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Limiting choices and trust:

The effect of trusting an intermediary who provides a pre-selection on attractiveness, choice difficulty and satisfaction with the chosen item

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Abstract

This paper adds to current literature about choice difficulty and trust by adapting the model of Sarver (2008) in order to predict effects of trusting an intermediary who provides a pre-selected choice set on attractiveness of the choice set, choice difficulty and satisfaction with the chosen item. It is predicted that attractiveness of the choice set increases if the intermediary appears trustworthy, as items in the choice set are more likely to match preferences of the decision maker. Attractiveness in turn increases satisfaction with the chosen item as well as choice difficulty, which has a negative effect on satisfaction with the chosen item. These predictions are tested through analyzing the results of a survey created for the purpose of this study (N=90), where respondents were randomly selected into one of three treatment groups with either a trustworthy, untrustworthy or no intermediary. Results from tests with composite scales as well as structural equation modeling are partially in line with predictions. Evidence is found that attractiveness of the choice set increases both satisfaction with the chosen item as choice difficulty. The predicted positive effect of trust on attractiveness and the predicted negative effect of choice difficulty on satisfaction with the chosen item are found, but are not found to be significant. Implications of this research are still of importance to intermediaries who provide clients with pre-selected choice sets, as they should attempt to provide a varied pre-selection to increase attractiveness and be wary of providing choice sets if the client possesses much expertise of the subject and the options are relatively unknown to the client.

Key words

Trust; intermediary; choice sets; pre-selection; satisfaction with the chosen item; attractiveness; choice difficulty; structural equation modeling;

Table of Contents

1. Introduction

In many cases, an intermediary presents a pre-selected choice set to a client, thereby narrowing down a larger set of choices. Having less choice reduces choice difficulty, where less choice difficulty has a positive effect on satisfaction with the chosen item. Choice difficulty includes matters such as risks of regret (Sarver, 2008), searching costs (Thaler, 1980) and expectations (Diehl & Poynor, 2010). However, having less choice also reduces the probability of finding a match to the decision maker's preferences (Hotelling, 1990), thereby reducing attractiveness of the choice set. Being confronted with a less attractive choice set decreases satisfaction with the chosen item (Bollen et al., 2010).

In this context another factor which is hypothesized to influence satisfaction with the chosen item is introduced. The aim of this report is to *research the effect of trusting an intermediary who pre-selects a choice set on satisfaction with the chosen item*. Research shows that the relation a decision maker has with an intermediary is of influence to satisfaction with the chosen item of the decision maker (Aggarwal & Botti, 2007). In line with this, decision makers use intermediaries they trust to a larger extent than intermediaries they do not trust (Komiak & Benbasat, 2006; Sniezek & Van Swol, 2001). Furthermore, decision makers are more susceptible to advice from trusted advisors compared to untrustworthy advisors (Nuijten, 2012). However, it has not been researched how trust relates exactly to the decision maker's satisfaction with the chosen item.

Two motives, benevolence and credibility, determine if the intermediary is to be trusted or not (Ganesan & Hess, 1997). Benevolence, concerns the extent to which the intermediary acts in line with the preferences of the agent. Simply put, if the intermediary is *willing* to deliver a good service. The second motive, credibility, deals with the expertise of the intermediary. Thus, if the intermediary *can* deliver good service.

This report adds to literature by extending the model of Sarver (2008), which shows that agents can avoid regret by limiting their own options, through inclusion of attractiveness and trust, as well as providing an in-depth analysis, through the use of structural equation modeling, by implementing trust in the model of Bollen et al (2010). Analysis is performed by using data from a survey created for the purpose of this report (N=90). The survey consisted of a hypothetical situation where respondents either faced a trustworthy, untrustworthy or no intermediary and afterwards were asked 20 questions to determine expertise of the individual, perceived item set variety, attractiveness of the choice set, choice difficulty and satisfaction with the chosen item.

The main results are partially in line with predictions derived from the adapted model. Firstly, trusting the intermediary does have the predicted positive effect on attractiveness, but is not significant (H1a). Secondly, attractiveness of the choice set has a positive effect on both

satisfaction with the chosen item as well as choice difficulty (H1b; H2a). Lastly, choice difficulty has the predicted negative effect on satisfaction with the chosen item, yet is also not significant (H2b). Insignificance may have been caused by a lack of power due to the relatively small sample size. Yet, concerning the results of this report there is no evidence that trusting the intermediary who pre-selects the choice set has an influence on satisfaction with the chosen item.

As there is no solid evidence to answer the main question, no implications for practice can be provided concerning trust. However, intermediaries should strive to create varied item sets to increase attractiveness, as attractiveness has a large positive effect on satisfaction with the chosen item and the hypothesized negative effect of choice difficulty was not found and is much smaller in effect size. Furthermore, intermediaries should be wary of clients who have much expertise, as they perceive less variation in an item set with many unknown options and little information, which in turn decreases the positive effect of attractiveness.

This report is structured as follows: In chapter 2 a literature review is provided about the effects of choice, the nature of trust and the model of Bollen et al. (2010). In chapter 3 the model of Sarver (2008) is introduced, its adaptation is shown and hypotheses are derived. In chapter 4 the content of the survey is summarized, demographics of the sample presented and a report of the analyses performed. In chapter 5 the results are presented, including the structural equation model. In chapter 6 the results, limitations, recommendations for further research and implications are discussed. The report is concluded in chapter 7.

2. Literature Review

This chapter reviews relevant literature concerning limitation of choices and trust. It is split in four paragraphs. Firstly, positive effects of choice will be presented. Secondly, choice overload will be discussed. Thirdly, the concept of trust will be examined. And lastly, the model of Bollen, Graus, Knijnenburg & Willemsen (2010) will be detailed as all effects associated with choice can be incorporated within the concepts of the model and it can serve as a basic causal model to expand upon.

2.1 Positive effects of increased choice

There are many benefits of having (more) options to choose from (Botti & Iyengar, 2006). For example, even being able to make inconsequential choices increases feelings of control and happiness (Langer & Rodin, 1976). Decision makers internally bolster their choices, thus feeling responsible, when they make decisions by themselves (Bem, 1967). In line with this, having the ability to choose increases intrinsic motivation, which in turn increases the quality of decision making (Deci & Ryan, 2000a). Furthermore, literature shows that having the freedom to choose can increase life-satisfaction i.e. happiness (Veenhoven, 2000). Veenhoven (2000) makes a distinction between variety of choices and the capability to choose. It is stated that an individual needs both to utilize his freedom and increase life-satisfaction.

However, the most straightforward of consequences is that having a larger choice set increases the degree of the preference match possible. Simply put, this means that having more choice increases the chance of an item optimally fitting the individual's needs (Hotelling, 1990). It has been proven that individuals use the theory of preference matching themselves. Diehl & Poynor (2010) found that individuals think that larger item sets offer a higher probability of finding the best item, thus increasing expectations. An increase of expectations can also lead to adverse consequences, which is detailed in paragraph 2.2.

Expanding upon this is the finding that larger item sets result in higher attractiveness, which in turn increases choice difficulty. This was first found through the classic experiment of Iyengar & Lepper (2000), who compared selling 6 jams versus selling 24 jams. The booth of 24 jams drew more initial attention of the customers, however much more items were sold from the booth containing 6 jams, thus the larger booth appeared more attractive, yet not resulting in more sales. This finding has been substantiated by Bollen, Graus, Knijnenburg & Willemsen (2010), who used an extensive experiment with an online recommender system for movies to show that attractiveness of the choice set is a significant factor influencing satisfaction with the chosen item positively.

2.2 Choice overload

Much research has been done to investigate the concept of choice overload (i.e. choice paradox), a relatively new concept popularized by Barry Schwartz (2004) through the book 'The Paradox of Choice: Why more is less'. According to Schreibehenne et al. (2010) choice overload can be defined as: "an increase in the number of options to choose from, which may lead to adverse consequences such as a decrease in the motivation to choose or the satisfaction with the finally chosen option" (p. 409).

There has been discussion if choice overload really exists. For example, Scheibehenne (2008) replicated the earlier mentioned study concerning choice overload of Iyengar and Lepper (2000) and did not find a significant result. This prompted Scheibehenne, Greifender & Todd (2010) to conduct a meta-analysis, compiling 50 published and unpublished papers about choice overload. It was found that there was no significant evidence to prove the consistent existence of choice overload. However, the considerable variation that was found between papers hints that there are specific conditions under which choice overload does, and does not, occur. The authors summarize four possible moderators which were used in previous research. These are 1) categorization of the items of choice, 2) degree of difficulty of the trade-offs between items, 3) information overload and 4) time pressure. Chernev, Böckenholt & Goodman (2010) emphasize the importance of these moderating factors in their critique on Scheibehenne et al. (2010) arguing that it was never an interesting question if choice overload exists in all situations, but rather in what situations it occurs.

Literature mainly shows three reasons why choice overload can occur. Firstly, having more choice directly increases searching costs (Thaler, 1980). It simply costs effort as well as time to search among items. Logically, it costs more time and effort to search among larger item sets when more information is presented or the attributes of the items are very similar. Greenleaf & Lehmann (1995) show that individuals receive more cognitive strain, when more choice is presented.

Secondly, increased choice appears to create more regret afterwards, as a higher number of items on the choice list had to be rejected (Beattie et al. 1994). Sarver (2008) models this line of thought and finds that it can be optimal for decision makers to limit their choice set when the ex-post valuation of the chosen item can differ from the ex-ante prediction.

Thirdly, Diehl & Poynor (2010) show that larger item sets induce higher expectations to such an extent that satisfaction with the product decreases. This effect is called expectation-disconfirmation, where the expectation does not meet up with the actual experience. It is closely linked to the benefit of preference matching. However, individuals overestimate the actual benefit of the increased degree of preference matching and thus expectations do not meet reality.

Consequences of choice overload appear to be multitude. Of course, the aforementioned lesser satisfaction with the chosen item as well as regret, but also lesser confidence and more confusion (Lee & Lee, 2004), experiencing more negative feelings (Iyengar, Elwork, & Schwartz, 2006), postponing decision making (Iyengar, Jiang & Kamenica, 2006) and necessitating the use of heuristics, which can result in sub-optimal decisions (Kahn & Baron, 1995). However, in this report there will be a focus on satisfaction with the chosen item.

