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Michael Roos

Values, Attitudes and Economic Behavior

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Michael Roos¹

Values, Attitudes and Economic Behavior

Abstract

In this paper, I propose a simple model in which behavior is determined by the individual's attitude towards the behavior and the attitude depends on the individual's values. The model is based on the Schwartz theory of human values, which is very prominent in social psychology. Values are desirable, transsituational, abstract goals. In the model, they fix aspiration levels for specific targets that are related to an object. The distance between the properties of an object and the aspiration levels determines the degree of the agent's satisfaction or dissatisfaction with the properties of the object. Attitude is the importance-weighted sum of the degrees of (dis-)satisfaction. The model highlights the importance of systematic and measurable heterogeneity among individuals and shows how values can predict differences in tastes and sensitivity to income and prices. The model also explains when Veblen effects occur.

JEL Classification: D01, D11, D91

Keywords: Values; attitudes; heterogeneity; Veblen effect; preferences; multiple attributes

November 2018

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1 Introduction

Economic theory has little to say about the nature and origins of preferences. Standard microeconomic household theory assumes that people have preferences and make choices in line with their preferences. Yet economics does not attempt to say anything about who has which preferences. For economists preferences are a black box, only known by people themselves, but not directly observable by the researcher (see Opp 1999 for a discussion). In principle, people can have any kind of preferences. The only strong statements economists dare making about preferences is to require the rationality properties completeness and transitivity. They often also assume that there is non-satiation and decreasing marginal utility. This agnosticism of economists is in stark contrast with the conviction of marketing researchers who aim at segmenting consumers into groups with identifiable tastes and behaviors. According to Allenby and Rossi (1999, p. 76), it is a “fundamental assumption of marketing [...] that people are different. People differ in the products they prefer, where they shop, how they communicate and in their sensitivity to variables such as price”.

In this paper, I propose an economic model based on values and attitudes (values-attitudes model of economic behavior) that explains why individuals can have systematic differences in tastes and behaviors. The model heavily draws on research in social psychology, in particular the Schwartz theory of human values (Schwartz 1992, 1994, Schwartz et al. 2012), the theory of the values-attitudes-behavior hierarchy (see Homer and Kahle 1988) and the theory of planned behavior (Ajzen 1985). The main objective of this paper is to combine these well-established approaches in psychology and to formalize them in a way so that they can be used in economic models. Research in psychology is very empirical and seeks to explain human behavior in all its facets. Research in economics, in contrast, is less interested in understanding the behavior of specific individuals, but rather attempts to make general statements about human behavior in larger contexts. I hence develop a stylized model of human behavior that is applicable in a variety of market and non-market situations. The model necessarily is less detailed as the original psychological theories, but richer than the usual economic model of constrained utility maximization. The model, which is not based on the axiom of pervasive rationality but on extensive empirical evidence, is a conceptual alternative to the neoclassical model of behavior. Also differing from the standard microeconomic approach, the model treats the price of a good as one of several attributes. I argue that this approach is useful, because the price is not only a constraint, but can also serve as a quality or status signal. In order to demonstrate the usefulness of treating price as an attribute of a good, I apply the model to explain the so-called Veblen effect by which the demand for a good rises with higher prices.

Schwartz (1994, p. 21) defines “values as desirable transsituational goals, varying in importance, that serve as guiding principles in the life of a person or other social entity”. Values have a number of

functions and characteristics: “(1) they serve the interests of some social entity, (2) they can motivate action – giving it direction and emotional intensity, (3) they function as standards for judging and justifying action, and (4) they are acquired both through socialization to dominant group values and through the unique learning experiences of individuals” (Schwartz 1994, p. 21). The Schwartz theory of values makes two central propositions. First, the theory postulates that there is a structure of relations among values, which has the form of a circular continuum. In other words, we can arrange values on a circle with neighboring values being motivationally compatible and values on opposite sides of the circle being motivationally opposed. In the original version of the theory, Schwartz (1992) identified ten different values. Among them are tradition and conformity, which are motivationally compatible in that one can pursue them with the same action, e.g. attending a religious service. In contrast, tradition is opposed to stimulation and self-direction, because an action conducive to tradition is often in conflict with self-direction. The second important proposition is that individuals have a hierarchy of values. For each person, some values are more important than others determining how the person resolves value trade-offs by his or her behavior. The Schwartz theory of values is very important in social psychology and has been tested extensively with different methods and data from hundreds of samples in over 75 countries and 40 national representative samples. The empirical evidence largely supports the theory, in particular the circular structure of values (see Cieciuch et al. 2015). Compared to other empirical findings in social psychology or the social sciences in general, the empirical support of the Schwartz theory is unusually strong leading Borg et al. (2017) to speculate about biological foundations of the phenomenon.

Values are linked to behavior, but often only indirectly because of their abstractness. In between values and behavior are attitudes, which according to Petty (2001, p. 894) “are one of the most studied and important constructs in psychology because of the critical role of attitudes in guiding behavior”. Attitudes can be “defined as stable psychological tendencies to evaluate particular entities (outcomes or activities) with favor or disfavor” (McFadden 1999, p. 74). In contrast to the more abstract values, attitudes relate to specific objects that could be “anything a person discriminates or holds in mind” (Vogel and Wänke 2016, p. 2), such as things, persons, groups or abstract ideas. Homer and Kahle (1988) speak of a value-attitude-behavior hierarchy in which attitudes are more specific cognitions than can be derived from values as the most general cognitions. A link between attitudes and behavior is postulated in the theory of reasoned action (Fishbein and Ajzen 1975) and its extension, the theory of planned behavior (Ajzen 1985). The theory of planned behavior is another cornerstone in social psychology and it has received “overwhelming empirical support in literally thousands of studies” (Vogel and Wänke 2016, p. 238). Due to their strong empirical confirmation, the Schwartz theory of values and the theory of planned behavior are attractive candidates as foundations of a psychologically valid economic model of behavior.

The model presented here is also in the spirit of Lancaster's "new approach to consumer theory" (Lancaster 1966), which criticizes conventional consumer theory for being highly elegant, but also rather empty. According to Lancaster, conventional consumer theory refrains from making statements about consumer tastes and the intrinsic properties of goods. The only thing that one can say within conventional theory is that "goods are simply what consumers like more of" and that "goods are goods" (Lancaster 1966, p. 132). As a less sterile alternative to the conventional theory, Lancaster proposes to assume that consumers do not value the good itself, but its properties or attributes. He contrast his model with the conventional approach, discusses its predictions and how they might be tested, but does not consider how psychology could contribute to a better understanding of tastes. There is also a more recent critique against conventional consumer theory. The literature on happiness, life-satisfaction and subjective well-being (e.g. Frank 1997, Ng 1997, Oswald 1997, Frey and Stutzer 1999, Stutzer and Frey 2010, Oswald and Wu 2010) and also some research in neuroeconomics (Stuphorn 2006) challenge the view that it is impossible to measure preferences or utility.

