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*The Relativity of Consumer Decision Making:
Psychological Distance, Construal Level, Evaluation Mode and Framing*

vorgelegt von
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**The Relativity of Consumer Decision Making:
Psychological Distance, Construal Level, Evaluation Mode and Framing**

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1. The Relativity of Decision-Making: A Taxonomy

The invariance axiom of rational choice is one of the fundamental principles on which expected utility theory is built (Bernoulli, 1954 [1738]; Von Neumann & Morgenstern, 1944). Invariance of choice implies that preferences between options are independent of the way in which they are presented. Different presentations of the same decision problem should yield the same decision (Tversky & Kahneman, 1986). From this perspective, it should not make a difference whether a product in a supermarket is evaluated in isolation or in the context of other products, whether organ donation is based on an opt-in or an opt-out decision, or whether a gamble offers \$50 for sure or \$100 with a likelihood of 50%. According to the invariance axiom of rational choice, it is irrelevant whether the proverbial glass is presented as half-full or half-empty.

The idea of invariance originates from a *normative* analysis of decision making; it refers to what rational¹ actors *should* do. If rational behavior is motivated by maximizing utility in its classical economic sense, then there should be no difference between a glass described as half-full and a glass described as half-empty, because the utility of the two options is logically identical. Without decision invariance across different descriptions and contexts of the same option, it is impossible to interpret one's choices as (exclusively) driven by rational principles of utility maximization.

Although the invariance axiom is based on normative considerations, it is frequently assumed to also provide a *descriptive* framework of decision making. Beyond describing what people *should do*, it is assumed to predict what people *actually do*. In fact, according to Thaler (1980), economists rarely differentiate between normative and descriptive or positive models of decision making and, more or less directly, assume their normative analyses of choice to be descriptively valid for characterizing actual behavior.

¹ Note that throughout the present thesis, the term “rational” behavior refers to the classical economic definition of rationality, that is, as behavior aimed at maximizing personal utility.

It is the descriptive validity of the invariance axiom of rational choice that has been challenged by a plethora of research findings from psychology (Kahneman & Tversky, 1979; Slovic, 1995; Tversky & Kahneman, 1981, 1986), behavioral economics (Thaler, 1980), and consumer research (Bettman, Luce, & Payne, 1998). Decades of research in these fields have demonstrated systematic violations of the invariance axiom: Different presentations elicit different choices, different response modes lead to different decisions, and different contexts produce different outcomes.

The goal of the present thesis is to integrate several lines of research against the backdrop of this debate on the invariance axiom. Empirical evidence as well as theoretical analyses will be discussed that provide evidence for the relativistic nature of decision making emphasizing that decision outcomes heavily depend on descriptions, procedures, contexts, and mindsets. To that end, a taxonomy will be introduced that characterizes four aspects of the relativity of decision making. Next, the empirical and theoretical work of the present thesis is discussed in relation to the taxonomy, before finally coming back to the rationality debate concerning the invariance axiom.

1.1. Description Dependency

Among the first phenomena to call the invariance axiom into question were Tversky and Kahneman's (1981) seminal demonstrations of framing effects. Based on prospect theory (Kahneman & Tversky, 1979), the authors predicted and found a wide range of preference reversals across formally identical descriptions of the same choice problem. For instance, in the famous Asian disease dilemma in which 600 people are expected to be killed by an unusual Asian disease, a clear majority chooses a certain (saving 200 out of 600 people) over an uncertain option (1/3 probability that all 600 people will be saved, and 2/3 probability that no one will be saved) when the decision is framed in terms of gains. However, when the very

same decision is framed in terms of losses (i.e., lives lost instead of lives saved), a clear majority prefers the exact opposite, namely, the uncertain over the certain option.

The Asian disease dilemma and many similar decision problems that have been created since this initial demonstration of framing effects (for overviews, see Keren, 2011b; Kühberger, 1998; Levin, Schneider, & Gaeth, 1998) clearly contradict the notion of description invariance. Preferences are not invariant across different descriptions of logically equivalent alternatives. The way in which an option is described affects how much it is preferred.

1.2. Procedure Dependency

A very much related line of research took a different angle on empirically challenging expected utility theory's notion of invariance. While the classical framing research was mostly concerned with framing at the level of the description of choice alternatives, a series of experiments by S. Lichtenstein and Slovic (1971, 1973; Slovic & Lichtenstein, 1968; see also Tversky, Sattath, & Slovic, 1988) questioned the idea of *procedure invariance*. According to this idea, preferences should not be affected by their method of elicitation – preference orders should stay invariant across different measures of choice, preference, or price matching.

Refuting the concept of procedure invariance, S. Lichtenstein and Slovic (1971) were able to demonstrate preference reversals across equivalent gambles as a function of the response mode through which the preference was indicated. Whereas attractiveness ratings and choices between pairs of gambles were primarily influenced by the gambles' winning or losing proportions, buying and selling prices were primarily determined by the absolute dollar amounts to be won or lost. Thus, for logically identical alternatives, the method of elicitation alone is sufficient to affect which option is preferred.

1.3. Context Dependency

A third line of research that challenged the validity of the invariance axiom focusses on the context in which the decision takes place (Tversky & Simonson, 1993). A rational choice between two alternatives should be independent of any third option that is inferior to the two focal alternatives. Based on a complete preference order, a rational actor should always select the most preferred option from the choice set. Research on the attraction effect, however, contradicts this fundamental principle of rational choice (Huber, Payne, & Puto, 1982; Huber & Puto, 1983): When adding a clearly inferior, but asymmetrically dominated decoy option to a choice set (i.e., an option which is dominated by only one out of two options in a choice set), the attractiveness of the dominating option increases. Accordingly, by varying which of the two options dominates the decoy, preference reversal between the focal alternatives can be obtained. The context in which a decision takes place matters; allegedly irrelevant alternatives affect which option is preferred.

1.4. Mindset Dependency

A fourth line of research to contest the axioms of rational choice can be derived from psychological research on people's subjective construal of a decision problem. People do not encounter decisions as blank slates. In fact, decades of research on the constructive nature of decision-making demonstrate quite the opposite: The specific mindset that is activated when making a choice can significantly affect a person's preferences.

To name a few prominent out of many fields that demonstrated such effects, research on construal level (Trope & Liberman, 2003, 2010), regulatory focus (Higgins, 1998), mood-dependent judgments (Forgas, 1995), cultural mindsets (Oyserman, 2011), and assimilative versus accommodative processing (Fiedler, 2001) has provided comprehensive evidence for the significance of a person's chronically or momentarily activated processing style when construing a decision problem.

For instance, after activating a mindset that induces a focus on high-level rather than low-level construals, people show stronger preferences for choice options that require a relatively high degree of self-control (Fujita, Trope, Liberman, & Levin-Sagi, 2006). The way in which the information given in a decision problem is subjectively construed affects how preferences are formed.

1.5 Discussion

The common denominator of all the examples discussed above is the idea that decision making is relative. Decision making is relative rather than absolute in the sense that it is contingent on a wide range of extrinsic variables that go beyond what expected utility theory would predict to be of relevance (i.e., outcomes and probabilities). If the exclusive goal was to maximize utility, rational choices should be invariant across (1) descriptions, (2) response modes, (3) decision contexts, and (4) mindsets. However, based on the wealth of findings that has been accumulated over the past decades across several disciplines, the invariance idea has been challenged.