Of course, the benefits and costs of increased choice interact with each other influencing satisfaction with the chosen item, see figure 1. Benefits of choice increase rapidly at the start as the number of choice items increase. But afterwards, when the choice set already contains many options, benefits only increase very slightly. For example, the difference in benefit of having two or three choices can be large, while the difference in benefits between choosing from 202 and 203 choices is small. Costs of choice behave differently, where costs of choice are small with little items of choice, but large with more items of choice. Therefore, satisfaction tends to increase strongly, as benefits are dominant. However, after some amount of choice items, satisfaction starts to decrease, as costs of choice exceed benefits.
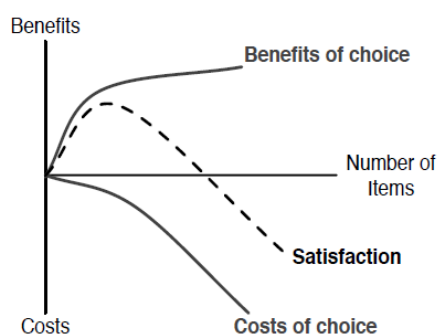
Figure 1: Satisfaction as a function of benefits, costs and number of items (Bollen, Graus, Knijnenburg & Willemsen, 2010)

2.3 Trust

The trust game experiment of Berg, Dickhout and McCabe (1995) has become a widely researched subject after its introduction (Johnson & Mislin, 2011). The experiment shows that decision makers can trust others as well as reciprocate, without any monetary incentive to do so. This finding provided evidence against the classic thought of individuals as 'homo economicus'. Trust also has a pronounced effect in the relationship between decision makers and intermediaries. Komiak & Benbasat (2006) research if trust has an influencing role on the decision to use an electronic recommendation agent and find this to be true. Sniezek & Van Swol (2001) perform an experiment in which participants are either judges or advisors, where the advisor possesses more information than the judge. It was found that judges who trusted their advisor to a larger extent were also more susceptible to advice and more likely to ask advice. This finding has been substantiated by Nuijten (2012), who presented hypothetical situations to a sample group of managers and auditors in which an intermediary was introduced that could either be trusted or should be perceived as an opponent.

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Trust can be defined as the perceived benevolence and credibility of a party (Ganesan & Hess, 1997; Doney, & Cannon, 1997). Firstly, benevolence refers to the extent to which the intermediary selects options with the individuals preferences and well-being in mind. Thus benevolence revolves around the question if the intermediary is *willing* to help the agent well. Credibility of the intermediary concerns the actual ability and expertise of the intermediary in the specific area of interest. Therefore, credibility concerns the question if the intermediary *can* help the agent well. If an intermediary is both benevolent and credible, he will select the best options for the decision maker, as he wishes to aid the decision maker and is capable to do so. This corresponds with the aforementioned research of Sniezek & Van Swol (2001), who found that judges trusted advisors to a larger extent if they displayed confidence and elaborated their answers, thus signaling credibility. Furthermore, judges also reported to trust their advisor to a larger extent if they had prior knowledge or a prior relationship with their advisor, in line with the concept of benevolence. It should be noted that it is not necessary to trust advice of the intermediary about every facet of life or even in general. Only expertise and trustworthiness about the particular subject is of interest to the decision maker.

Aggarwal & Botti (2007) perform an experiment which is similar to the survey of this report. They use the theory of communal and exchange relationships (Mills & Clark, 1991; Mills & Clark, 2011). This theory more extensively describes the component 'benevolence'. According to the theory of communal and exchange relationships, exchange relationships are defined by the principle of 'quid pro quo', something for something. When in this relationship individuals expect to receive a payment in return upon giving an item. Note that the traded items do not necessarily need to be money. This relationship mostly occurs between acquaintances and business relations. Communal relations are the exact opposite of exchange relations, whereas the individual simply gives an item because he or she cares for the welfare of the other. The individual may hope that the action will be returned, but returning the action is not mandatory. This relationship is more common among friends and (close) relatives.

Aggarwal & Botti (2007) find that participants who are in an exchange relationship with their intermediary reported lower satisfaction when their book was selected for them compared to selecting the book themselves, while participants in a communal relationship with their intermediary reported no difference in satisfaction from having the book selected for them and selecting themselves. This finding is substantiated by two follow up experiments. Firstly, it is shown that the decrease in satisfaction is not due to losing freedom (participants could select either to choose or to have it chosen). Secondly, it is shown that a mismatch of expectations with reality can lead to positive reactions in a communal relationship (trusting expertise of bookstore) and negative reactions in an exchange relationship (evidence of egoistic behavior).

2.4 Towards a causal model

Bollen, Graus, Knijnenburg & Willemsen (2010) research the effect and interactions of item set variety, attractiveness and choice difficulty on choice satisfaction by creating an elaborate recommendation system, used by individuals to find movies best fitting to their needs. The authors had the recommendation system create one of three sets of items for the participants, either a top 5, a top 20 or a set containing 20 items with the top 5 and bottom 15 movies. Analyses of the experiment resulted in a structural equation model that will be used as the basic model to expand upon in this paper, see figure 2.

In the model, attractiveness of the choice set incorporates the aforementioned preference matching. As individuals believe that larger assortments have a higher probability of meeting their needs, they are more attracted to larger item sets. However, choice sets which are more attractive do increase choice difficulty as searching costs and anticipated regret increases. It takes little effort, as well as a low risk of regret, to pick from a choice set if one alternative is clearly much better than the other alternatives, yet if the choice set consists of several excellent options, it will cost much effort to find the optimal item and risks of regret increase. Expertise of the individual utilizing the choice set increases the perceived item set variety as well as attractiveness, as someone with expert knowledge can see more variety in a similar set than an individual without expertise.

Bollen et al. (2010) found that satisfaction with the chosen item was similar among the top 5, top 20 and the set with the top 5 combined with bottom 15. However, attractiveness and choice difficulty of the choice set did differ. The top 20 was more attractive, yet harder to choose from compared to the top 5. While the mixed set was less attractive than the top 5, but appeared to be easier to choose from. Thus, the path towards satisfaction with the chosen product differs for all three sets.
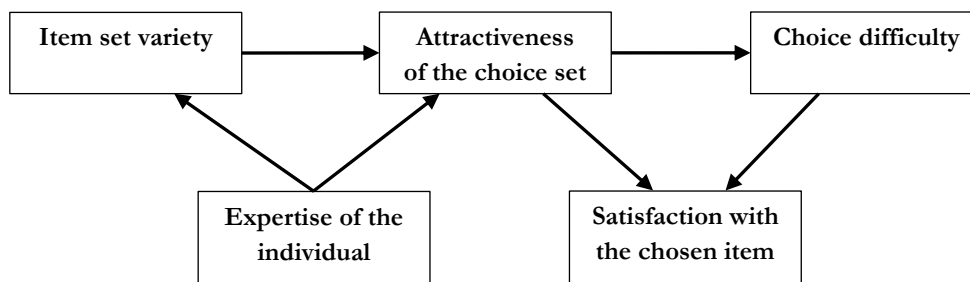
Figure 2: Causal model influencing satisfaction of choice
(Bollen, Graus, Knijnenburg & Willemsen, 2010)

3. The Model

In this chapter the model of Sarver (2008) is presented and adapted after which predictions are derived. In paragraph 1 the theoretical and mathematical background of the model of Sarver (2008) is detailed. The model is adapted to suit the theory of Bollen et al. (2010) and include trust and attractiveness in paragraph 2. Predictions are derived from the model in paragraph 3 and included in the causal model.

3.1. The Model of Sarver (2008)

The economical model of Sarver (2008) is an extension of the work of Dekel, Lipman and Rustichini (2001), as preferences over menu's consisting of lotteries are investigated. These lotteries could be seen as products of which the ex-post satisfaction is uncertain. The model has been created to predict a decision maker's desire for limiting options when anticipating regret. There is a two-period setting, where in period 0 the decision maker chooses a menu. In period 1, the decision maker chooses an alternative from the menu. The assumption is made that the decision maker makes ex-ante predictions about utility of the menu and alternatives, which can differ from the ex-post valuation. Regret can thus come about if the decision maker chooses an ex-ante alternative from a list of multiple items, but finds out that a different alternative ex-post was better. The model shows that anticipated regret is a reason for decision makers to limit choices i.e. choose for a menu with less choice.

For example, consider having to decide going to either a restaurant where they serve solely beef, solely chicken or both beef and chicken. If you prefer beef over chicken, you will order beef. However, if you go to the restaurant where they serve both beef and chicken and your ordered beef turns out to be bad, while the chicken served on the plate of your neighbor looks amazing, you will experience regret. This could have been avoided by going to the restaurant where solely beef was served. It is important to note that Sarver (2008) models additional regret after choosing the menu. Thus regret associated from choosing the wrong menu is not represented.

Following is the mathematical representation of the model[1]. The decision maker is facing uncertainty about her future tastes. Meaning, she is uncertain what she will like in the future. The uncertainty is modeled through the probability measure μ, where U is the set of possible ex-post utility functions. The agent's ex-post utility is determined by the realized state of $u \epsilon U$ and the lottery p, thus represented by $u(p)$. The work is restricted in the extent that all ex-post utility functions have to be a von Neumann-Morgenstern expected-utility function.

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[1] The same notations will be used as in the model. Most of the model is explained in pages 264-268, the remainder of the paper deals with various axioms.

Suppose two lotteries p and q, where the decision maker prefers p over q, such that $\{p\} \gtrsim \{q\}$. This effect is called the commitment preference, as the decision maker would choose the menu with only p over the menu with only q in period 0. The assumption is made that decision makers also behave in this (logical) manner in period 1, thus when faced with the two alternatives *within* a menu, p is preferred as $\{p\} \gtrsim \{q\}$. Therefore, adding q to a menu does not add any value, this particular axiom is called dominance: If $\{p\} \gtrsim \{q\}$ and $p \in A$, then $A \gtrsim A \cup \{q\}$, where A is the item set variety. Simply put, if p is included in all menus, the menu with q will always be preferred equally or less than a menu without q. The reason why a menu with q would be preferred less is due to regret. This is detailed in the following equation of the value of a menu, which depends on the utility of the chosen item minus the disutility of regret. As the decision maker does not know what her utility function will be ex-post, the integral is maximized over domain U, which includes all ex-post utility functions. It is modeled as if the agent chooses p from menu A:

(1) $$V\,(A) = \ \max_{p \in A} \int_{U}[u(p) - R(p, A, u)]\mu(du).$$

Where regret depends on the utility of alternatives that exceeds the utility of the chosen item:

(2) $$R\,(p, A, u) = \ K[\max_{q \in A} u(q) - u(p)].$$

Where K is representative of the strength of regret, with at least $K \geq 0$ and is an exogenous variable. It follows that if there is a singleton menu, no regret is possible as $A = \ p$, thus $R\,(p, A, u) = \ 0$. The model shows that regret is anticipated by the agent, which serves as an incentive to limit her menu.

