, most students reported a great amount attention to this survey (M = 4.19, SD = 0.79; in 5-point scale). In short, 202 responses are left for rest analysis based off both objective statistical analysis and subject attention report.

Figure 1a & 1b Q-Q plots

all scales included



only focal scales



In this 202-sample, 97 are female (48%) and 105 are male (52%). The majority are Caucasians (70.8%), followed by Asians (15.3%). The rest are African Americans (5%), Hispanics (4%) and Pacific Islanders (1 %). Few respondents chose other or prefer not to tell (4% in total). Interesting, this sample shows a great income gap between respondents: 24.3% of them are from low-income family (annual before-tax income < $30k) whereas 34.2% of them are from upper-middle income family (annual before-tax income > 150k) and 21.8% of them are from middle income family(annual before-tax income > 100k but < 150k). Consistent with their income levels, majority of respondents perceived them middle class in American society (68.4% scored them 4-7 in 10-point social ladder) and a quarter

of respondents perceived them lower class (25.7% scored them 1-3 in 10-point social ladder). In short, although this is a student sample with an average age at 21, this sample can represent a wide range of Americans, because it shows a decent variety in terms of gender, ethnicity and social class.

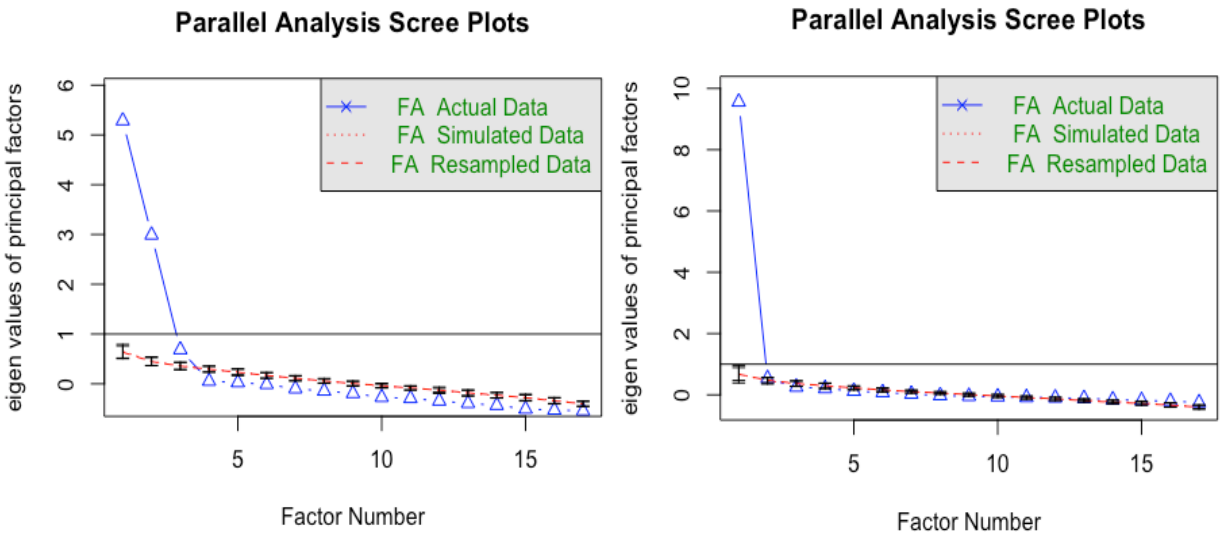
As for the self-selected brands, the most selected brands are Porsche (13.9%), Gucci (13.9%), Mercedes (11.9%), Chanel (7.9%), BMW (7.4%) and LV (6.4%). Surprisingly, respondents have relatively low brand attachment to their self-selected brands with a relatively high variance ($M = 3.80$, $SD = 1.95$; in 9-point scale). Low attachment and high variance may be resulted from unsophistication of students. A more sophisticated sample (such as from MTurk) is expected to reduce both issues.

Exploratory Factor Analysis

I conduct EFA to probe any unidentified sub-dimensions and refine the preliminarily items. Based off parallel analysis, there are three clear factors for SSO scale whereas one or two factors for OSO scale that need further analysis (Figure 2a and 2b). I first examine the three-factor model for SSO scale. Per preliminary factor loadings, I retain 4, 3 and 2 items whose factor loadings are higher than 0.8, 0.75 and 0.7 for factor 1, factor 2 and factor 3 respectively, because the second highest factor loading for factor 2 is 0.76 and the highest factor loading for factor 3 is only 0.72 in the preliminary model. Also, in the preliminary model, cross-loadings are only found on low factor loading items which are excluded for refinement. With revision, the new model explains 66% variance in total (31% by factor 1, 23% by factor 2 and 12% by factor 3), increasing from 58% that is explained by the preliminary model. However, in this new model, factor loading of one item for factor 3 is only 0.67. I exclude this item and the remaining items constitute the final version of three-factor model for SSO scale. The final model also explains 66% variance in total (27% by factor 1, 26% by factor 2 and 13% by factor 3), but all factor loadings are above 0.72. RMSEA index is 0, suggesting a good model fit. Items for each factor are shown in List 2a (factor loading of each item is shown in the brackets). Per the contents of each item, I label factor 1 "self-enhancement"; this factor indicates and measures

consumers' lower-order motive of self-enhancement reflects the attribute of "conveying information to self". I label factor 2 "self-stimulation" that reflects the attribute of self-stimulation and factor 3 "private use" that reflect the attribute of being independent from others' feedback. In short, though factor 3 is relatively weak (factor loadings are 0.72 and 0.71 respectively), the three factors reflect and measures three key attributes of the construct SSO scale, providing some evidence of content validity. Correlation matrix shows that items under each factor are moderately correlated with each other, indicating they are not the identical items, but they are measuring the same construct (Table 2a).