The model proposed here makes two main contributions. First, it is an example how we can build economic models of behavior taking into account the results of decades of established research in psychology. Psychological research is strongly empirical, and psychology has developed sophisticated psychometric methods to measure subjective variables such as values and attitudes (see Vogel and Wänke 2016). Ignoring the methodological advances in other disciplines limits the progress of economics (see Opp 1999). Second, the model highlights the importance of systematic and measurable heterogeneity among individuals. Heterogeneity of preferences and behaviors is important for theoretical reasons and it should play a much stronger role in economics than it currently does (see Kirman 2006). Since the work of Sonnenschein (1972), Mantel (1974) and Debreu (1974) it is well known in general equilibrium theory that imposing standard restrictions on individual preferences does not guarantee the uniqueness and stability of a general equilibrium. Yet without uniqueness and stability, general equilibrium theory is of very limited use (see Kirman 2006). The standard way to rescue general equilibrium models is to make very restrictive assumptions on individuals, which boil down to the assumption that all individuals are identical (see Hartley 1997). The alternative approach, which is less popular in economics, is to derive uniqueness and stability of the equilibrium from the heterogeneity of agents and their behavior (Hildenbrand 1994, Kneip 1999, Hildenbrand and Kneip 2005). This approach shows that the "Law of Demand", which cannot in general be derived from the microeconomic assumptions on individual rationality, can be deduced if individual consumption choices are sufficiently heterogeneous. In Section 3, I show that this model allows deriving market demand function from individual heterogeneity.

2 General Model

The main idea of the model is that the value system of an agent determines the agent's attitude toward an object. The model is very general in terms of its applicability. In economic applications, the object might be a good that the agent considers buying. It could also be a job offer, which the agent could accept or decline, or an interest group for which the agent might give a donation. According to the theory of planned behavior, attitudes are one factor that determines the behavioral intention, e.g. the intention to purchase a good, to accept a job, or to give a donation. Whether or not an intention leads to the respective behavior depends on whether the agent can perform the behavior, i.e. has control over the behavior. For the sake of simplicity, I abstract here from the possibility that an agent lacks control over an intended behavior and assume that the intention also becomes effective. However, one important control factor in economic applications is typically the budget constraint, which I take into account.

Figure 1: Logic of the model

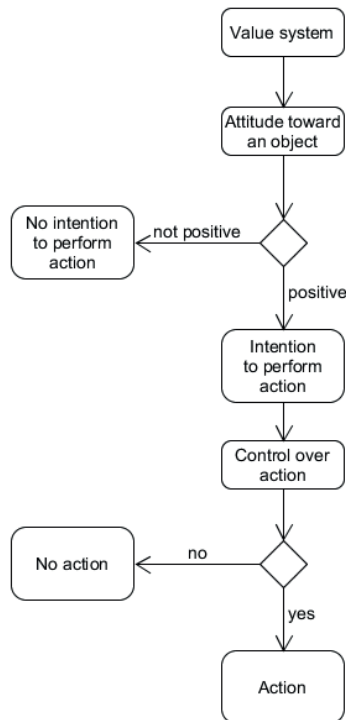


Figure 1 shows the logic of the model. The value system determines the attitude an agent has towards the object of interest¹. The attitude can be positive or negative (more precisely: not positive). Only if the attitude is positive, the agent develops the intention to perform an action that relates to the object. If the agent also has control over the action, he or she executes the action. For instance, a person may favor owning a car (positive attitude towards an object) and hence want to purchase one (intention to perform an action). However, the person can only buy the car (action), if he or she has enough cash or access to credit to pay for it (control over the action).

2.1 Values and abstract goals

I model the value system in line with the Schwartz theory of human values (see Schwartz et al. 2012). Schwartz and his coauthors describe 19 universal values, of which 12 are basic categories and seven are subcategories of some of the basic ones. In order to keep the model simple, I focus on the 12 values listed in Table 1. Values manifest themselves in *abstract goals* that people pursue in their lives. For example, if *self-direction* is an important value in someone’s life, this person strives for the freedom to cultivate his or her own ideas and abilities and to determine his or her own actions. Somebody who aims for control over other people and resources expresses the value of *power*. As stated in the Introduction, the values form a system that can be represented as a circle. Figure 2 shows a simplified version of the Schwartz value circle for a set \mathcal{V} of 12 values². For convenience, I number the values starting at 1 for self-direction and ending with 12 for benevolence, $v \in \{1, 2, \dots, 12\}$. This numbering is arbitrary, but useful for the formalization of the model.

Table 1: Values and abstract goals

No.	Value	Abstract goal
1	Self-Direction	Freedom to cultivate one’s own ideas and abilities and to determine one’s own actions
2	Stimulation	Excitement, novelty, and change
3	Hedonism	Pleasure and sensuous gratification
4	Achievement	Success according to social standards
5	Power	Power through control over people and resources (material and social)

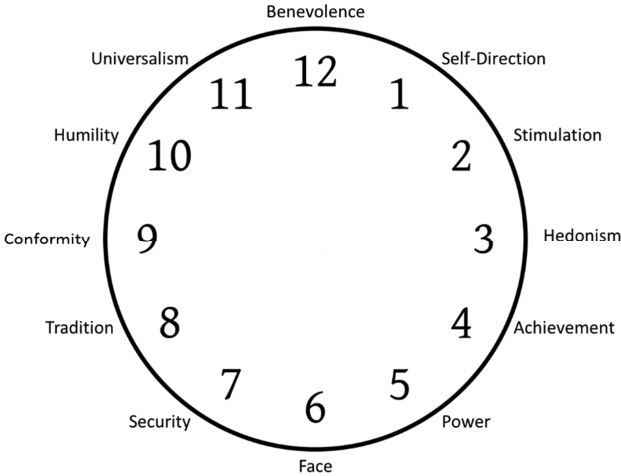
¹ The attitude may also depend on external influences such as efforts of other agents to persuade the agent. I abstract from this aspect here.

² In the earlier version of the Schwartz theory, the order of universalism and benevolence was reversed, but newer evidence as in Cieciuch et al. (2014) suggests the order assumed here.

6	Face	Maintaining one's public image and avoiding humiliation
7	Security	Safety in one's immediate environment and in the wider society
8	Tradition	Maintaining and preserving cultural, family or religious traditions
9	Conformity	Compliance with rules, laws, and formal obligations and avoidance of upsetting or harming other people
10	Humility	Recognizing one's insignificance in the larger scheme of things
11	Universalism	Concern for nature, equality, justice, and protection of all people, acceptance and understanding of those who are different from oneself
12	Benevolence	Devotion to the welfare of in-group members and being a reliable and trustworthy member of the in-group

Consistent with the theory, I assume that an agent i has a single most important value in the set of natural number from 1 to 12, $v_i^{max} \in \{1, 2, \dots, 12\}$.

Figure 2: Value circle



I furthermore assume a tent-shaped ranking of all values, i.e. one value is ranked highest, the two neighboring values are ranked second and so forth, and the value opposite the most preferred value is ranked lowest. Hence for an agent i with $v_i^{max} = 5$ *power* is the most important value on the first rank. *Face* and *achievement* are direct neighbors of *power* on the circle and hence ranked second.

Universalism has the maximum distance to *power* on the circle and therefore is the only value with rank 7.

In order to formalize the tent-shaped hierarchy of values, I introduce the variable *value importance*, vi_i , that attaches an integer between 1 and 7 to each value. Under the assumption about the ranking made before, vi_i is uniquely determined by v_i^{max} : $vi_i(v_i^{max}) = 7$, $vi_i(v_i^{max} \pm 1) = 6$, ..., $vi_i(v_i^{max} \pm 6) = 1$, where $v_i^{max} \pm x$ stands for the neighbors of v_i^{max} at distance x . In other words, I assign an importance of 7 to the most important value and an importance of 1 to the least important one.