3.2 Adaptation

Two major modifications are made. The first modification is including attractiveness, where the agent can be more attracted to certain menus. The second modification concerns trust in the intermediary having an effect on attractiveness. Where T represents the amount of trust in the intermediary, with a value of $0 \leq T \leq 2$ The lower bound denoting absolute distrust and the upper bound denoting absolute trust. If $T = 1$, trust in the intermediary is either neutral or not existing.

Trust consists of two components as detailed in the paragraph 2.3, benevolence and credibility. Thus the first component deals with the extent to which the intermediary acts with the preferences and well-being of the agent in mind. The second component incorporates the

measure of expertise attributed to the intermediary, where the agent trusts the intermediary to a larger extent if the intermediary is an expert. A menu provided by a trustworthy intermediary is more attractive as the pre-selection is more likely to be in line with the preferences of the decision maker. If $T = 2$ the intermediary acts completely in line with the preferences of the decision maker and has complete expertise of the subject. Any value below this upper bound can be a mix of benevolence and credibility. Thus, $T = 1,5$ may be due to high credibility and relatively low benevolence, but also vice versa or any mix in between. Variable T is exogenous[2].

Additionally, the original dependent variable which represented the value of the menu is assumed to be similar to satisfaction with the chosen product in the adapted model. In order to avoid confusion, note that utility of the item defined by $u(p)$, is different from satisfaction with the chosen product, which is defined as $V(A, T)$. In the adapted model utility derived from the chosen product as well as regret can be increased by attractiveness.

(3) $$V(A, T) = \ \max_{p \epsilon A} \int_U [S(A, T)(u(p) - R(p, A, u))] \mu(du).$$

Where attractiveness depends on item set variety and trust:

(4) $$S(A, T) = 2 \left(\frac{AT}{AT + u(p)} \right).$$

Through the modeling of attractiveness and the influence of attractiveness on utility of the item and regret in the adapted model (3), the outcome of the adapted model in a setting with a singleton menu where trust in the intermediary is neutral, is similar to the outcome of the original model (1). However, in a situation where there is more than one option in the menu or trust plays a role, attractiveness will be of influence and thus $u(p)$ and $R(p, A, u)$ will be multiplied by $S(A, T)$.

The equation of attractiveness (4) is modeled such that attractiveness will take a value of $0 \ \leq S(A, T) \ \leq 2$, where attractiveness can increase in four ways. Firstly, if more items are included in the menu. Secondly, if the items in the menu provide high anticipated utility. Thirdly, if the intermediary is to be trusted. And lastly, if the utility linked to the chosen item, p, is rather equal to the utility provided by other alternatives. Thus, a set with many excellent options, therefore having similar anticipated utility, and provided by a trustworthy advisor would result in a very attractive menu.

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[2] It would be possible to create a principal-agent model, where the effort/trustworthiness of the intermediary is determined by the benefit and costs of aiding the decision maker as well as some given value of expertise. However, the aim of this paper is to research the effect of trusting the intermediary on attractiveness, choice difficulty and satisfaction with the chosen item. Thus, for simplicity trust is determined exogenously.

The effect of attractiveness is twofold. Firstly, the positive effect of utility of the item on satisfaction with the chosen item is multiplied as the item is deemed more desirable in a highly attractive menu. Secondly, anticipated regret increases as more items are included in the menu and/or the items are rather equal thus the potential for alternatives to exceed the chosen item increases and/or items provided by a trustworthy advisor are more in line with preferences and as such, it is more regretful if the decision maker chooses wrongly.

As this research focuses on the influence of trust, this part is examined more extensively. The possible outcome is created that a decision maker can absolutely distrust the intermediary, $T = 0$, therefore $S(A, T) = 0$ and $u(p)$ as well as $R(p, A, u)$ becomes meaningless. Yet, if a decision maker completely distrusts an intermediary, it is logical that his suggested options are deemed worthless. When dealing with an intermediary who is to be trusted, $T > 1$, attractiveness of the choice set increases, in turn multiplying the utility of the chosen product, but also anticipated regret. In comparison, if the intermediary is not to be trusted, $T < 1$, attractiveness decreases and the utility of the options as well as anticipated regret decreases. Lastly, if trust about the intermediary is non-existent or does not play a role, $T = 1$, trust has no role in influencing the satisfaction with the chosen item.

3.3 Predictions derived from the model

By adapting the model to be in line with theory, specific predictions can be made, see figure 3.

H1: The Attractiveness Hypothesis
   a) Trusting the intermediary has a positive effect on the attractiveness of the choice set.
   b) Attractiveness of the choice set has a positive effect on satisfaction with the chosen item.

H2: The Regret Hypothesis
   a) Attractiveness of the choice set has a positive effect on choice difficulty (regret).
   b) Choice difficulty (regret) has a negative effect on satisfaction with the chosen item.

The main intent of this paper is to research the effect of trust on satisfaction with the chosen item. However, trusting the intermediary appears to primarily have an effect on attractiveness of the choice set, which in turn increases choice difficulty (i.e. regret), thus it is unclear what the net effect will be on satisfaction with the chosen item. Both of these hypotheses are tested
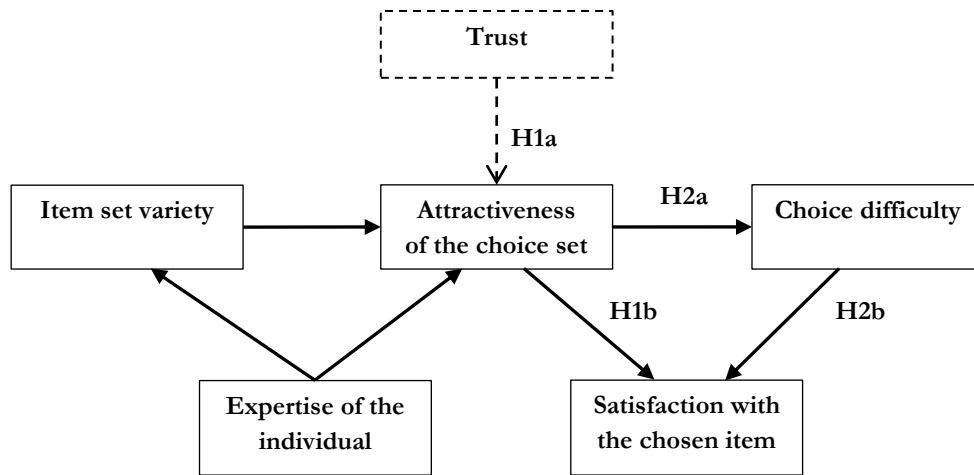
Figure 3: Adapted causal model influencing satisfaction of choice
Original model of Bollen et al. (2010)

empirically, where the experimental set up is mostly in line with Aggarwal & Botti (2007), who research the effect of having an intermediary decide for you depending on the type of relationship, communal or exchange. However, in this paper, the intermediary limits the choice-set. The concepts and the method of measuring these concepts is similar to Bollen et al. (2010).

4. Data

In this chapter the design of the survey is discussed as well as the performed analysis. In paragraph 1 the construction and distribution of the survey is presented as well as demographics of the sample. Paragraph 2 details the analysis performed in order to gain results, see the appendix for more information concerning the survey and detailed statistical results.

4.1 Survey and sample

The data used in this report has been collected through a survey of Qualtrics.com, which was online from June 12th, 2014 to July 3th, 2014. An online survey was deemed most efficient with respect to time and money. The survey has been distributed through Facebook and the internetforum 'Wetenschapsforum.nl', which is a forum dedicated to science. On both Facebook and the forum it was specifically mentioned that students were the target group to gain a homogeneous sample group. By participating in the survey, respondents had the chance to win one of three 10 EUR book coupons. In total 158 surveys were started and 90 surveys were completed, thus reaching a completion rate of 56.9%.

During the survey, all respondents read the hypothetical situation that they entered a book store and faced a rack containing 32 books[3]. Respondents were then randomly selected into one of three possible scenarios. In both the 'trust' and 'distrust' treatments, an employee approached the respondent with a pre-selection of six books. In the 'trust' treatment, this employee was to be trusted, in the 'distrust' treatment, this employee was to be distrusted. The third scenario acted as the control group, where six books were stalled out on a table in front of the rack of books, no employee or trust was mentioned. The six books presented were always the same in all treatments. They were deliberately chosen to be real, in order to avoid deception, yet likely to be unknown to respondents. Furthermore, besides the title, no extra information was provided, as the intent of this research is to investigate the effect of trusting the intermediary and any prior knowledge or preferences in genre would produce noise in the results.

After selecting a book, respondents were asked to answer 20 questions on a 5-point Likert scale measuring item set variety, attractiveness, choice difficulty, satisfaction with the chosen item and expertise of the individual. These questions were adapted from questions that were constructed and used earlier by Bollen et al (2010) and are reported in detail in Knijnenburg et al. (2012). For example, a question linked to attractiveness reads "The pre-selection was appealing." and a question linked to choice difficulty reads "Eventually I was in doubt between items in the list." The last question in a series is often juxtaposed to earlier questions in order

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[3] The hypothetical scenario resembles the work of Arragwal & Botti (2007) as their paper served as inspiration.

to prevent respondents to answer without thinking. The full survey design including the hypothetical situations, questions and responses of the sample in percentages can be found in Appendix 1.1. Lastly, demographics were asked of the respondents including age, gender, education and income. A short summary of demographics is provided here.

Age   Respondents were aged between 17 and 43, with an average age of 24. 74 % of respondents had an age below 26.

Gender   43% of the respondents reported to be male and 57% of respondents reported to be female.

Income   Respondents reported gross monthly incomes between 0 and 8000 EUR. On average, respondents earned 1010 EUR.

