

**Master Thesis**

**Does choice-making orientation moderate choice overload?**

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## **Abstract**

Choice-overload effect is common under the current commercial context where an excessive amount of options are available. Abundant prior research has provided insights on possible conditions for occurrence of choice overload. Among these researches, some has found choice-making orientation to be one major factor contributing to low choice satisfaction, others has not found such moderating effect of choice-making orientation. No study regarding the condition for choice-making orientation to moderate choice-overload effect can be found. After gathering data through an online survey, this paper utilizes ANOVA to test the effect of assortment size on choice satisfaction. Later on, by using the PROCESS macro of Hayes (2018) Model 1, the paper looks into the moderation effect of choice-making orientation on the relationship between assortment size and choice-making orientation. Lastly, this paper assumes that product tangibility of tested objects in previous studies is related to the different conclusion regarding the moderation effect of choice-making orientation. This paper tested this assumption by using the PROCESS macro of Hayes (2018) Model 3. All hypotheses in this paper are found insignificant. Insights of this study can be a reference for future research looking into relevant matters of the moderation effect of choice-making orientation on choice-overload.

**KEYWORDS:** *Choice Overload, Assortment Size, Choice-making Orientation, Product Tangibility, Choice Satisfaction*

### **Author's declaration**

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Sincerely,

Keer Wang

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## **1. Introduction**

Choice overload occurs when choice satisfaction level of consumers decreases when more choices become available. However, this overload does not necessarily occur every time when a bigger assortment is offered. The condition of the appearance of choice overload remains worthy of exploration. Previous research has brought up multiple potential moderators for choice overload effect. This paper mainly intends to research whether choice-making orientation (Dar-Nimrod et al., 2009) moderates the effect of assortment size on choice satisfaction, as well as whether there are factors moderating this moderation effect of choice-making orientation.

### **1.1 Research Problem & Motivation**

Choice-making orientation (Schwartz et al., 2002) is an individual difference variable that differentiates people based on their approach to making decisions. On one extreme are “maximizers” who have the tendency to approach choices with the goal of finding the “best” alternative. On the other extreme are “satisficers” who tend to approach choices with the goal of finding an option that is “good enough” according to their threshold of acceptability (Dar-Nimrod et al., 2009).

According to Dar-Nimrod et al. (2009), maximizers are willing to spend more time and effort to attain a larger choice array while people who are more easily satisfied do not tend to spend more effort getting a larger choice set. However, maximizers who have chosen from a larger choice set tend to be less satisfied than maximizers who chose from a small assortment, or than satisficers (Schwartz et al. 2002). This effect was named “maximizers paradox” by Schwartz et al. (2002). Furthermore, Schwartz et al. (2002) found that maximizers are more likely to engage in social comparisons compared to satisficers, as well as more adversely affected by upward social comparison. The same study has also shown that maximizers are more sensitive to regret and less satisfied in an ultimatum bargaining game (Schwartz et al., 2002). However, a single study in the meta-analytical conducted by Scheibehenne et al. (2009) which formally tested maximizing in a context of choice overload could not

establish choice-making orientation as a moderator.

Literature review of this paper has identified that there is a conflict among previous researches that try to examine the moderator effect of choice-making orientation. These studies share the same independent variable (assortment size), moderator variable (choice-making orientation), and dependent variable (satisfaction towards the decision), yet drew opposing conclusions. Additionally, consumers with different choice-making orientation have different decision making goals, willingness to sacrifice resources, and likelihood to experience regret. Because of these three psychological differences caused by different choice-making orientations, it is reasonable to expect choice-making orientation moderates choice overload. Hopefully this will provide business operators, consumers, and further researchers a reference regarding the condition of choice overload occurrence. The main variables in this paper are listed below.

Independent variable: assortment size

Dependent variable: choice satisfaction

Moderate variable: choice-making orientation

Understanding how we choose could guide consumers to make better decisions.

Understanding the condition that will need to hold for choice overload to appear will help both consumers and businesses improve their shopping/selling experience and as a result, increase the efficiency of business activities.

## **1.2 Research Objectives**

**Research question of this paper:** Does choice-making orientation moderate the effect of assortment size on choice satisfaction?

**Sub-question:**

Does product tangibility moderates the moderation effect of choice-making orientation?



There are two research questions in the paper. The first and main one is that whether maximization personality moderates the effect of assortment size on choice satisfaction. According to the meta-analytic review conducted by Benjamin Scheibehenne, Rainer Greifeneder, and Peter M. Todd (2010), moderators of choice overload effect can be categorized among assortment structure, decision strategies, perception of distribution, and the measuring method of choice satisfaction level. This paper intends to research on the moderation effect of choice-making orientation as one niche of decision strategies.

In the study of Dar-Nimrod et al. (2009), the moderation effect of maximization on choice overload is found on three products: cleaning supply, chocolate, and ice cream. Whereas in the study of Schwartz et al. (2002), no such effect is found when choices on music are required to be made. Malone and Lusk (2018) study the moderator of choice overload on the U.S. beer market and found that maximizers experienced no choice overload effect and satisficers found it easier to make a beer choice as the assortment size increases. The past disagreement regarding the moderating effect of maximizing personality may lie in the difference in tangibility of that the experiment products. This paper makes it the second research question to research into the moderation effect of product tangibility. This is studied by testing both tangible and intangible products to examine if product tangibility moderates the moderation effect of choice-making orientation.

### **1.3 Research Methodology**

To achieve the goals of this study, information on three different aspects needs to be collected. First, whether the object has maximizing or satisficing personality needs to be determined. Second, whether choice overload has occurred when the object product is tangible needs to be determined. Third, whether choice overload has occurred when the object product is intangible needs to be determined.

Required information for the research are collected through an online survey. A randomly selected group of participants in the total sample are given imaginary

scenarios where they need to make a choice on 5-18 types of flavors of protein powder, whereas the rest of the participants are asked to make their choice among workout lessons. All respondents are asked to choose one optimal option for themselves. Afterwards, respondents are asked to report their emotion about the decision. This will be tested in the form of a 7-point scale (on a scale from 1 to 7, 7 being most satisfied, 1 being the least). Next, the 13-item Maximization Scale (Schwartz et al., 2002) is used to assess maximizing tendencies (e.g., “I always tend to find the best alternative that I can”) of all participants. Ratings will be made on a 7-point scale (1 = completely disagree, 7 = completely agree). Higher scores indicate a stronger tendency to seek the best option when making a choice (i.e., “maximizing”). Manipulation check and control variables testing are conducted in the end of the survey.

#### **1.4 Thesis Outline**

The structure of the thesis is as follows. In Chapter 2 prior literatures are reviewed. Background information on the topic is given in this chapter. Antecedents of choice overload as well as different moderators of choice overload are reviewed here. Chapter 2 also mentions studies about the distinguishment of maximizing and satisficing personality. Relevant studies regarding the moderating effect of maximizing personality on choice overload are also presented in this part. Chapter 3 discusses the research methodologies adopted by previous relevant studies. Then, research design and methodology of this paper are explained. Chapter 4 provides an empirical analysis and results of the study. Chapter 5 further discusses the results and gives limitations as well as managerial applications of this paper. Suggestions for future research can also be found in Chapter 5. Chapter 6 concludes the study.

## **2. Literature Review**

### **2.1. Introduction**

This chapter serves to give insights on prior research about the moderation effect choice-making orientation casts on choice overload. Thereupon, literature regarding the effect of assortment size on choice satisfaction is reviewed. Next, prior literature on choice-making orientation is reviewed, followed by its moderating effect on the relationship between assortment size and choice satisfaction. After the moderation effect of choice-making orientation is discussed, literature on effect of product tangibility in marketing is reviewed. The moderation effect of product tangibility on the choice-making orientation as a moderator is reviewed afterwards. Previous academic findings are used to establish hypotheses and to create a conceptual model, which is presented at the end of this chapter.

### **2.2. The effect of assortment size on choice satisfaction**

Commonly known as the choice overload effect, the negative influence of too large of an assortments has challenged the idea that larger assortments are always desirable. Researchers (e.g., Chernev 2003; Gourville & Soman 2005; Iyengar & Lepper 2000; Lehmann 1998) have suggested that large assortments may create negative effects on consumer satisfaction. For example, consumers may not choose the better-fitting options from larger assortments partially because they fail to find these options without access to sophisticated screening tools (Diehl et al., 2003) or they search inappropriately even in the presence of such tools (Diehl, 2005). They may not even subjectively view options to be better when these options come from a larger rather than a smaller assortment (Benartzi & Thaler, 2002). Large sets may also decrease confidence of consumers in being able to make a good decision (Chernev, 2003). As a result, they are more likely to be disappointed by the result of their overconfidence afterwards. Furthermore, when consumers experience preference uncertainty (Dhar, 1997) or feel overwhelmed (Iyengar & Lepper, 2000) when facing larger sets, they may defer the decision-making process. Finally, consumers choosing from larger

assortments may experience higher levels of post-decision regret, even when they made objectively good choices (Gourville & Soman, 2005). Diehl and Poynor (2018) demonstrated that a larger assortment heightens expectations of consumers regarding their ability to match their preferences and therefore the expectation is less likely to be met by the final choice. There is a strong association between category familiarity and assortment satisfaction, with differing levels of assortment satisfaction between high and low category familiarity groups. When the category familiarity level is low, the negative impact of a large assortment is weaker compared to that when the familiarity level is high (Broniarczyk & Griffin, 2010; Chernev, 2003). The presence of a favorite item also plays a role in maintaining assortment perceptions. A study on the effect of assortment size reduction indicates that by maintaining the favorite items during the assortment reduction, the consumer perceptions of the assortment remain unchanged (Beneke et al., 2013). Furthermore, item reduction can be used to increase the satisfaction of consumers if they are unfamiliar with the product category (Beneke et al., 2013). Since the effect of the assortment size has been abundantly studied from various angles, this specific direction of research is not the main discussion of this paper. However, the above studies are worth mentioning because the main hypothesis of this paper is built on the hypothesis that the increase of assortment size has a negative influence on choice satisfaction.

**H1: Assortment size has a negative influence on choice satisfaction.**

### **2.3. The effect of choice-making orientation on choice satisfaction**

Choice-making orientation (Schwartz et al., 2002) is an individual difference variable that differentiates people based on their approach to making decisions. On one extreme are “maximizers” who tend to make choices with the goal of finding “the best” alternative. On the other extreme are “satisficers” who look for an option that is “good enough” according to their threshold of acceptability (Dar-Nimrod et al., 2009). There have been various researches demonstrating the reasons why choice-making orientation itself may cast an effect on satisfaction. First of all, maximizers have the goal of “making the best choice” when they choose from a collection of goods while

satisficers have the goal of “making a good choice” (Schwartz et al., 2002). As a result, an increase in the number of options increases the difficulty to narrow down to “the best choice” for maximizers. For satisficers, the increasing assortment size actually increases the possibility of the appearance of a “good choice”. If the satisficers have already found a “good enough” choice, the new choices will simply be ignored and will not cast any negative influence on the satisficers. Thus, the difference in choice-making goals is one of the reasons why maximizers may be more negatively influenced by an increase in assortment size.

The second difference between maximizers and satisficers lies in the decision-making process of the two. Maximizers tend to sacrifice more resources (such as time and money) in search of the possibly “best choice” compared to satisficers (Dar-Nimrod et al., 2009). Therefore, when assortment size increases, maximizers sacrifice more resources because they try to examine as many alternatives as possible whereas satisficers stop once they have found a choice that goes pass their criteria of being “good enough”. It is also suggested in prior literature that maximizers and satisficers perceive time differently when making decisions (Misuraca & Teuscher, 2013). In particular, compared to satisficers, maximizers tend to underestimate time while choosing, independently of the number of options and the specific task requirements. Satisficers instead tend to underestimate time only when the number of options or the task requirements are more challenging (Misuraca & Teuscher, 2013). This paper also suggests that satisficers adopt a more malleable decision-making process than maximizers do. This difference in the information-gathering process indicates that maximizers are likely to lose more resources when assortment size increases compared to satisficers thus are less satisfied with their decision-making experience.

The third difference between maximizers and satisficers is that maximizers are at a higher risk to experience the emotion of regret (Schwartz et al., 2002). Despite that they have sacrificed more resources looking for “the best option”, they are more likely to experience regret regarding the choice they have made compared to satisficers do. It is argued that maximizers are less likely to be happy about the

decision because they tend to maximize the positive as well as the negative outcome (Polman, 2009). The study of Polman suggests an irony of maximizing: It produces both positive and negative outcomes. The three psychological differences explained in Chapter 2.3 between maximizers and satisficers indicate that maximizers are more likely to be negatively influenced by an increase in the assortment size compared to satisficers.