Figure 2a Scree Plots for SSO (left) and OSO (right)



Parallel analysis for OSO scale indicates that either one-factor or two-factor model could work, but, one-factor model may fit better, because both red line and error bars suggests that the second factor is within the range of what can be found in random data. However, I investigate both models in terms of factor loadings, variance explained, and model fit. I first examine the single-factor model for OSO scale. Per preliminary factor loadings, I retain 7 items whose factor loadings are higher than 0.8 in this single-factor model. With revision, the second single-factor model explains 68% variance in total, increasing from 56% that is explained by the preliminary model. However, in the second single-factor model, factor loadings of two items are 0.78. With second revision, the third model

explains 72% variance in total, but the factor loading of one item in this model is 0.79. I further exclude this item and the remaining items constitute the final single-factor model for OSO. In The final single-factor model explains 74% variance in total, and all factor loadings are above 0.80. RMSEA index is 0.068, suggesting a good model fit. I then examine the two-factor model for OSO scale. Per preliminary factor loadings, I retain 3 and 2 items whose factor loadings are higher than 0.8 and 0.75 for factor 1 and factor 2 respectively in this two-factor model. Also, in the preliminary two-factor model, cross-loadings are only found on low factor loading items which are excluded for refinement. With revision, the revised two-factor model explains 65% variance in total (44% by factor 1 and 21% by factor 2), increasing from 60% that is explained by the preliminary model. However, factor loadings for factor 1 are 0.90, 0.86 and 0.79 respectively and those for factor are only 0.72 and 0.72 respectively; cross-loading are not found. RMSEA is 0.1113. Both factor-loadings an RMSEA suggest that two-factor model for OSO scale fails to well fit the data. Clearly, single-factor model is the better option (Table 3). Items in the single-factor model are shown in List 2b (factor loading of each item is shown in the brackets). Item 1 to 3 reflect the attribute of being affected from others' feedback and the attribute of impressing others; item 4 indicates and measures consumers' lower-order motive of self-impression reflects the attribute of "conveying information to others". In short, though the reflection is not balanced in the sense that "conveying information to others" is only reflected by one-item, the three factors reflect and measures three key attributes of the construct SSO scale, providing some evidence of content validity. Correlation matrix shows that items are moderately correlated with each other, indicating they are not the identical items, but they are measuring the same construct (Table 2a).

List 2a Self-signaling Orientation (SSO)

Factor 1 Self-enhancement

1. Owning X would help me boost my self-importance. **(0.89)**
2. Owning X would reflect an ideal me to myself. **(0.83)**
3. I would like to use X to make myself more confident. **(0.80)**

Factor 2 Self-stimulation

4. I would enjoy owning X without any compliments from others. **(0.84)**
5. Even if no one noticed that I owned X, I would still feel good about owning X. **(0.83)**
6. I would enjoy owning X without any admiration from others. **(0.81)**

Factor 3 Private Use

7. I would not care whether others could appreciate X. **(0.72)**
8. I would not bother broadcasting the fact that I owned X. **(0.71)**

List 2b Others-signaling Orientation (OSO)

Factor 1

1. I would enjoy owning X more if I received admirations from others. **(0.94)**
2. I would enjoy owning X more if I received compliments from others. **(0.88)**
3. The more people noticed that I was using X, the better I would feel. **(0.81)**
4. I would like to use X to display my social status to others. **(0.81)**

Table 2a Between-items Correlation Matrix for SSO

		Factor 1			**Factor 2**			**Factor 3**	
		1	2	3	4	5	6	7	8
Factor 1	1	1.00	0.72	0.74	0.08	0.15	0.03	0.03	0.05
	2	0.72	1.00	0.67	0.15	0.21	0.08	0.05	0.08
	3	0.74	0.67	1.00	0.09	0.2	0.04	0.00	0.01
Factor 2	4	0.08	0.15	0.09	1.00	0.70	0.70	0.43	0.32
	5	0.15	0.21	0.20	0.7	1.00	0.64	0.32	0.25
	6	0.03	0.08	0.04	0.7	0.64	1.00	0.36	0.28
Factor 3	7	0.03	0.05	0.00	0.43	0.32	0.36	1.00	0.52
	8	0.05	0.08	0.01	0.32	0.25	0.28	0.52	1.00