This taxonomy of four aspects of relativity of decision making is not meant to be exhaustive. Indeed, further perspectives easily come to mind such as, for instance, ecological (Fiedler, 2000; Fiedler & Wänke, 2009) or motivational approaches (Kunda, 1990; Molden & Higgins, 2005). Likewise, the four aspects are not meant to be (perfectly) mutually independent – descriptions and contexts, for instance, may trigger mindsets. Nevertheless, this analysis of the relativity of decision making provides a basic taxonomy to integrate, but also to distinguish different aspects of contextualized decision making. This framework will be used to structure the empirical part of the present thesis.

2. The Present Work

The present thesis is based on four manuscripts that address different aspects of relativity of decision making. The first research article is concerned with the effects of psychological distance and construal level on the formation of response categories that are used to express numerical quantities. The second article applies these basic ideas in the domain of consumer decision making and provides further insights into the specific processes underlying these effects. In terms of the taxonomy of relativity of decision making, these two studies refer to points (3) and (4), namely, the relevance of the context of the judgment and the relevance of people's mindset when making a judgment. The third research article investigates preferences for product bundles as a function of the evaluation mode in which the judgment takes place. It is directly concerned with the presence versus absence of other choice alternatives in a decision context, thus, it is concerned with point (3) of the taxonomy. In the fourth and final manuscript, a theoretical perspective and an empirical review of framing effects are discussed in the form of a book chapter. This work naturally focusses on the effects of presentation and response formats, that is, it is concerned with points (1) and (2) of the taxonomy. In the following sections, the specific theoretical backgrounds on which the respective research is based will be introduced and the main findings will be summarized.

2.1. Psychological Distance and Construal Level

Asked about the defining or unique capabilities of humans, popular opinions might resort to answers such as human speech, higher-order cognition, or even the believe in religious entities (e.g., Burton, 2012). An aspect that is often overlooked – although, at a more basic level, it may even provide an underpinning for these domains of human behavior – is the unique capacity to transcend the here and now (Liberman & Trope, 2008). More than any other species, the human species is capable of construing distal entities that are detached from the immediate perception of a given moment. Traversing mental distances in time, humans

plan ahead and learn from errors in the past. Territorial spaces are segmented and organized in terms of provinces, states, and countries that go way beyond of what an individual can perceive in a given moment. Complex social structures that differentiate between friends, colleagues, and rivals overlay the immediate experience of human social interactions. And even extremely unlikely events or counterfactuals can be mentally construed, for instance, when taking precautions against a potentially threatening situation.

Indeed, the human species evolved to simulate, to predict and to reconstruct what is not present in one's immediate perception; humans transcend their direct experience via mental construction. In large part, it is work by Yaacov Trope and Nira Liberman that developed the fundamental principles underlying human cognition across psychological distances (Liberman & Trope, 2008; Liberman, Trope, & Stephan, 2007; Trope & Liberman, 2003, 2010; Trope, Liberman, & Wakslak, 2007). According to *construal level theory* (CLT), mental representations vary systematically as a function of the psychological distance of the target object. People think differently of the same object when it is close versus distant to them: Psychologically close objects are represented in terms of concrete, complex, unstructured, and contextualized mental images; with increasing distance, their representations become increasingly abstract, simple, structured, and decontextualized.

For example, in one's immediate experience, a final exam may be about ticking answers on a multiple choice questionnaire, whereas, after a couple of weeks, the very same event may be seen as a final duty in order to receive a college degree and, even later, say after several years, the exam will be represented as the endpoint of a major period of life.

Abstractness increases with increasing distance.

CLT explicitly considers four distinct dimensions of psychological distance – time, space, social relations, and hypotheticality, although there is some debate about further dimensions of distance (Fiedler, 2007; Liberman, Trope, & Wakslak, 2007). All distance

dimensions are associated. When an episode is distant on one of the dimensions, it is typically perceived as more distant on the other dimensions, too, highlighting the unitary nature of psychological distance (Bar-Anan, Liberman, Trope, & Algom, 2007; Fiedler, Jung, Wänke, & Alexopoulos, 2012). Psychological distance causes variation in construal levels. Notably, the reverse is true as well: Differences in construal levels produce differences in perceived distance (Liberman & Förster, 2009).

The effects of psychological distance and construal level on perception, evaluation, decision-making, and behavior are manifold and well-documented (for recent overviews, see Burgoon, Henderson, & Markman, 2013; Hamilton, 2014; Liberman & Trope, 2008; Trope & Liberman, 2010; Trope et al., 2007). For instance, based on the idea that an increase in psychological distance puts an emphasis on an object's meaningful core, Liberman and Trope (1998) demonstrated that high-level desirability concerns loom larger from a distant rather than a proximate perspective, whereas the reverse is true for low-level feasibility concerns. In one of their studies, a lecture on an interesting topic at an inconvenient time is seen as more attractive from a temporally distant perspective and a lecture on a tedious topic at a convenient time is seen as more attractive from a temporally close perspective. In a similar vein, people are more likely to follow their high-level values (Eyal, Sagristano, Trope, Liberman, & Chaiken, 2009) or their long-term motivation to engage in self-control (Fujita et al., 2006), from a distant rather than a proximate perspective.

2.1.1. Response Category Width as a Psychophysical Manifestation of Construal Level and Distance (Krüger, Fiedler, Koch, & Alves, 2014). Drawing on CLT as a theoretical framework, we investigated the influence of psychological distance and construal level on the construction of response categories. Response categories express the extension between the upper and lower boundary of an individual's distribution of expectancy values

within specific attribute dimensions with regard to a specific stimulus object (C. W. Sherif, 1963; M. Sherif & Hovland, 1961; Thurstone, 1927; Torgerson, 1958).

For instance, when judging a reasonable price for a coffee in a certain place the boundaries of the expression “reasonable prices” have to be scaled in terms of an ordinal interval. There are certain prices which are “too high” to be considered reasonable, there are other prices which are “too low” to be considered reasonable, and in between both poles, there is a specific range of prices that expresses the response category “reasonable prices”. In virtually all social domains, response categories provide flexible tolerance limits that are used for making evaluative judgments: Aggressive behaviors may be deemed “inacceptable”, a manager’s salary may be seen as “unwarranted”, and a job candidate’s previous experiences may be “sufficient” to justify employment.

The purpose of our research was to investigate the effects of psychological distance and construal level on such response categories. People are less knowledgeable about distal objects as compared with proximate objects, because the former are experienced less frequently than the latter, by definition (Trope & Liberman, 2010). Similarly, high-level construals are based on less specific information than low-level construals. As a consequence, we expected distal entities and high-level construals to be expressed in terms of wider response categories than proximate entities and low-level construals.

Results of five experiments provide converging support for our hypothesis. For instance, when judging the length of a bridge, participants provide wider interval estimates when they are told that the bridge is distant rather than close (spatial distance), or when they think that the bridge has not been constructed yet versus has already been constructed (hypothetical distance). Similar results are obtained when raising the construal level at which the target object is mentally construed.