2.2 Specific targets

As mentioned before, values primarily refer to abstract goals. Objects and the related actions, however, serve to achieve *specific targets*. These specific targets concretize the abstract goals. An example is helpful to explain this. Consider a person who ponders his or her future career. While in abstract terms, e.g. self-direction, stimulation and power are important, most people do not use these terms to think about a job. When looking for a job, people think about whether the position allows them to travel or to be a team leader. They might also care about whether the job has family-friendly working hours. Hence, travelling, team leadership, and family-friendly working hours would be specific targets that relate to the abstract goals of some of the values. Travelling is related to stimulation, because it implies meeting new people and visiting new places. Team leadership gives people control over other people, which expresses the desire for power. Benevolence is the value behind the target of family-friendly working hours, because the family is an important in-group for most people and they appreciate being able to meet family obligations.

If a person thinks about an object, he or she evaluates the properties of the object with regard to relevant specific targets. In our example, a person might have a specific job offer and compare its job description with job-related targets. Accepting the specific job offer could help achieving some targets, but might also conflict with other targets. A managerial position may provide control over people and resources and opportunities to travel, but may also require working at night and on weekends. Therefore, a person could achieve the specific targets related to stimulation and power by accepting such a position, but not benevolence vis-a-vis the family.

To formalize this, I assume that an object under consideration is associated with a set \mathcal{T} of *targets*. In principle, this set could be quite large, but in most cases, it is likely that only a small number of targets T is relevant. Assume further that each target is mapped to one value, $\tau: \mathcal{T} \rightarrow \mathcal{V}$. The mapping τ assigns the most relevant value to each target³. Since targets map into values, the targets inherit the

³ There might be cases in which a target is associated with several values. I abstract from these cases here.

importance of the values. The value system of person i hence defines the *target importance*, ti_i , for each target in the set \mathcal{T} .

Objects have properties that are assumed to be measurable by some indicators. The agent is interested in the object properties that are relevant for the targets. Each target has a *direction* d , which defines whether more or less of the respective object properties is conducive to the target. If the direction is positive (+), more of the property is needed to achieve the target, and less, if the direction is negative (-). For instance, the target “family-friendly working hours” has a negative direction with respect to the total number of working hours per day week, with the requirement to work overtime or to work on call.

2.3 Aspiration

The agent i has an *aspiration level* $a_{t,i}$ for each target t and uses this aspiration level to determine how far the respective object property meets the target. The aspiration level is a function of the target importance, $a_{t,i}(ti_{t,i})$, which I assume to be linear for simplicity:

$$(1) \quad a_{t,i} = \begin{cases} \bar{p}_{t,i} + \phi_{t,i}(ti_{t,i} - 4) & \text{if } d_t = + \\ \bar{p}_{t,i} + \phi_{t,i}(4 - ti_{t,i}) & \text{if } d_t = - \end{cases}$$

In the aspiration function, $\bar{p}_{t,i}$ is a reference level of the object property that agent i uses to anchor the aspiration level. The reference level might result from comparison within a peer group. Depending on whether the direction d_t of the target is positive or negative, the more ambitious aspiration level is either higher or lower than the reference level. $\phi_{t,i} > 0$ is a parameter that determines how strongly the agents deviate from the reference level. Since target importance ranges from 7 to 1, 4 means that the target has an intermediate importance. In that case, the agent has neither a particularly high nor a low aspiration with regard to that target and hence does not deviate from the reference level. Agents have ambitious aspirations, if the target is related to values of high importance.

2.4 Satisfaction

For each target, the agent compares the indicator for the respective object property $p_{t,i}$ with his or her aspiration level, from which a *degree of satisfaction* $s_{t,i}$ results. Degree of satisfaction can be positive, zero or negative and is defined as the percentage deviation from the aspiration level:

$$(2) \quad s_{t,i} = \begin{cases} \frac{p_{t,i} - a_{t,i}}{a_{t,i}} & \text{if } d_t = + \\ \frac{a_{t,i} - p_{t,i}}{a_{t,i}} & \text{if } d_t = - \end{cases}$$

The indicator of the object property $p_{t,i}$ has an agent index i , because the agent’s subjective perception of the object might play a role or because the object property is only meaningful relative to some

agent-specific characteristic. For example, the taste of a food is certainly subjective. If the property can be determined objectively and does not interact with agent characteristics, the index is not necessary.

2.5 Attitude

I define the *attitude* of agent i towards an object as the importance-weighted sum of the degrees of satisfaction with the various targets t :

$$(3) \quad att_i = \sum_t \omega_{t,i} \times s_{t,i}.$$

In order to take into account that not all targets are equally important, I use the relative target importance as weights:

$$(4) \quad \omega_{t,i} = \frac{ti_{t,i}}{\sum_t ti_{t,i}}.$$

Note that the sum over the target importance levels is different for individuals with different maximum values.

As stated before, an agent evaluates an object positively if $att_i > 0$. The attitude can also be negative or neutral ($att_i = 0$). If the attitude is positive, the agent forms an intention to perform an action that is consistent with that attitude. Whether the agent actually performs the action, depends on his or her control over the action.

It is easy to compute the attitude of each agent i in this linear specification of the model:

$$(5) \quad att_i = \sum_t \omega_{t,i} \times s_{t,i} \\ = \frac{1}{\sum_t ti_{t,i}} \left(\sum_{t|d=+} ti_{t,i} \frac{p_{t,i} - a_{t,i}}{a_{t,i}} + \sum_{t|d=-} ti_{t,i} \frac{a_{t,i} - p_{t,i}}{a_{t,i}} \right) \\ = \frac{1}{\sum_t ti_{t,i}} \left(\sum_{t|d=+} ti_{t,i} \left[\frac{p_{t,i}}{p_{t,i} + \phi_{t,i}(ti_{t,i} - 4)} - 1 \right] + \sum_{t|d=-} ti_{t,i} \left[1 - \frac{p_{t,i}}{p_{t,i} + \phi_{t,i}(4 - ti_{t,i})} \right] \right).$$

For each agent, the attitude towards an object depends linearly on the indicators of the object properties, $p_{t,i}$.

3 Buying intention

In order to illustrate how the model works, I apply it to the simple economic example of the attitude towards buying a bottle of wine.

3.1 Simple case

Let's assume that a bottle of wine has only two relevant properties: the price p_p and the quality (or taste) p_q . The price is measured in monetary units. I assume that there is an objective measure of

quality, which might be a wine rating such as “Parker points” ranging from 50 (bad) to 100 (extraordinary).

For simplicity, I assume that only two targets are relevant which are directly related to the two properties (or attributes)⁴. A good taste of the wine gives pleasure, which is most important to agents that value hedonism most highly. The price determines how much the agent has to spend on the wine. Spending money is not a target per se, but conflicts with the target of *not* spending, i.e. saving. Hence, the direction of the saving goal is negative, because agents seek low prices. Among others, the precautionary motive induces people to save. I hence assume that the target of saving is most important for agents that value security most ($v_i^{max} = 7$). Note that these two targets generate a tradeoff between buying a bottle of wine and saving the money. Table 2 show the importance of the two targets for the 12 different agent types and the respective relative weights.