Table 2a Between-items Correlation Matrix for OSO

		Factor 1			
		1	2	3	4
Factor 1	1	1.00	0.82	0.74	0.78
	2	0.82	1.00	0.73	0.70
	3	0.74	0.73	1.00	0.66
	4	0.78	0.70	0.66	1.00

Table 3 Comparison between Single-Factor Model (SFM) and Two-factor Model (TFM) for OSO

	N of factors	**Lowest factor loading**	**Highest factor loading**	**Cumulative variance explained**	**RMSEA**	**BIC**
SFM	1	0.81	0.94	74%	0.068	-6.8
TFM	2	0.72	0.90	65%	0.113	-1.79

Reliability and Validity

Based off results from EFA, I refine my items and measurement model for both SSO and OSO scales. Specifically, scale for SSO consists of three factors and eight items (3 items for factor 1 and factor 2 and 2 items for factor 3) whereas scale for OSO scale is a single-factor scale with four items. Then, I test reliability of both scales (Table 4). Cronbach's alpha for SSO scale is 0.75 and drop of any items would decrease the reliability. This moderate Cronbach's alpha could be resulted from multiple dimensions (factors) of this scale; moreover, Cronbach's alpha for factor 1 is 0.88 and for factor 2 is 0.83 whereas correlation coefficient for factor 3 is only 0.52, suggesting the moderate overall Cronbach's alpha could be resulted from factor 3 which is quite weak. Thus, this SSO scale can be regarded as a reliable scale, even though Cronbach's alpha is below 0.8, the widely-used cutoff value for good reliability. In addition, results suggest current items are all good items and it is unnecessary to drop off any of them. However, revision of content may help increase reliability. For example, better items should be written for factor 3, because factor loadings for this factor are below 0.8 and correlation between the two items for this factor is only. Cronbach's alpha for OSO scale is 0.92 and drop of any items would decrease the reliability. Results suggest current OSO scale is reliable and current items are decent.

Table 4 Reliability of SSO/OSO scales

Scale	Raw alpha	Standardized alpha	95% CI of alpha
SSO	0.75	0.76	[0.69,0.80]
OSO	0.92	0.92	[0.90, 0.94]

As mentioned, the survey also included scales of prestige sensitivity, material values and status consumption. Items for each scale are shown in list 3a-3c. Inclusion of these scales provide me a chance to explore convergent and discriminate validity. In Eastman, Goldsmith and Flynn (1999)'s original work, status consumption is defined as "the motivational process by which individuals strive to improve their social standing through the conspicuous consumption of consumer products that

confer and symbolize status both for the individual and surrounding significant others" (p. 42). By definitions, status consumption is supposed to be moderately correlated with OSO and with the factor, namely, self-enhancement of SSO, because one type of information that consumers conveys to self or to others is social status, especially when they do so out of self-enhancement motives. By contrast, status consumption is supposed to be weakly correlated with other two factors of SSO, which are more about private pleasure and self-stimulation. Related to status consumption, prestige sensitivity is defined as "favorable perceptions of the price cue based on feelings of prominence and status that higher prices signal to other people about the purchaser" (Lichtenstein, Ridgway& Netemeyer, 1993; p. 236). Therefore, prestige sensitivity is also supposed to be moderately correlated with OSO and self-enhancement of SSO but weakly correlated with other two factors of SSO. There are three sub-dimensions of material value. "Acquisition centrality" (centrality) refers to a belief that possession and acquisition lay at the center of life. "Acquisition as the pursuit of happiness" (happiness) refers to a belief that possession and acquisition are essential for life satisfaction and subjective well-being and are helpful in pursing happiness. "Possession-defined success" (success) refers to a belief that success (theirs and others) are defined by number and quality of cumulative possessions. (Richins & Dawson, 1992) By definitions, centrality and happiness are supposed to be weakly related with all factors of SSO and OSO, because the two sub-dimensions of material value are irrelevant to SSO or OSO whereas success is supposed to moderately correlated with OSO and self-enhancement of SSO whereas weakly correlated with other factors of SSO. Correlations between each scale and factors of each scale confirm these predictions (Table 5a and 5b). In general, SSO is weakly correlated with all other scales (0.32 with material value, 0.11 with status consumption and 0.25 with prestige sensitivity), providing evidence for discriminate validity of SSO scale. Meanwhile, self-enhancement factor of SSO is moderately correlated with all other scales (0.59 with material value, 0.58 with success factor; 0.44 with status consumption and 0.55 with prestige sensitivity), providing evidence for convergent validity

of SSO scale. OSO, on the other hand, is moderately correlated with all other scales (0.50 with material value, 0.53 with success factor; 0.61 with status consumption and 0.61 with prestige sensitivity, providing evidence for convergent validity of OSO scale. It is weakly correlated with centrality factor of material value (0.22), providing evidence for discriminate validity of OSO scale. Surprisingly, it is moderately correlated with happiness factor of material value (0.40). This correlation indicates that OSO is more likely to drive consumers to adopt materialism and accordingly view possession and acquisition as an effective mean to pursue happiness than SSO. In short, correlations between SSO/OSO scales and other scales provide evidence for both convergent and discriminate validity.