**H2: Choice-making orientation moderates the relationship between the assortment size and choice satisfaction; maximizing orientation strengthens the negative effect of a large assortment size on satisfaction level while satisficing orientation weakens the effect.**

#### **2.4 The influence of product tangibility on the moderating effect of choice-making orientation.**

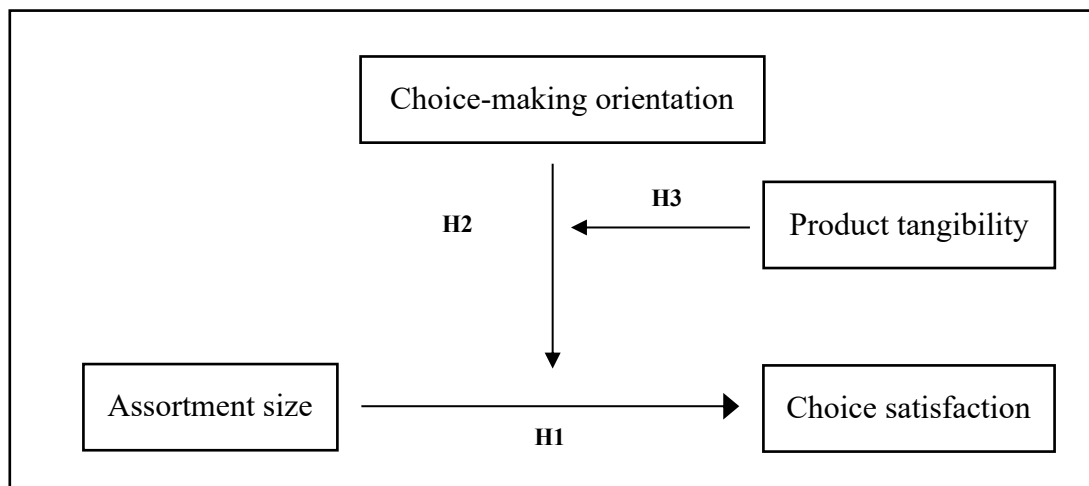
There have been numerous antecedents in which researchers categorize products in terms of the tangibility. Tangible products are physical products and intangible products are services and non-physical products that cannot be touched (Vijayarathy, 2002). Product tangibility can affect consumer behavior. For example, product tangibility has a significant influence on consumer intentions toward online shopping (Vijayarathy, 2002). Consumer intentions to shop for intangible product online is higher than that for tangible product (Vijayarathy, 2002). Product tangibility has also been found to play a moderating role in influencing consumer behavior. For example, it is found that when the provided product is tangible, online shops should provide more quality information while when the product is intangible, webshops should focus on the aesthetics, interactive, and personalization features of the sites (Aljukhadar & Senecal, 2015).

In the study of Dar-Nimrod et al. (2009), the moderating effect of maximization on the relationship between assortment size and satisfaction is found on three products: cleaning supply, chocolate, and ice cream. Whereas in the study of Schwartz et al. (2002), no such effect is found when choices on music are required to be made. Malone and Lusk (2018) studied moderators of choice overload effect on the U.S.

beer market and found that maximizers experience no choice overload effect and that satisficers find it easier to make a beer choice as the assortment size increases. The past disagreement regarding the moderating effect of maximizing personality may lie in the tangibility of the product chosen in the research. This paper intends to research into this issue by studying both tangible and intangible products to examine if product tangibility moderates the moderating effect of choice-making orientation.

**H3: Product tangibility moderates the moderating effect of choice-making orientation. The moderation effect of choice-making orientation is more significant when the tested product is tangible compared to when the product is intangible.**

## 2.5. Conceptual model



**Figure 1.** *Overview Conceptual Model*

**H1:** *Assortment size has a negative influence on choice satisfaction.*

**H2:** *Choice-making orientation moderates the relationship between the assortment size and choice satisfaction; maximizing orientation strengthens the negative effect of a large assortment on satisfaction level while satisficing orientation weakens the effect.*

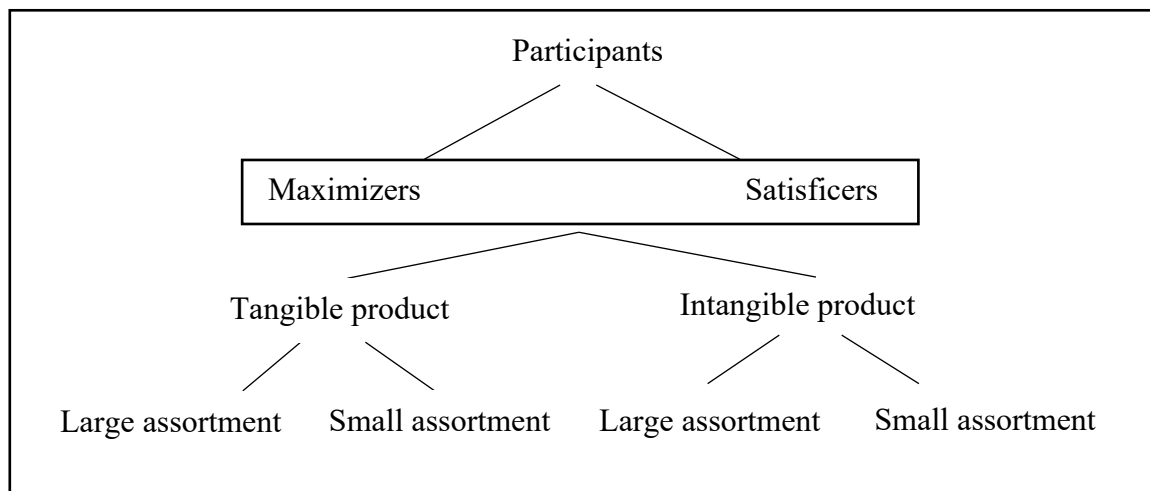
**H3:** *Product tangibility moderates the moderating effect of choice-making orientation. The moderating effect of choice-making orientation is more significant when the tested product is tangible compared to when the product is intangible.*

### 3. Research Methodology

#### 3.1 Research design

To collect data, an online survey is designed and distributed (see Appendix A). This experiment follows a 2 (large/small assortment) x 2 (tangible/intangible products) between-subject design. This paper does not adopt a within-subject design in order to limit the impact one condition may have on others if they are encountered by the same individual. A 200-participant sample is used to reduce the individual difference in reaction to a certain condition. After making their choice from each assortment, participants are asked to report their choice satisfaction level. In the end, respondents report their choice-making orientation by conducting a self-report test. The choice-making orientation self-report is arranged in this end of the survey to reduce cognition bias of participants.

#### Depiction of survey flow



**Figure 2.** *Depiction of survey flow*



## 3.2 Measures

### 3.2.1 Independent variable

#### *Assortment size*

Assortment size is manipulated by testing on a large and a small assortment for both tangible and intangible products. The small assortment consists of six choices while the large one consists of **15** (including the six choices from the small assortment). In their Chocolate study, Dar-Nimrod et al. (2009) presented six chocolates in the small assortment and 30 in the large assortment (including the six from the small assortment). The Restaurant Study conducted by Scheibehenne et al. (2010) has 30 restaurants presented in the large assortment and five in the small assortment. In the Music Study conducted by Scheibehenne et al. (2010), there are 30 CDs in the large assortment and six in the small one. However, if the survey in this study was to include 30 different workouts, many of them would not be comprehensible to respondents. This means another factor would be introduced, which might confound the result. In addition, according to Miller (1994), the maximum process capacity of consumers is seven. 15 is more than double of the maximum process capacity. Thus, there will be 15 choices in the large assortments in this study.

Manipulation check is done adopting the method of Stanton and Paolo (2010). Respondents are asked to give ratings of three items on a 7-point Likert scale, see **List 1** below. The manipulation check aims to show whether the participants perceive certain assortment as small or large.

#### **List 1:** Assortment size manipulation check (Stanton & Paolo, 2010)

1. I feel overwhelmed by the number of options
- 2: I have a hard time choosing what would be the best option
- 3: I get frustrated by the number of choices

### 3.2.2 Moderators

#### *Choice-making orientation*

The choice-making orientation of participants is measured using the 13-item Maximizing scale questionnaire (Schwartz et al., 2002), see **List 2** on the right. The questionnaire consists of 13 items to which participants respond using a 7-point Likert scale (1 = *completely disagree*, 7 = *completely agree*). Respondents with average result of four or higher for the test are considered as maximizers in this study whereas those with average result of lower than four are considered as satisficers. This choice-making orientation test has been popularly adopted by past relevant studies. This specific paper continues to use it as a tool to determine the choice-making orientation of participants since it has been proved effective.

- When I watch TV, I channel surf, often scanning through the available options even while attempting to watch one program.
- When I am in the car listening to the radio, I often check other stations to see if something better is playing, even if I'm relatively satisfied with what I'm listening to.
- I treat relationships like clothing: I expect to try a lot on before I get the perfect fit.
- No matter how satisfied I am with my job, it's only right for me to be on the lookout for better opportunities.
- I often fantasize about living in ways that are quite different from my actual life.
- I'm a big fan of lists that attempt to rank things (the best movies, the best singers, the best athletes, the best novels, etc.).
- I often find it difficult to shop for a gift for a friend.
- When shopping, I have a hard time finding clothing that I really love.
- Renting videos is really difficult. I'm always struggling to pick the best one.
- I find that writing is very difficult, even if it's just writing a letter to a friend, because it's so hard to word things just right. I often do several drafts of even simple things.
- No matter what I do, I have the highest standards for myself.
- I never settle for second best.
- Whenever I'm faced with a choice, I try to imagine what all the other possibilities are, even ones that aren't present at the moment.

#### **List 2.** *The Schwartz Maximizing scale*

#### *Product tangibility*

The tangible product used in the research is "Myprotein" protein powder. The intangible product is workout tutorial class. According to Iyengar and lepper (2000), consumers should be familiar enough with the product chosen for studies on assortment size yet not too familiar so that a preference is already established before the choice-making process. In order to avoid preference bias, protein powder is chosen as the tangible product for the test because it is a commonly seen product that

does not cast too much difficulty to understand. Since there are numerous flavors of “Myprotein” protein powder, distinction among choices is clear to participants and a large assortment can be formed. For intangible product, workout tutorial class is chosen. The assortments consist of a variety of workout types such as “swimming” and “upper body weight training”. The intangible product should also have similar features such as function, long-term effect, required expertise, compared to the tangible one except for its tangibility for any difference in the result to be only due to product tangibility. Thus, workout tutorial class is chosen.

### **3.2.3 Dependent variable**

#### *Choice satisfaction*

The choice satisfaction level in this study is measured using a self-report questionnaire which is filled in by participants after making their choices in each assortment. Items in the questionnaire cover three dimensions (the decision-making process, the selected (single) choice, and post-decision regret) of choice satisfaction to form a relatively complete view on the choice satisfaction level of participants. All items ask for answers on a 7-point Likert scale ((1 = *Strongly disagree*, 7 = *Strongly agree*) (see Appendix B for the complete form). One of the reasons why results of past studies on choice overload vary may lay in the different ways how choice satisfaction is measured. Three types of measurement of choice satisfaction are commonly adopted by previous researchers ---- satisfaction with the choice experience as a whole, with the decision-making process, and with the finally selected (single) choice (Scheibehenne et al., 2010). These can all relate to different aspects of the choice (Scheibehenne et al., 2010). Researchers are most commonly interested in the third measure yet participants may confuse all three measures altogether when they are asked about their choice satisfaction. Besides, consumers sometimes happily select a less satisfying choice simply because they want to learn about the range of possibilities or that they enjoy variance (Ratner et al., 1999). Covering all three

aspects of choice satisfaction gives a more completed measurement with less errors. Since the choice experience and the decision-making process may be difficult for participants to be separated, this study combines them into decision-making process and adds an extra aspect “post-decision regret” to increase the completeness of the satisfaction measurement.

#### **3.2.4 Control variables**

The moderating effect of both choice-making orientation and product tangibility can be affected by demographic features of participants including their age, gender, education level, and nationality. These variables are included as control variables to have a cleaner result. Prior knowledge on both protein powder and workout tutorial class experience and expertise of participants are also included as control variables since they can affect the choice-making experience. This is measured by using the subjective knowledge scale (Hao et al., 2010). Participants are asked to rate the item “I am knowledgeable about this product/service” on a 7-point Likert scale. The perceived realism of the experiment is also controlled by asking participants to rate two items “I could imagine myself doing the things described in this scenario” and “I believe that the described situation could happen in real life” on a 7-point Likert scale (Darley & Lim, 1993).

### **3.3 Procedure**

To avoid potential psychological implication which may cause cognition bias, the name of the questionnaire is set to be “A research on consumer behavior” so that it is not too specific for participants to assume the “right answer” in the survey.

Participants are randomly assigned to four different versions of questionnaires that feature four different conditions (small tangible, large tangible, small intangible, large intangible). The questionnaire starts with an appreciation of participation as well as an general explanation of the purpose of the study.

Participants are first asked to choose from both a large and a small assortment of products. Then they are enquired about their current expertise regarding the object they have chosen from. Next, participants are enquired to fill in the Likert-scale which measures their choice satisfaction. Choice-making orientation is measured in the form of a self-report after measurement of choice satisfaction. Measuring the choice-making orientation after choice satisfaction can avoid the demand effects of variable manipulation.

Subsequently, participants are requested to answer questions for manipulation check. A question will be inserted in this part of the questionnaire for attention check, for which participants are requested to choose “Agree” on a 1 (Strongly disagree) to 7 (Strongly agree) Likert scale. The order of questions will be randomized within manipulation check so that order effect is prevented. Afterwards, demographic features are examined regarding age, gender, education level, and nationality of participants. Participants are thanked for their participation once again at the end of the questionnaire.

## **4. Analysis**

### **4.1 Preparing the analysis**

In total, 326 online responses are recorded, excluding 26 pretest results that are used to make sure the questionnaire design is valid for the research. First, participants who failed the implemented attention check are removed from dataset. Second, participants who did not finish the complete questionnaire are removed from the dataset. Finally, the questions in the survey are set to force response, meaning that all used data is complete. After data cleaning, 165 responses are kept and transformed into a dataset.

Specifically, the scaling for the statement “I regret my choice” and “I think that another option from the assortment would have been better than the one I chose” are reversed to be consistent with the scaling direction of the other items representing the same variable which is choice satisfaction. Since factor analysis has indicates that all

statements should be kept in, the scaling for all nine statements representing choice satisfaction are taken average as the score for choice satisfaction. Same averaging approach is also applied on statements for other scaling variables in the survey to form the dataset.

## 4.2 Descriptive analysis

All 300 respondents are evenly distributed and randomly assigned to one of the four experimental conditions (Small\_Intangible = 23.6%, Small\_Tangible = 24.8%, Large\_Intangible = 28.5%, Large\_Tangible = 23.0%). The gender representation within the dataset is dominated by female with a larger group (64.2%) compared to male (32.1%). 3.6% of participants either claimed themselves as non-binary or preferred not to indicate their gender. Most participants age between 18 to 30 (52.7%), followed by the age category of 45 to 64 with a slightly smaller group (40.6%) . Most of the respondents are non-European (76.4%). The rest are approximately evenly distributed between the Netherlands (12.1%) and other European countries (11.5%). The majority of the respondents is highly educated with most respondents holding either a bachelor degree (50.9%) or a master degree (41.2%). 7.9% of the respondents have a high school degree or equivalent.