This research provides insights into the psychophysical underpinnings of mental representations across psychological distances and construal levels. People express distinct tolerance limits for close and low-level versus distant and high-level targets. Based on these fundamental differences in the mental scaling of responses, predictions for categorization, perception of similarities, and assimilation versus contrast processes can be derived. Namely, semantic categories based on high-level construals should be able to incorporate more category members than the respective categories construed at a lower level. Likewise, high-level versus low-level construals should put an emphasis on similarities over dissimilarities and on assimilation over contrast. And, indeed, previous CLT research provides evidence for such effects (Goodman & Malkoc, 2012; Liberman, Sagristano, & Trope, 2002).

2.1.2. Latitude of Price Acceptance Across Psychological Distance (Krüger, Alves, & Koch, 2015). The second research article that is part of this doctoral thesis is directly related to the abovementioned work. Applying the idea that the width of response categories increases with increasing psychological distance, we investigated distance effects on consumers' latitude of price acceptance as a particularly relevant response category for consumer decision making.

Latitude of price acceptance defines the range of prices a consumer considers acceptable for a certain product (Kosenko & Rahtz, 1988; D. R. Lichtenstein, Bloch, & Black, 1988). Just like *latitudes of acceptance* at a more general level (C. W. Sherif, 1963), latitudes of price acceptance are critical for evaluations within the price dimension. For instance, the same price is evaluated more positively within a high versus a low reference price range even when controlling for differences in the set's means (Janiszewski & Lichtenstein, 1999).

In the same way as response categories for judging lengths and quantities increased with increasing distance (Krüger, Fiedler, et al., 2014), we expected price intervals to become wider when the products were presented as distant rather than close. Six studies provided

empirical support for this hypothesis. For instance, the typical price for a coffee was construed at a wider latitude of acceptance when participants were asked to estimate the price of the coffee for a distant location rather than for their hometown. As a consequence, price evaluations were more positive and purchase intentions were more pronounced for distant rather than close products. This effect of distance on price evaluations was particularly strong when elevated rather than average prices were judged. While average prices in the center of most people's acceptability limits appeared to be quite attractive from both close and distant perspectives, elevated prices were only perceived as acceptable when distance was high, thus, when price latitudes were wide enough to incorporate even relatively extreme exemplars.

Moreover, two studies investigated the role of price knowledge as an underlying process variable to explain the distance-price latitudes relationship in a causal chain design (see Spencer, Zanna, & Fong, 2005). Results indicated that it is because of consumers' lower knowledge about prices in distant versus close locations, that they are willing to accept a wider range of prices when distance is high.

2.1.3. Discussion. When judging ordinal attributes, people use response categories to express the distribution of expected and acceptable values. The width of such response categories depends heavily on the psychological distance and the construal level of the object to be judged. One reason for this relationship can be found in differences in perceived knowledge about objects across distances and construal levels. To express the uncertainty that stems from such knowledge asymmetries, people adjust their acceptability limits when generating quantitative expressions.

As a consequence, judgments of the length of the very same bridge, judgments of the quantity of the very same number of items, and judgments of the price of the very same product vary as a function of the object's mental construal. Coming back to the initial discussion on the invariance axiom of rational choice, the present studies support the idea that

the context in which the judgment takes place and the mindset the judge is in matter for the outcome of the judgment.

2.2. Evaluation Mode

At a very basic level, any judgment can be construed as an isolated judgment of the focal object or as a joint comparison of the focal object along with one or more alternatives. Indeed, many situations in our everyday environment map onto this distinction: Supermarkets may offer only one or several products of the same category, a particular mobile phone may come in a single or in multiple variants, and a student may have the possibility to enroll in one or in several classes within the same module to receive his credit points. From a purely rational perspective, the evaluation of the focal alternative should be invariant across the isolated versus joint evaluation context. Psychological research on *evaluation* mode, however, contradicts such an assumption conclusively.

According to *general evaluability theory* (Hsee & Zhang, 2010), judgments can differ substantially across joint versus separate evaluations. In separate evaluations, the focal object has to be evaluated without any reference context. Only the evaluators' preexisting knowledge about the typical distribution of attribute values can be used to classify whether a certain attribute is high or low, good or bad. In joint evaluations, however, the other alternatives in the set provide a reference context that helps interpreting the quality of the focal alternative in addition to any preexisting knowledge about it. Just by comparing whether a certain attribute value is better than another, the evaluator gains potentially valuable insights into the quality of an alternative.

Importantly, different attributes benefit differentially from the additional context information that is available in joint but not in separate evaluations. Drawing on Hsee's (1996) rough taxonomy, there are *easy-to-evaluate* attributes that are context-independently evaluable, because people typically know about their distribution. For instance, when

evaluating a used dictionary, it is clear that the condition “like new” is good and the condition “the cover is torn” is at least mildly negative. No reference standard is necessary to make such a judgment. However, *hard-to-evaluate* attributes are typically only evaluable when there is context information available, because people lack specific knowledge about whether a certain value is good or not. In the case of a dictionary, one may speak of the number of entries as a relatively hard-to-evaluate attribute. In a separate evaluation, it is difficult to say whether 10,000 entries is good or not, because most people would not know about the typical number of entries in a dictionary. In a joint evaluation, however, the other alternatives can be used as reference information to draw an evaluative judgment about the focal object. For instance, in a reference set where an alternative dictionary has 5,000 entries, the original option will be evaluated positively; in a set with a 20,000 entry alternative, the opposite will be the case.

In general, according to the *evaluability hypothesis* (Hsee, 1996), the relative impact of hard-to-evaluate versus easy-to-evaluate attributes varies across evaluation modes. In separate evaluations, reference information about how to interpret hard-to-evaluate attributes is missing. Therefore, the judgment is mostly based on easy-to-evaluate attributes. In joint evaluations, however, the other alternatives in the set increase the evaluability of the hard-to-evaluate attributes rendering both types of attributes relevant for the decision. Based on this reasoning, choice sets can be constructed that demonstrate preference reversals across evaluation modes (for an overview, see Hsee, Loewenstein, Blount, & Bazerman, 1999).

For instance, in separate evaluations, a job applicant for a computer programming position with a GPA of 4.9 and the experience of having written 10 KY computer programs (a fictive programming language) is preferred to a candidate with a GPA of 3.0 and the experience of having written 70 KY computer programs. In a joint evaluation, however, the

candidate with the higher programming experience is preferred, because only in this condition, the number of KY computer programs is easily evaluable (Hsee, 1996).

2.2.1. *The Presenter's Paradox Revisited: An Evaluation Mode Account (Krüger, Mata, & Ihmels, 2014)*. General evaluability theory (Hsee & Zhang, 2010) and the evaluability hypothesis (Hsee, 1996) are based on the idea that attribute evaluability is the chief causal agent to generate preference asymmetries across evaluation modes. One of the goals of the third research article that is part of this thesis was to suggest another variable that might underlie preference asymmetries across evaluation modes. Namely, going beyond the idea of evaluability, we suggested an attentional account to explain why some options are preferred more strongly in joint evaluations, while some others appear as more attractive when evaluated separately.

In three experimental studies, participants judged the quality of single products and product bundles. Bundles were always composed of the respective single product plus an extra add-on item. For instance, in one study, participants provided attractiveness ratings for a coffee maker (single product) as well as for that coffee maker plus an additional milk frother (product bundle). Critically, the two options were either evaluated jointly by the same participant or separately by two independent participants. We expected the value of the bundle to be higher in joint relative to separate evaluations, because the bundle's added value (i.e., the add-on) is more salient when it is directly contrasted to its single product counterpart. Results confirmed these expectations – participants provided a higher willingness to pay and higher attractiveness ratings for the bundle in the joint rather than the separate evaluation context.