Table 5a Correlation Matrix between SSO and Other Scales

(SSO = Self-signaling Orientation: f1: self-enhancement, f2: self-stimulation, f3: private use;
MV = Material Value: c = Centrality, h = Happiness, s = Success;
SC = Status Consumption; PS = Prestige Sensitivity)

	SSO	SSOf1	SSOf2	SSOf3	**MV**	MVc	MVh	MVs	**SC**	**PS**
SSO	1	0.7	0.72	0.6	0.32	0.09	0.32	0.27	0.11	0.25
SSOf1	0.7	1	0.14	0.05	0.59	0.28	0.49	0.58	0.44	0.55
SSOf2	0.72	0.14	1	0.42	0.07	0.04	0.13	-0.03	-0.17	-0.05
SSOf3	0.6	0.05	0.42	1	-0.21	-0.28	-0.13	-0.17	-0.21	-0.17
MV	0.32	0.59	0.07	-0.21	1	0.64	0.86	0.87	0.7	0.76
MVc	0.09	0.28	0.04	-0.28	0.64	1	0.36	0.39	0.49	0.37
MVh	0.32	0.49	0.13	-0.13	0.86	0.36	1	0.62	0.48	0.6
MVs	0.27	0.58	-0.03	-0.17	0.87	0.39	0.62	1	0.69	0.76
SC	0.11	0.44	-0.17	-0.21	0.7	0.49	0.48	0.69	1	0.76
PS	0.25	0.55	-0.05	-0.17	0.76	0.37	0.6	0.76	0.76	1

Table 5b Correlation Matrix between OSO and Other Scales

(OSO = Others-signaling Orientation)

	OSO	**MV**	MVc	MVh	MVs	SC	PS
OSO	1.00	0.50	0.22	0.40	0.53	0.61	0.61
MV	0.50	1.00	0.64	0.86	0.87	0.70	0.76
MVc	0.22	0.64	1.00	0.36	0.39	0.49	0.37
MVh	0.40	0.86	0.36	1.00	0.62	0.48	0.60
MVs	0.53	0.87	0.39	0.62	1.00	0.69	0.76
SC	0.61	0.70	0.49	0.48	0.69	1.00	0.76

PS	0.61	0.76	0.37	0.60	0.76	0.76	1.00

List 3a Prestige Sensitivity

1. People notice when you buy the most expensive brand of a product.
2. Buying a high-priced brand makes me feel good about myself.
3. Buying the most expensive brand of a product makes me feel classy.
4. I enjoy the prestige of buying a high-priced brand.
5. It says something to people when you buy the high-priced version of a product.
6. Your friends will think you are cheap if you consistently buy the lowest priced version of a product.
7. I have purchased the most expensive brand of a product just because I knew other people would notice.
8. I think others make judgments about me by the kinds of products and brands I buy.
9. Even for a relatively inexpensive product, I think that buying a costly brand is impressive.

List 3b Material Values

Factor 1 Success

1. I admire people who own expensive homes, cars and clothes
2. The things I own say a lot about how well I'm doing in life.
3. I like to own things that impress people.

Factor 2 Centrality

4. I try to keep my life simple, as far as possessions are concerned. (R)
5. Buying things gives me a lot of pleasure.
6. I like a lot of luxury in my life.

Factor 3 Happiness

7. My life would be better if I owned certain things I don't have.
8. I'd be happier if I could afford to buy more things.
9. It sometimes bothers me quite a bit that I can't afford to buy all the things I'd like.

List 3b Status Consumption

1. I would buy a product just because it has status.
2. I am interested in new products with status.
3. I would pay more for a product if it had status.
4. The status of product is irrelevant to me. (R)
5. A product is more valuable to me if it has some snob appeal.

Confirmatory Factor Analysis

Expect for correlational analysis, CFA also provides evidence for discriminate validity for SSO an OSO by comparing them with other scales. Satorra.Bentler adjustments are used for compared models, because normality of all compared models is not perfectly satisfied based on multivariate tests, especially considering the moderate sample size (Table 6). Results show that misfits are found in SSO-

PS, SSO-SC, SSO-MV[1], OSO-PS, OSO-SC, OSO-MV, because all constrained models in which correlations between paired latent factors (i.e. SSO and PS) are set to be 1.0 are significantly fit worse than unstrained models (P (Chi-square change) < 0.05) (Table 7). Other indexes also indicate misfits but are not presented here.