**Table 1.** *Descriptive statistics of measurements.*

Variable	N	Minimum	Maximum	Mean	Std. Deviation
AS	165	0	1	.52	.50
PT	165	0	1	.48	.50
CMO	165	1.46	7	4.14	0.92
CS	165	2.44	7	5.31	0.79
Control Variables					
FAMP	165	1	5	2.69	1.24
MC	165	1	7	3.80	1.48
RC	165	2	7	5.09	1.13
AGE	165	2	5	2.92	1.00
GENDER	165	1	4	1.74	.60

Looking at the descriptive measurements in Table 1, it can be concluded that the choice satisfaction level is relatively high ( $M = 5.307$ ), an indication that people are generally happy about their choice as well as the choice making process and post-choice satisfaction. Participants are overall found relatively familiar with their tested objects yet not too familiar that they had already developed a personal preference ( $M = 2.69$ ,  $SD = 1.24$ ) as their familiarity to the products is found to be slightly above the neutral point (see *Table 1*).

### **4.3 Factor Analysis**

Though the measurement scales are adapted from previous studies and are reported to have high internal consistency, adaptation to the current study as well as using a different sampling group can affect validity. Therefore, factor analysis is conducted to measure the validity of the constructs. First, the appropriateness of conducting a factor analysis is examined by conducting Bartlett's Test of sphericity ( $p < .001$ ), Kaiser-Meyer-Olkin test ( $KMO > 0.7$ ), and the communalities table (communalities  $> 0.3$ ). Accordingly, with  $p < .001$ ,  $KMO = .779$  and all communalities above the cutoff point, factor analysis can be considered appropriate (see *Appendix C*). All items load well to their respective construct factors. Therefore, all items are kept in the analysis.

In total five factors are found. Two factors are identified for choice satisfaction and three factors are found for choice-making orientation. Item 7 of choice satisfaction "I regret my choice" and item 8 of choice satisfaction "I think that another option from the assortment would have been better than the one I chose" load strong to the same factor while all other items measuring choice satisfaction load strong to another factor. Schmitt & Stuits (1985) have stated that this issue is common in psychological research due to the nature of negative keyed items and the carelessness of some respondents while answering the survey. Item 7 and 8 are the only two negative statements measuring choice satisfaction and have been reversely coded before data analysis. However, the data has been thoroughly cleaned to exclude ineffective answers before the analysis process. In addition, no evidence has shown that the two items are correlated. Therefore, the additional factor caused by the

reverse-coded items is ignored in further data analysis. Choice satisfaction is considered to have only one factor. In general, besides item 7 and item 8 of choice satisfaction, the scales are tested appropriate with all items correlating to their respective constructs.

In terms of choice-making orientation, three factors are found. “When I watch TV, I channel surf, often scanning through the available options even while attempting to watch one program” (0.562), “When I am in the car listening to the radio, I often check other stations to see if something better is playing, even if I am relatively satisfied with what I am listening to” (0.638), “I treat relationships like clothing: I expect to try a lot on before I get the perfect fit” (0.717), and “Choosing videos to watch is difficult, I am always struggling to pick the best one” (0.668) have large positive loadings on factor 1. Therefore, it can be concluded that factor 1 describes specific scenarios participants encounter in daily life;

“No matter how satisfied I am with my job, it is only right for me to be on the lookout for better opportunities” (0.661), “I often fantasize about living in ways that are quite different from my actual life” (0.698), “I am a big fan of lists that attempt to rank things (the best movies, the best singers, the best athletes, the best novels, etc)” (0.723), “I often find it difficult to shop for a gift for a friend” (-0.636), and “When shopping, I have a hard time finding clothing that I really love” (-0.730) have large loadings on factor 2. Based on the commonality of these items, factor 2 describes tendency to look for the best options.

“I find that writing is very difficult, even if it is just writing a letter to a friend, because it is so hard to word things just right. I often do several drafts of even simple things” (0.678), “No matter what I do, I have the highest standard for myself” (0.658), “I never settle for second best” (0.719), and “Whenever I am faced with a choice, I try to imagine what all the other possibilities are, even ones that are not present at the moment” (0.701) have large positive loadings on factor 3. Therefore, this factor describes general self-conscious report regarding maximizing tendency from participants.



Because three factors are found for choice-making orientation, the second and the third hypothesis are both tested using each of these three factors. In addition, each hypothesis needs to be tested with and without control variables. Therefore, there are six sets of results for the second hypothesis and six other sets for the third hypothesis.

#### 4.4 Reliability

Scale reliability has been measured using Cronbach's Alpha. Pallant (2013) identifies .7 as a benchmark for a reliable scale. The dependent variable, Choice Satisfaction, consisting of nine items obtained a .751 score. Deleting item 8 or 9 would result in a marginally higher score (*see Appendix D*). This can be explained by the fact that these items were reversely coded after the data extraction. The independent variable, Choice-making Orientation, has a .804 score and is therefore considered to be internally consistent. Deleting any score would result in a lower Cronbach's Alpha. Furthermore, the manipulation- and reality check scales have also been measured. The Reality Check has a score that is slightly below the .7 cutoff value. The small size of this scale (2 items) likely contributed to this lower score. Given the common occurrence of this scale in similar research, and its slight deviation from acceptable, it is decided to be unaltered during further analysis. The Product Familiarity variable consisted of only one single item and could therefore not be measured using this approach. An overview of all values can be found in Table 2.

**Table 2.** Cronbach's Alpha for the various scale variables used in the survey.

Scale	N of Items	Cronbach's $\alpha$
Choice Satisfaction	9	.751
Choice-making Orientation	13	.804
Manipulation Check	3	.851
Reality Check	2	.635

## 4.5 Hypothesis Testing

### 4.5.1 H1: Main effect of assortment size on choice satisfaction

Given that H1 consists of a dependent interval variable (Choice Satisfaction) and a nominal dummy independent variable (Assortment Size), a one-way ANOVA analysis is used to test H1. A few assumptions need to be met first however, before we can use ANOVA. These include the assumptions of independence, scale of measurement, normality, and homogeneity of variances.

The data used for the research has been randomly and independently sampled (see Chapter 3). The assumption of independence is therefore met. The dependent variable (Choice Satisfaction) is an interval variable and is therefore suitable for ANOVA. For the assumption of normality, skewness and kurtosis are considered as well as two normality tests. As seen in Appendix E, skewness and kurtosis remain in the (-1, 1) interval, which reflects a normal distribution. The normality test, however, is significant which implies that Choice Satisfaction does significantly deviate from normality. Given the robustness of ANOVA to a non-normal distribution and the contrasting results, it is decided to stick to ANOVA for H1.

The homogeneity of variances assumptions requires the variances in both groups (small- and large assortment size) to be equal. Given that the p-value (0.278) is not significant, the variances do not significantly differ. This assumption is therefore met.

Based on the outcomes, a statistically significant difference between groups as demonstrated by one-way ANOVA ( $p = .809$ ) is not found. This means that there is no significant difference between the means of choice satisfaction score of respondents choosing from a large assortment and those who choose from a small assortment. Therefore, H1 is rejected, a larger assortment does not correlate to a significantly lower choice satisfaction level (see Table 3). Even if the difference between the means of the two groups had been statistically significant, the difference (0.060) would be negligible on a 1-7 scale and therefore has no economic significance.

**Table 3.** *One-way ANOVA of Choice Satisfaction (CS) and Assortment Size (AS).*

AS		Small			Large	
One-way ANOVA	$F(1, 163-164)$	$p$	$M$	$SD$	$M$	$SD$
CS	0.59	0.809	5.2917	0.831	5.2316	0.755
N	165		80		85	

#### 4.5.2 H2: Moderation effect of choice-making orientation

To evaluate the moderation effect of choice-making orientation on the relationship between assortment size and choice satisfaction, the PROCESS macro of Hayes (2018) is used. This method uses Ordinary Least Regression to analyze the regression paths (Hayes, 2018). Model 1 is used since it tests the effect of assortment size while accounting for the interaction between assortment size and choice-making orientation. A second analysis is conducted using the same model but with control variables included to control for factors that can potentially influence choice satisfaction of participants.

The analysis can only be done once multiple assumptions have been met. There can be no multicollinearity between the independent variables. This is met as the highest VIF value is 1.424 (see *Appendix G*) which is below 3. Given that the study has a between-subject design where the sample is obtained independently, the independent error terms assumption is met as well. Given that the independent variable (Assortment Size) is a nominal dummy variable, linearity is assumed which leads to the assumptions of linearity being met.

**Table 4.** *Effect on Choice Satisfaction.*

Regression	(1)	(2)
Assortment Size	-0.23 (0.56)	0.06 (0.52)
Choice-making Orientation	-0.24 (0.10)	-0.18 (0.10)
Assortment Size x Choice-making Orientation	0.07 (0.13)	-0.01 (-0.12)
Product Familiarity		-0.10 (0.05)
Age		0.02 (0.07)
Gender		0.10 (0.10)
Education		0.07 (0.10)
Nationality		-0.13 (0.09)
Manipulation Check	No	Yes
Reality Check	No	Yes
N	165	165
R-squared	0.06	0.25

**Assortment size**

Based on the outcomes of the model an overall significant regression model is found ( $F(3,161) = 3.371, p < .05, R^2 = .06$ ). No significant effect of assortment size on choice satisfaction is observed ( $\beta = -.23, t = -.40$ ). When control variables are added to the model the effect remains insignificant. As mentioned in the result of H1 testing,

a large assortment does not correlate to significantly lower levels of choice satisfaction (see Appendix F).

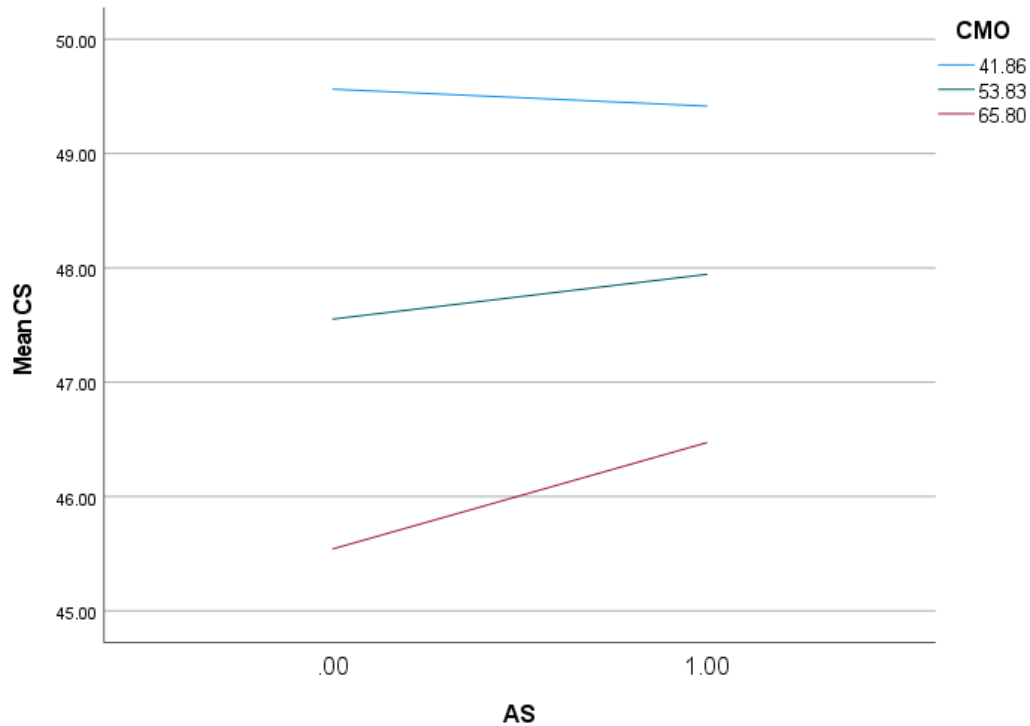
### **Choice-making orientation**

As mentioned in factor analysis, three factors are found for choice-making orientation. They are all tested both with and without control variables for this hypothesis. However, none of them are found significant (see Appendix I). Therefore, the testing results for individuals factors are kept in appendix for neatness of this paper. This paper also tested choice-making orientation as a whole without separating it into three factors (see Appendix H). Only the result of testing choice-making orientation as a whole is reported here.

The result shows that there is a negative significant effect of choice-making orientation on the experienced choice satisfaction ( $\beta = -.24, t = -2.42$ ). This indicates that as the maximizing orientation level increases, choice satisfaction decreases. As examined in Appendix J, the effect becomes insignificant when control variables are added.

### **Moderation effect of Choice making orientation**

H2 states that choice-making orientation moderates the effect of assortment size on choice satisfaction. No significant relationship is found between the interaction variable of assortment size and choice-making orientation on choice satisfaction ( $\beta = -.065, t = .49$ ). When control variables are added to the model this effect remains not significant. Therefore, H2 is rejected. Choice-making orientation does not have a significant moderating effect on the relationship between assortment size and choice satisfaction (see Appendix H).



**Figure 3.** *Interaction Assortment size x Choice-making Orientation*

### 4.5.3 H3: Moderation effect of product tangibility on the moderation effect of choice-making orientation

Moderated moderation is involved in H3. To evaluate the moderation effect of product tangibility on choice-making orientation as a moderator of the relationship between assortment size and choice satisfaction, Model 3 of the PROCESS macro of Hayes (2018) is used. A second analysis is conducted using the same model but with control variables included to control for factors that could potentially influence respondents choice satisfaction.