Pertinent to the theoretical interpretation of these results, an experimental causal chain design (cf. Spencer et al., 2005) was able to attribute the evaluation of the product bundle to the level of attention that was paid to the add-on. As indicated by a change detection task (cf.

Simons & Levin, 1997), participants were much more attentive to the add-on in joint rather than in separate evaluations. It is due to these differences in attention, that the product bundle was evaluated more positively in joint evaluations.

Note that it is difficult to explain the stronger preference for the bundled offer under joint evaluation by differences in add-on evaluability (cf. Hsee, 1996; Hsee & Zhang, 2010). It is unlikely that adding an alternative without any add-on at all changes much of the add-on's evaluability. Also, in one of our studies, particularly those participants who did pay attention to the add-on rated the bundle as more attractive. Based on this reasoning and the data from our causal chain of experiments, the present research suggests differences in attention as another route through which evaluation mode affects preferences above and beyond the evaluability idea.

2.2.2. Discussion. The evaluation of a choice option depends on whether it is judged alone or in the presence of other alternatives. There are at least two ways in which the presence of additional alternatives may affect the evaluation of a focal option. First, as suggested by general evaluability theory (Hsee & Zhang, 2010), including additional options in a choice set increases the evaluability of the options within the set because comparative information becomes available. Second, as suggested by the present research, including additional options directs attention to the differences between the alternatives. Features that are shared are cancelled out and features that are unique receive particular weight in the decision process (cf. Houston & Sherman, 1995; Sherman, Houston, & Eddy, 1999).

With regard to the relativity discussion that provides the backbone of this thesis, our results are illustrative of the influence of the context on the outcome of a judgment. The evaluation of a focal option is a function of its context. Contrary to the notion of context invariance, adding an allegedly irrelevant, inferior alternative to a choice context affects judgments of the focal option.

2.3. Framing Effects in Consumer Judgment and Decision-Making

(Krüger, Vogel, & Wänke, 2015)

Discussing the relativity of decision-making, the previous sections were concerned with the context in which a decision takes place and the mindset the evaluator is in when making his judgment. The fourth and final manuscript on which the present thesis is built is concerned with framing effects as further instances of relativistic decision-making.

Framing effects occur when equivalent presentations of the same decision problem lead to different responses to it (Druckman, 2001; Sher & McKenzie, 2006). For instance, a medical treatment with a 50% success rate is logically equivalent to a medical treatment with a 50% failure rate. Ground beef that is 75% lean is logically equivalent to ground beef that is 25% fat. Yet, despite the frames' logical equivalence, people exhibit significantly higher preferences for the positive (success rate, lean beef) rather than the negative (failure rate, fat beef) description of the same choice option (Levin & Gaeth, 1988; Levin, Schnittjer, & Thee, 1988).

Explanations for the occurrence of framing effects are manifold and almost always restricted to a particular subset of effects (for overviews, see Keren, 2011b; Kühberger, 1998; Levin et al., 1998): In the area of risky choice framing such as in the case of the Asian disease dilemma (Tversky & Kahneman, 1981), authors typically resort to prospect theory (Kahneman & Tversky, 1979) as a descriptive model to clarify the effect². Attribute framing, which is oftentimes concerned with switching the valence of a single attribute dimension such in the ground beef example above, is commonly explained via attentional mechanisms (Levin et al., 1998). Response framing (e.g., choosing versus rejecting, Shafir, 1993) is interpreted in terms of compatibility principles (Slovic, Griffin, & Tversky, 1990). And outcome framing – such as when presenting a monetary amount as an integrated whole or as separated parts

² Note, however, that despite its usefulness as a *descriptive model* of decision making under uncertainty, prospect theory by itself does not provide any explanation at the *algorithmic level* (cf. Marr & Poggio, 1976).

(Thaler, 1985) – can be explained as a reference set effect (Janiszewski, 2011; Janiszewski, Silk, & Cooke, 2003).

A defining criterion of framing effects is the *standard of equivalence* between the frames. Without equivalence, any preference asymmetries across the framing conditions may simply be a consequence of factual differences in the choice alternatives. But what does it mean for frames to be equivalent? Clearly, there are many standards according to which equivalence may be defined (see Keren, 2011a). In a rigorous analysis, Sher and McKenzie (2006, 2011) suggest *information equivalence* as a gold standard to judge the equivalence between frames. According to the idea of information equivalence, two frames A and B are equivalent only when there is no choice-relevant background condition C about which the listener can make inferences based on the mere fact that the speaker chose frame A instead of frame B. Thus, in Sher and McKenzie's framework, framing is foremost about communication and the adherence to conversational logic (Grice, 1975) rather than formal logic.

To illustrate this abstract idea, in the case of a doctor communicating the outcome of a medical treatment as successful 50% of the time, a patient may interpret the mere fact that the doctor chose the success rather than the failure frame as a positive signal – the choice of frame “leaks” information about the outcome of the treatment. As a consequence, the success and the failure frame differ in terms of their information equivalence despite their logical or mathematical equivalence.

Along these lines, Keren (2007, 2011a) highlighted the importance to restrict any conclusion about equivalence to particular dimensions: Ground beef that is described as 75% lean versus 25% fat is logically equivalent on the dimension amount of fat. However, people consider the fat-frame more “trustworthy” than the lean-frame highlighting non-equivalence on dimensions other than logical reasoning.

A thorough analysis of a particular study's definition of equivalence is indispensable before drawing any conclusions about human rationality. From its very beginning, framing research was concerned with the question whether the observed effects violate the invariance axiom of rational choice emphasizing potential disparities between normative and descriptive models of human behavior (Quattrone & Tversky, 1988; Thaler, 1980; Tversky & Kahneman, 1981, 1986). However, violations of normative principles of rational behavior must always be interpreted in the light of the underlying standard of equivalence. Different frames are never entirely equivalent and, depending on the particular modification, one may argue that *not* picking up on the subtle differences between two frames represent the “irrational” behavior (Keren, 2011a).

With regard to the relativity of decision making, decades of empirical research on framing effects have established that decision-making depends (a) on the way in which the options are described and (b) on the method through which responses are elicited. Contesting fundamental axioms of rational choice, preferences are not invariant across descriptions and procedures (Tversky & Kahneman, 1986).

On a final note, it is interesting to see that in many of the paradigms used it is essentially no problem at all to mentally convert one frame into the other. Knowing about the winning proportion of a lottery, virtually everybody is able to compute the complementary losing proportion. Likewise, having to select a most preferred option can easily be represented as a task about the rejection of non-preferred alternatives. However, empirically it is well-established that this is not what people do. Instead, in most situations, people do pay much attention to the particular presentation format and, therefore, provide choices relative to the specific decision context.

3. General Discussion

Decision-making is relative – it is relative rather than absolute as it is dependent on a multitude of factors that are not inherent to the logical structure of the decision problem itself (i.e., outcomes and probabilities). In the present thesis, a subset of these factors was reviewed in terms of a taxonomy of relativistic decision-making. In particular, empirical evidence was discussed that demonstrates how the outcome of decision processes depends on (1) the description of the choice alternatives, (2) the response mode through which the answer is elicited, (3) the context in which the decision takes places, and (4) the mindset that is activated when making a decision.