Table 6 Normality Tests

Model	Based on univariate test (Y/N)	Based on multivariate test (Y/N)
SSO-PS	Y, skews of none items are smaller than |2|	N, P (skew) < 0.05
SSO-SC	Y, skews of none items are smaller than |2|	N, P (skew) < 0.05
SSO-MV	Y, skews of none items are smaller than |2|	N, P (skew) < 0.05
OSO-PS	Y, skews of none items are smaller than |2|	N, P (skew) < 0.05
OSO-SC	Y, skews of none items are smaller than |2|	N, P (skew) < 0.05
OSO-MV	Y, skews of none items are smaller than |2|	N, P (skew) < 0.05

Table 7 Model Comparison Results by CFA

Model	**SSO-PS**	**SSO-SC**	**SSO-MV**	**OSO-PS**	**OSO-SC**	**OSO-MV**
Unconstrained Chi-square	553	450	554	141	56	154
Constrained Chi-square	697	461	673	349	200	394
P (Chiq. change)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Since both SSO and OSO scales are over-identified models (20 df left for SSO without estimating the relationship between three factors and 17 df left for SSO with estimating the relationship between three factors, even though the factor 1 and factor 2 of SSO with three items are just identified and factor 3 of SSO with only two items is under-identified; 2 df left for OSO), I conduct CFA to examine whether current three-factor model for SSO scale and single-factor model

[1] I treat SSO and MV as one factor, ignoring the sub-dimensions and I use codes as following that I am not sure whether everything is correct, or I shall take sub-dimensions into consideration.

```
SSOMV<- 'SSO=~Se9+Se7+Se4+Se11+Se2+Se10+Se16+Se14
MV=~MVCr+MVC2+MVC3+MVH1+MVH2+MVH3+MVS1+MVS2+MVS3'
SSOMV.SBfit <-cfa(SSOMV,data=MTG_sub3,test="Satorra.Bentler",std.lv=T)
summary(SSOMV.SBfit,fit.measures=T,standardized=T)
SSOMV1<- 'SSO=~Se9+Se7+Se4+Se11+Se2+Se10+Se16+Se14
MV=~MVCr+MVC2+MVC3+MVH1+MVH2+MVH3+MVS1+MVS2+MVS3
SSO~~1*MV'
SSOMV.SBfit1 <-cfa(SSOMV1,data=MTG_sub3,test="Satorra.Bentler",std.lv=T)
summary(SSOMV.SBfit1,fit.measures=T,standardized=T)
anova(SSOMV.SBfit,SSOMV.SBfit1)
Similar for other comparisons.
```

for OSO scale suggested by EFA fit well or not. Since normality of the data for SSO/OSO scales is not satisfied based on multivariate test (Figure 3a & 3b, P (skew) < 0.05), Satorra.Bentler adjustment are used for both scales, even though the violations of normality are caused by outliners. Also, I check whether the data for SSO/OSO scales are categorical or continuous in nature. Results suggest that under the assumption of categorical data, the OSO scale has a better model fit; whereas under the assumption of continuous data, the SSO scale has a better model fit; however, both improvements seem insignificant, suggesting it is unclear whether both data are categorical or continuous in nature (Table 8). Results also suggest that SSO/OSO scales have good model fit (RMSEA < 0.08, SRMR < 0.08, CFI = 1.00, P(Chi-square) > 0.05). Estimates of factor loadings for SSO/OSO scales with Satorra.Bentler adjustments that suggest most items for SSO scale are good, except for item 8 of factor 3, whose standardized factor loading is only 0.63 whereas all items for OSO scale are good (Table 9a and 9c). However, since there are only two items of factor 3 (item 7 and 8), it is impossible to simply delete item 8. Instead, a more practical remedy is to revise or replace this item and re-collect data in the future. In addition, is covariance between factors are week in SSO scale, indicating the three factors are distinct aspects of the latent construct, namely SSO (Table 9b). I also explore whether SSO and OSO can be two factors of a higher-order construct, for example, identity signaling, or two convergent constructs. Results show SSO and OSO are two discriminate constructs with Satorra.Bentler adjustment (P (Chi-square change) < 0.05). However, R fails to provide output for high-order fits[2].

[2] **Coding and Warning:**

With SH <- 'sso=~Se9+Se7+Se4+Se11+Se2+Se10+Se16+Se14
oso=~So10+So11+So2+So5
IS=~sso+oso' **Warning messages are:**
1: In lav_model_vcov(lavmodel = lavmodel, lavsamplestats = lavsamplestats, :
lavaan WARNING: Could not compute standard errors! The information matrix could not be inverted. This may be a symptom that the model is notidentified.
2: In lav_test_satorra_bentler(lavobject = NULL, lavsamplestats = lavsamplestats, :
lavaan WARNING: could not invert information matrix
With SH2 <- 'Se=~Se9+Se7+Se4
Ss=~Se11+Se2+Se10

Table 8 Model Fit Indices of CFA (under different data type assumptions)

	under the assumption of continuous data					under the assumption of categorical data			
	Chi-square	**CFI**	**RMSEA**	**SRMR**		**Chi-square**	**CFI**	**RMSEA**	**SRMR**
SSO	14.22	1.000	0.000	0.036	**SSO**	21.82	0.985	0.033	0.036
OSO	2.60	0.999	0.039	0.046	**OSO**	2.26	0.999	0.026	0.011

Figure 3 Normal Q-Q plots for SSO (left) and OSO (right) (based on multivariate test)