#### Assortment size

Based on the outcomes the model of the regression is found significant of the model ( $F(7,157) = 3.047, p < .01, R^2 = .12$ ). As mentioned in the results of testing H1 and H2, no significant effect of assortment size on choice satisfaction is observed ( $\beta = -.47, t = -.62$ ) (see Appendix L). When control variables are added to the model the effect remains insignificant (see Appendix N). Consistent with the testing results of

the previous two hypotheses, large assortment does not correlate to significantly lower levels of choice satisfaction.

### **Choice-making orientation**

Similar to H2, three factors are found for choice-making orientation. They are all tested both with and without control variables for this hypothesis. However, none of them are found significant (see Appendix M). Therefore, the testing results for individuals factors are kept in appendix for neatness of this paper. This paper also tests choice-making orientation as a whole without separating it into three factors (see Appendix L). Here only the result of choice-making orientation as a whole is reported.

A negative significant effect of choice-making orientation on the experienced choice satisfaction ( $\beta = -.47, t = -3.19$ ) is found based on the outcome. The negative effect of choice-making orientation is found even more significant compared to that appears in the testing of H2. This indicates that as the maximizing orientation level increases, choice satisfaction decreases. The effect becomes insignificant when control variables are added (see Appendix N).

### **Product tangibility**

The effect of product tangibility on choice satisfaction is not found to be significant according to the outcome ( $\beta = -1.56, t = -1.85$ ). This indicates that product tangibility does not have a significant effect on choice satisfaction. After control variables are introduced, the effect remains not significant.

### **Moderation of Product tangibility on moderation of choice-making orientation**

According to the outcome of the analysis, no significant moderation effect of product tangibility on moderation of choice-making orientation is found ( $\beta = -.67, t = -.24$ ). This indicates that product tangibility does not have significant moderation effect on choice-making orientation as a moderator on the relationship between assortment size

and choice satisfaction. The moderation effect of product tangibility remains not significant when control variables are introduced (see Appendix N).

## **5. Discussion**

### **5.1 General Discussion**

This study intends to research the effect of assortment size on choice satisfaction, as well as 1) The moderation effect of choice-making orientation on the relationship between assortment size and choice satisfaction and 2) The moderation effect of product tangibility on the moderation of choice-making orientation. Specifically, choice-making orientation in this study refers to the maximizing tendency of consumers. If someone tends to maximize utility of their choices instead of being satisfied by any choice that qualifies their requirement, they are considered to be a maximizer instead of a satisficer. Findings of this study are discussed in three separate sections, each corresponding to one of the three hypotheses mentioned earlier in the study. Additionally, the results are discussed by relating the findings to previous literature. The first part discusses the effect of assortment size on choice satisfaction. The second part discusses the moderation effect of choice-making orientation on the relationship between assortment size and choice satisfaction. The third part discusses the moderation effect of product tangibility on the moderation of choice-making orientation.

#### **Assortment size and choice satisfaction**

Based on the results of this study, the effect of assortment size is found to be insignificant on choice satisfaction. This result indicates that a larger (smaller) assortment size does not necessarily relate to a lower (higher) level of choice satisfaction. The finding does not match the prediction of this study. The result is not in line with the finding of most previous studies stating that large assortments may create negative effects on consumer satisfaction (e.g., Chernev 2003; Gourville &



Soman 2005; Iyengar & Lepper 2000; Lehmann 1998). Consumers have not exhibited decreased confidence when put in front of a large assortment in this study, which is suggested to be the case in previous literature (Chernev, 2003). As a result, consumers have not shown more post-decision regret after choosing from a large assortment compared to after choosing from a small one (Gourville & Soman, 2005).

One possible explanation for the contradiction between the result of this study and previous literature is category familiarity. Overall, participants are found not too familiar with the objects ( $M = 2.69$ ,  $SD = 1.24$ ) as their familiarity to the products is found to be only slightly above the neutral point. It has been found that there is a strong association between category familiarity and assortment satisfaction. When the category familiarity level is low, the negative impact of a large assortment is weaker compared to that when the familiarity level is high (Broniarczyk & Griffin, 2010; Chernev, 2003). Therefore, it is possible that assortment size does not impose strong negative impact on consumer choice satisfaction in this study because participants are not so familiar with the objects.

Additionally, the existence of a favorite object in the assortment can also lead to unchanged assortment perceptions (Beneke et al., 2013). Even though category familiarity is reported as not so high that respondents had developed a favorite option even before making the choice, whether a favorite choice had already existed at all before the survey cannot be examined due to the limitation of study methods.

Finally, the difference between the finding of this study and ones of previous literature can also be caused by the online research environment. Unlike most of previous relevant studies, the survey of this study is distributed as well as answered online due to geographic limitation and inconvenience caused by Covid-19 pandemic. As a result, participants may have experienced less direct social pressure compared to when they are asked about their opinion offline in person. For example, in one of the prior studies, consumers are asked directly about their satisfaction level on their chosen ice cream right outside of the ice cream store they just visited (Dar-Nimrod et al., 2009). In addition, an online environment also allows participants to participate in

the survey at location and time of their choice, which not only creates a more comfortable decision-making condition that is likely to increase choice satisfaction level, but also decreases the accuracy of measurement of choice deferral, whereas deferral of decision is one important indication of consumers experiencing preference uncertainty and feeling overwhelmed.

### **Moderation of choice-making orientation**

The study has found that choice-making orientation does not have significant moderation effect on the relationship between assortment size and choice satisfaction (see Appendix H). Maximizers do not experience more negative impact casted by a large assortment compared to satisficers. This contradicts previous studies stating that maximizers are at a higher risk of experiencing the emotion of regret (Schwartz et al., 2002). This study also shows contradictory result compared to the study discovering that maximizers tend to maximize negative outcome as well as positive ones and therefore are more likely to experience negative feelings when choosing from a large assortment compared to satisficers (Polman, 2009). Even if the result has been significant, the coefficient of assortment size (0.06), coefficient of choice-making orientation (-0.18), and coefficient of interaction of the two (-0.01) are too small to be considered having economic significance.

The most possible explanation for the difference between prediction and results of this study is that maximizers do not go through the typical maximizing experience in this study due to a lower level of reality in the online survey. The lack of experience is due to the relatively weak sense of reality in the study, which is also mentioned later in the limitations. The following parts will elaborate this further based on the three psychology differences between maximizers and satisficers that are also mentioned in the literature review.

In a realistic context, maximizers have a different goal for decision making compared to satisficers. Their goal is to “make the best choice” whereas satisficers have the goal of “making a good enough choice” (Schwartz et al., 2002). As a result,

it is more difficult for maximizers to narrow down to their choice in a large assortment compared to satisficers who actually have a bigger chance to find the choice that simply pass their threshold of “being good enough”. However, it is reasonable to assume that maximizer participants of this study have lower incentive to look for “the best choice”. Knowing that this is a simulation instead of real-life situation, it is natural for respondents to place less importance in the choice they make. Therefore, the difference between maximizers and satisficers in terms of their decision-making goals weakens in this study.

The second psychological difference between maximizers and satisficers is that maximizers tend to sacrifice more resources (such as time and money) in search of the possibly “best choice” compared to satisficers (Dar-Nimrod et al., 2009). When encountering a large assortment, the extra resources maximizers put in are more than those satisficers put in. However, the decision in this study is relatively easy to make and has no significant real-life consequences. Therefore, it does not require many resources for respondents to reach a decision. Maximizers may spend more time than satisficers to make the final choice but the extra time is too marginal to reduce satisfaction.

Finally, maximizers are generally at a higher risk to experience the emotion of regret (Schwartz et al., 2002) compared to satisficers. However, as mentioned above, the choice made in this study by respondents have no significant real-life outcomes and the effort maximizers have invested in making the choice is neglectable. Therefore, the negative outcome of the decision is more tolerable compared to general situation and maximizers do not experience post-decision regret as strongly. This is also a reason why choice-making orientation is not found significant in moderating the effect of assortment size on choice satisfaction.

### **Moderation of Product tangibility on moderation of choice making orientation**

Products are categorized into tangible and intangible ones in this study. Tangible products are physical products and intangible products are services and non-physical

products that cannot be touched (Vijayasathy, 2002). Product tangibility has been proven to moderate consumer behavior (Aljukhadar & Senecal, 2015). For example, online shopping intention of consumers differs between tangible and intangible products (Vijayasathy, 2002). Prior researches on the moderation effect of choice-making orientation on the relationship between assortment size and choice satisfaction have shown inconsistent findings. The moderation effect of choice-making orientation has been proven existing when the study objects are cleaning supply, chocolate, and ice cream (Dar-Nimrod et al., 2009). Whereas the moderation effect is found not significant when the chosen object is music (Schwartz et al., 2002). To the knowledge of the researcher conducting this study, this paper has the first to raise the assumption that the moderation effect of choice-making orientation may be related to product tangibility. The moderation effect of choice-making orientation is assumed to be more significant when the tested product is tangible compared to when the product is intangible.

The result shows that no significant moderation effect of product tangibility on moderation of choice-making orientation has been found ( $\beta = -.67$ ,  $t = -.24$ ). This indicates that the third hypothesis is rejected and that product tangibility does not moderate the moderating effect of choice-making orientation. Although product tangibility is found to have no significant effect on choice satisfaction, its coefficient (-1.56) is large given a scale of 1 to 7. Therefore, if product tangibility was found to be significant, it would have economic significance on choice satisfaction.

## **5.2 Managerial Implications**

The main purpose of this research is to study the moderation effect of choice-making orientation. The goal is to provide new insights for consumers who struggle in such a choice-overloading era, marketers who are seeking a better way to target and to attract customers, and businesses which are dedicated to provide an efficient shopping environment. Despite the hypotheses being rejected, there are numerous implications for all three parties.

The study reminds and inspires consumers to take a closer look at their choice-making orientation. Having a better idea of their own personality, consumers stand a bigger chance of making rational decisions and increasing their choice satisfaction level. This is because distinguishment of choice-making orientation provides consumers a clearer goal when they are involved in commercial activities. Therefore, they can make use of their resources more effectively.

It is crucial for marketers to target consumer accurately before conducting any marketing activities. Separating consumers based on their choice-making orientation provides marketers another method to categorize potential audience. Additionally, this study points out the psychological as well as behavioral differences between maximizers and satisficers. Thus marketers are advised to adopt different approaches when conducting marketing activities for these two types of consumers. An accurate targeting method as well as the idea of employing customized marketing approaches based on choice-making orientation of audience can help marketer sell their products/service to customers with matching demands.

When designing product lines, businesses are advised to take the choice-making orientation of their target customers into consideration. It is reasonable to design the product range considering whether the target group is mostly made or maximizers or satisficers. By considering the choice-making orientation of consumers, business can create a more comfortable decision-making process and as a result, acquire a bigger profit.

### **5.3 Limitations**

This study has several limitations that are worth acknowledging. First, as mentioned in discussion of hypotheses, the online environment in which the survey was conducted does not provide enough sense of reality. This limitation diminished the differences between maximizers and satisficers, and thus may lead to inaccurate results. Although the survey is considered appropriate based on the result of reality check, there is room for improvement regarding the reality level of the survey.

Second, the large assortment adopted in this study may not accurately match the generally big assortment size in a real business context. Though it was mentioned in research methodology that seven is the maximum process capacity of consumers (Miller, 1994) and the big assortment in this study consists of 15 options, consumers usually are faced with a much larger choice range in real life. It has been claimed that choice satisfaction level will not be influenced by increasing size of assortment which is already larger than the cognitive limit of processing. Nevertheless, simulation of real-life situations can improve the credibility and application of the research result. This can be considered as one of the limitations of this paper and should be taken into consideration when the findings of this paper are applied in a real-life context.

Finally, demographic features of participants of this research shows that they may not be the best representative of general consumers. The participants domain is mostly made of female (64.2%) respondents. Additionally, most of the participants are non-European (76.4%) and based on the distribution channel of the survey, most of these participants are from China or other Asian countries. The rest are divided between the Netherlands (12.1%) and other European countries (11.5%). Therefore, the findings of this study may be a good description for Chinese or Asian consumers and a poor generalization of American consumers since they are barely in the sample, if at all. This study also better describes highly educated consumers than high school diplomat holders, since the former takes up 50.9% of the participants and latter only 7.9%. These demographic imbalances should be kept in mind when generalizing the findings of this study.

#### **5.4 Further Research**

Based on the limitations and results of this study, numerous suggestions for further research are proposed in this chapter. Regarding the method of data collection, it is advised to create appropriate pressure on respondents to create a more realistic responding environment. For instance, time pressure can be imposed on surveys. A more interactive and direct way of collecting data is also advised to create more social

pressure on participants to imitate a real-life situation. Thus, focus group or interview in a supermarket or outside of a shop (Dar-Nimrod et al., 2009) is recommended as a more appropriate approach for data collection. When collecting data, it is important for researchers to pay attention to demographic characteristics of participants to attain representative results.

Second, this study only uses one type of product (protein powder) representing tangible products and another type (workout session) for intangible products. For future research which studies product tangibility, it is advised to include more than one product type for each tangibility category. Including more products can be beneficial in reducing the influence of individual preference for a specific product. By increasing types of product, future researchers may attain a more generalizable result.

Lastly, an appropriate question design is important for future study to reduce unnecessary data cleaning work and to reduce errors. In this study, some of the scale items are found to have ambiguous factor loadings. This can be caused by the negative nature of the corresponding questions in the survey. Future studies should take this into consideration when design questions. Finally, this study asks participants to make their choice in assortments before asking them to report their choice-making orientation. This order helps to avoid psychological bias. Future studies are also advised to be careful regarding the order of their designed questions to avoid data contamination.