3.1. Antecedents of Relativistic Decision-Making

The literature review and the empirical results that have been discussed provide conclusive evidence that decisions do not take place in a context-free vacuum. Instead, they are constructed in a given moment relative to the specific configuration and environment of the decision problem (Bettman et al., 1998; Slovic, 1995). But *why* are decision processes constructive and context-sensitive rather than invariant and stable?

Different schools of thought provide different answers to this question. The early constructivist models of decision-making interpreted context-dependency as a consequence of *bounded rationality* (Kahneman, 2003; Simon, 1955, 1957; Tversky & Kahneman, 1981). According to these models, rationality is bounded in the sense that decision-making is an effortful process and that cognitive and temporal resources to arrive at an optimal decision outcome are limited. As a consequence, decision-makers have to draw on mental shortcuts to simplify their decision strategies according to their cognitive limitations (Gilovich, Griffin, & Kahneman, 2002; Tversky & Kahneman, 1974). It is central to this perspective, to locate the determinants of decision-making within the individual's mind. Biased decision outcomes reflect biased cognitive processes.

An alternative framework to explain the constructive nature of decision-making is the *cognitive-ecological approach* (Fiedler, 2000; Fiedler & Juslin, 2006; Fiedler & Wänke, 2009). According to this perspective, decision outcomes are constructed as a function of the environment or, more precisely, as an interaction of environment and person variables. For instance, availability effects may not (exclusively) reflect differences in ease of retrieval at the interpersonal level (cf. Tversky & Kahneman, 1973), but also differences in the prevalence of certain pieces of information in the environment (Combs & Slovic, 1979). In this view, different learning environments produce different decision outcomes. Decision-making is relative to the information sample at hand. Biased decision outcomes reflect accurate processing of biased information samples rather than deficient processing of unbiased samples.

3.2. The Adaptivity of Relativistic Decision-Making

A final and arguably most controversial issue to be discussed with regard to the relativity of decision-making is the question of adaptivity – is it *good* or is it *bad* that decision-making is a function of its context? The controversy regarding this question lies within the definition of an appropriate evaluation standard to determine the quality of decision outcomes. What does it mean for a decision to be good?

Coming back to the introduction of this thesis, expected utility theory suggests utility maximization as one such standard to be used for the evaluation of decision outcomes. According to utility maximization principles, the answer to the adaptivity question is very straightforward: The dependency of decision outcomes on the framing, context, and construal of the decision problem is bad. Relativistic decision-making should be seen as an instance of irrational behavior, because, for many decision problems, there is an objectively definable optimal outcome that should be chosen – and even when there is none, the mere fact that the same person exhibits preference reversals within the same decision problem is sufficient to

call the rationality of his behavior into question. In this view, people behave irrationally in the sense that they lack the ability to pursue adequate strategies to maximize their personal benefits.

This economic perspective is surely not the only standard to evaluate the quality of human decision-making. Yet, it is interesting to note that on the part of psychology, there is much more to say about *descriptive* rather than *prescriptive* norms of human behavior. Psychologists developed a great number of elaborate theories and models that are well suited to describe how human behavior is. The question whether it is good the way it is, is frequently left unanswered.

One notable exception may be found in the rationality debate that accompanied the heuristics and biases research program. In the early research primarily initiated by Tversky and Kahneman (1973; 1974; Kahneman, Slovic, & Tversky, 1982), statistical procedures and methodological tools such as regression models, analyses of variance, or Bayesian models were typically used as benchmarks to prove the naïvety and faultiness of human decision-making (see, e.g., Birnbaum, 1983; Kelley, 1973). Applying mathematical algorithms as evaluation standards, human reasoning was seen as a “poor replica” of scientific methods (D. G. Goldstein & Gigerenzer, 2002, p. 75) that frequently violates even basic logical principles.

In a markedly different perspective on the heuristics and biases research, Gigerenzer and colleagues suggested the concept of *ecological rationality* as an alternative standard for judging rationality in decision-making (Gigerenzer & Selten, 2001; Gigerenzer, Todd, & the ABC Research Group, 1999; D. G. Goldstein & Gigerenzer, 2002). The term ecological rationality refers to the ability to efficiently make use of the information in natural environments. In this view, decision strategies are seen as rational when they provide *fast and frugal* ways to arrive at satisfactory decision outcomes within a certain environment rather than when they provide perfectly correct results in a mathematical sense. Thus, in contrast to

the original notion of decision *biases*, from this ecological perspective, the context-dependency of decision-making is seen as an efficient way to process information within concrete ecologies.

3.3. Conclusion

Decision-making is relative to a wide range of contextual and psychological variables that go beyond the logical structure of the decision problem itself. The present thesis highlighted psychological distance, construal level, evaluation mode, and framing effects as vital examples of this relativistic nature of decision-making.

Particularly in the recent past, the fact that people's decisions can be subtly influenced via the architecture of the decision problem and its context has attracted much interest not only of scientists but also of policymakers (Marteau, Ogilvie, Roland, Suhrcke, & Kelly, 2011; Thaler & Sunstein, 2008). Utilizing the knowledge that has been accumulated in the behavioral sciences, real-world decisions as important as whether to participate in organ donation programs (Johnson & Goldstein, 2003), whether to be honest in one's tax declaration (UK Cabinet Office Behavioral Insights Team, 2012), or whether to promote environmentally friendly behavior (N. Goldstein, Cialdini, & Griskevicius, 2008) have been shown to be amenable to manipulations of the decision context.

Context matters. Evaluations and decisions critically depend on the specific embodiment of the decision problem and its environment. Researching the relativity of decision-making thus provides the opportunity to make enlightened decisions and, ultimately, to guide people into making good decision, whenever optimal decision outcomes are clear.

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**Response Category Width as a Psychophysical Manifestation
of Construal Level and Distance**

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Abstract

The present research suggests that people adjust their mental response scales to an object's distance and construal level. People make use of wider response categories when they judge distant and abstract as compared to close and concrete stimuli. Across five experiments, participants worked on visual and verbal estimation problems (e.g., length or quantity judgments). Answers were provided in interval format and differences between minimal and maximal estimates served as a measure of response category width. When target objects were framed as spatially distant rather than close (Studies 1 and 3), as unlikely rather than likely (Study 2), and as abstract rather than concrete (Study 4) category widths increased. Similarly, priming a high-level rather than a low-level mindset yielded wider interval estimates (Study 5). The general discussion highlights the usefulness of category width as a basic measure of construal level and as a theoretical link between various branches of construal-level theory.

The Two-Fold Role of Categorization

The basic process of categorization is ubiquitous. Whether we recognize a face, read a letter, or interpret a dangerous situation, we categorize a new stimulus as belonging to an older semantic category that already exists as part of our world knowledge in long-term memory. Although the same face will never produce exactly the same projection on our retina, we nevertheless recognize the invariance of the person behind the face. Thousands of different manifestations of the letter *a*, involving different sizes, angles, colors, font types, inclinations, etc., are all encoded as instances of the same semantic category.