Table 2: Target importance, relative target weights and aspirations levels in the wine example

v_i^{max}	1	2	3	4	5	6	7	8	9	10	11	12
ti_p	1	2	3	4	5	6	7	6	5	4	3	2
ti_q	5	6	7	6	5	4	3	2	1	2	3	4
ω_p	1/6	1/4	3/10	2/5	1/2	3/5	7/10	3/4	5/6	2/3	1/2	1/3
ω_q	5/6	3/4	7/10	3/5	1/2	2/5	3/10	1/4	1/6	1/3	1/2	2/3
a_p	8	7	6	5	4	3	2	3	4	5	6	7
a_q	80	85	90	85	80	75	70	65	60	65	70	75

Because security and hedonism are not directly opposite on the value circle, the self-direction type ($v_i^{max} = 1$) has the highest relative weight on the quality of the wine ($5/6=0.833$) and the conformity type ($v_i^{max} = 9$) places the largest relative weight on the price. The power type ($v_i^{max} = 5$) and the universalism type ($v_i^{max} = 11$) weigh both targets equally, but both are more important for the power type than for the universalism type.

In order to calculate the aspiration level, we have to specify the reference levels \bar{p} and the adjustment parameters ϕ , which is an empirical task in the end. Here, I make arbitrary, but plausible assumptions just for illustration purposes. Let us assume that $\bar{p}_q = 75$ and $\bar{p}_p = 5$ for all agents. The reference quality might be the average number of Parker points of a bottle of wine⁵ and the reference price could be the average price of a bottle of wine in the category. This calibration is plausible for average wine

⁴ There could be more targets like impressing friends, having a potential present at home or hoping for an increase in the value of the wine (wine as an asset).

⁵ In the Parker system, the category “average” ranges from 70 to 79 points.

consumers. If we want to model sophisticated wine connoisseurs, we would have to set both parameters higher. The adjustment parameters must be chosen that they, first, prevent nonsensical numbers and, second, are realistic for the given agents and market. For the quality, $\phi_q = 5$ generates an aspiration level of the most hedonistic agent of 90. Choosing $\phi_p = 1$ produces a lowest price aspiration level of 2 and a highest one of 8. The two rows at the bottom of Table 2 present the aspiration levels.

The self-direction type ($v_i^{max} = 1$) would pay up to 8 units before he or she becomes dissatisfied with the price. The aspiration level is not directly a willingness to pay, because the agents are willing to pay a price that makes them unhappy, if the quality exceeds the aspiration level sufficiently. Because of the additive specification, the targets are substitutable. The security type ($v_i^{max} = 7$) requires the price to be below 2 units in order to be satisfied. These agents are hence quite unwilling to sacrifice savings for the pleasure of a bottle of wine, since 2 units would be a very low price. The hedonistic type has the highest aspiration in terms of quality (90 Parker points) and the conformity type would be happy already with 60 Parker points.

Figure 3: Attitude as a function of the price for three types



Given the assumptions about the parameters, we can compute the attitude of each agent type toward buying a bottle of wine for each price and each quality level. Figure 3 shows the attitude as a function

of the price for the quality level $p_q = 85$ for the self-direction type (T1), the power type (T5) and the security type (T7). The price sensitivity of the attitude is given by

$$(6) \quad \frac{\partial att_i}{\partial p_p} = -\frac{t_{p,i}}{(t_{p,i}+t_{q,i})(9-t_{p,i})} = \frac{-\omega_{p,i}}{(9-t_{p,i})}$$

The self-direction type's attitude is least price sensitive ($\partial att_1/\partial p_p = -0.0208$), whereas the security type responds most strongly to price changes ($\partial att_7/\partial p_p = -0.35$) and the power type is in between. It is straightforward to determine the intersection with the price axis, which is the price for which an agent of this type has a neutral attitude: $p_i^{att=0} = \{10.52, 4.25, 2.18\}$ for $i = \{1, 5, 7\}$.

The price for which an agent has an attitude of zero (neutral price) is given by⁶

$$(7) \quad p_i^{att=0} = a_{p,i} + a_{p,i} \frac{t_{q,i}}{t_{p,i}} \left(\frac{p_q}{a_{q,i}} - 1 \right)$$

Figure 4: Neutral price as a function of quality for three types

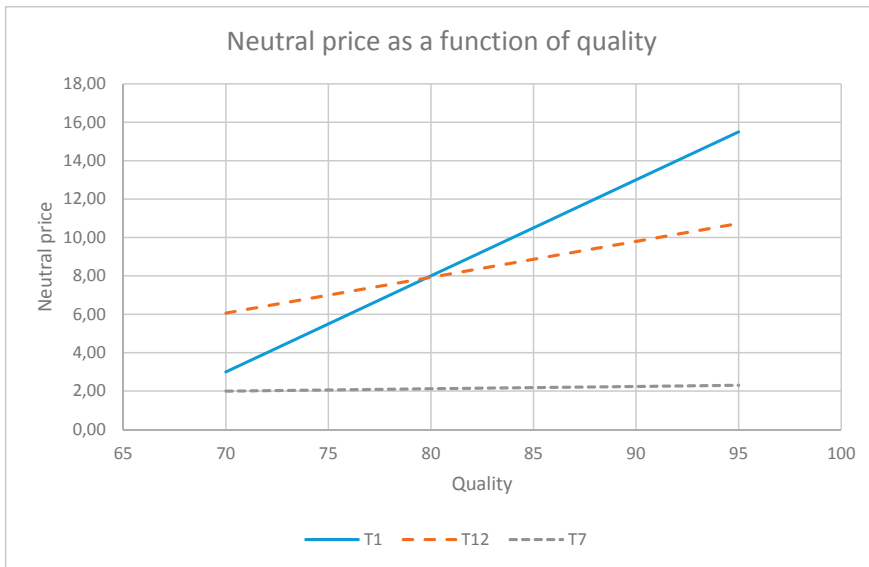


Figure 4 shows the neutral price as a function of different quality levels. Agents of type 1 are very sensitive to quality. Their neutral price ranges from 3 to 15.5 units if the quality rises from 70 points to 95 points. The value of every additional Parker point is equivalent to 0.5 monetary units. Type-7 agents are very insensitive to quality differentials. They would only pay 0.012 monetary units for an additional

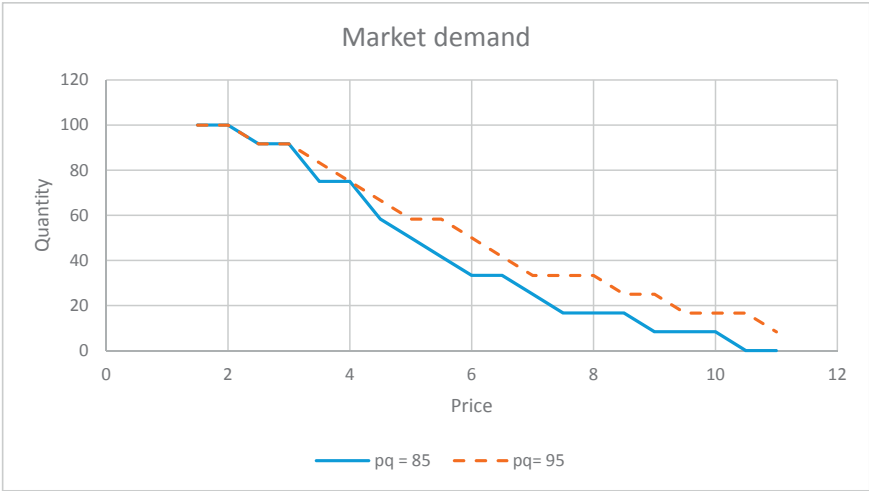
⁶ I assume the quality level to be objective so that no agent index is necessary.

quality point. Even for a wine with the maximum of 100 points, they would not pay more than 2.37 monetary units. Agents of type 12 (benevolence type) pay more than the Type-1 agents for low quality, but less for high quality.