## **6. Conclusion**

Choice overload has been a common issue in business world for long. Numerous research papers have studied the conditions for choice overload to appear yet they achieved different conclusion. This study aims to explore whether choice-making orientation can have major influence on the appearance of choice overload. The result indicates that a larger (smaller) assortment does not correlate significantly to a lower (higher) choice satisfaction level. Furthermore, the result has shown that choice-making orientation does not have significant moderation effect on the relationship

between assortment size and choice satisfaction. This means that maximizers do not necessarily experience more negative emotions when exposed to a large assortment compared to satisficers. Findings of this study contradict the conclusion proposed in previous researches stating that choice-making orientation does cast an important effect on choice satisfaction (Polman, 2009). This study also tested whether product tangibility is the cause for varying results in previous studies regarding the moderation effect of choice-making orientation. The result has shown that product tangibility does not have significant moderation effect on the moderation of choice-making orientation. This research combines three research questions into one study and provides a relatively complete perspective for the discussion about choice overload. Accordingly, the results of this research bridge the discussion of choice overload and the discussion of impact of choice-making orientation. Additionally, to the knowledge of the researcher of this study, this paper is the first to categorize and summarize previous researches methods and findings, and as a result, to raise the assumption that product tangibility may be the cause of disagreeing results regarding the moderation effect of choice-making orientation. It is also one of the first to conduct research on the moderation effect of product tangibility of moderation of choice-making orientation. As such, not only does this research provide reference for future researchers on the effect of product tangibility, it also inspires further studies to explore other possible factors that may cause the different results regarding studies on choice-making orientation. Additional studies are needed for an even deeper discussion on factors that are related to the appearance of choice overload.



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# Appendices

## Appendix A

### Survey

**Dear participant:**

**Thank you for your interest in this survey.**

**My name is Keer Wang and I am working on my master thesis at Erasmus University Rotterdam. Filling in the survey takes an estimated 4 minutes and is completely anonymous. All data is completely confidential and you can terminate participation at any time. Please feel free to send me an email at 566808cw@student.eur.nl if you have any questions regarding this questionnaire.**

**Thank you in advance for your participation.**

**Kind regards,  
Keer Wang**

**• By clicking on the proceed button you are implying that you have read and understood this form and you agree to participate in the research.**

**Figure 4.** *Introduction page of survey*

**For the next question, please imagine yourself being in a real-life situation.**

**Figure 5.** *Request for real-life simulation*

**You are booking a workout session with a personal trainer and you are to choose from the following 15 types. Which one will you choose?**

Boxing	Rowing	Zumba	Karate	Sprinting	Yoga	Swimming	Jogging	Cycling	Judo	Hip Hop	Lower Body Weight Training	Stairmaster	Running	Upper Body Weight Training
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**How familiar are you with working out?**

- I do it regularly and have a preference among the options mentioned above.
- I do it regularly and do not have a preference among the options mentioned above.
- I do it sometime and do not have a preference among the options mentioned above.
- I have heard of it but never do it.
- I have never heard of it.

**Figure 6.** *Large\_Intangible situation*

**You are purchasing a new bag of protein powder and you are to choose from the following 15 flavors. Which one will you choose?**

Salted Caramel    Toffee    Coconut    Chocolate    Cereal Milk    Cheesecake    Blueberry    Banana    Latte    Golden Syrup    Mango    Summer Fruits    Pineapple    Strawberry    Cream

**How familiar are you with protein powder?**

I use it regularly and have a preference among the options mentioned above.  
 I use it regularly and do not have a preference among the options mentioned above.  
 I use it sometime and do not have a preference among the options mentioned above.  
 I have heard of it but never use it.  
 I have never heard of it.

**Figure 7.** *Large\_Tangible situation*

**You are booking a workout session with a personal trainer and you are to choose from the following 6 types. Which one will you choose?**

Swimming    Running    Karate    Yoga    Cycling    Boxing

**How familiar are you with working out?**

I do it regularly and have a preference among the options mentioned above.  
 I do it regularly and do not have a preference among the options mentioned above.  
 I do it sometime and do not have a preference among the options mentioned above.  
 I have heard of it but never do it.  
 I have never heard of it.

**Figure 8.** *Small\_Intangible situation*

**You are purchasing a new bag of protein powder and you are to choose from the following 6 flavors. Which one will you choose?**

Toffee    Salted Caramel    Pineapple    Mango    Strawberry    Cheesecake

**How familiar are you with protein powder?**

I use it regularly and have a preference among the options mentioned above.  
 I use it regularly and do not have a preference among the options mentioned above.  
 I use it sometime and do not have a preference among the options mentioned above.  
 I have heard of it but never use it.  
 I have never heard of it.

**Figure 9.** *Small\_Tangible situation*

**Please describe your feelings regarding the choice. Choose the state that suits you the best.**

**When making the decision above:**

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
I felt at ease and comfortable.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It was not difficult to make a decision.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The differences among options were clear.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I did not feel the need to defer the decision-making process.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**How do you feel about the choice now?**

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
I am happy with the option I chose.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The option I chose is better than other given options in the assortment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I regret my choice.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think that another option from the assortment would have been better than the one I chose.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Please fill in "Agree" here.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If I could repeat the choice, I would choose the same option again.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Figure 10.** *Choice satisfaction measurement*

**Think about how you are in daily life. Please choose the state that suits you the best.**

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
When I watch TV, I channel surf, often scanning through the available options even while attempting to watch one program.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I am in the car listening to the radio, I often check other stations to see if something better is playing, even if I am relatively satisfied with what I am listening to.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I treat relationships like clothing: I expect to try a lot on before I get the perfect fit.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Choosing videos to watch is difficult, I am always struggling to pick the best one.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Think about how you are in daily life. Please choose the state that suits you the best.**

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
No matter how satisfied I am with my job, it is only right for me to be on the lookout for better opportunities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often fantasize about living in ways that are quite different from my actual life.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am a big fan of lists that attempt to rank things (the best movies, the best singers, the best athletes, the best novels, etc).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often find it difficult to shop for a gift for a friend.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When shopping, I have a hard time finding clothing that I really love.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**We would like to know more about you. Please choose the state that suits you the best.**

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
I find that writing is very difficult, even if it is just writing a letter to a friend, because it is so hard to word things just right. I often do several drafts of even simple things.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
No matter what I do, I have the highest standard for myself.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I never settle for second best.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Whenever I am faced with a choice, I try to imagine what all the other possibilities are, even ones that are not present at the moment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Figure 11.** *Choice-making orientation self-report*

**Please tell us about how you felt about the choice set given at the beginning of the survey.**

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
I felt overwhelmed by the number of options.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I had a hard time choosing what would be the best option.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I got frustrated by the number of choices.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Recall how you felt when making the choice at the beginning of the survey. Please choose the state that suits you the best.**

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
I could imagine myself doing the things described in the scenario.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believed that the described situation could happen in real life.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Figure 12.** *Manipulation & Reality check*

**Indicate your age**

- Under 18
- 18 - 30
- 31 - 44
- 45 - 64
- 65 years or older

**Indicate your gender**

- Male
- Female
- Non-binary / third gender
- Prefer not to say

**Indicate your level of education**

- Master or higher
- Bachelor
- High School

**Indicate your nationality**

- Dutch
- Other European
- Non-European

**Figure 13.** *Demographic questions*



## **Appendix B**

### **Measurement for choice satisfaction**

#### *Choice-making experience (4 items)*

1. I feel at ease and comfortable when I was making the decision.
2. It is not difficult for me to make a decision.
3. The differences among all the options are clear to me.
4. I do not feel the need to defer the decision-making process.

#### *Choice satisfaction (2 items)*

1. I am happy with the option I chose.
2. I think the option I chose is better than other given options in the assortment.

#### *Post-choice regret (3 items) (Adopted from the questionnaire by Scheibehenne et al., 2010)*

1. I regret my choice.
2. I think that another option from the assortment I have made the choice from would have been better than the one I chose.
3. If I could repeat the choice, I would choose the same product/workout tutorial class again.

## Appendix C

### 1. KMO and Bartlett's test

**Table 5.** *KMO and Bartlett's Test*

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.779
Bartlett's Test of Sphericity	Approx. Chi-Square	432.647
	df	36
	Sig.	<.001

### 2. Communalities

**Table 6.** *Communalities.*

	Initial	Extraction
CS1	1.000	.698
CS2	1.000	.673
CS3	1.000	.273
CS4	1.000	.484
CS5	1.000	.664
CS6	1.000	.347
CS7	1.000	.718
CS8	1.000	.782
CS9	1.000	.298
CM1	1.000	.449
CM2	1.000	.513
CM3	1.000	.456
CM4	1.000	.479
CM5	1.000	.501
CM6	1.000	.513
CM7	1.000	.547
CM8	1.000	.589
CM9	1.000	.563
CM10	1.000	.448
CM11	1.000	.624
CM12	1.000	.606
CM13	1.000	.466

### 3. Component matrix

**Table 7.** *Component matrix for Choice Satisfaction*

	Component 1	Component 2
CS1	.776	-.311
CS2	.794	-.205
CS3	.522	-.004
CS4	.662	-.213
CS5	.815	.015
CS6	.588	-.028
CS9	.511	.193
CS7	.255	.808
CS8	.297	.833

**Table 8.** *Component matrix for Choice-making Orientation*

Item	Component 1	Component 2	Component 3
CMO1	.562	-.188	-.274
CMO2	.638	-.150	-.290
CMO3	.717	-.164	-.002
CMO4	.668	-.139	-.117
CMO5	.215	.661	-.130
CMO6	.011	.698	.159
CMO7	.205	.723	-.292
CMO8	.187	-.636	.255
CMO9	.025	-.730	.384
CMO10	.150	-.220	.678
CMO11	.359	.248	.658
CMO12	.292	.198	.719
CMO13	.145	.210	.701

## Appendix D

### Choice Satisfaction:

#### 1. Reliability Statistics

**Table 9.** *Reliability Statistics.*

Cronbach's Alpha	N of Items
.751	9

#### 2. Reliability Statistics

**Table 10.** *Item Statistics.*

Item	Mean	Std. Deviation	N
CS1_1	5.21	1.338	165
CS1_2	5.19	1.459	165
CS1_3	5.30	1.402	165
CS1_4	5.06	1.489	165
CS2_1	5.76	.964	165
CS2_2	5.21	1.287	165
CS2_3	5.42	1.490	165
CS2_4	4.87	1.693	165
CS2_6	5.75	1.016	165

#### 3. Item-Total Statistics

**Table 11.** *Item-Total Statistics.*

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
CS1_1	42.55	39.566	.548	.709
CS1_2	42.58	37.904	.587	.700
CS1_3	42.47	41.641	.385	.736
CS1_4	42.70	39.649	.464	.722
CS2_1	42.01	41.262	.677	.703
CS2_2	42.55	42.005	.414	.731
CS2_3	42.35	43.325	.256	.758
CS2_4	42.89	41.269	.296	.757
CS2_6	42.02	44.189	.396	.735

## Choice-making Orientation:

### 1. Reliability Statistics

**Table 12.** *Reliability Statistics.*

Cronbach's Alpha	N of Items
.804	13

### 2. Reliability Statistics

**Table 13.** *Item Statistics.*

Item	Mean	Std. Deviation	N
CMO3_1	4.29	1.798	165
CMO3_2	3.59	1.916	165
CMO3_3	3.76	1.838	165
CMO3_4	4.12	1.712	165
CMO4_1	3.87	1.610	165
CMO4_2	4.25	1.705	165
CMO4_3	3.98	1.680	165
CMO4_4	4.54	1.705	165
CMO4_5	4.18	1.742	165
CMO5_1	3.78	1.683	165
CMO5_2	4.84	1.433	165
CMO5_3	3.90	1.606	165
CMO5_4	4.75	1.416	165

### 3. Item-Total Statistics

**Table 14.** *Item-Total Statistics.*

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
CMO3_1	49.54	122.189	.452	.790
CMO3_2	50.24	117.904	.524	.783
CMO3_3	50.07	123.428	.406	.794
CMO3_4	49.72	119.571	.558	.781
CMO4_1	49.96	121.682	.538	.783
CMO4_2	49.58	118.818	.583	.778
CMO4_3	49.85	125.763	.393	.795
CMO4_4	49.29	125.866	.382	.796

CMO4_5	49.65	124.142	.417	.793
CMO5_1	50.05	126.930	.359	.798
CMO5_2	48.99	132.348	.273	.803
CMO5_3	49.93	126.575	.394	.795
CMO5_4	49.08	128.975	.386	.795

**Manipulation Check:**

**1. Reliability Statistics**

**Table 15.** *Reliability Statistics.*

Cronbach's Alpha	N of Items
.851	3

**2. Reliability Statistics**

**Table 16.** *Item Statistics.*

Item	Mean	Std. Deviation	N
MC6_1	4.01	1.689	165
MC6_2	3.69	1.677	165
MC6_3	3.70	1.701	165

**Table 17.** *Item-Total Statistics.*

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
MC6_1	7.39	9.545	.708	.805
MC6_2	7.72	9.595	.711	.802
MC6_3	7.70	9.210	.745	.770

## Reality Check:

### 1. Reliability Statistics

**Table 18.** *Reliability Statistics.*

Cronbach's Alpha	N of Items
.635	2

### 2. Reliability Statistics

**Table 19.** *Item Statistics.*

Item	Mean	Std. Deviation	N
RC7_1	5.01	1.357	165
RC7_2	5.16	1.278	165

### 3. Item-Total Statistics

**Table 20.** *Item-Total Statistics*

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
RC7_1	5.16	1.634	.466	
RC7_2	5.01	1.841	.466	

## Appendix E

**Table 21.** *Statistics*

Skewness	0.397
Std. Error of Skewness	0.189
Kurtosis	0.651
Std. Error of Kurtosis	0.376

**Table 22.** *Tests of Normality.*

Shapiro-Wilk				
	AS	Statistic	df	Sig.
CS	0	.979	80	.201
	1	.976	85	.118

**Table 23.** *Test of Homogeneity of Variance.*

		Levene Statistic	df1	df2	Sig.
CS	Based on Mean	1.186	1	163	0.278
	Based on Median	1.142	1	163	0.287
	Based on Median and with adjusted df	1.142	1	163	0.287
	Based on trimmed mean	1.154	1	63	0.284