Education   3% of respondents reported having an education on MBO-level or lower, 28% of respondents on HBO-level. 27% of respondents on bachelor-level, 40% of respondents on master-level and 2% reported having an education above master-level.

Treatments 33 of the respondents were randomly selected in the 'distrust' treatment, 30 respondents were selected in the control group and 27 of respondents were selected into the 'trust' treatment.

As intended, the sample appears to mainly consist of students. The data has no missing values as respondents had to fill in every question before they could continue with the survey.

4.2 Analysis

The statistical procedure performed is split into two methods. Firstly, simply summing up the 20 Likert-items to create five composite scales of item set variety, attractiveness, choice difficulty, satisfaction with the chosen option and expertise of the individual. However, this method is very controversial as a variable that is supposed to be ordinal is interpreted as an interval variable. The second method concerns performing exploratory factor analysis (EFA) and structural equation modeling (SEM)[4]. This method is relatively new, especially including ordinal variables in the model. In regards to EFA and SEM this means that there are 90 observations which will define 20 Likert items, resulting in a sample to variable ratio just short

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[4] For an introduction to EFA, see Brown & Onsman (2010); see Finney & DiStefano (2006) for in-depth knowledge about SEM .

of 5:1. The sample to variable ratio is important in EFA and SEM as reporting absolute sample size does not provide any indication without mentioning the amount of variables to be used.

Firstly, composite scales are created by summing the Likert items. But this may only be done if internal consistency is sufficient. Upon performing the Cronbach's alpha for all five supposed combinations of Likert items, being item set variety, expertise of the individual, attractiveness, choice difficulty, satisfaction with the chosen item, one item linked to choice difficulty had to be dropped due to its negative influence[5]. After removing this item all five supposed combinations had a joint alpha above or approximately 0.7, which is considered good internal consistency (Nunnaly, 1978). As said, creating the composite scales is done by summing the Likert items. For example, 'attractiveness' consists of four items and is thus calculated as: Item 1 + item 2 + item 3 – (6 - item 4), creating an interval range of 4 to 20. Item 4 is juxtaposed to the other items and thus a trick needs to be used to sum it correctly. The Shapiro-Wilk test is used to test normality as it has been shown to be the most powerful normality test and observations are less than 2000 (Razali & Wah, 2011). It is found that 12 out of 20 Likert items are not normally distributed at a 5% significance level. Both age and income are also not normally distributed. Combining the 19 Likert items to be used also shows that there is no multivariate normality. However, the five composite scales do appear to be normally distributed as well as having equal variances according to F-tests, thus tests that demand normality and equal variances are used in chapter 5: Results.

Secondly, EFA is performed with the goal to construct a SEM similar to figure 3. Exploratory factor analysis is used to find factors which are underlying a larger set of variables. Specifically, factor analysis is used, as clear ideas about the latent variables are described in previous chapters, while principal component analysis should be used when the researcher simply wants to reduce variables (Brown & Onsman, 2010). In the case of this report, we have 19 Likert items which are supposed to be linked to five latent variables, as one item was already dropped due to the analysis of Cronbach's alpha. Before conducting EFA, tests were ran to see if the data was suitable. The correlation matrix showed several correlations above 0.3, with many correlations at approximately 0.5, which is categorised as practically significant by Hair et al. (1995). Furthermore, Barlett's test of sphericity and Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) are conducted in order to test if factor analysis can be performed. Both tests investigate if variables are correlated sufficiently, but use different calculations. Barlett's test of sphericity is significant, meaning that the correlation matrix is significantly different from the identity matrix, in which all variables are orthogonal. KMO calculates partial correlations of two variables to account for the influence of the other variables and has a value of 0.696. Brown & Onsman (2010) stress that KMO is important when sample to variables

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[5] This item concerns the question: "I think I chose the best book from the options."

ratio is lower than 5:1, where any KMO above 0.5 is acceptable. Communalities of the variables range between 0.2 and 0.8, which according to Hogarty et al. (2005) can result in somewhat larger statistical bias, RMSE and lower pattern accuracy when dealing with smaller sample sizes. All three are indices to show the accuracy of the pattern matrix. The accuracy of the pattern matrix may therefore be a bit worse when using the smaller sample size of this research compared to the near perfect accuracy when using very large sample sizes.

Exploratory factor analysis is conducted on the 19 Likert items with an orthogonal Varimax rotation including Kaiser normalization resulting in a fairly simple structure, see table 1. As suggested by Brown (2009) oblique rotations were tested first, but provided no correlation between the extracted factors and thus an orthogonal rotation was chosen based upon providing the simplest pattern, which is the Varimax rotation. The fifth factor does not have an eigenvector above 1, which is commonly used as a method to determine how many factors to keep (Brown & Onsman, 2010). However, analysis of the screeplot suggests that the fifth factor is important enough to be included in the factor analysis. Two variables corresponding to attractiveness have a small crossloading of approximately 0.35 with the latent variable satisfaction with the chosen item. It concerns the questions "The pre-selection appears to match my preferences." and "I did not like any of the recommendations in the pre-selection." Removing these items is not useful as crossloadings in other variables increase and it is also not necessary as both variables have a much higher loading corresponding with their own latent variable, thus the items are retained (Costello, 2009).

Variable	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Communality
V1				.6691		.5488
V2				.6234		.4252
V3				.5354		.3480
V4				-.6105		.3940
A1			.6117			.4541
A2			.6876			.6435
A3	.3423		.6854			.5917
A4	-.3608		-.5480			.4734
C1					.6873	.5160
C2					.7850	.6334
C4					.4331	.2801
S1	.6400					.4486
S2	.6471					.5507
S3	.6657					.4946
S4	.7199					.5650
S5	-.3252					.2068
E1		.8626				.7746
E2		.8675				.8182
E3		.6612				.5270

Table 1: Exploratory Factor Analysis, rotation: Varimax, Kaiser normalization.
Loadings below 0.3 are not significant in lower sample sizes (Hogarty et al., 2005) and thus not shown to improve readability.

As all 19 Likert items can be used in the SEM model according to the EFA, a SEM is constructed. The following quote of Kaplan (2004) provides a good description of SEM: "Structural equation modeling can be defined as a class of methodologies that seeks to represent hypotheses about the means, variances, and covariances of observed data in terms of a smaller number of 'structural' parameters defined by a hypothesized underlying conceptual or theoretical model" (p. 1089). The Likert items are linked to their respective latent variables and estimated with ordered probit. As the data is categorical and not multivariate normal, a weighted least squares means and variances adjusted (WLSMV) estimator is used, which is recommended in Finney & DiStefano (2006). Using maximum likelihood with numerical integration (ML) would be better as it is an efficient estimator, but takes too much computation power for the hardware available to be calculated. Furthermore, it is found that WLSMV produces a goodness-of-fit chi-square almost as good as ML and can even produce better standard errors to factor loadings in small sample sizes compared to ML (Hox, Maas & Brinkhuis, 2010). There is a vague consensus in literature that sample size should be at least 200 to conduct SEM, however smaller sample sizes are less of a problem when at least three variables are used to determine latent factors and the effect of having a smaller sample size is primarily an increased number of Type 2 errors, which would result in less significant paths. Thus SEM can be used with smaller sample sizes, but chances of finding significance are reduced (Iacobucci, 2010).

5. Results

In this chapter, results are presented. The results of tests conducted with composite scales constructed of multiple Likert items are discussed in paragraph 1. The structural equation model is presented in paragraph 2 and in paragraph 3 the precise results are set forth.

5.1 Composite scales

Performing a one-way ANOVA shows that there are no significant differences in satisfaction with the chosen item among the three treatments groups at a 10% significance level, see table 2. Using 2-independent t-tests to see if there are significant differences in satisfaction with the chosen item between pairs of treatment groups also provides no evidence for such differences. When performing similar tests for attractiveness, recall hypothesis 1a, no evidence for a significant difference in attractiveness among the treatments could be found as well. However, a slight increase can be observed in both composite scales from the treatment of distrust to the control group to the treatment of trust, see figure 4.

Test	Variable	Treatment groups	Test statistic	P-value
ANOVA	Satisfaction	Distrust, Trust and Control	$F_{(2, 89)}= 1.1$	.336
2-independent t-test	"	Distrust and Trust	$T_{(58)}= -1.34$	.184
2-independent t-test	"	Control and Trust	$T_{(55)}= -.07$	.948
2-independent t-test	"	Control and Distrust	$T_{(61)}= 1.27$	.210
ANOVA	Attractiveness	Distrust, Trust and Control	$F_{(2, 89)}= .90$	.410
2-independent t-test	"	Distrust and Trust	$T_{(58)}= -1.17$	.250
2-independent t-test	"	Control and Trust	$T_{(55)}= -1.08$	.283
2-independent t-test	"	Control and Distrust	$T_{(61)}= .07$	.943

Table 2: Statistical results of tests with composite scales.
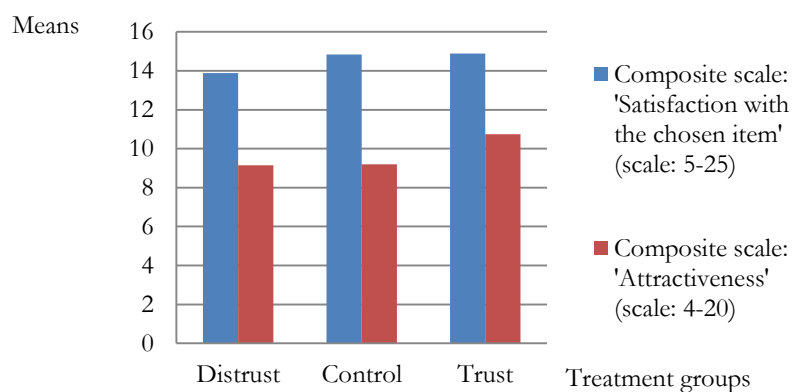
Figure 4: Means of composite scales by treatment groups.