The neutral price is the maximum willingness to pay for the object and its other attributes. Treating the price as an attribute as well makes it possible to relate it to the other attributes and to predict how the agent types respond to price changes or to derive how their different willingness to pay for the same level of quality depends on the value system.

We can aggregate the individual buying intentions based on positive attitudes into a market demand function. Assume that there is an equal distribution of types in the economy with each type representing 1/12 of the total population of 100 individuals. Figure 5 depicts two resulting market demand functions for the quality levels $p_q = 85$ and $p_q = 95$. The demand function is downward sloping and consists of flat segments of each value-type group. Notice that this demand function represents buying intentions and does not contain income or feasibility considerations. The law of demand results from the heterogeneity of agents. In this simple example, each agents only considers buying one bottle of wine or not buying the bottle.

Figure 5: Market demand for two quality levels ($p_q = 85$ and $p_q = 95$)



The demand function shifts to the right if the quality of the wine increases. As shown in Figure 4, the neutral price rises in quality, so that at a given price more agents develop a positive attitude if the quality increases.

3.2 Budget considerations

So far, income did not play a role, but it is clear that an economic model of demand must take into consideration the budget constraint. Incorporating an agent's budget into the model is easy. The budget constraint means that income spent on one good cannot be spent on other goods. Therefore, another specific target is to keep the opportunity cost low. I argue that the opportunity cost depends on the agent's desire for variety, which is stronger if an agent values *stimulation* (value no. 2) highly. The abstract goals behind the value of stimulation is to experience excitement, novelty, and change, which an agent can achieve by consuming many different goods and services.

The direction of the variety target is negative, because spending income on one good, a bottle of wine in our example, reduces the set of other available options. The strength of this effect depends on the budget of the agent, which I incorporate into the analysis by looking at the expenditure share of the good at hand. There are different ways of doing this. We could assume that the agent considers his total wealth when forming an attitude, but this seems unrealistic from a behavioral perspective. More plausibly, the agent does some mental accounting (see Thaler 1985) and has a budget reserved for specific purposes, such as food and beverages or luxuries. Assume that the agent has a weekly mental budget for groceries and wine, which depends positively on his overall weekly or monthly income⁷. The expenditure share of a bottle of wine relative to the weekly food-and-wine budget, $p_{e,i}$, is a useful indicator for the object property in this context. The expenditure share depends on the price of the wine⁸ p_p and the budget b_i of agent i :

$$(8) \quad p_{e,i} = \frac{p_p}{b_i}.$$

The attitude function gets a third term that captures the effect of expenditure on variety, indicated by the index e :

$$(9) \quad att_i = \frac{1}{ti_{e,i} + ti_{p,i} + ti_{q,i}} \left(ti_{q,i} \left[\frac{p_q}{\bar{p}_q + \phi_q (ti_{q,i} - 4)} - 1 \right] + ti_{p,i} \left[1 - \frac{p_p}{\bar{p}_p + \phi_p (4 - ti_{p,i})} \right] + ti_{e,i} \left[1 - \frac{p_{e,i}}{\bar{p}_e + \phi_e (4 - ti_{e,i})} \right] \right).$$

For simplicity, I assume that the parameters \bar{p} and ϕ are not agent-specific, although this might be relevant in some applications. The effect of the household's budget on attitude,

$$(10) \quad \frac{\partial att_i}{\partial b_i} = \frac{ti_{e,i}}{(ti_{e,i} + ti_{p,i} + ti_{q,i})(\bar{p}_e + \phi_e (4 - ti_{e,i}))} \frac{p_p}{b_i^2}$$

⁷ While it is often assumed that the income effect for food is negative, it might be positive if wine is included.

⁸ The price is independent of the agent and has no agent index.

is positive if $p_e + \phi_e(4 - ti_{e,i}) > 0$, which is true by assumption. Richer agents are more likely to have a positive attitude towards buying a bottle of wine, which is very plausible. Furthermore, the sensitivity of the attitude towards the budget becomes small, as the budget gets large, because of the quadratic term in the derivative.

Introducing the variety target makes the attitude more sensitive to the price of the good, which shows up in the second term in the derivative of the attitude with respect to the price

$$(11) \quad \frac{\partial att_i}{\partial p_p} = \frac{-1}{ti_{e,i} + ti_{p,i} + ti_{q,i}} \left(\frac{ti_{p,i}}{\bar{p}_p + \phi_p(4 - ti_{p,i})} + \frac{ti_{e,i}/b_i}{\bar{p}_e + \phi_e(4 - ti_{e,i})} \right).$$

However, the price sensitivity of the attitude decreases in the available budget. For a very large budget, the variety effect is practically irrelevant and the price sensitivity stems from the saving goal alone.

3.3 Veblen effect

In this model, I treat the price as one attribute of an object not different from other attributes. This approach clearly differs from the usual approach in microeconomic household theory, which treats all positive attributes only implicitly and separates tastes and price. If we think of the price only as a constraint, this approach is clearly justified, but the price may serve other functions as well. Erickson and Johansson (1985) distinguish price as a constraint and price as a quality signal that consumer use to infer the unknown product quality. Another function of the price can be to demonstrate status. Many goods become status symbols because they are expensive, such as luxury cars, first-class flights or fashion-designer clothes. Microeconomic theory calls these goods *Veblen goods* (Veblen 1899, see also Bagwell and Bernheim 1996) and the phenomenon that demand rises with price is the *Veblen effect*.

Wine is a particular interesting good, where the Veblen effect is likely to play a role. Oczkowski and Doucouliagos (2015) show in a meta-study that the correlation between the price of wine and its sensory quality rating is positive, but only moderate. Blind wine tastings demonstrate that most people do not derive more enjoyment from more expensive wines if they are unaware of the price (Goldstein et al. 2008). Even experts often cannot replicate their own judgments of a wine's quality (Hodgson 2008). If quality difference are difficult to detect, especially for laypeople, reputation and Veblen effects are likely to contribute to price differentials.