**Appendix F****Table 24.** *ANOVA.*

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	0.037	1	0.037	0.059	0.809
Within Groups	102.356	163	0.628		
Total	102.392	164			

**Appendix G****Table 25.** *Coefficients.*

Model 1	Collinearity Statistics	
	Tolerance	VIF
AS	.942	1.061
PT	.752	1.329
CMO	.770	1.298
FAMP	.704	1.420
MC	.776	1.289
RC	.910	1.099
CV_Age	.702	1.424
CV_Gender	.910	1.099
CV_Education	.785	1.273
CV_Nationality	.780	1.282



## Appendix H – Hayes PROCESS Model 1 No Control Variables

Run MATRIX procedure:

\*\*\*\*\* PROCESS Procedure for SPSS Version 4.0  
\*\*\*\*\*

Written by Andrew F. Hayes, Ph.D. [www.afhayes.com](http://www.afhayes.com)  
Documentation available in Hayes (2022). [www.guilford.com/p/hayes3](http://www.guilford.com/p/hayes3)

\*\*\*\*\*  
\*\*\*\*\*

Model : 1  
Y : CS  
X : AS  
W : CMO

Sample  
Size: 165

\*\*\*\*\*  
\*\*\*\*\*

OUTCOME VARIABLE:  
CS

Model Summary

	R	R-sq	MSE	F	df1	df2
p	.2431	.0591	.5984	3.3709	3.0000	
	161.0000	.0200				

Model

	coeff	se	t	p	LLCI	ULCI
constant	6.2881	.4199	14.9742	.0000	5.4588	
7.1173						
AS	-.2257	.5612	-.4023	.6880		
-1.3340	.8825					
CMO	-.2426	.1000	-2.4248	.0164	-.4401	
-.0450						
Int_1	.0650	.1325	.4905	.6244		
-.1967	.3267					

Product terms key:

Int\_1 : AS x CMO

Test(s) of highest order unconditional interaction(s):

	R2-chng	F	df1	df2	p
X*W	.0014	.2406	1.0000	161.0000	.6244

-----

Focal predict: AS (X)  
Mod var: CMO (W)

Conditional effects of the focal predictor at values of the moderator (s):

	CMO	Effect	se	t	p	LLCI
ULCI	3.2197	-.0164	.1711	-.0960	.9236	
		.3214				
	4.1408	.0435	.1206	.3605	.7190	
		.2816				

```

-.1946    .2816
   5.0619   .1033   .1721   .6005   .5490
-.2365    .4432

```

There are no statistical significance transition points within the observed range of the moderator found using the Johnson-Neyman method.

Conditional effect of focal predictor at values of the moderator:

ULCI	CMO	Effect	se	t	p	LLCI
	1.4615	-.1307	.3743	-.3492	.7274	
-.8699		.6085				
	1.7253	-.1136	.3414	-.3327	.7398	
-.7878		.5606				
	1.9890	-.0964	.3090	-.3121	.7554	
-.7066		.5137				
	2.2527	-.0793	.2771	-.2861	.7752	
-.6265		.4680				
	2.5165	-.0621	.2461	-.2525	.8010	
-.5482		.4239				
	2.7802	-.0450	.2163	-.2080	.8355	
-.4722		.3822				
	3.0440	-.0278	.1883	-.1479	.8826	
-.3997		.3440				
	3.3077	-.0107	.1630	-.0656	.9477	
-.3326		.3112				
	3.5714	.0064	.1419	.0454	.9638	
-.2737		.2866				
	3.8352	.0236	.1270	.1858	.8528	
-.2271		.2743				
	4.0989	.0407	.1207	.3376	.7361	
-.1976		.2790				
	4.3626	.0579	.1243	.4658	.6420	
-.1875		.3033				
	4.6264	.0750	.1370	.5476	.5847	
-.1955		.3456				
	4.8901	.0922	.1567	.5884	.5571	
-.2172		.4016				
	5.1538	.1093	.1810	.6040	.5467	
-.2481		.4668				
	5.4176	.1265	.2084	.6070	.5447	
-.2850		.5380				
	5.6813	.1436	.2377	.6041	.5466	
-.3259		.6131				
	5.9451	.1608	.2684	.5989	.5501	
-.3694		.6909				
	6.2088	.1779	.3001	.5929	.5541	
-.4147		.7705				
	6.4725	.1951	.3324	.5868	.5581	
-.4614		.8515				
	6.7363	.2122	.3652	.5811	.5620	
-.5090		.9334				
	7.0000	.2293	.3983	.5758	.5656	-.5573
1.0160						

\*\*\*\*\* ANALYSIS NOTES AND ERRORS \*\*\*\*\*

Level of confidence for all confidence intervals in output:  
95.0000

W values in conditional tables are the mean and +/- SD from the mean.

----- END MATRIX -----

## Appendix I – Hayes PROCESS Model 1 No Control Variables for Three Choice-making Orientation Factors

Run MATRIX procedure:

\*\*\*\*\* PROCESS Procedure for SPSS Version 3.5.3 \*\*\*\*\*

Written by Andrew F. Hayes, Ph.D. [www.afhayes.com](http://www.afhayes.com)  
 Documentation available in Hayes (2018). [www.guilford.com/p/hayes3](http://www.guilford.com/p/hayes3)

\*\*\*\*\*

Model : 1  
 Y : CS  
 X : AS  
 W : CMO1

Sample  
 Size: 165

\*\*\*\*\*

OUTCOME VARIABLE:  
 CS

Model Summary

	R	R-sq	MSE	F	df1	df2	p
	.2885	.0832	.5831	4.8708	3.0000	161.0000	.0029

Model

	coeff	se	t	p	LLCI	ULCI
constant	5.9046	.2671	22.1023	.0000	5.3770	6.4321
AS	.1752	.3800	.4610	.6454	-.5753	.9256
CMO1	-.1562	.0645	-2.4212	.0166	-.2835	-.0288
Int_1	-.0356	.0916	-.3891	.6978	-.2166	.1453

Product terms key:

Int\_1 : AS x CMO1

Test(s) of highest order unconditional interaction(s):

	R2-chng	F	df1	df2	p
X*W	.0009	.1514	1.0000	161.0000	.6978

\*\*\*\*\* ANALYSIS NOTES AND ERRORS \*\*\*\*\*

Level of confidence for all confidence intervals in output:  
 95.0000

----- END MATRIX -----

Run MATRIX procedure:

\*\*\*\*\* PROCESS Procedure for SPSS Version 3.5.3 \*\*\*\*\*

Written by Andrew F. Hayes, Ph.D.      www.afhayes.com  
Documentation available in Hayes (2018). www.guilford.com/p/hayes3

\*\*\*\*\*

Model : 1  
Y : CS  
X : AS  
W : CMO3

Sample  
Size: 165

\*\*\*\*\*

OUTCOME VARIABLE:  
CS

Model Summary							
	R	R-sq	MSE	F	df1	df2	p
	.0712	.0051	.6328	.2734	3.0000	161.0000	.8445

Model						
	coeff	se	t	p	LLCI	ULCI
constant	5.4037	.4280	12.6244	.0000	4.5584	6.2489
AS	.2071	.5584	.3709	.7112	-.8956	1.3099
CMO3	-.0260	.0973	-.2675	.7894	-.2182	.1661
Int_1	-.0408	.1263	-.3233	.7469	-.2901	.2085

Product terms key:  
Int\_1 : AS x CMO3

Test(s) of highest order unconditional interaction(s):					
	R2-chng	F	df1	df2	p
X*W	.0006	.1045	1.0000	161.0000	.7469

\*\*\*\*\* ANALYSIS NOTES AND ERRORS \*\*\*\*\*

Level of confidence for all confidence intervals in output:  
95.0000

----- END MATRIX -----

Run MATRIX procedure:

\*\*\*\*\* PROCESS Procedure for SPSS Version 3.5.3 \*\*\*\*\*

Written by Andrew F. Hayes, Ph.D.      www.afhayes.com  
Documentation available in Hayes (2018). www.guilford.com/p/hayes3

\*\*\*\*\*

Model : 1  
Y : CS  
X : AS  
W : CMO3

Sample  
Size: 165

\*\*\*\*\*

OUTCOME VARIABLE:  
CS

Model Summary

R	R-sq	MSE	F	df1	df2	p
.0712	.0051	.6328	.2734	3.0000	161.0000	.8445

Model

	coeff	se	t	p	LLCI	ULCI
constant	5.4037	.4280	12.6244	.0000	4.5584	6.2489
AS	.2071	.5584	.3709	.7112	-.8956	1.3099
CMO3	-.0260	.0973	-.2675	.7894	-.2182	.1661
Int_1	-.0408	.1263	-.3233	.7469	-.2901	.2085

Product terms key:

Int\_1 : AS x CMO3

Test(s) of highest order unconditional interaction(s):

	R2-chng	F	df1	df2	p
X*W	.0006	.1045	1.0000	161.0000	.7469

\*\*\*\*\* ANALYSIS NOTES AND ERRORS \*\*\*\*\*

Level of confidence for all confidence intervals in output:  
95.0000

----- END MATRIX -----

## Appendix J – Hayes PROCESS Model 1 With Control Variables

Run MATRIX procedure:

\*\*\*\*\* PROCESS Procedure for SPSS Version 4.0  
\*\*\*\*\*

Written by Andrew F. Hayes, Ph.D. [www.afhayes.com](http://www.afhayes.com)  
Documentation available in Hayes (2022). [www.guilford.com/p/hayes3](http://www.guilford.com/p/hayes3)

\*\*\*\*\*  
\*\*\*\*\*

Model : 1  
Y : CS  
X : AS  
W : CMO

Covariates:  
FAMP MC RC CV\_Age CV\_Gen CV\_Edu CV\_Nat

Sample  
Size: 165

\*\*\*\*\*  
\*\*\*\*\*

OUTCOME VARIABLE:  
CS

Model Summary

	R	R-sq	MSE	F	df1	df2
P	.5033	.2533	.4965	5.2235	10.0000	
	154.0000	.0000				

Model

	coeff	se	t	p	LLCI	ULCI
constant	5.5915	.5185	10.7846	.0000	4.5672	
6.6157						
AS	.0580	.5218	.1112	.9116	-.9728	
1.0888						
CMO	-.1799	.0980	-1.8355	.0684		
-.3735	.0137					
Int_1	-.0059	.1235	-.0475	.9622		
-.2498	.2381					
FAMP	-.1041	.0478	-2.1751	.0311	-.1986	
-.0096						
MC	-.0975	.0422	-2.3121	.0221	-.1809	
-.0142						
RC	.2145	.0512				
4.1938	.0000	.1135	.3156			
CV_Age	.0234	.0663	.3527	.7248		
-.1076	.1543					
CV_Gen	.1019	.0953	1.0690	.2868		
-.0864	.2902					
CV_Edu	.0672	.0997	.6748	.5008		
-.1296	.2641					
CV_Nat	-.1341	.0908	-1.4767	.1418		
-.3135	.0453					

Product terms key:

Int\_1 : AS x CMO

Test(s) of highest order unconditional interaction(s):

	R2-chng	F	df1	df2	p
X*W	.0000	.0023	1.0000	154.0000	.9622

-----

Focal predict: AS (X)  
Mod var: CMO (W)

Conditional effects of the focal predictor at values of the moderator (s):

	CMO	Effect	se	t	p	LLCI
ULCI						
	3.2197	.0392	.1587	.2468	.8054	
	-.2743	.3526				
	4.1408	.0338	.1124	.3004	.7643	
	-.1883	.2558				
	5.0619	.0284	.1611	.1761	.8605	
	-.2899	.3466				

There are no statistical significance transition points within the observed range of the moderator found using the Johnson-Neyman method.

Conditional effect of focal predictor at values of the moderator:

	CMO	Effect	se	t	p	LLCI
ULCI						
	1.4615	.0495	.3477	.1422	.8871	
	-.6375	.7364				
	1.7253	.0479	.3171	.1511	.8801	
	-.5785	.6743				
	1.9890	.0464	.2869	.1616	.8718	
	-.5204	.6131				
	2.2527	.0448	.2572	.1743	.8619	
	-.4633	.5530				
	2.5165	.0433	.2284	.1895	.8499	
	-.4079	.4945				
	2.7802	.0417	.2007	.2080	.8355	
	-.3547	.4382				
	3.0440	.0402	.1747	.2301	.8183	
	-.3048	.3852				
	3.3077	.0386	.1512	.2556	.7986	
	-.2600	.3373				
	3.5714	.0371	.1316	.2818	.7785	
	-.2230	.2972				
	3.8352	.0356	.1180	.3013	.7636	
	-.1976	.2687				
	4.0989	.0340	.1124	.3025	.7627	
	-.1881	.2561				
	4.3626	.0325	.1161	.2797	.7801	
	-.1969	.2618				
	4.6264	.0309	.1282	.2412	.8097	
	-.2223	.2841				
	4.8901	.0294	.1467	.2003	.8415	
	-.2604	.3191				
	5.1538	.0278	.1694	.1642	.8698	
	-.3069	.3625				

	CMO	Effect	se	t	p	LLCI
ULCI						
	1.4615	.0495	.3477	.1422	.8871	
-.6375	.7364					
	1.7253	.0479	.3171	.1511	.8801	
-.5785	.6743					
	1.9890	.0464	.2869	.1616	.8718	
-.5204	.6131					
	2.2527	.0448	.2572	.1743	.8619	
-.4633	.5530					
	2.5165	.0433	.2284	.1895	.8499	
-.4079	.4945					
	2.7802	.0417	.2007	.2080	.8355	
-.3547	.4382					
	3.0440	.0402	.1747	.2301	.8183	
-.3048	.3852					
	3.3077	.0386	.1512	.2556	.7986	
-.2600	.3373					
	3.5714	.0371	.1316	.2818	.7785	
-.2230	.2972					
	3.8352	.0356	.1180	.3013	.7636	
-.1976	.2687					
	4.0989	.0340	.1124	.3025	.7627	
-.1881	.2561					
	4.3626	.0325	.1161	.2797	.7801	
-.1969	.2618					
	4.6264	.0309	.1282	.2412	.8097	
-.2223	.2841					
	4.8901	.0294	.1467	.2003	.8415	
-.2604	.3191					
	5.1538	.0278	.1694	.1642	.8698	
-.3069	.3625					
	5.4176	.0263	.1950	.1348	.8930	
-.3589	.4115					
	5.6813	.0247	.2224	.1112	.9116	
-.4146	.4641					
	5.9451	.0232	.2511	.0924	.9265	
-.4728	.5191					
	6.2088	.0216	.2806	.0772	.9386	
-.5326	.5759					
	6.4725	.0201	.3107	.0647	.9485	
-.5936	.6338					
	6.7363	.0186	.3412	.0544	.9567	
-.6555	.6926					
	7.0000	.0170	.3721	.0457	.9636	
-.7181	.7521					

\*\*\*\*\* ANALYSIS NOTES AND ERRORS \*\*\*\*\*

Level of confidence for all confidence intervals in output:  
95.0000

W values in conditional tables are the mean and +/- SD from the mean.