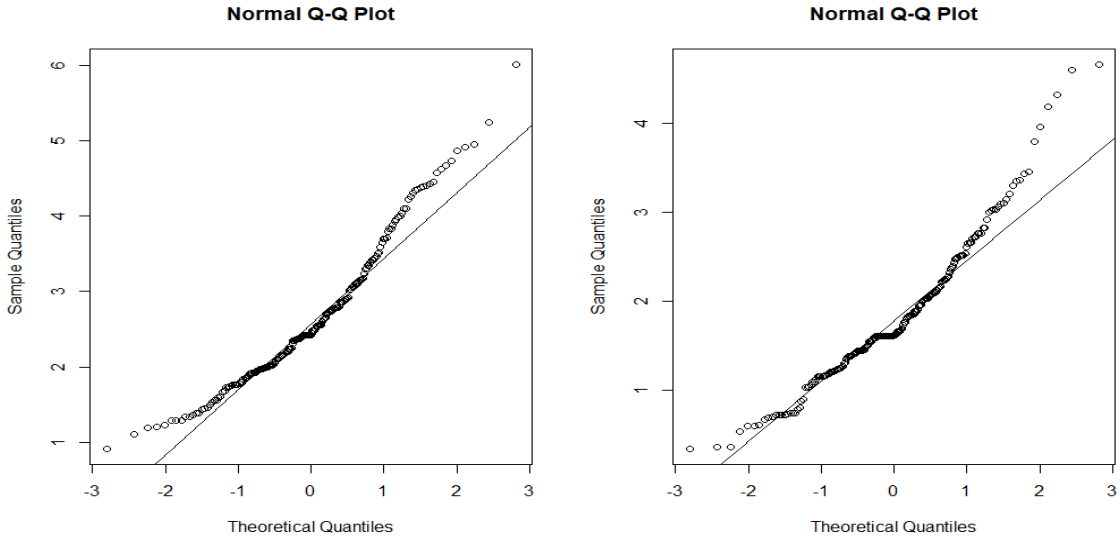


Table 9a Estimates of Factor Loadings for SSO scale

Item	#1	#2	#3	#4	#5	#6	#7	#8
Factor		#1			#2		#3	
Estimate	1.00	0.97	0.90	1.00	0.82	1.00	1.00	0.83
Std. Est.	0.89	0.83	0.81	0.89	0.80	0.80	0.83	0.63

Table 9b Covariances between Factors of SSO scale

	Self-enhancement	**Self-stimulation**	**Private use**
Self-enhancement	1.00	0.15	0.05
Self-stimulation	0.15	1.00	0.56
Private use	0.05	0.56	1.00

Table 9c Estimates of Factor Loadings for OSO scale

Item	#1	#2	#3	#4
Estimate	1.00	0.98	0.85	0.91
Std. Est.	0.94	0.88	0.82	0.81

Pu=~Se16+Se14
Os=~So10+So11+So2+So5
IS=~Se+Ss+Pu+Os', **Warning message is:**
In lavaan::lavaan(model = SHM, data = MTG_sub3, test = "Satorra.Bentler", :
lavaan WARNING: the optimizer warns that a solution has NOT been found!

Advanced Analysis: Measure Equivalence Test and Latent Profile Analysis

I first explore whether SSO/OSO scales are equivalent to genders with WLSMV estimation, because gender difference is common in signaling behaviors. Result show for SSO scale is equivalent to both genders, because all models with different constraints fit well, though the Chi-square change from baseline model to model with factor-loading constraints is significant (P(Chi-change) =0.05) (Table 10a). As for OSO scale, strict non-equivalence is found (P(Chi-square) = 0.02, P(Chi-change) =0.03), suggesting measurement errors are variant to different genders (Table 10b). Specifically, it indicates that males and females may have different interpretations of each or some item(s) and different understandings of the latent factor, namely other-signaling orientation[3]. Therefore, OSO scale cannot be used to compare gender difference in OSO as it is biased.

Table 10a Test of Measurement Equivalence for Genders for SSO

Model	#0	#1	#2	#3	#4
	N/A	factor	factor	factor loadings,	factor loadings, intercepts,
Constraints		loadings	loadings, intercepts	intercepts, residuals	residuals, lv.variances, lv.covariances, means
P (Chi-square)	0.56	0.28	0.26	0.33	0.17
P (Chiq. change)		0.05	0.31	0.68	0.23

Table 10b Test of Measurement Equivalence for Genders for OSO

Model	#0	#1	#2	#3	#4
	N/A	factor	factor	factor loadings,	factor loadings, intercepts,
Constraints		loadings	loadings, intercepts	intercepts, residuals	residuals, lv.variances, lv.covariances, means
P (Chi-square)	0.57	0.10	0.17	0.02	0.77
P (Chiq. change)		0.11	0.56	0.03	0.93

I also test whether SSO/OSO scales are equivalent to different classes with WLSMV estimation, because class plays a role in luxury consumption and signaling behaviors. For example, higher class bother less with signaling their status to others with high-profile luxury products while lower class prefer highly conspicuous products to show off their status as a way to restore their power. Respondents whose annual before-tax household income is over $60,000 are grouped as middle and

[3] I am not sure whether the interpretation is correct.

upper class whereas those whose income is below $60,000 are grouped as lower class; this grouping is based on the median household income in 2018 that is $61,891. Result show for SSO/OSO scales are equivalent to both classes (Table 11a and 11b). Future researchers may test whether SSO/OSO scales are equivalent to more-detailly-categorized classes (i.e., lower, lower-middle, middle, middle-upper, upper, superrich) if they have larger-scale samples; however, current sample does not allow to conduct such test, because most students are from middle class families.