The possession of a good wine allows an individual to demonstrate connoisseurship. Yet if the quality is not easy to discern, a high price can signal good quality. In addition, being able to pay a high price for a bottle of wine demonstrates wealth and success. Both the demonstration of economic success and of connoisseurship are specific targets coupled with the value of *achievement*. I index this target with s for status. Incorporating this effect into the attitude function leads to a fourth term:

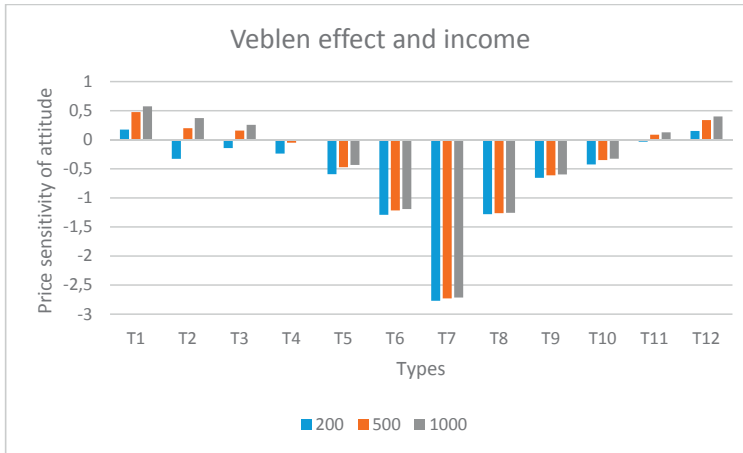
$$(12) \quad att_i = \frac{1}{ti_{e,i} + ti_{p,i} + ti_{q,i} + ti_{s,i}} \left(ti_{q,i} \left[\frac{p_q}{\bar{p}_q + \phi_q(ti_{q,i} - 4)} - 1 \right] + ti_{p,i} \left[1 - \frac{p_p}{\bar{p}_p + \phi_p(4 - ti_{p,i})} \right] \right. \\ \left. + ti_{e,i} \left[1 - \frac{p_{e,i}}{p_e + \phi_e(4 - ti_{e,i})} \right] + ti_{s,i} \left[\frac{p_p}{\bar{p}_s + \phi_s(ti_{s,i} - 4)} - 1 \right] \right)$$

This status effect works in the opposite direction of the price effect and is similar to the quality effect. $ti_{s,i}$ is highest for the achievement-type ($v_i^{max} = 4$) and lowest for the humility-type ($v_i^{max} = 10$). In this specification, a Veblen effect in the sense that the attitude and hence, the buying intention *rise* with the price occurs, if the status target dominates the variety target and the saving target:

$$(13) \quad \frac{ti_{s,i}}{\bar{p}_s + \phi_s(ti_{s,i} - 4)} > \frac{ti_{p,i}}{\bar{p}_p + \phi_p(4 - ti_{p,i})} + \frac{ti_{e,i}/b_i}{\bar{p}_e + \phi_e(4 - ti_{e,i})}$$

This inequality captures the observation that the price can be both a desirable attribute of the product, because it serves a signaling function (left-hand side), and a constraint, because high prices limit the capacity to save and to consumer other goods (right-hand side). Which function is more important depends on the parameters of the aspiration functions and on the budget b_i and the importance individuals give to the respective targets. With rising budgets (or income) the variety target becomes less important for all individuals and the presence of a Veblen effect mainly depends on the importance of the status target, $ti_{s,i}$, relative to the importance of the saving target, $ti_{p,i}$.

Figure 6: Rising buying intension with higher price as a function of the budget



In order to get an intuition for what the model predicts, I compute the terms in the inequality in a numerical example. For the calibration, we could assume that the reference expenditure on wine is 10% of the weekly budget for food and wine, which is roughly calibrated to German consumption

habits and income⁹, $\bar{p}_e = 0.7 * \frac{5}{35} = 0.7 * 1/7 = 0.1$. I arbitrarily assume $\phi_e = 0.02$. For simplicity, I assume that $\bar{p}_s = \bar{p}_p = 5$ and $\phi_s = \phi_p = 1$. Figure 6 shows the derivative of the attitude function with respect to the price for three budget levels, $b_i \in \{200, 500, 1000\}$.

Maybe in contrast to a spontaneous hunch, it is not true that the types for whom the status target is most or least important (T4 and T10 respectively) are most and least prone to the Veblen effect. In this numerical example, types 1 and 12 have more positive attitudes towards the wine the more expensive the wine is for all three budget levels and type 7 always has a strong negative relation between attitude and price. For some types, the sign of the derivative changes from negative to positive as the budget gets larger (T2, T3, T4, T11). In this numerical example, the Veblen effect can occur for these types if their budgets are large enough. The reasons why the types show this pattern is the structure of values. Achievement, which is the value behind the status target, and security as the value that governs the saving target in my model are relatively close together on the circle. This means that the constraint function of the price neutralizes the status function for all types close to the security type (T7) for which the constraint function is strongest. The relative importance of the status function is higher for types to the left of type 4 and strongest for type 1, which is opposite of type 7.

Of course, the preceding discussion refers only to one numerical example and cannot claim generality. For robust statements about the Veblen effect, a comprehensive sensitivity analysis and a careful empirical validation of the model are necessary. The example demonstrates how the model can be used to exploit the structure in the value system to explain why and how individuals differ in their economic behavior. Furthermore, the example illustrates why it can be useful to treat the price of the good as one of multiple attributes of a good and to acknowledge that the price can have several functions.

4 Choice among several objects

Up to now, I discussed cases in which an agent considers only one object and develops an intention to perform an action or not. In the wine example, there was not choice among several bottles of wine, but only the choice to buy a specific bottle or to leave it. It is also possible to apply the model to choice among several objects, which brings it closer to standard microeconomic household theory.

In order to model choice among several objects, it is useful to introduce the psychological concept of *attitude extremity*. Krosnick and Smith (1994, p. 280) provide the following definition: “Attitude

⁹ Average yearly wine consumption is 25 l, which amounts to 70% of a typical 0.7-l-bottle per week. On average, Germans spend roughly 10% of their expenditure on food and beverages, and the average disposable income is roughly EUR 1400 per month or EUR 350 per week. The reference price of a bottle of wine is assumed to be EUR 5.

extremity is the extent to which an individual likes or dislikes the object. The more extreme the individual's attitude is, the further it is from neutrality. Attitude extremity has typically been operationalized as the deviation of an individual's attitude rating from the midpoint of a dimension ranging from highly favorable to highly unfavorable.”

The psychological literature is rather silent on the effect of attitude extremity on choice. I assume that in a situation, in which an individual wants to choose one object from a set of many options, attitude extremity determines the choice. Let J be the set of available objects. An agent i determines his or her attitude, $att_i(j)$, for each object j in the choice set. It is plausible to interpret $att_i(j)$ as attitude extremity in this model.

The model can account both for a maximization logic and for a satisficing logic. The psychological literature suggests that there are differences in individual decision-making style (Schwartz 2002, Schwartz et al. 2002, Lewer et al. 2009). While some individuals have a desire to maximize the outcomes of their choices (maximizers), others aim for good decisions instead of the best ones possible (satisficers). Misuraca et al. (2015) suggest that some people are even minimizers that are not interested in the quality of their decisions and aim at minimizing decision-making effort.

4.1 Maximization

The maximization logic is straightforward. A maximizers determines his or her attitude towards all objects in the choice set and chooses the one for which the attitude extremity is highest. In other words, the individual will choose the option that he or she likes most:

$$(14) \quad j_i^{max} = \operatorname{argmax}_{j \in J} att_i(j)$$

For an illustration, I use the simple wine example again, neglecting the variety target and the status target. Assume that the choice set of available wines is as in Table 3. There are five wines, of which one has a low quality and a low price, one has a high price and high quality and three are of intermediate price and quality.

Table 3: Choice set of wines and types

	Wine 1	Wine 2	Wine 3	Wine 4	Wine 5
Price	3	4	5	6	10
Quality	65	75	75	85	95
Chosen by types	4, 5, 6 7, (8), 9, 10, 11	3, 12		2	1

With the calibration used in Section 3, wine 1 would be the most popular one, chosen by agents of types 4, 5, 6, 7, 9, 10, and 11. Type 8 would have a neutral attitude and hence might choose it or not. Wine 2 is the best choice for agents of type 3 and 12. Nobody chooses wine 3, which makes sense because wine 2 dominates wine 3, which has the same quality, but is more expensive than wine 2. If a status target played a role, there might be cases in which some agents prefer wine 3 over wine 2. Only agents of type 1 choose the most expensive wine 5, because these agents are least price sensitive, but value quality highly.