----- END MATRIX -----



## Appendix K – Hayes PROCESS Model 1 With Control Variables for Three Choice-making Orientation Factors

Run MATRIX procedure:

\*\*\*\*\* PROCESS Procedure for SPSS Version 3.5.3 \*\*\*\*\*

Written by Andrew F. Hayes, Ph.D. [www.afhayes.com](http://www.afhayes.com)  
 Documentation available in Hayes (2018). [www.guilford.com/p/hayes3](http://www.guilford.com/p/hayes3)

\*\*\*\*\*

Model : 1  
 Y : CS  
 X : AS  
 W : CM01

Covariates:

FAMP MC RC Age Gender Educ Nation

Sample

Size: 165

\*\*\*\*\*

OUTCOME VARIABLE:

CS

Model Summary

	R	R-sq	MSE	F	df1	df2	p
	.5282	.2790	.4794	5.9579	10.0000	154.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	5.1894	.4265	12.1685	.0000	4.3470	6.0319
AS	.4311	.3490	1.2350	.2187	-.2585	1.1206
CM01	-.0986	.0617	-1.5981	.1121	-.2204	.0233
Int_1	-.1046	.0841	-1.2431	.2157	-.2708	.0616
FAMP	-.1088	.0468	-2.3237	.0214	-.2013	-.0163
MC	-.1034	.0403	-2.5635	.0113	-.1831	-.0237
RC	.2073	.0492	4.2095	.0000	.1100	.3045
Age	.0419	.0640	.6544	.5138	-.0845	.1683
Gender	.1231	.0940	1.3097	.1922	-.0626	.3088
Educ	.0815	.0981	.8312	.4072	-.1123	.2754
Nation	-.1298	.0884	-1.4696	.1437	-.3044	.0447

Product terms key:

Int\_1 : AS x CM01

Test(s) of highest order unconditional interaction(s):

	R2-chng	F	df1	df2	p
X*W	.0072	1.5453	1.0000	154.0000	.2157

\*\*\*\*\* ANALYSIS NOTES AND ERRORS \*\*\*\*\*

Level of confidence for all confidence intervals in output:

95.0000

----- END MATRIX -----

Run MATRIX procedure:

\*\*\*\*\* PROCESS Procedure for SPSS Version 3.5.3 \*\*\*\*\*

Written by Andrew F. Hayes, Ph.D.                      www.afhayes.com  
Documentation available in Hayes (2018). www.guilford.com/p/hayes3

\*\*\*\*\*

Model : 1  
Y : CS  
X : AS  
W : CMO2

Covariates:  
FAMP      MC              RC              Age              Gender      Educ              Nation

Sample  
Size: 165

\*\*\*\*\*

OUTCOME VARIABLE:  
CS

Model Summary							
	R	R-sq	MSE	F	df1	df2	p
	.4952	.2453	.5018	5.0044	10.0000	154.0000	.0000

Model						
	coeff	se	t	p	LLCI	ULCI
constant	5.7101	.4837	11.8051	.0000	4.7545	6.6656
AS	-.4266	.4443	-.9603	.3384	-1.3043	.4511
CMO2	-.1870	.0832	-2.2483	.0260	-.3512	-.0227
Int_1	.1116	.1039	1.0745	.2843	-.0936	.3168
FAMP	-.1100	.0479	-2.2970	.0230	-.2046	-.0154
MC	-.1027	.0422	-2.4327	.0161	-.1861	-.0193
RC	.2062	.0512	4.0272	.0001	.1050	.3073
Age	.0265	.0668	.3965	.6923	-.1055	.1585
Gender	.0844	.0959	.8792	.3807	-.1052	.2739
Educ	.0648	.1002	.6469	.5187	-.1332	.2629
Nation	-.1294	.0908	-1.4248	.1562	-.3087	.0500

Product terms key:  
Int\_1 : AS x CMO2

Test(s) of highest order unconditional interaction(s):					
	R2-chng	F	df1	df2	p
X*W	.0057	1.1546	1.0000	154.0000	.2843

\*\*\*\*\* ANALYSIS NOTES AND ERRORS \*\*\*\*\*

Level of confidence for all confidence intervals in output:  
95.0000

----- END MATRIX -----

Run MATRIX procedure:

\*\*\*\*\* PROCESS Procedure for SPSS Version 3.5.3 \*\*\*\*\*

Written by Andrew F. Hayes, Ph.D. [www.afhayes.com](http://www.afhayes.com)  
Documentation available in Hayes (2018). [www.guilford.com/p/hayes3](http://www.guilford.com/p/hayes3)

\*\*\*\*\*

Model : 1  
Y : CS  
X : AS  
W : CMO3

Covariates:

FAMP MC RC Age Gender Educ Nation

Sample  
Size: 165

\*\*\*\*\*

OUTCOME VARIABLE:

CS

Model Summary

R	R-sq	MSE	F	df1	df2	p
.4697	.2207	.5182	4.3603	10.0000	154.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	5.0507	.5523	9.1444	.0000	3.9596	6.1418
AS	.3009	.5257	.5723	.5679	-.7377	1.3395
CMO3	.0025	.0913	.0278	.9779	-.1777	.1828
Int_1	-.0680	.1190	-.5717	.5684	-.3032	.1671
FAMP	-.1229	.0484	-2.5373	.0122	-.2186	-.0272
MC	-.1302	.0415	-3.1331	.0021	-.2123	-.0481
RC	.1907	.0523	3.6498	.0004	.0875	.2940
Age	.0316	.0690	.4581	.6475	-.1047	.1679
Gender	.0981	.0976	1.0054	.3163	-.0947	.2909
Educ	.0575	.1021	.5627	.5744	-.1443	.2592
Nation	-.0987	.0931	-1.0599	.2908	-.2825	.0852

Product terms key:

Int\_1 : AS x CMO3

Test(s) of highest order unconditional interaction(s):

	R2-chng	F	df1	df2	p
X*W	.0017	.3268	1.0000	154.0000	.5684

\*\*\*\*\* ANALYSIS NOTES AND ERRORS \*\*\*\*\*

Level of confidence for all confidence intervals in output:

95.0000

----- END MATRIX -----

## Appendix L – Hayes PROCESS Model 3 No Control Variables

Run MATRIX procedure:

\*\*\*\*\* PROCESS Procedure for SPSS Version 4.0  
\*\*\*\*\*

Written by Andrew F. Hayes, Ph.D. [www.afhayes.com](http://www.afhayes.com)  
Documentation available in Hayes (2022). [www.guilford.com/p/hayes3](http://www.guilford.com/p/hayes3)

\*\*\*\*\*  
\*\*\*\*\*

Model : 3  
Y : CS  
X : AS  
W : CMO  
Z : PT

Sample  
Size: 165

\*\*\*\*\*  
\*\*\*\*\*

OUTCOME VARIABLE:  
CS

Model Summary

	R	R-sq	MSE	F	df1	df2
p	.3459	.1196	.5742	3.0473	7.0000	
	157.0000	.0049				

Model

	coeff	se	t	p	LLCI	ULCI
constant	7.1259	.5860	12.1593	.0000	5.9684	
8.2835						
AS	-.4713	.7606	-.6197	.5364	-1.9737	
1.0311						
CMO	-.4685	.1470	-3.1861	.0017	-.7589	
-.1781						
Int_1	.1719	.1893	.9081	.3652		
-.2020	.5458					
PT	-1.5618	.8444	-1.8495	.0663		
-3.2297	.1062					
Int_2	-.1548	1.1377	-.1361	.8919	-2.4021	
2.0924						
Int_3	.4035	.2020				
1.9978	.0475	.0046	.8025			
Int_4	-.0646	.2681	-.2410	.8099		
-.5941	.4649					

Product terms key:

Int_1	:	AS	x	CMO		
Int_2	:	AS	x	PT		
Int_3	:	CMO	x	PT		
Int_4	:	AS	x	CMO	x	PT

Test(s) of highest order unconditional interaction(s):

	R2-chng	F	df1	df2	p
X*W*Z	.0003	.0581	1.0000	157.0000	.8099

Int_4	-.0646	.2681	-.2410	.8099
-.5941	.4649			

Product terms key:

Int_1	:	AS	x	CMO		
Int_2	:	AS	x	PT		
Int_3	:	CMO	x	PT		
Int_4	:	AS	x	CMO	x	PT

Test(s) of highest order unconditional interaction(s):

	R2-chng	F	df1	df2	p
X*W*Z	.0003	.0581	1.0000	157.0000	.8099

-----

Focal predict:	AS	(X)
Mod var:	CMO	(W)
Mod var:	PT	(Z)

Test of conditional X\*W interaction at value(s) of Z:

	PT	Effect	F	df1	df2	p
	.0000	.1719	.8247	1.0000	157.0000	.3652
	1.0000	.1073	.3195	1.0000	157.0000	.5727

Conditional effects of the focal predictor at values of the moderator (s) :

	CMO	PT	Effect	se	t	p
LLCI	ULCI					
	3.2197	.0000	.0821	.2115	.3882	.6984
	-.3356	.4998				
	3.2197	1.0000	-.2807	.2767	-1.0147	.3118
	-.8272	.2658				
	4.1408	.0000	.2404	.1693	1.4203	.1575
	-.0939	.5748				
	4.1408	1.0000	-.1819	.1763	-1.0320	.3037
	-.5301	.1663				
	5.0619	.0000	.3988	.2709	1.4720	.1430
	-.1363	.9338				
	5.0619	1.0000	-.0831	.2162	-.3844	.7012
	-.5101	.3439				

\*\*\*\*\* ANALYSIS NOTES AND ERRORS \*\*\*\*\*

Level of confidence for all confidence intervals in output:  
95.0000

W values in conditional tables are the mean and +/- SD from the mean.

----- END MATRIX -----

## Appendix M – Hayes PROCESS Model 3 for Three Choice-making Orientation Factors No Control Variables

Run MATRIX procedure:

\*\*\*\*\* PROCESS Procedure for SPSS Version 3.5.3 \*\*\*\*\*

Written by Andrew F. Hayes, Ph.D. [www.afhayes.com](http://www.afhayes.com)  
 Documentation available in Hayes (2018). [www.guilford.com/p/hayes3](http://www.guilford.com/p/hayes3)

\*\*\*\*\*

Model : 3  
 Y : CS  
 X : AS  
 W : CMO1  
 Z : PT

Sample  
 Size: 165

\*\*\*\*\*

OUTCOME VARIABLE:  
 CS

Model Summary

	R	R-sq	MSE	F	df1	df2	p
	.3479	.1211	.5732	3.0894	7.0000	157.0000	.0044

Model

	coeff	se	t	p	LLCI	ULCI
constant	6.2335	.3526	17.6777	.0000	5.5370	6.9300
AS	.1435	.4843	.2964	.7673	-.8130	1.1000
CMO1	-.2526	.0895	-2.8219	.0054	-.4295	-.0758
Int_1	.0141	.1222	.1150	.9086	-.2274	.2555
PT	-.7129	.5386	-1.3238	.1875	-1.7767	.3508
Int_2	-.2538	.7826	-.3243	.7462	-1.7996	1.2921
Int_3	.1956	.1299	1.5062	.1340	-.0609	.4521
Int_4	-.0250	.1871	-.1334	.8941	-.3946	.3447

Product terms key:

Int_1	:	AS	x	CMO1		
Int_2	:	AS	x	PT		
Int_3	:	CMO1	x	PT		
Int_4	:	AS	x	CMO1	x	PT

Test(s) of highest order unconditional interaction(s):

	R2-chng	F	df1	df2	p
X*W*Z	.0001	.0178	1.0000	157.0000	.8941

\*\*\*\*\* ANALYSIS NOTES AND ERRORS \*\*\*\*\*

Level of confidence for all confidence intervals in output:  
 95.0000

----- END MATRIX -----

Run MATRIX procedure:

\*\*\*\*\* PROCESS Procedure for SPSS Version 3.5.3 \*\*\*\*\*

Written by Andrew F. Hayes, Ph.D.            www.afhayes.com  
Documentation available in Hayes (2018). www.guilford.com/p/hayes3

\*\*\*\*\*

Model : 3  
Y : CS  
X : AS  
W : CMO2  
Z : PT

Sample  
Size: 165

\*\*\*\*\*

OUTCOME VARIABLE:  
CS

Model Summary

R	R-sq	MSE	F	df1	df2	p
.3068	.0941	.5908	2.3298	7.0000	157.0000	.0274

Model

	coeff	se	t	p	LLCI	ULCI
constant	6.5317	.5168	12.6392	.0000	5.5109	7.5524
AS	-.3138	.6693	-.4688	.6399	-1.6359	1.0083
CMO2	-.3192	.1300	-2.4557	.0152	-.5759	-.0625
Int_1	.1368	.1649	.8299	.4078	-.1888	.4624
PT	-.5104	.7293	-.6999	.4850	-1.9510	.9301
Int_2	-.8637	.9789	-.8824	.3789	-2.7972	1.0697
Int_3	.1487	.1741	.8544	.3942	-.1951	.4925
Int_4	.0971	.2285	.4250	.6714	-.3543	.5485