5.2 Structural equation model

As the composite scales cannot provide further information, a structural equation model is constructed, see figure 5. Significant relations between latent variables, with at least a 5% significance level, are visualized through the use of a solid arrow, while non-significant relations are depicted with broken arrows. For interpretation, the coefficient of attractiveness of the choice set on choice difficulty means that 1 standard deviation difference in attractiveness causes a 0.24 standard deviation difference in choice difficulty. The 'trust' treatment and 'distrust' treatment are introduced through the use of dummy-variables. The coefficient of the 'trust' treatment shows that attractiveness of the choice set is 0.14 standard deviations higher for respondents in the 'trust' treatment compared to respondents in the control group.
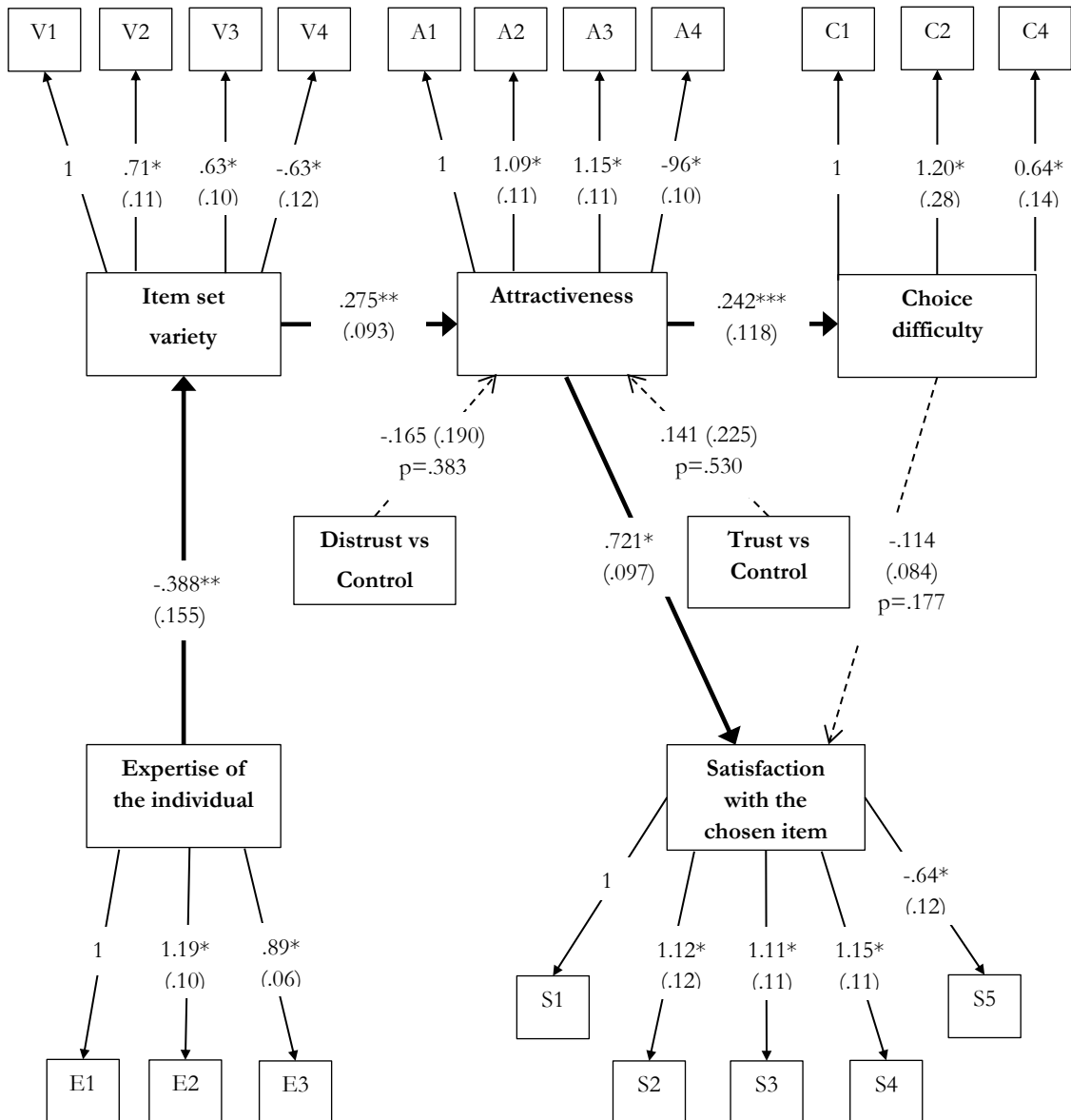
*= p < 0.001; **=p < 0.01; ***=p < 0.05

Figure 5: Structural equation model
Depicted in the arrows are the coefficients, standard deviations and p-values.

Regarding goodness-of-fit of categorical SEM models, RMSAE and WRMR are the indices to be considered (Newsom, 2005; Finney & DiStefano, 2006). The model scores excellent in these statistics (RMSEA = .057, below the prescribed maximum of .06. WRMR = .905, below the prescribed maximum of 1. Furthermore, CFI = .954 and TLI = .947, both approximately at the prescribed minimum of .95. Chi-Square(183) = 237.05, p = .004, which is significant thus showing poor fit, yet according to Kline (2004) if $\frac{\chi^2}{df} \leq 3$ the test result is acceptable as the chi-square is often considered too sensitive). R-square values for the latent variables are item set variety (0.125), attractiveness (0.162), satisfaction with the chosen item (0.573) and choice difficulty (0.054). Bollen et al. (2010), of whom this model is adapted, also found similar R-square values and argue that low R-square values in item set variety, attractiveness and choice difficulty are to be expected as residual variance depends on the respondents' tendency to call something varied, attractive or difficult.

5.3 Causal paths

Analyzing the outcome of the SEM model, it can be seen that expertise of the individual has a moderate, negative and significant effect on perceived item set variety. This means that respondents who reported to have more expertise also reported to perceive less variety in the item set. In turn, item set variety has a moderate, positive and significant effect on attractiveness of the item set. Thus, attractiveness does increase when the respondent observes more variety in the item set. The expected effect of trust on attractiveness is found, where respondents faced with a trustworthy advisor reported the choice set to be more attractive and respondents faced with a non-trustworthy advisor reported the choice set to be less attractive compared to respondents in the control group. However, this effect is not significant even at a 10% significance level. Combining these results with the findings of the one-way ANOVA and 2-indepent t-tests it has be concluded that **hypothesis 1a is to be rejected**. Attractiveness does have a large, positive and significant effect on satisfaction with the chosen item. Therefore, respondents who reported to find the choice set more attractive were also more satisfied with their chosen item, thus **hypothesis 1b cannot be rejected**. It is found that attractiveness of the choice set has a moderate, positive and significant effect on choice difficulty. Therefore, **hypothesis 2a cannot be rejected**. Lastly, choice difficulty does display the predicted negative effect on satisfaction with the chosen item, but is not significant, thus **hypothesis 2b is to be rejected**. These findings are discussed in more detail in the next section, chapter 6: Discussion.

6. Discussion

In this chapter the results, limitations, recommendations and implications are discussed. In paragraph 1 the results are interpreted. In paragraph 2 the limitations and recommendations for further research are discussed. Implications of this report are presented in paragraph 3.

6.1 Interpretation of results

Overall, this study cannot confirm the full model of Bollen et al. (2010) nor the hypothesized effect of trusting the intermediary predicted through adapting the model of Sarver (2008). It is not remarkable that the tests conducted with the composite scale of satisfaction with the chosen item did not show a significant difference. The hypothesized construct, detailed in chapter 3, predicts an ambiguous effect of trust on satisfaction with the chosen item, as positive effects of attractiveness would increase with more trust, the negative effect of choice difficulty would in turn increase with more attractiveness. Bollen et al. (2010) also find no significant difference in satisfaction with the chosen item similarly.

When observing results concerning the first hypothesis (H1a: Trusting the intermediary has a positive effect on the attractiveness of the choice set.), it is more puzzling that no significant effect was found when analyzing the effect of trusting the intermediary on attractiveness through both the composite scale and the SEM. One explanation for this may be a lack of power as both the 'distrust' treatment as the 'trust' treatment do show the predicted path effect in the SEM, where trusting the intermediary leads to a more attractive choice-set, and p-values of the 2-independent t-tests are quite low. Furthermore, performing SEM with low sample sizes increases Type 2 errors, thus reducing the probability of finding significant paths. (Iacobucci, 2010).

The second hypothesis (H1b: Attractiveness of the choice set has a positive effect on satisfaction with the chosen item) could not be rejected and the effect of attractiveness on satisfaction with the chosen item is not only significant at a 0.1% significance level, but also has a very large coefficient relative to the other causal paths of the model. In combination with the finding that item set variety increases attractiveness, this part of the results replicates Bollen et al. (2010). Thereby, it is also in line with more fundamental theoretical findings. For example, recall the theory of preference matching, where individuals believe more choice increases the chance of an item optimally fitting the individual's needs (Hotelling, 1990; Diehl & Poynor, 2010).

The third hypothesis (H2a: Attractiveness of the choice set has a positive effect on choice difficulty (regret)) could also not be rejected. In line with Bollen et al. (2010), as well as the adapted model of Sarver (2008), being confronted with a more attractive item set also increases choice difficulty (regret). Attractiveness has a much smaller effect on choice difficulty

compared to satisfaction with the chosen item. However, this is probably explained as choice difficulty has much less explained variation compared to satisfaction with the chosen item, thus implying that choice difficulty is influenced by external factors, this is discussed in detail in paragraph 6.2.

The argument of lack of power can be made with even more conviction when discussing the last hypothesis (H2b: Choice difficulty (regret) has a negative effect on satisfaction with the chosen item). The p-value of the causal path is very small and it seems likely that a larger sample size would lead to significance. Although we cannot truly compare both causal paths as the effect of choice difficulty on satisfaction with the chosen item is insignificant, it is interesting that the positive effect of attractiveness is much larger than the negative effect of choice difficulty on satisfaction with the chosen item, this would suggest that increasing attractiveness is more important than the negative consequence of increased choice difficulty if choice difficulty would have a significant effect on satisfaction with the chosen item.

Not included in the hypotheses, but a relevant result is the negative effect of expertise of the individual on perceiving variation in the choice set. This is contrary to earlier findings of Bollen et al. (2010). One reason for this contrast may be that Bollen et al. (2010) constructed a recommender system, thus providing a choice set with known options and much information, while in this research respondents were presented with a list of unknown options and little information of the books. Individuals with more book expertise may have actually interpreted a set of completely unknown books as less varying than counterparts with lesser expertise. Furthermore, the expected positive causal path of expertise of the individual on attractiveness was not found. Having more expertise will actually result in less attractiveness through the intermediating role of perceived variation of the item set.