As a new stimulus is recognized as belonging to an existing category, the resulting stimulus representation is enriched with attributes that have not been perceived but can be inferred from general category knowledge (Bruner, 1957). At the same time, actually observed stimulus attributes that are irrelevant for the category may be discarded. Thus, *semantic categories* are conceived as stimulus classes represented as essential knowledge about their defining and characteristic features in long-term memory. When textbooks and journal articles in social psychology refer to categories as carriers of stereotypes, self-concepts, and attitudes, they are usually referring to this kind of socially shared knowledge structures.

In the present research, however, we are referring to *response categories* in a different sense. Whereas semantic categories' main function is to represent firm knowledge about different attributes of stimulus classes in long-term memory, response categories are pragmatic tools to communicate quantitative information within specific attribute dimensions. Thus, whereas the semantic category "a glass of wine" includes socially shared knowledge about physical (glass), social (gregarious settings), cultural (weddings), and content-related attributes (alcohol), response categories serve to communicate quantitative constraints in specific attribute dimensions, such as a reasonable price for a glass of wine, its volume, or its temperature. Thus, like successive categories of a rating scale (cf. Parducci, 1965; Thurstone,

1927a; Torgerson, 1958; Upshaw, 1969b), we use the term “response category” more broadly to denote the boundaries of quantitative expressions. Note that response categories are much more flexible and more dependent on context and communicators’ perspectives than stable and socially shared semantic categories. A reasonable price for a glass of wine can be negotiated in many different ways and it may differ greatly between persons and situations.

Despite the central role of response categories in scaling and psychometric measurement (Likert, 1932; Parducci, 1965; Thurstone, 1927a; Torgerson, 1958; Upshaw, 1969a), they have been rarely the focus of social-psychological research. When we categorize a behavior as unacceptable, a deal as fair, or a painting as beautiful, we are setting aspiration levels and negotiating tolerance limits. Changes in response categories can thus be used strategically to influence, for instance, selling and buying prices and to redefine attitudes and goals.

The tolerance limits (in specific dimensions) of a glass of wine can be set in many different ways, depending on the communication partners’ judgment motive, negotiation strategy, aspiration level, and problem context. Accordingly, response categories can also be used to deal with uncertainty: When interacting with strangers in a foreign country and when insecure about cultural norms, typical habits and etiquettes, a wider range of behaviors may be considered acceptable (like slurping at the dinner table, taking off one’s shoes before entering someone’s place, etc.) as compared to one’s hometown when being around well-known friends. Moreover, the mapping of preferences, aspiration levels and communication goals onto quantitative response categories is not only subject to deliberate strategies but also to various sources of fluctuation (cognitive, perceptual, environmental; cf., Thurstone, 1927a, 1927b; Torgerson, 1958).

As a consequence, rather than a single fixed value, response categories encompass a distribution of variable responses to a stimulus object – there is no sole, single reasonable price for a glass of wine, but a range encompassing all nuances of prices that are considered reasonable in a given moment. The difference between the upper and lower boundary of such

a distribution – indicated by maximal and minimal category value – provides an index for the response category's width. In practice, this view on response categories implies that high and low widths reflect wide and narrow distributions of psychological responses to a stimulus object, respectively. Thus, while a connoisseur may have a very narrow range of what prices he or she deems reasonable for a certain wine, a person less familiar with wine may form wider tolerance limits to quantify the same stimulus attribute.

The central aim of the present research is to shed light on one particularly important determinant of the category formation process. Namely, we investigate the impact of psychological distance and construal level (Trope & Liberman, 2003, 2010) on the width of response categories used for quantitative judgments. Based on five experiments, we propose that response category width – operationalized as the difference between a minimal and maximal estimate of a stimulus attribute – affords a natural approach to measuring and understanding the psychophysical underpinnings of construal levels.

Numerous studies have established an intriguingly wide range of findings from various research areas in regard to distance and construal level, including perception (Förster, Friedman, & Liberman, 2004), preference formation (Trope & Liberman, 2000), action identification (Liberman & Trope, 1998), personal values (Eyal, Sagristano, Trope, Liberman, & Chaiken, 2009), and self-control (Fujita, Trope, Liberman, & Levin-Sagi, 2006). However, less attention has been devoted to examining how construal level itself can be traced back to elementary cognitive processes. By proposing response category width as a psychophysical manifestation of construal level and distance, the present research aims to fill this void in the literature.

Basic Assumptions of Construal-Level Theory (CLT)

CLT can be conceived as a comprehensive theory linking psychological distance and construal levels. Depending on whether a judgment object or decision problem is far away (in time, space, probability, or social distance) or close to our own here-and-now position, we can

either focus on few global and essential aspects of a schematic, abstract reality or we can form a more local picture that includes many details and complicating features that often deviate from the idealized and simplified schemes. This zooming ability is presumably of great adaptive value. It allows us to either abstract from local and subsidiary details and context conditions in order to keep track of distal goals or to increase the resolution level so that more contextualized details become visible and finer distinctions possible, whenever a more contextualized short-distance view is needed.

Empirical evidence for CLT. Corroborating evidence for the functional importance of this kind of distance regulation stems from numerous experiments showing that from a distal perspective judgments and decisions rely more on abstract, idealized, low-dimensionality models of reality (Liberman, Sagristano, & Trope, 2002) and give more weight to superordinate attributes and causal origins (Rim, Hansen, & Trope, 2012) and lesser weight to subordinate attributes and incidental consequences (Nussbaum, Liberman, & Trope, 2006) than from a proximal perspective. As a consequence, manipulations of construal level or cognitive distance have been shown to trigger a number of judgment biases, decision anomalies, and preference reversals (see e.g. Sagristano, Trope, & Liberman, 2002; Trope & Liberman, 2000; Zhao & Xie, 2011).

Given the central assumption of a bi-directional relationship between psychological distance and construal level, empirical research relies heavily on appropriate methods to measure construal level. Although in the published literature linguistic abstractness is certainly the most commonly cited measure of construal level (Fujita, Henderson, Eng, Trope, & Liberman, 2006), some studies have resorted to other measures, such as the number and inclusiveness of semantic categories in a sorting task (Liberman et al., 2002), the spontaneous reference to large or small measurement units (Maglio & Trope, 2011), the restrictive or creative span of associations (Förster et al., 2004; Jia, Hirt, & Karpen, 2009), or the sensitivity for local versus global features in perception (Förster et al., 2004; Liberman & Förster, 2009).

However, hardly any prior research has investigated what might be considered one of the most natural and straightforward measures of construal level in the context of quantitative judgment tasks, namely, the direct estimation of category width conceived as the difference between separate estimates of a stimulus attributes' upper and lower boundary.

Construal level and category width. In order to understand why psychological distance and construal level would affect such quantitative judgment tasks, it is necessary to first analyze the relativity of judgments in the context of psychological scaling (Thurstone, 1927a) and personal reference scales (Upshaw, 1969a). Intriguingly, judgments of the same person's life satisfaction (Parducci, 1984), the same consumer products (Mellers & Cooke, 1996), and invariant decision prospects (Stewart, Chater, Stott, & Reimers, 2003) depend heavily on the comparison level and the tolerance limits of the reference scale that is applied to the decision at hand. Consider, for example, again the judgment category "reasonable prices". Can \$10 for a coffee be categorized a reasonable price? Most people would probably deny and refrain from buying such a drink. However, priming people with luxury-related images or even more inflated prices of luxury products, or telling them that other people have already bought such a \$10-coffee, may cause an upward shift in people's internal reference scale. As a consequence, a price of \$10 may become acceptable on such an elevated reference scale. Note that no invariant answer exists to the question of whether \$10 per se is an acceptable price or not. "Acceptable prices" is a malleable response category that is formed ad hoc in a given situation for the purpose of making, for instance, a buying decision about one particular coffee. Moreover, reference scale effects in price judgments do not depend on changes in the semantic memory representation of the target object (i.e., the coffee for \$ 10). Even when knowledge about the coffee remains identical, shifts in the reference scale can lead to different judgments.