Table 11a Test of Measurement Equivalence for Classes for SSO

Model	#0	#1	#2	#3	#4
Constraints	N/A	factor loadings	factor loadings, intercepts	factor loadings, intercepts, residuals	factor loadings, intercepts, residuals, lv.variances, lv.covariances, means
P (Chi-square)	0.31	0.41	0.52	0.50	0.70
P (Chiq. change)		0.63	0.80	0.39	0.59

Table 11b Test of Measurement Equivalence for Classes for OSO

Model	#0	#1	#2	#3	#4
Constraints	N/A	factor loadings	factor loadings, intercepts	factor loadings, intercepts, residuals	factor loadings, intercepts, residuals, lv.variances, lv.covariances, means
P (Chi-square)	0.28	0.88	0.45	0.70	0.35
P (Chiq. change)		0.81	0.13	0.69	0.28

Lastly, I conduct latent profile analysis to explore how consumers can be classified into various segments based on their SSO and OSO, a critical substantive question relevant to most marketers. I treat OSO as one factor, paralleling with three factors of SSO scale, because the three factors are weakly correlated with each other as discussed[4]. This four-factor model fails to fit well as expected (i.e., RMSEA=0.11, CFI=0.90, SRMR=0.10), however, the bad model fit does not affect LPA. Per BIC and Entropy results, I adopt three-profile model for further analysis (Table 12). Standardized means for each factor by latent profiles are graphed in Figure 4. Although, the dataset consists of 202 observations, Mplus only recognizes 101 observations for some unknown reasons[5]. Out of the 101

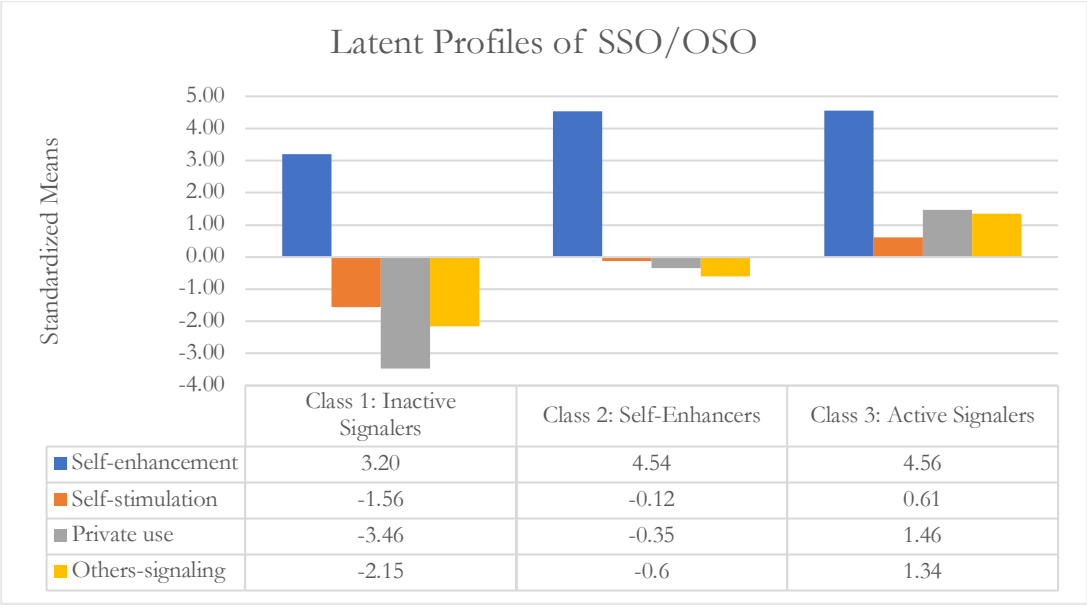
[4] I am not sure whether this is the correct solution, or I shall treat SSO as one factor, paralleling with OSO.
[5] I am not sure why this happens.

recognized observations, 12 are classified to class 1, 48 are classified to class 2 and 41 are classified to class 3. Strangely, all classes have high standardized means on self-enhancement, suggesting that self-signaling out of self-enhancement motives is prevalent among all respondents. In addition, class 2 and class 3 have almost the same score on self-enhancement; the difference between the two groups is that class 2 have much lower scores than class 3 on other three factors. Compared with class 2 and class 3, class 1 have the lowest scores on all factors. Therefore, I label class 3 as active signalers who have strong SSO and OSO, but a stronger orientation to SS out of self-enhancement motives whereas I label class 1 as inactive signalers who have weak SSO and OSO, but a stronger orientation to SS out of self-enhancement too. As for class 2, I label them self-enhancers who have a strong orientation to SS out of self-enhancement motives whereas weak orientations to SS out of other motives and to OS.