When observing the overall construct, there is no evidence that trusting the intermediary has a significant effect on attractiveness and thus it can also not be mediated through choice difficulty and have an ambiguous effect on satisfaction with the chosen item. However, the proposed effects are found and insignificance may be due to lack of power, thereby implying that there may be an effect when decision makers trust the intermediary.

6.2 Limitations and recommendations for further research

The designed survey served its purpose, but did have several flaws. Firstly, the situation was presented hypothetically and the respondents did not actually receive the chosen item in order to control costs. Although hypothetical situations are common practice in science, one can never truly know if the results hold in a 'real environment'. Therefore, an actual experiment with real items and intermediaries would be more preferable. However, in this setting the amount of trust the respondent attributes to the intermediary should be measured and used to

control the results as the intermediary will not leave the exact same impression on different respondents.

Secondly, respondents were forced to accept the advice of the intermediary and may have reacted to this 'injustice' by simply quitting the survey. In particular during the first days of distribution it was noticeable that 10 surveys of the 'trust' treatment and 11 surveys of the 'control' treatment were finished against zero surveys of the 'distrust' treatment. The treatment groups were balanced out by the end of the distribution, yet this may indicate that some respondents faced with a untrustworthy intermediary thought the situation so undesirable that they would rather quit, thereby not reporting their feelings of attractiveness of the choice set, choice difficulty and satisfaction with the chosen item. This could thus result in smaller differences between the 'distrust', control and 'trust' treatment. The issue of respondents quitting would be controlled in any experiment setting, real or hypothetical, where the respondents cannot simply quit. However, then it is still unknown what the effects are of being forcibly limited in choices. To test for this a similar method to the second experiment of Aggarwal & Botti (2007) could be performed, where the respondent can choose to pick a book from the rack of 32 or pick a book from the pre-selected list of 6 and afterwards measure satisfaction with the chosen item and compare those to results of tests performed in this paper.

Thirdly, no information was presented about the books, which were chosen to be unknown to the respondent, besides from their title. This was done in order to nullify the effects of preferences. However, several respondents commented that they could not make a good decision without more information. The lack of information could have increased choice difficulty and decreased attractiveness, thereby also explaining the rather large residual variance. A good option to account for this would be to create a recommender system similar to Bollen et al. (2010), where the respondent values known books with a grade and the recommender system can provide a choice set in line with preferences of the individual. This could not be achieved for this paper as it would take too much time and knowledge to construct a recommender system.

Regarding statistics, the most important limitation is sample size. The possible effect of a smaller sample size on the rejected hypotheses is discussed in paragraph 6.1. Furthermore, the effect of a smaller sample size on the EFA and SEM is discussed in paragraph 5.2. Specifically, the wide communalities do result in larger statistical bias, RMSE and lower pattern accuracy, which are all indices to measure accuracy of the pattern matrix (Hogarty et al., 2005). The straightforward recommendation for further research is thus to obtain a larger sample size.

There are more possibilities for further research, which do not involve tackling limitations. One of these would be to expand the research to include the influence of trusting the intermediary varying with different choice set sizes. For example, increasing the rack of 32

books to a rack of 200 books, thus increasing the influence of the intermediary when pre-selecting a list of six books.

6.3 Practical implications

This paper adds to current literature in two ways. Firstly, by expanding the model of Sarver (2008) with attractiveness and trust, thereby creating a theoretical model which predicts behavior of decision makers who choose which menu to take. Trust increases the value attributed to items in the choice set, as items selected by a trustworthy intermediary are more likely to fit the preferences of the decision maker. Attractiveness increases the benefit of having more items in the choice set, yet this implies more anticipated regret.

Secondly, an analysis is performed which is either more extensive than previous research (Aggarwal & Botti, 2007) or includes trust in the model (Bollen et al., 2010). Although there is no conclusive evidence that trust has an effect on satisfaction with the chosen item, the results, methodology and recommendations of this research can be used to perform further research more accurately.

Although no implications for practice can be drawn concerning the main question of this paper, there are smaller implications that do arise from the analysis. Firstly, expertise of the individual should be considered when providing a pre-selected list with rather unknown options. More expertise actually decreased perceived item set variety, thereby also decreasing the size of the positive effect of item set variety on attractiveness. Thus, when the client is known to have much expertise, perhaps more explanation about the choice items would have a positive effect on their perceived item set variety.

Furthermore, the intermediary should strive to provide a pre-selection with much variation in it. This has a clear positive effect on attractiveness of the choice set, which in turn has a large positive effect on the client's satisfaction with the chosen item. Aiming to increase attractiveness will increase choice difficulty the client experiences, but the effect of choice difficulty on satisfaction with the chosen item appeared very small relative to the positive effect of attractiveness and could not be proven.

Although the hypothetical setting used in the survey took place in a bookstore, it seems likely that the implications hold for many more situations where an intermediary provides a pre-selection to limit down large item sets. For example, an accountant providing his supervisor with a pre-selected list of possible investment option or a government advisory board, who provide a set of possible solutions to solve a problem in society. In all these cases, it is often in the interest of the intermediary to increase the client's satisfaction with the chosen item.

7. Conclusion

Literature shows that there are both positive effects to having more choice, such as preference matching (Hotelling, 1990) and higher attractiveness of the choice set, as well as negative effects, such as searching costs (Thaler, 1980), regret (Sarver, 2008) and higher expectations (Diehl & Poynor, 2010). The positive effects result in more attractiveness of the choice set, while the negative effects increase choice difficulty (Bollen et al., 2010). The purpose of this study is to investigate the effect of trusting an intermediary who provides a pre-selection, to narrow down a larger choice set, on satisfaction with the chosen item. Where trust is a combination of benevolence, the intermediary is *willing* to help the client, and credibility, the intermediary *can* help the client (Ganesan & Hess, 1997).

The model of Sarver (2008) shows that decision makers can deliberately limit their choices to reduce anticipated regret. The model is extended by including both attractiveness and trust, after which it is shown that trusting the intermediary increases attractiveness (H1a), which in turn increases satisfaction with the chosen item (H1b). Yet through increased attractiveness, it becomes harder to choose as the items are more desirable, which results in more anticipated regret (H2a), thereby decreasing satisfaction with the chosen item (H2b). Thus the effect of trusting the intermediary who provides the pre-selection is ambiguous.

A survey was distributed (N=90) containing a hypothetical situation where respondents either faced a trustworthy, untrustworthy or no intermediary, after which the respondents answered several questions which could measure expertise of the individual, item set variety, attractiveness of the choice set, choice difficulty and satisfaction with the chosen item as well as information about demographics.

Statistical analysis conducted with composite scales through combining the Likert items, using one way ANOVA and 2-indepent t-tests, did not provide any significant evidence for any of the hypotheses. Therefore, exploratory factor analysis and structural equation modeling was performed. It was found that attractiveness of the choice set increases both satisfaction with the chosen item as choice difficulty (H1b; H2a). The predicted effect of trust on attractiveness and the effect of choice difficulty on satisfaction with the chosen item was found, however these causal paths were not significant (H1a; H2b). It is suggested that a lack in power due to the relatively small sample size is the cause, however, there is no solid evidence that trusting the intermediary who provides a pre-selection has an effect on satisfaction with the chosen item.

This research adds to current literature as the model of Sarver (2008) is expanded and extensive analysis is conducted similar to Bollen et al., (2010), but including trust in the model. Intermediaries should be wary when clients are very experienced, as presenting such clients pre-selections containing many unknown items may have negative effects. Furthermore, it is

beneficial for the intermediary to provide a varied pre-selection, as the positive effects of providing a more attractive pre-selection on satisfaction with the chosen item are larger and more well-defined than negative effects of choice difficulty.

8.   References

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Appendix

1. Survey Design

1.1 Hypothetical situations

'Trust' treatment, hypothetical situation:

"Please read the following text carefully as it is essential to the study.

Suppose you are in a book store, where you can freely pick one book as part of a promotion. In front of you is a large rack containing 32 books. Although you can pick one book freely, you notice that all books are equally priced, thus only content of the book varies. An employee of the book store approaches you and will make a pre-selection from these 32 books, down to six recommendations. The employee appears trustworthy, where you believe the employee has your best interests in mind as well as the expertise to make a good selection. The employee presents you the following selection of books, please choose the book that you would take:"

'Distrust' treatment, hypothetical situation:

"Please read the following text carefully as it is essential to the study.

Suppose you are in a book store, where you can freely pick one book as part of a promotion. In front of you is a large rack containing 32 books. Although you can pick one book freely, you notice that all books are equally priced, thus only content of the book varies. An employee of the book store approaches you and will make a pre-selection from these 32 books, down to six recommendations. The employee appears untrustworthy, where you believe the employee does not act with your best interests in mind and does not have the expertise to make a good selection. The employee presents you the following selection of books, please choose the book that you would take:"

Control group, hypothetical situation

"Please read the following text carefully as it is essential to the study.