This example shows that we can derive preference relations over a set of objects from the model. However, attitude extremity has a cardinal interpretation, whereas standard microeconomic theory emphasizes the ordinal nature of preferences and is unwilling to use cardinal interpretations of utility¹⁰. Attitudes are not the same as preferences, because preferences are a relative concept that describes a relation between at least two objects. Strictly speaking, there is only a preference for an object in comparison to another object. In contrast, an attitude can stand for itself, because it makes sense to say that somebody has a positive or negative attitude towards an object independent of other objects.

4.2 Satisficing

The rationale behind satisficing approaches is that making a choice from a set of options involves effortful comparisons of the options. With many objects and multiple attributes of each object, these comparisons can require considerable cognitive effort. Additionally, gathering information about the characteristics of the objects and forming aspiration levels can involve cognitive costs, even without further comparison. Satisficing implies that the decision-maker does not take into account all information, because collecting and processing information is costly and difficult.

There are several ways, in which the model could incorporate a satisficing logic of choice. A simple one is to assume that agents encounter and evaluate the available options sequentially instead of simultaneously. Under this assumption, an agent would form an attitude considering all object characteristics for the first object at hand. If the attitude is positive, the agent would choose this object and refrain from looking at the other ones. If the attitude is not positive, the agent evaluates the next object and so on. The reduction of cognitive effort occurs by stopping the evaluation process as soon as a good option is found.

¹⁰ While standard microeconomic textbooks take pains to argue that utility function should not be given any interpretation and only serve to represent preference orders, it is common practice in macroeconomics and other fields to give utility levels a cardinal interpretation and to use them for welfare analyses.

Another satisficing strategy consists in considering only the most important characteristics of the objects and neglecting all others. In the wine example, one can argue that there are quality types of agents, price types and mixed types. The agents of types 1, 2, 3, 4 and 12 assign a higher importance to the target *quality* than to the target *price* (see Table 2). The opposite is true for the agents of types 6, 7, 8, 9 and 10, and for agents of types 5 and 11 price and quality are of equal importance. The quality types only consider whether they are satisfied with the quality of the wines and choose the wine whose quality satisfies them most. Since the mixed types do not have a most important target, I ignore them in the following.

Figure 7 represents the agents of the quality types showing their satisfaction levels with the quality and the price for the five different wines. All types have positive satisfaction levels with regard to wine 5, and types 1 and 12 are also satisfied with wine 4. In both cases, the satisfaction is higher with wine 5 so that all types choose wine 5.

Figure 7: Satisfaction of the quality types with quality and price

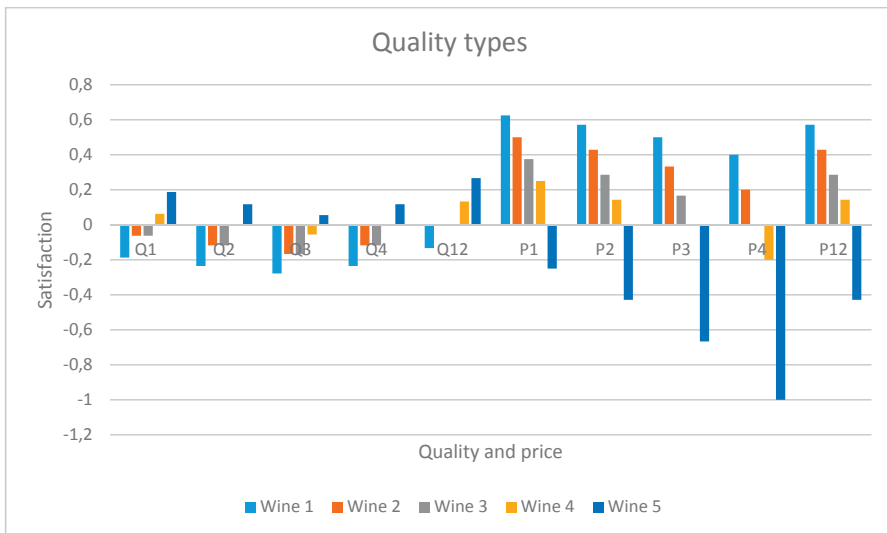


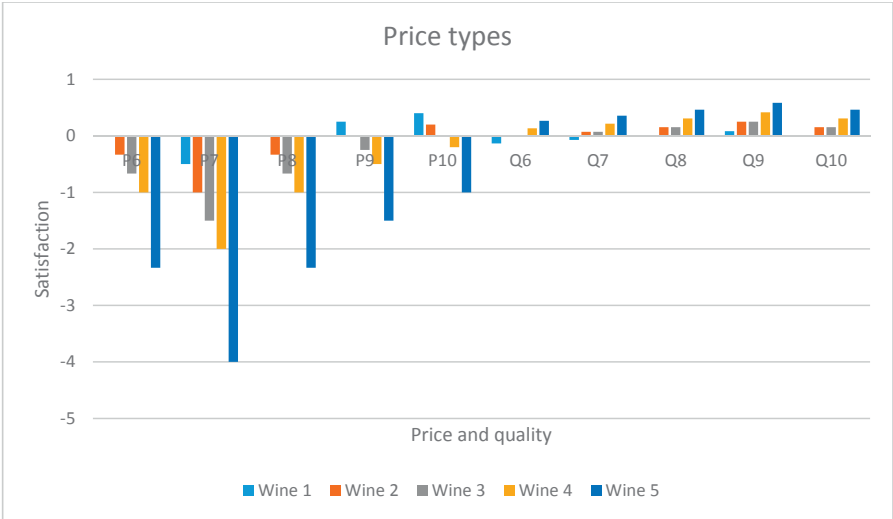
Figure 8 shows that types 6 and 7 are dissatisfied with the price of all wines. Hence, they do not choose any wine according to this satisficing heuristic. Types 8, 9 and 10 choose the cheapest wine 1, which gives them (the highest) positive satisfaction¹¹.

The assumption that agents consider only one attribute is quite strong. An alternative satisficing heuristic has multiple steps. In the first step, the agents eliminate all objects that do not satisfy them

¹¹ Type 8 is neutral with regard to the price of wine 1. These agents might not choose any wine.

with regard to their most important attribute. In the second step, they look at the second-most important attribute and eliminate all objects that do not meet the respective aspiration level and so on until the agent has considered all attributes. A variant of this procedure is that the agent does not evaluate all attributes but only the n most important ones. From the set that remains after the elimination of objects that meet all aspiration levels, the agent chooses the best one, which is the one with the highest attitude extremity. Note that this heuristic is non-compensatory, because a negative satisfaction level with an important attribute cannot be compensated for by a positive satisfaction with a less important attribute.