Product terms key:

Int_1	:	AS	x	CMO2		
Int_2	:	AS	x	PT		
Int_3	:	CMO2	x	PT		
Int_4	:	AS	x	CMO2	x	PT

Test(s) of highest order unconditional interaction(s):

	R2-chng	F	df1	df2	p
X*W*Z	.0010	.1806	1.0000	157.0000	.6714

\*\*\*\*\* ANALYSIS NOTES AND ERRORS \*\*\*\*\*

Level of confidence for all confidence intervals in output:  
95.0000

----- END MATRIX -----

Run MATRIX procedure:

\*\*\*\*\* PROCESS Procedure for SPSS Version 3.5.3 \*\*\*\*\*

Written by Andrew F. Hayes, Ph.D. www.afhayes.com  
Documentation available in Hayes (2018). www.guilford.com/p/hayes3

\*\*\*\*\*

Model : 3  
Y : CS  
X : AS  
W : CMO3  
Z : PT

Sample  
Size: 165

\*\*\*\*\*

OUTCOME VARIABLE:  
CS

Model Summary	R	R-sq	MSE	F	df1	df2	p
	.2775	.0770	.6020	1.8712	7.0000	157.0000	.0777

Model	coeff	se	t	p	LLCI	ULCI
constant	6.7256	.6623	10.1546	.0000	5.4174	8.0339
AS	-.7318	.8102	-.9033	.3678	-2.3322	.8685
CMO3	-.3439	.1569	-2.1927	.0298	-.6538	-.0341
Int_1	.2172	.1926	1.1277	.2612	-.1632	.5975
PT	-2.1839	.8647	-2.5258	.0125	-3.8918	-.4761
Int_2	.8534	1.1383	.7497	.4546	-1.3950	3.1017
Int_3	.5108	.1986	2.5716	.0110	.1185	.9032
Int_4	-.2849	.2577	-1.1057	.2705	-.7938	.2240

Product terms key:

Int_1	:	AS	x	CMO3		
Int_2	:	AS	x	PT		
Int_3	:	CMO3	x	PT		
Int_4	:	AS	x	CMO3	x	PT

Test(s) of highest order unconditional interaction(s):

	R2-chng	F	df1	df2	p
X*W*Z	.0072	1.2226	1.0000	157.0000	.2705

\*\*\*\*\* ANALYSIS NOTES AND ERRORS \*\*\*\*\*

Level of confidence for all confidence intervals in output:  
95.0000

----- END MATRIX -----



## Appendix N – Hayes PROCESS Model 3 with Control Variables

Run MATRIX procedure:

\*\*\*\*\* PROCESS Procedure for SPSS Version 4.0  
\*\*\*\*\*

Written by Andrew F. Hayes, Ph.D. [www.afhayes.com](http://www.afhayes.com)  
Documentation available in Hayes (2022). [www.guilford.com/p/hayes3](http://www.guilford.com/p/hayes3)

\*\*\*\*\*  
\*\*\*\*\*

Model : 3  
Y : CS  
X : AS  
W : CMO  
Z : PT

Covariates:

FAMP MC RC CV\_Age CV\_Gen CV\_Edu CV\_Nat

Sample  
Size: 165

\*\*\*\*\*  
\*\*\*\*\*

OUTCOME VARIABLE:  
CS

Model Summary

	R	R-sq	MSE	F	df1	df2
P	.5410	.2926	.4829	4.4323	14.0000	
	150.0000	.0000				

Model

	<u>coeff</u>	se	t	p	LLCI	ULCI
constant	6.5455	.6619	9.8884	.0000	5.2376	
7.8535						
AS	-.4312	.7091	-.6082	.5440		
-1.8323	.9698					
CMO	-.4233	.1382	-3.0630	.0026	-.6963	
-.1502						
Int_1	.1489	.1763	.8443	.3998		
-.1995	.4972					
PT	-1.6237	.7935	-2.0462	.0425	-3.1916	
-.0558						
Int_2	.5582	1.0712	.5211	.6030	-1.5583	
2.6748						
Int_3	.4302	.1883				
2.2845	.0237	.0581	.8023			
Int_4	-.2044	.2513	-.8132	.4174		
-.7010	.2922					
FAMP	-.0946	.0523	-1.8082	.0726		
-.1980	.0088					
MC	-.1036	.0425	-2.4377	.0159	-.1875	
-.0196						
RC	.2014	.0511				
3.9393	.0001	.1004	.3024			

CV_Age	.0060	.0658	.0909	.9277
-.1241	.1361			
CV_Gen	.1088	.0949	1.1461	.2536
-.0788	.2964			
CV_Edu	.0819	.0998	.8211	.4129
-.1152	.2791			
CV_Nat	-.1303	.0898	-1.4516	.1487
-.3077	.0471			

Product terms key:

Int_1	:	AS	x	CMO		
Int_2	:	AS	x	PT		
Int_3	:	CMO	x	PT		
Int_4	:	AS	x	CMO	x	PT

Test(s) of highest order unconditional interaction(s):

	R2-chng	F	df1	df2	p
X*W*Z	.0031	.6614	1.0000	150.0000	.4174

-----

Focal predict: AS (X)  
 Mod var: CMO (W)  
 Mod var: PT (Z)

Test of conditional X\*W interaction at value(s) of Z:

PT	Effect	F	df1	df2	p
.0000	.1489	.7129	1.0000	150.0000	.3998
1.0000	-.0555	.0957	1.0000	150.0000	.7575

Conditional effects of the focal predictor at values of the moderator (s):

	CMO	PT	Effect	se	t	p
LLCI	ULCI					
3.2197	.0000		.0481	.1985	.2422	.8089
-.3441	.4402					
3.2197	1.0000		-.0518	.2609	-.1986	.8429
-.5674	.4638					
4.1408	.0000		.1852	.1594	1.1622	.2470
-.1297	.5001					
4.1408	1.0000		-.1030	.1642	-.6270	.5316
-.4275	.2215					
5.0619	.0000		.3223	.2533	1.2726	.2051
-.1781	.8228					
5.0619	1.0000		-.1541	.2014	-.7655	.4452
-.5520	.2437					

\*\*\*\*\* ANALYSIS NOTES AND ERRORS \*\*\*\*\*

Level of confidence for all confidence intervals in output:  
 95.0000

W values in conditional tables are the mean and +/- SD from the mean.

----- END MATRIX -----

## Appendix O – Hayes PROCESS Model 3 for Three Choice-making Orientation Factors with Control Variables

Run MATRIX procedure:

\*\*\*\*\* PROCESS Procedure for SPSS Version 3.5.3 \*\*\*\*\*

Written by Andrew F. Hayes, Ph.D.                      www.afhayes.com  
Documentation available in Hayes (2018). www.guilford.com/p/hayes3

\*\*\*\*\*

Model : 3  
Y : CS  
X : AS  
W : CMO1  
Z : PT

Covariates:

FAMP      MC              RC              Age              Gender      Educ              Nation

Sample  
Size: 165

\*\*\*\*\*

OUTCOME VARIABLE:  
CS

Model Summary

	R	R-sq	MSE	F	df1	df2	p
	.5529	.3057	.4740	4.7172	14.0000	150.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	5.5953	.4899	11.4205	.0000	4.6272	6.5633
AS	.3083	.4468	.6901	.4912	-.5746	1.1913
CMO1	-.2080	.0827	-2.5134	.0130	-.3715	-.0445
Int_1	-.0466	.1126	-.4141	.6794	-.2691	.1759
PT	-.7546	.5030	-1.5002	.1357	-1.7485	.2393
Int_2	.0320	.7318	.0437	.9652	-1.4139	1.4779
Int_3	.2191	.1201	1.8237	.0702	-.0183	.4564
Int_4	-.0632	.1745	-.3621	.7178	-.4080	.2816
FAMP	-.1043	.0520	-2.0065	.0466	-.2070	-.0016
MC	-.1107	.0409	-2.7037	.0076	-.1915	-.0298
RC	.1969	.0496	3.9695	.0001	.0989	.2950
Age	.0368	.0638	.5775	.5645	-.0892	.1628
Gender	.1375	.0945	1.4551	.1477	-.0492	.3242
Educ	.0864	.0994	.8688	.3864	-.1101	.2828
Nation	-.1306	.0881	-1.4836	.1400	-.3046	.0433

Product terms key:

Int_1	:	AS	x	CMO1		
Int_2	:	AS	x	PT		
Int_3	:	CMO1	x	PT		
Int_4	:	AS	x	CMO1	x	PT

Test(s) of highest order unconditional interaction(s):

	R2-chng	F	df1	df2	p
X*W*Z	.0006	.1311	1.0000	150.0000	.7178

\*\*\*\*\* ANALYSIS NOTES AND ERRORS \*\*\*\*\*

Level of confidence for all confidence intervals in output:  
95.0000

----- END MATRIX -----

Run MATRIX procedure:

\*\*\*\*\* PROCESS Procedure for SPSS Version 3.5.3 \*\*\*\*\*

Written by Andrew F. Hayes, Ph.D. www.afhayes.com  
Documentation available in Hayes (2018). www.guilford.com/p/hayes3

\*\*\*\*\*

Model : 3  
Y : CS  
X : AS  
W : CMO2  
Z : PT

Covariates:  
FAMP MC RC Age Gender Educ Nation

Sample  
Size: 165

\*\*\*\*\*

OUTCOME VARIABLE:  
CS

Model Summary							
	R	R-sq	MSE	F	df1	df2	p
	.5150	.2652	.5016	3.8677	14.0000	150.0000	.0000

Model						
	coeff	se	t	p	LLCI	ULCI
constant	6.0897	.6185	9.8466	.0000	4.8677	7.3117
AS	-.5458	.6239	-.8748	.3831	-1.7785	.6870
CMO2	-.3138	.1242	-2.5273	.0125	-.5591	-.0685
Int_1	.1842	.1538	1.1976	.2329	-.1197	.4880
PT	-.5792	.6834	-.8476	.3980	-1.9295	.7711
Int_2	-.1244	.9238	-.1347	.8930	-1.9498	1.7009
Int_3	.1829	.1623	1.1273	.2614	-.1377	.5036
Int_4	-.0553	.2147	-.2578	.7969	-.4795	.3688
FAMP	-.1041	.0531	-1.9586	.0520	-.2091	.0009
MC	-.0941	.0429	-2.1951	.0297	-.1788	-.0094
RC	.2037	.0517	3.9431	.0001	.1016	.3058
Age	.0082	.0675	.1208	.9040	-.1253	.1416
Gender	.0932	.0963	.9674	.3349	-.0972	.2836
Educ	.0824	.1018	.8100	.4192	-.1186	.2835
Nation	-.1281	.0915	-1.4006	.1634	-.3089	.0526

Product terms key:  
Int\_1 : AS x CMO2  
Int\_2 : AS x PT  
Int\_3 : CMO2 x PT  
Int\_4 : AS x CMO2 x PT

Test(s) of highest order unconditional interaction(s):					
	R2-chng	F	df1	df2	p
X*W*Z	.0003	.0664	1.0000	150.0000	.7969

Run MATRIX procedure:

\*\*\*\*\* PROCESS Procedure for SPSS Version 3.5.3 \*\*\*\*\*

Written by Andrew F. Hayes, Ph.D. www.afhayes.com  
Documentation available in Hayes (2018). www.guilford.com/p/hayes3

\*\*\*\*\*

Model : 3  
Y : CS  
X : AS  
W : CMO3  
Z : PT

Covariates:  
FAMP MC RC Age Gender Educ Nation

Sample  
Size: 165

\*\*\*\*\*

OUTCOME VARIABLE:|  
CS

Model Summary

	R	R-sq	MSE	F	df1	df2	p
	.5151	.2653	.5015	3.8689	14.0000	150.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	6.4377	.7455	8.6358	.0000	4.9647	7.9106
AS	-.7952	.7656	-1.0387	.3006	-2.3080	.7175
CMO3	-.3205	.1457	-2.2000	.0293	-.6083	-.0326
Int_1	.2148	.1818	1.1814	.2393	-.1444	.5739
PT	-2.1269	.8098	-2.6266	.0095	-3.7270	-.5269
Int_2	1.4565	1.0597	1.3744	.1714	-.6374	3.5504
Int_3	.5140	.1845	2.7857	.0060	.1494	.8787
Int_4	-.3903	.2396	-1.6291	.1054	-.8638	.0831
FAMP	-.1015	.0533	-1.9068	.0585	-.2068	.0037
MC	-.1407	.0414	-3.3981	.0009	-.2225	-.0589
RC	.1830	.0519	3.5258	.0006	.0804	.2855
Age	.0216	.0685	.3145	.7535	-.1138	.1569
Gender	.0633	.0974	.6497	.5169	-.1292	.2558
Educ	.0694	.1017	.6831	.4956	-.1314	.2703
Nation	-.0931	.0921	-1.0115	.3134	-.2751	.0888

Product terms key:  
Int\_1 : AS x CMO3  
Int\_2 : AS x PT  
Int\_3 : CMO3 x PT  
Int\_4 : AS x CMO3 x PT

Test(s) of highest order unconditional interaction(s):

	R2-chng	F	df1	df2	p
X*W*Z	.0130	2.6539	1.0000	150.0000	.1054

\*\*\*\*\* ANALYSIS NOTES AND ERRORS \*\*\*\*\*

Level of confidence for all confidence intervals in output:  
95.0000

----- END MATRIX -----