Suppose you are in a book store, where you can freely pick one book as part of a promotion. In front of you is a large rack containing 32 books. Although you can pick one book freely, you notice that all books are equally priced, thus only content of the book varies. On a table in front of the rack is a pre-selection of these 32 books, it contains six books. You decide to pick from the table. The following selection is presented on the table, please choose the book that you would take:"

Books to be chosen from:

Royal Stable Words

The Negative Dialectics of Poodle Play

Some People

The Snow Goose

Tied up in Tinsel

Fudoki

1.2 Questions, statistical names and responses in percentages

Item set variety

Statistical name	Question	Completely disagree	Disagree	Neither agree nor disagree	Agree	Completely agree
V1	The list of recommendations appeared varied.	2%	11%	10%	61%	15%
V2	The list of recommendations included different genres.	0%	3%	20%	68%	9%
V3	Many of the books in the list differed from other books in the list.	1%	6%	36%	50%	7%
V4	All recommendations seemed similar.	8%	62%	12%	18%	0%

Attractiveness

Statistical name	Question	Completely disagree	Disagree	Neither agree nor disagree	Agree	Completely agree
A1	The pre-selection was appealing.	12%	49%	22%	16%	1%
A2	I would care to read many of the items listed in the pre-selection.	23%	56%	10%	9%	2%
A3	The pre-selection appears to match my preferences.	19%	54%	20%	7%	%
A4	I did not like any of the recommendations in the pre-selection.	3%	26%	22%	40%	9%

Choice difficulty

Statistical name	Question	Completely disagree	Disagree	Neither agree nor disagree	Agree	Completely agree
C1	Eventually I was in doubt between items in the list.	8%	21%	6%	56%	10%
C2	I changed my mind several times before making a decision.	11%	39%	13%	33%	3%
C3	I think I chose the best book from the options.	1%	6%	32%	54%	7%
C4	The task of making a decision was overwhelming.	14%	46%	18%	20%	2%

Satisfaction with the chosen item

Statistical name	Question	Completely disagree	Disagree	Neither agree nor disagree	Agree	Completely agree
S1	My chosen book could become one of my favorites.	10%	30%	43%	17%	%
S2	I am satisfied with my chosen book.	2%	13%	46%	38%	1%
S3	I would recommend the chosen book to others.	8%	31%	50%	9%	2%
S4	I think I would enjoy reading the chosen book.	6%	13%	51%	29%	1%
S5	I would rather rent a different book from the one I chose.	2%	23%	41%	27%	7%

Expertise of the individual

Statistical name	Question	Completely disagree	Disagree	Neither agree nor disagree	Agree	Completely agree
E1	I am a book lover.	4%	14%	18%	49%	14%
E2	Compared to my peers I read a lot of books.	10%	22%	24%	33%	10%
E3	Compared to my peers I am an expert on books.	12%	47%	26%	13%	2%

Gender

	Frequency	Percentage
Male	39	43%
Female	51	57%

Education

	Frequency	Percentage
Primary or secondary school	1	1%
MBO	2	2%
HBO	25	28%
Bachelor	24	27%
Master	36	40%
Above master	2	2%

Age: Mean: 24.19; Std. Dev: 3.92; Min: 19; Max: 43

Income: Mean: 1009,9; Std. Dev: 1302,69; Min:0; Max: 8000

2. Statistics

2.1 Statistical names

Likert Items:	See Appendix: 1.2
Treatment Trust:	TT
Treatment Distrust:	TD
Treatment Control:	TC
Composite scale item set variety:	ItemVariety
Composite scale attractiveness:	Attractiveness
Composite scale choice difficulty:	ChoiceDiff
Composite scale satisfaction with the chosen item:	Satisfaction
Composite scale expertise of the individual:	Expertise
Age:	A
Gender:	G
Education:	Ed
Income:	I

2.2 Internal consistency & normality tests

2.1 Cronbach's alpha

Item set variety:

Item	Obs	Sign	item-test correlation	item-rest correlation	average interitem covariance	alpha
V1	90	+	0.821	0.576	0.263	0.615
V2	90	+	0.707	0.502	0.386	0.658
V3	90	+	0.697	0.463	0.387	0.677
V4	90	-	0.717	0.503	0.373	0.656
Test scale					0.352	0.716

Attractiveness:

Item	Obs	Sign	item-test correlation	item-rest correlation	average interitem covariance	alpha
A1	90	+	0.771	0.576	0.421	0.737
A2	90	+	0.806	0.632	0.389	0.708
A3	90	+	0.786	0.638	0.432	0.714
A4	90	-	0.766	0.535	0.417	0.765
Test scale					0.415	0.783

Choice difficulty:

Item	Obs	Sign	item-test correlation	item-rest correlation	average interitem covariance	alpha
C1	90	+	0.809	0.529	0.466	0.568
C2	90	+	0.857	0.637	0.320	0.418
C4	90	+	0.686	0.369	0.791	0.755
Test scale					0.526	0.691

Satisfaction with the chosen item:

Item	Obs	Sign	item-test correlation	item-rest correlation	average interitem covariance	alpha
S1	90	+	0.748	0.569	0.260	0.698
S2	90	+	0.742	0.587	0.272	0.695
S3	90	+	0.739	0.566	0.267	0.700
S4	90	+	0.790	0.644	0.246	0.671
S5	90	-	0.566	0.302	0.341	0.797
Test scale					0.277	0.758

Expertise of the individual:

Item	Obs	Sign	item-test correlation	item-rest correlation	average interitem covariance	alpha
E1	90	+	0.892	0.756	0.790	0.823
E2	90	+	0.947	0.857	0.575	0.728
E3	90	+	0.840	0.682	0.984	0.888
Test scale					0.783	0.874

2.2 Shapiro-Wilk test for normality:

Variable	Obs	W	V	z	Prob>z
V1	90	0.978	1.697	1.167	0.122
V2	90	0.960	3.012	2.432	0.008
V3	90	0.964	2.687	2.180	0.015
V4	90	0.966	2.595	2.103	0.018
A1	90	0.965	2.636	2.138	0.016
A2	90	0.923	5.846	3.894	0.000
A3	90	0.981	1.451	0.821	0.206
A4	90	0.987	0.999	-0.001	0.501
C1	90	0.949	3.865	2.982	0.001
C2	90	0.960	2.997	2.421	0.008
C4	90	0.955	3.385	2.689	0.004
S1	90	0.997	0.254	-3.019	0.999
S2	90	0.951	3.711	2.892	0.002
S3	90	0.991	0.702	-0.779	0.782
S4	90	0.965	2.657	2.156	0.016
S5	90	0.999	0.094	-5.210	1.000
E1	90	0.965	2.652	2.151	0.016
E2	90	0.991	0.677	-0.860	0.805
E3	90	0.968	2.452	1.979	0.024
G	90	0.998	0.120	-4.669	1.000
A	89	0.823	13.252	5.696	0.000
Ed	90	0.981	1.446	0.813	0.208
I	90	0.752	18.732	6.463	0.000
ItemVariety	90	0.983	1.290	0.562	0.287
Attractiveness	90	0.981	1.439	0.802	0.211
ChoiceDiff	90	0.991	0.645	-0.968	0.833
Satisfaction	90	0.992	0.601	-1.122	0.869
Expertise	90	0.981	1.438	0.802	0.211

2.3 Multivariate normality:

Doornik Hansen. Chi-square (38)= 96.779; Prob>chi2=0.000

3. ANOVA and 2-independent t-tests

3.1 One-way ANOVA

Satisfaction by treatments:

Number of obs   = 90   R-squared   = 0.0247

Root MSE   = 3.02166   Adj R-squared   = 0.0023

Source	Partial SS	df	MS	F	Prob>F
Model	20.1515152	2	10.07576	1.1	0.3363
Treatments	20.1515152	2	10.07576	1.1	0.3363
Residual	794.348485	87	9.130442		
Total	814.5	89	9.151685		

Attractiveness by treatments:

Number of obs   = 90   R-squared   = 0.0203

Root MSE   = 2.91428   Adj R-squared   = -0.0022

Source	Partial SS	df	MS	F	Prob > F
Model	15.3279461	2	7.663973	0.9	0.4094
Treatments	15.3279461	2	7.663973	0.9	0.4094
Residual	738.894276	87	8.493038		
Total	754.222222	89	8.474407		

3.2 2-indepent t-tests

Satisfaction with treatments 'distrust' and 'trust':

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
Distrust	33	13.879	0.472	2.713	12.917	14.841
Trust	27	14.889	0.598	3.105	13.661	16.117
combined	60	14.333	0.376	2.915	13.580	15.086
diff		-1.010	0.751		-2.514	0.494

diff= mean(0) - mean(1)   t= -1.3444

Ho: diff= 0   degrees of freedom= 58

Ha: diff < 0   Ha: diff != 0   Ha: diff > 0

Pr(T < t) = 0.0920   Pr(|T| > |t|) = 0.1840   Pr(T > t) = 0.9080

Satisfaction with treatments 'control' and 'trust':

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
Control	30	14.833	0.595	3.260	13.616	16.051
Trust	27	14.889	0.598	3.105	13.661	16.117
combined	57	14.860	0.418	3.159	14.021	15.698
diff		-0.056	0.846		-1.750	1.639

diff= mean(0) - mean(1)   t = -0.0657

Ho: diff= 0   degrees of freedom= 55

Ha: diff < 0	Ha: diff != 0	Ha: diff > 0
Pr(T < t) = 0.4739	Pr(|T| > |t|) = 0.9479	Pr(T > t) = 0.5261

Satisfaction with treatments 'control' and 'distrust':

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
Control	30	14.833	0.595	3.260	13.616	16.051
Distrust	33	13.879	0.472	2.713	12.917	14.841
combined	63	14.333	0.378	3.000	13.578	15.089
diff		0.9545455	0.753113		-0.5513971	2.460488

diff= mean(0) - mean(1)   t= 1.2675

Ho: diff= 0   degrees of freedom= 61

Ha: diff < 0	Ha: diff != 0	Ha: diff > 0
Pr(T < t) = 0.8951	Pr(|T| > |t|) = 0.2098	Pr(T > t) = 0.1049

Attractiveness with treatments 'distrust' and 'trust':

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
Distrust	33	9.152	0.467	2.682	8.200	10.103
Trust	27	10.074	0.656	3.407	8.726	11.422
combined	60	9.566667	0.392275	3.038547	8.781727	10.35161
diff		-0.9225589	0.78599		-2.495889	0.650771

diff= mean(0) - mean(1)   t= -1.1738

Ho: diff= 0   degrees of freedom= 58

Ha: diff < 0	Ha: diff != 0	Ha: diff > 0
Pr(T < t) = 0.1226	Pr(|T| > |t|) = 0.2453	Pr(T > t) = 0.8774

Attractiveness with treatments 'control' and 'trust':

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
Control	30	9.200	0.488	2.670	8.203	10.197
Trust	27	10.074	0.656	3.407	8.726	11.422
combined	57	9.614035	0.403427	3.045807	8.805874	10.4222
diff		-0.8740741	0.806722		-2.490781	0.742633

diff= mean(0) - mean(1)   t= -1.0835

Ho: diff= 0   degrees of freedom= 55

Ha: diff < 0	Ha: diff != 0	Ha: diff > 0
Pr(T < t) = 0.1417	Pr(|T| > |t|) = 0.2833	Pr(T > t) = 0.8583

Attractiveness with treatments 'control' and 'distrust':

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
Control	30	9.200	0.488	2.670	8.203	10.197
Distrust	33	9.152	0.467	2.682	8.200	10.103
combined	63	9.174603	0.334514	2.655121	8.50592	9.843287
diff		0.0484848	0.675227		-1.301714	1.398684