Figure 8: Satisfaction of the price types with price and quality



We can express this heuristic formally as follows. Assume that initially there are J_0 objects in the choice set \mathcal{J}_0 . The objects have T different attributes related to specific targets. An agent i has an ordering of the targets by their importance, $\{t_1, t_2, \dots, t_n\}$, where t_1 is the most important target. The agent may decide that he or she does not consider all attributes of the object, hence $n < T$, because not all attributes are important to her or him. In the specification of this paper, this might be attributes with a target importance greater less 4, because 4 represents an average importance. The heuristic has two parts: First, the agent sequentially eliminates objects from the choice set that do not meet the aspirations for important attributes. Second, after the elimination of all poor options, the agent chooses the best object from the remaining set. Algorithmically, we can write:

```
for t = 1 to n {
```

$$\begin{aligned} & \text{define } \mathcal{J}_t \subseteq \mathcal{J}_{t-1} \mid \forall j \in \mathcal{J}_{t-1}: s_{t,j} \geq 0 \\ & \} \\ & \text{set } j^{max} = \operatorname{argmax}_{j \in \mathcal{J}_n} att(j) \end{aligned}$$

In the simple wine example, there are only two attributes. The quality types winnow all wines with too low quality first and then look at the price. In the example, this procedure leads to an easy solution. All types find wine 5 of acceptable quality and types 1, 2 and 12 are also satisfied¹² with the quality of wine 4. Regarding the price, wine 5 is too expensive for all types, which eliminates this wine in the second step. Type 1, 2 and type 12 are satisfied with the price of wine 4, so that they choose wine 4 and all the other quality types do not buy any wine. The price types 6 and 7 eliminate all wines because the price is above their aspiration level. Type 9 would accept wines 1 and 2, type 10 is satisfied with the price of wine 1, wine 2 and wine 3. In the second step, quality does not eliminate any of the remaining wines. Therefore, the agents weigh the satisfaction levels with the relative importance of price and quality in order to determine the overall attitude towards the wines. This leads to the choice of the cheapest wine in both cases. Type 8 is neutral with regard to both price and quality of wine 1.

Table 4: Comparison of choices according to different heuristics

Agent type	Most important attribute	Maximization	Satisficing 1 step	Satisficing 2 steps
1	quality	5	5	4
2	quality	4	5	4
3	quality	2	5	-
4	quality	1	5	-
6	price	1	-	-
7	price	1	-	-
8	price	1	(1)	(1)
9	price	1	1	1
10	price	1	1	1
12	quality	2	5	(2)

¹² Strictly speaking, type 2 is neutral, but I assume that an object is only eliminated if the satisfaction level is negative.

Table 4 summarizes the choices of the types according to the different heuristics. I do not include types 5 and 11, because their choices are identical in all cases. For some types, the heuristics generate rather different predictions about their choice, e.g. for type 3, type 4 and type 12. However, the 1-step heuristic that takes into account only the most important attribute might be too extreme. The 2-step heuristic appears more realistic.

5 Discussion and applications

As any model, the model presented here rests on a number of assumptions. In order to keep the exposition simple and to make the model easy to apply, I did not strive for generality but chose strong assumptions that allow for analytic solutions. The single-peakedness of values, the tent-shaped hierarchy of values and the linearity of the aspiration and attitude functions are such simplifications. Whether these assumptions are valid is an empirical question and depends on the intended use of the model. When the model is used to predict actual behavior in specific situations, other functional forms might be more appropriate, but the version proposed here might suffice as an abstraction in theoretical models. In any case, empirical testing is desirable, e.g. with surveys and experiments.

The psychological theories underlying the model are rather general and refer to many different kinds of human behavior, which is a strength. In order to apply the theories and the economic model to specific economic questions, it is necessary to specify the relevant factors that drive the agents' cognitive processes and their behavior. One of these factors are the specific targets that are related to an object. In the wine example, I assumed that buying a bottle of wine contributes to the target of enjoying sensual pleasure, but conflicts with the target of precautionary saving. These targets are likely to be present in many cases when somebody considers buying wine. However, other targets might be relevant, too, like receiving social recognition or treating somebody else nicely. Offering a good bottle of wine to guests at a nice dinner is a way to care for the well-being of others, which is an expression of *benevolence*. It is probably not possible to define a complete list of all relevant targets for all individuals in all situations. Psychologists would argue that human behavior is always driven by a multitude of factors, which may even vary from situation to situation. Economists, in contrast, tend to look for parsimonious theories that are able to explain behavior in many situations with a small set of determinants. There is an obvious tradeoff between the two approaches: incorporating many details and factors improves the explanatory and predictive power of theories, but makes them hard to generalize. In the present model, I abstracted away from the abovementioned targets. Whether and when they are important is another empirical question. One could hypothesize that status considerations are important in specific market segments, but not if one looks at *the* market for wine in general (if there is such a thing). I also neglected topics from psychological research such as the *strength* and the *importance* of attitudes (see Krosnick and Smith 1994), because they are highly

specific to the individual. For economic applications, it is more interesting to include more factors from the environment of the individual. The reference level in the aspiration function is a variable that has both an individual aspect and an environmental aspect. I assumed that the reference level is determined by the “normal” behavior of a reference group, which can be captured by the average behavior in the environment of the agent. However, how the agent defines the relevant reference group is – of course – subjective and may differ among individuals. Yet based on the literature on peer groups and peer effects (e.g. Feld and Zölitz 2017) I believe that it is possible to identify relevant reference groups in many cases.

The model presented here has a broad applicability to issues of economic interest. In psychology, theories linking attitudes and behavior have been successfully applied to consumer behavior, personally significant decisions such as having an abortion and many health-related behaviors such as donating blood, condom use, exercising or attending screening programs (see Vogel and Wänke 2016, p. 238). Many of these topics are also studied in economics. In general, I see the greatest potential of the model for complex decisions on issues that are important to individuals and in which multiple attributes play a role. Regarding consumer behavior, the model might be most relevant for challenging choices among multi-attribute goods and services such as cars, holiday travels, or homes. Job choice also depends on many aspects (see Janger and Nowotny 2016 for job choice in academia), similarly as residential choice (e.g. Kim et al. 2005). A final example is voting for political parties (see Mayer 2001).

6 Conclusions

In this paper, I propose a simple model in which behavior is determined by the individual’s attitude towards the behavior and the attitude depends on values. The model is based on the Schwartz theory of human values, which is very prominent in social psychology. Values are desirable, transsituational, abstract goals. In my model, they fix aspiration levels for specific targets that are related to an object. The distance between the properties (or attributes) of an object and the aspiration levels determines the degree of the agent’s satisfaction or dissatisfaction with the properties of the object. Attitude is the importance-weighted sum of the degrees of (dis-)satisfaction.

The model is a formalization of established ideas in social psychology and may serve as a bridge between economics and social psychology. The paper’s special contribution is to demonstrate that we can make coherent and reliable statements about agents’ preferences. For economists, preferences are usually a black box. Apart from the usual rationality assumptions of completeness and transitivity, and often also non-satiation and decreasing marginal utility, economists have little to say about preferences. Even more, it is a common conviction in economics that little can be said about people’s preferences. A key message of this paper is that this conviction is false and that there is an established

literature with strong empirical support that makes robust statements about people's values. Values are not the same as preferences, but as I show in my model, we can derive preferences towards a set of objects from attitudes and these attitudes depend on values.

The Schwartz theory emphasizes that people are different with regard to their value priorities and this model links this heterogeneity in values to heterogeneity in behavior. I show that price and income sensitivity are functions of target importance, which is a direct function of values. Furthermore, the model suggests under which conditions Veblen effects can occur and how they depend on values. One can link other behaviors to values in a similar fashion and hence get predictable differences in behavior.

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