Table 12 Model Fit Indices of LPA

	2-profile	**3-profile**	**4-profile**
BIC	1591	1563	1559
Entropy	0.82	0.84	0.83

Figure 4 Latent Profiles of SSO/OSO



	Class 1: Inactive Signalers	Class 2: Self-Enhancers	Class 3: Active Signalers
Self-enhancement	3.20	4.54	4.56
Self-stimulation	-1.56	-0.12	0.61
Private use	-3.46	-0.35	1.46
Others-signaling	-2.15	-0.6	1.34

General Discussion

I develop the SSO/OSO scales to measure SSO and OSO. Based off a series of analyses, including correlation analysis, EFA, CFA, ME and LPA, I conclude a three-factor scale for SSO and

single-factor scale for OSO. Per correlation analysis, EFA and CFA, I show they both are relatively reliable and valid scales (by evidencing convergent and discriminate validity). However, correlation coefficient between the two items of the third factor ("private use") in SSO scale is week (0.52) and the factor loading of the item 8 ("I would not bother broadcasting the fact that I owned X") of the third factor is also week (0.71 per EFA, 0.63 per CFA). Both suggest that item 8 should be revised or rewritten. More importantly, since none of the factors of SSO are over-identified, it is necessary to add least one more good item to first two factors (with three items currently) and two more good items to the third factor (with two items currently) to ensure all of factors are over-identifies. This remedy can also enhance the reliability of each factor, especially the most weak third factor. Th e most critical issue with OSO is that three of the four items reflect the same attribute of OSO ("impress others") and only the last item reflects the attribute of "convey information to others" (out of self-expression motives). Therefore, more items are required to reflect all attributes in a balanced way and to construct more factors.

Per ME, both scales are equivalent to different classes. However, only SSO scale is equivalent to both genders whereas measurement error of OSO scale is not equivalent to both genders. Thus, it is cautious OSO cannot be used for comparing gender differences. Further analysis may help in probing what caused the measurement error non-equivalence and how serious this issue is.

Per LPA, I classify respondents into three profiles: active signalers (strong orientation to both SS and OS), inactive signalers (weak orientation to both SS and OS) and self-enhancers (strong orientation to SS out of self-enhancement only). Results from LPA is quire surprising, because scores on the factor of self-enhancement are extremely high, compared to scores of other factors among all classes. The self-enhancers are quite unexpected. Theocratically, two classes who are high on one orientation but low on the other may exist, however, LPA indicates the absence of the two classes. Such absence can be caused by imperfect SSO/OSO items that fail to reflect all attributes of SSO and

OSO appropriately. Another possibility is that only 101 observations are reorganized by Mplus due to some nuances. With a larger sample, more classes might be identified.

Reference

Dubois, D., & Odabayeva, N. (2015). Social hierarchy, social status and status consumption. In Norton, M. I., Rucker, D. D., Lamberton, C. (Ed.), *The Cambridge Handbook of Consumer Psychology*. New York, NY: Cambridge University Press. 257-281.

Eastman, J. K., Goldsmith, R. E., & Flynn, L. R. (1999). Status consumption in consumer behavior: Scale development and validation. *Journal of Marketing Theory and Practice,7*(3), 41-52.

Gal, D. (2015). Identity-signaling behavior. In Norton, M. I., Rucker, D. D., Lamberton, C. (Ed.), *The Cambridge Handbook of Consumer Psychology*. New York, NY: Cambridge University Press. 257-281.

Gao, L., Wheeler, S. C., & Shiv, B. (2009). The "shaken self": Product choices as a means of restoring self-view confidence. *Journal of Consumer Research, 36*(1), 29–38.

Kim, S., & Gal, D. (2014). From compensatory consumption to adaptive consumption: The role of self-acceptance in resolving self-deficits. *Journal of Consumer Research, 41*(2), 526–542.

Lichtenstein, D. R., Ridgway, N. M., & Netemeyer, R. G. (1993). Price perceptions and consumer shopping behavior: A field study. *Journal of Marketing Research*, *30*(2), 234-245.

Park, C. W., Macinnis, D. J., Priester, J., Eisingerich, A. B., & Iacobucci, D. (2010). Brand attachment and brand attitude strength: Conceptual and empirical differentiation of two critical brand equity drivers. *Journal of Marketing*, *74*(6), 1–17.

Richins, M. L. (2004). The material values scale: Measurement properties and development of a short form. *Journal of Consumer Research*,*31* (1), 209 -219.

Richins, M.L. and Dawson, S. (1992) A consumer values orientation for materialism and its measurement: Scale development and validation. *Journal of Consumer Research, 19*, 303-316.

Shrum, L.J., Wong, N., Arif, F., Chugani, S. K., Gunz, A., M. Lowrey, T. M., Nairn, A., Pandelaere, M., Ross, S. M., Ruvio, A., Scott, K., & Sundie, J. (2013) Reconceptualizing materialism as identity goal pursuits: Functions, processes, and consequences. *Journal of Business Research, 66*(8), 1179-1185.

Veblen, T. (1899). *Theory of the Leisure Class: An Economic Study in the Evolution of Institutions*. New York: Macmillan.