Diff= mean(0) - mean(1)   t= 0.0718

Ho: diff= 0   degrees of freedom= 61

Ha: diff < 0	Ha: diff != 0	Ha: diff > 0
Pr(T < t) = 0.5285	Pr(|T| > |t|) = 0.9430	Pr(T > t) = 0.4715

2.4 Exploratory Factor Analysis

4.1 Correlation matrix:

	V1	V2	V3	V4	A1	A2	A3	A4	C1	C2	C4	S1
V1	1											
V2	.4545	1										
V3	.4158	.3133	1									
V4	-.4308	-.3853	-.3470	1								
A1	.3894	.1958	.0147	-.0688	1							
A2	.2216	.2860	.0892	.0685	.5545	1						
A3	.2393	.0702	.1533	.0451	.4222	.5892	1					
A4	-.2220	-.2068	-.0156	.0716	-.4270	-.3948	-.5145	1				
C1	.1548	.1767	.0880	-.1113	.0977	.1557	.1325	.1027	1			
C2	.1660	.1239	.0420	.0297	.1536	.2766	.0591	.0368	.606	1		
C4	.0874	-.0520	.1309	.0000	.0921	.2178	.1549	.0465	.266	.3974	1	
S1	.2155	.1136	-.0047	-.0147	.2240	.2776	.4065	-.2502	.052	.1103	.0988	1
S2	.2785	.1183	.0568	-.0831	.3416	.2735	.3817	-.4591	-.022	.0543	.0139	.4419
S3	.1454	.1190	.2029	-.0309	.2058	.3193	.4089	-.3780	.101	-.0040	-.0517	.4620
S4	.3162	.1389	.0636	-.0837	.2929	.3347	.2888	-.2913	.008	.1830	.0000	.5408
S5	-.0015	-.1178	-.0114	.0364	-.2195	-.2876	-.3132	.3055	.008	-.0722	.0410	-.2277
E1	-.1840	-.0727	-.3005	.2134	-.0773	.1085	-.0411	-.0667	-.241	-.0726	-.2721	.0041
E2	-.1909	-.1291	-.2682	.1549	-.0766	.0603	-.0174	-.0051	-.282	-.2386	-.2315	-.0735
E3	-.1183	-.1605	-.2495	.1926	-.0084	.0419	.0433	-.0083	-.259	-.2322	-.1362	.0135

	S2	S3	S4	S5	E1	E2	E3
S2	1						
S3	.5495	1					
S4	.5165	.4693	1				
S5	-.2112	-.1947	-.3184	1			
E1	-.1776	.0171	-.0677	-.2202	1		
E2	-.2016	.0154	-.1700	-.1069	.8031	1	
E3	-.0965	.0000	-.1819	-.0402	.5751	.7134	1

4.2 Factor analysis, unrotated:

Factor analysis/correlation	Number of obs =		90
Method: principal factors	Retained factors =		5
Rotation: (unrotated)	Number of params =		85

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor1	3.974	1.322	0.409	0.409
Factor2	2.652	1.365	0.273	0.681
Factor3	1.287	0.171	0.132	0.813
Factor4	1.115	0.450	0.115	0.928
Factor5	0.666	0.219	0.069	0.996
Factor6	0.447	0.100	0.046	1.042
Factor7	0.347	0.108	0.036	1.078
Factor8	0.239	0.107	0.025	1.103
Factor9	0.132	0.049	0.014	1.116
Factor10	0.083	0.052	0.009	1.125
Factor11	0.031	0.021	0.003	1.128
Factor12	0.010	0.069	0.001	1.129
Factor13	-0.059	0.050	-0.006	1.123
Factor14	-0.110	0.032	-0.011	1.112
Factor15	-0.142	0.023	-0.015	1.097
Factor16	-0.165	0.054	-0.017	1.080
Factor17	-0.219	0.059	-0.023	1.058
Factor18	-0.278	0.005	-0.029	1.029
Factor19	-0.282	.	-0.029	1

LR test: independent vs. saturated: chi2(171) = 676.85 Prob>chi2 = 0.0000

4.3 Screeplot (Line drawn through the 'scree'):

Scree plot of eigenvalues after factor

4.4 Factor analysis with Varimax rotation and Kaiser normalization:

Factor analysis/correlation	Number of obs =	90
Method: principal factors	Retained factors =	5
Rotation: orthogonal varimax (Kaiser on)	Number of params =	85

Factor	Variance	Difference	Proportion	Cumulative
Factor1	2.30821	0.11368	0.2373	0.2373
Factor2	2.19453	0.21505	0.2256	0.4628
Factor3	1.97948	0.30436	0.2035	0.6663
Factor4	1.67512	0.13858	0.1722	0.8385
Factor5	1.53654	.	0.1579	0.9964

4.5 Pattern matrix (also seen in table 1), loadings below 0.3 are blank:

Variable	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Communality
V1				.6691		.5488
V2				.6234		.4252
V3				.5354		.3480
V4				-.6105		.3940
A1			.6117			.4541
A2			.6876			.6435
A3	.3423		.6854			.5917
A4	-.3608		-.5480			.4734
C1					.6873	.5160
C2					.7850	.6334
C4					.4331	.2801
S1	.6400					.4486
S2	.6471					.5507
S3	.6657					.4946
S4	.7199					.5650
S5	-.3252					.2068
E1		.8626				.7746
E2		.8675				.8182
E3		.6612				.5270

4.6 Factor rotation matrix:

	Factor1	Factor2	Factor3	Factor4	Factor5
Factor1	0.6422	-0.2495	0.567	0.3798	0.244
Factor2	0.3028	0.7783	0.3333	-0.2851	-0.3319
Factor3	-0.1695	0.1798	0.2003	-0.4354	0.8422
Factor4	-0.4166	0.4709	0.0993	0.75	0.1798
Factor5	0.5419	0.2791	-0.7193	0.1496	0.2979

2.5 Structural equation model

5.1 Model results – Structural relations (also seen in figure 6):

Estimate	S.E.	P-Value	P-Value
V	BY		
V1	1	999	999
V2	.715	6.328	0
V3	.628	6.561	0
V4	-.625	-5.172	0

A	BY		
A1	1	999	999
A2	1.085	9.647	0
A3	1.149	10.678	0
A4	-0.962	-9.486	0

S	BY		
S1	1	999	999
S2	1.196	9.915	0
S3	1.105	10.188	0
S4	1.151	10.824	0
S5	-0.635	-5.117	0

C	BY		
C1	1	999	999
C2	1.2	4.357	0
C4	0.639	4.533	0

E	BY		
E1	1	999	999
E2	1.189	11.863	0
E3	0.887	14.562	0

A	ON		
V	0.275	2.967	0.003
TT	0.141	0.628	0.53
TD	-0.165	-0.872	0.383

C	ON		
A	0.242	2.059	0.04

S	ON		
A	0.721	7.424	0
C	-0.114	-1.352	0.177

V	ON		
E	-0.388	-3.427	0.001

5.2 Model results - Probit:

Tresholds	S.E.	P-Value	P-Value
V1$1	-2.033	-4.604	0
V1$2	-1.122	-4.149	0
V1$3	-0.74	-3.04	0.002
V1$4	1.01	3.987	0
V2$1	-1.856	-5.837	0
V2$2	-0.752	-3.375	0.001
V2$3	1.325	5.379	0
V3$1	-2.163	-5.484	0
V3$2	-1.358	-5.547	0
V3$3	-0.007	-0.036	0.971
V3$4	1.667	7.314	0
V4$1	-1.478	-5.573	0
V4$2	0.47	2.121	0.034
V4$3	0.87	3.647	0
A1$1	-1.002	-4.109	0
A1$2	0.456	2.061	0.039
A1$3	1.148	5.19	0
A1$4	2.483	5.221	0
A2$1	-0.581	-2.746	0.006
A2$2	0.97	4.402	0
A2$3	1.391	5.999	0
A2$4	2.187	6.935	0
A3$1	-1.009	-4.796	0
A3$2	0.518	2.541	0.011
A3$3	1.404	5.332	0
A4$1	-1.932	-6.581	0
A4$2	-0.64	-3.057	0.002
A4$3	-0.047	-0.232	0.817
A4$4	1.28	5.314	0

S1$1	-1.481	-7.004	0
S1$2	-0.442	-2.243	0.025
S1$3	0.813	3.996	0
S2$1	-2.155	-4.939	0
S2$2	-1.135	-4.518	0
S2$3	0.167	0.744	0.457
S2$4	2.197	5.633	0
S3$1	-1.423	-6.852	0
S3$2	-0.282	-1.362	0.173
S3$3	1.221	5.337	0
S3$4	2.007	6.26	0
S4$1	-1.66	-6.96	0
S4$2	-0.949	-4.198	0
S4$3	0.463	2.121	0.034
S4$4	2.25	4.414	0
S5$1	-1.917	-5.889	0
S5$2	-0.564	-2.638	0.008
S5$3	0.538	2.522	0.012
S5$4	1.617	6.416	0
C1$1	-1.61	-6.478	0
C1$2	-0.745	-3.613	0
C1$3	-0.588	-2.861	0.004
C1$4	1.114	5.062	0
C2$1	-1.365	-5.302	0
C2$2	-0.137	-0.655	0.512
C2$3	0.203	0.973	0.33
C2$4	1.706	6.12	0
C4$1	-1.205	-4.709	0
C4$2	0.128	0.577	0.564
C4$3	0.64	2.851	0.004
C4$4	1.901	6.221	0
E1$1	-1.624	-6.566	0
E1$2	-0.801	-3.713	0
E1$3	-0.261	-1.241	0.215
E1$4	1.143	4.91	0
E2$1	-1.156	-5.33	0
E2$2	-0.328	-1.618	0.106
E2$3	0.305	1.502	0.133
E2$4	1.425	6.207	0
E3$1	-1.067	-5.172	0

E3$2	0.328	1.681	0.093
E3$3	1.117	5.262	0
E3$4	2.112	6.704	0

5.3 Model results – Significant variances:

Variances	S.E.	P-Value	P-Value
E	0.752	9.38	0

Residual	Variances		
V	0.792	4.87	0
A	0.436	5.452	0
S	0.192	3.803	0
C	0.536	3.859	0