Now consider the impact of distance on the formation of the response category "reasonable prices". In the same way as comparison objects or priming can cause shifts in the

midpoint, we expect distance to affect the width of the category. Hardly anybody would buy a \$10 coffee in his or her hometown. However, in a foreign country, with a different culture, currency, and culinary norms, one may loosen the category limits and consider a very high price acceptable or an extremely low price still possible. We may be sure that \$10 is unacceptable for ourselves, but when making the same judgment for a (socially distant) co-worker, we may be less sure and, from his perspective, \$10 may well be a reasonable price.

More generally, we assume that people adjust their reference scales to the construal and distance of a stimulus object. Response categories do not stay invariant, when an object is mentally represented as concrete versus abstract or close versus distant. Instead, people increase their tolerance limits and thus their response category width with increasing distance and construal level, because distance and construal level are necessarily related to the amount of specific knowledge and certainty. The proximal end of the distance continuum is defined by direct experience (Trope & Liberman, 2010). People have a lot of specific knowledge about proximate objects because they encountered them repeatedly. In contrast, most distal objects have never been directly experienced and, therefore, judgments about these involve ambiguity and uncertainty. In fact, our visual perceptive system in and of itself is built for the regulation of informational density and uncertainty as a function of (spatial) distance: The further an object is removed from an observer, the blurrier the visual input gets and the higher the ambiguity about it. The link between distance and knowledge recently received support from studies demonstrating conceptual associations between construal level, psychological distance and the amount of information available (darkness vs. brightness; Steidle, Werth, & Hanke, 2011). People engage in broad, global processing when they encounter remote or unfamiliar objects that have not been experienced before (Förster, Marguc, & Gillebaart, 2010).

In a similar vein, we expect construal level to be linked to category width. Naturally, people can be less precise about estimating the duration of a *sports event* in comparison to a

basketball game, or when judging the aggressiveness of an *act of hostility* in comparison to an *insult*. Just like for distant objects, people are less knowledgeable about the concrete attributes of high-level construals – which by definition omit precise information. As a result, people take a wider range of possibilities into account when judging the attributes of an abstract target, which is composed of many specific instances, as compared to a concrete one.

Research on Parducci's (1965) range-frequency model supports our reasoning about knowledge and category width. According to this model, people split up crude categories into more fine-grained ones (i.e., they reduce category width), when they encounter increasingly more instances of that category (i.e., when a category's frequency increases). As more specific knowledge is available for close and low-level targets, we similarly expect people to narrow down the category width of those targets. In a classical study, Hovland and Sherif (1952) provide evidence for this idea by demonstrating that people are more restrictive in accepting statements that are close to their own opinion than in rejecting statements that are not. The distribution of response categories is skewed: People use narrow categories for judging stimuli at the psychologically close end (i.e., close to their own opinion) and crude categories at the psychologically distant end of the attitude dimension.

Overview of the Present Studies

In five experiments, we investigate the influence of psychological distance (Studies 1, 2 and 3) and construal level (Studies 4 and 5) on category width. In particular, participants are presented with stimulus objects and estimate the upper and lower boundary of a quantitative attribute of each object as a measure of category width. We manipulate the object's spatial distance (Studies 1 and 3), likelihood (Study 2) and construal level (Study 4) or participants' mindset construal level before they approach the estimation task (Study 5). If differences in category width are indeed a fundamental characteristic of distant versus close objects and high- versus low-level construals, we expect participants' interval estimates to increase with increasing distance and construal level.

For two reasons, we believe that such a study makes a valuable contribution beyond previous research. First, at the theoretical level, we are convinced that demonstrating the impact of construal level on category width does not merely add another item to an already long list of manifestations of distance and abstractness. Rather, direct interval estimates on quantitative judgment scales afford a natural means of establishing one of the central psychophysical underpinnings of construal level and distance that may foster understanding of a wide variety of related findings. Indeed, assuming that response categories become wider with increasing construal level offers a straightforward explanation why high-level (low-level) processing is associated with a focus on (dis-)similarities (Förster, 2009), why priming global (local) perception styles fosters assimilation (contrast; Förster, Liberman, & Kuschel, 2008), why people include more (less) instances in a semantic category that is distant (close; Liberman et al., 2002), why broader (narrower) associations are formed in distant (close) tasks (Förster et al., 2004), and why stereotyping is more (less) pronounced in high-level (low-level) mindsets (McCrea, Wieber, & Myers, 2012).

Second, the interval judgment paradigm in and of itself is of practical importance, and has face validity for a number of real-life settings. In marketing and consumer behavior, interval estimates (e.g., of minimally and maximally acceptable prices) determine the acceptance of various brands and markets (Dost & Wilken, 2012). In social psychology, the width of the categories used to identify elderly, handicapped, or criminal people reflects tolerance and moderates the impact of stereotypes and discriminatory behavior (Dovidio & Gaertner, 1999). Or, in decision research, interval construction tasks have been shown to produce particularly strong overconfidence effects (Juslin, Winman, & Hansson, 2007). Extending construal-level research to interval-estimation therefore raises new implications for applied fields such as marketing, stereotyping, and overconfidence. Moreover, for future research interval judgments afford a practical and natural quantitative assessment of construal

levels, going beyond linguistic measures of abstract versus concrete language, or general preferences for global versus local, or desirable versus feasible stimulus aspects.

Study 1

Study 1 was designed to investigate whether the width of a response category is adjusted to the geographical distance of a target item. Participants were provided with a series of visual stimuli (bridges) and their task was to provide upper and lower boundary estimates about a quantitative stimulus attribute (length) as a measure of category width. We expected response categories to be wider, hence interval judgments to be larger, when the objects were located in a spatially distant (France) rather than close location (USA). By applying (and sometimes over-generalizing) the rule that wider categories are required to judge distal rather than proximal objects, participants should broaden their mental unit size and apply larger categories when providing responses for distal as compared to proximate targets.

Method

Participants. Forty-four US-American participants were recruited via Amazon's Mechanical Turk online platform (MTurk; 22 women, age $M = 33.62$ years, $SD = 9.24^3$) and paid 0.50 USD for their participation (see Buhrmester, Kwang, & Gosling, 2011, for information regarding MTurk). Participants were randomly assigned by the computer program to either the USA (low spatial distance) or the France (high spatial distance) condition.

Materials and procedure. At the beginning of the online study participants were informed that their task in the present study was to estimate the length of several bridges. Each participant was instructed to provide interval estimates, that is, a minimal and a maximal estimate for each bridge's length and worked on a sample item. Next, participants read the following sentence as a manipulation of the target objects' spatial distance: "*All the bridges you will be presented with are located in the United States [France] and, from an*

³ Demographic data from two participants is missing due to a technical error. In this and all other studies only English-speaking, US-American participants who completed the entire survey were accepted as participants, following common guidelines on how to use MTurk (Goodman, Cryder, & Cheema, 2012).

architectural perspective, represent typical examples of bridges from this region.”

Additionally, participants were asked to write a few words about American (French) architecture in order to make sure that they took sufficient note of the spatial distance manipulation.

The main task consisted of 12 web pages presented in a random order. Each page was composed of a large photo displaying a bridge (see Figure 1) and the dependent measure below. Dependent on condition, the bridges either had English (e.g. *Sunderland Bridge, West Gate Bridge*) or French names (e.g. *Pont Saint-Louis, Pont de l'Archevêché*). Participants had to provide their interval estimates by answering questions of the following format: “*The Sunderland Bridge [Pont Saint-Louis] is in between ___ft. and ___ft. long*”. After answering all 12 items, participants filled out demographics, were thanked for their participation and received their payment electronically via Mechanical Turk.

Results and Discussion

In order to assess category width, we first subtracted the lower-boundary from the upper-boundary estimate for each of the twelve bridges. Since bridges differed greatly in terms of their actual lengths, scores were first *z*-standardized separately for each bridge and then summed up ($\alpha = .91$). One participant was excluded from data analysis for generating negative intervals (including this participant does not change level of significance in the reported analysis).

As predicted, psychological distance did affect category width. Participants formed larger response categories when the bridges were ostensibly located in France ($Z = 3.96$) as compared to the USA ($Z = -2.34$), $t(41) = 2.79$, $p = .008$, $d = .78$. A descriptive analysis reveals that in each of the twelve items category widths were larger in the high spatial distance condition.

Results indicate a clear pattern confirming our central hypothesis. Wider response categories were formed when the bridges were framed as psychologically distant rather than

close. Notably, the stimulus objects themselves – the bridges – did not differ between conditions. Providing information about a bridge's location was sufficient to affect participants' reference scales that they used for generating their numerical estimates. As a consequence, interval widths differed as a function of distance.

Study 2

The central aim of Study 2 was to generalize the findings obtained in the previous study to another dimension of psychological distance: Likelihood. According to CLT, there are four distance dimensions, which are interrelated and share a common underlying meaning (Bar-Anan, Liberman, Trope, & Algom, 2007; Fiedler, Jung, Wänke, & Alexopoulos, 2012; Trope & Liberman, 2010). Therefore, we expected the likelihood of an object to be similarly linked to response category width as spatial distance. To test this prediction, participants saw the same series of bridges that was already used in Study 1. However, this time we added several optical filters in an image processing program (Paint Shop Pro X, Corel Corporation) in order to make the original photographs look like computerized planning sketches (see Figure 2) that could either exist in reality (high likelihood condition) or not (low likelihood condition).

Method

Participants. Eighty US-American participants were recruited via MTurk (32 women, age $M = 31.74$, $SD = 9.07$), paid 0.50 USD for their participation in this study and randomly assigned to either the high likelihood or the low likelihood condition.

Materials and procedure. The experimental procedure was consistent with the previous study except for the following changes regarding the manipulation of psychological distance. In particular, at the beginning of the experiment, participants either read that “*All the bridges in the sketches we will present you have finally been built*” or that those bridges “*have not been built yet*”. Participants saw the same twelve bridges as in the previous study, but several optical filters were added to the photographs to be able to convince participants that

they were seeing digital planning sketches of bridges, which may or may not exist in reality. Critically, all participants saw the same twelve sketches when they provided their interval estimates. However, half of them thought that the bridges actually exist, while the other half thought that they do not exist yet. In the end of the study, participants were probed for suspicion about the images, answered demographics and received their payment via MTurk.

Results and Discussion

Following Study 1's procedure, category width was computed by subtracting the estimated minimum from the estimated maximum, z-standardized and summed up over all twelve items ($\alpha = .93$). Two participants were excluded from the analyses for providing negative interval scores, and two participants reported to not believe our cover story about the sketches (including these participants does not affect the level of significance).

Using a likelihood rather than a spatial distance manipulation, results from the Study 1 could be replicated. Participants provided wider response categories, when the bridges were presented as unlikely ($Z = 2.83$) rather than likely ($Z = -2.76$), $t(74) = 2.81$, $p = .006$, $d = .65$.

Studies 1 and 2 provide convergent evidence for the idea that people attune their internal reference scale to the psychological distance of an object to be judged. An increase in the distance of a target object leads to an increase in the coarseness of the reference scale that is used for providing a judgment about it. Thus, response categories are wider for distal than for proximate targets. Note that such reasoning is not concerned with the underlying mental representation of the target object in the first place. Although we do not want to preclude the possibility that different semantic categories can be chosen in order to represent a bridge (e.g. overpass, footbridge), we believe that the obtained results can more reasonably be explained in terms of response categories. The items to be judged were permanently visible to the participants and all information was directly accessible in the photographs. Thus, above all, the estimation task was about the scaling of a numerical estimate.

Study 3

Study 3 extended the results obtained so far, by investigating the distance-width association in a different judgment domain. In particular, participants' task was to provide quantity estimates about the number of individual items in a food bowl. Based on our theoretical reasoning, we expected participants to provide wider response categories when the foods were framed as spatially distant rather than close. Moreover, after judging all items we asked participants to rate their general confidence about the estimates they had just given. When people indeed use category width in order to compensate for differences in certainty about distal versus proximate targets, subsequent confidence judgments should be equally high, because certainty differences are already communicated by respective interval widths (cf. Klayman, Soll, Juslin, & Winman, 2006; Yaniv & Foster, 1995). Thus, we expected differences for category width but not for subsequent confidence judgments.

Method

Participants. Sixty-five US-American participants were recruited using MTurk (27 women, age $M = 36.89$ years, $SD = 11.4$). Participants received 0.50 USD for their participation and were randomly assigned to either the USA (low spatial distance) or France (high spatial distance) experimental condition.

Materials and procedure. After reading the instructions and seeing a sample item, participants were asked to write a few words about the American or French cuisine to ensure they paid sufficient attention to the spatial distance manipulation. The subsequent estimation task consisted of 10 web pages that were presented in random order and displayed photographs of bowls and boxes filled with different kinds of fruits, nuts or vegetables (see Figure 3). Dependent on experimental condition, the food items were either labeled in English (*cherries, hazelnuts, blueberries*) or French (*cerises, noisettes, brimbelles*) with the English translations following in parentheses. Below each photograph participants filled out the main dependent measure: "There are in between ___ and ___ cherries [*cerises (cherries)*] in the

box.”. After providing interval estimates for all 10 foods, participants indicated their overall confidence about the judgments they had given on a 9-point Likert scale ranging from *very unconfident* to *very confident*. Upon answering the confidence item they filled out demographics, were thanked for their participation and received their payment via Mechanical Turk.

Results and Discussion

A sum score of category width based on the 10 individual items was computed following Study 1’s procedure ($\alpha = .95$). As predicted, the spatial distance manipulation affected category widths. When the foods were presented as spatially distant ($Z = 1.63$) higher interval estimates were provided than when the same items were presented as spatially close ($Z = -1.58$), $t(63) = 2.06$, $p = .044$, $d = .54$. A descriptive analysis revealed the robustness of the experimental effect: The same ordinal pattern was found in each of the ten items used in the experiment.

Next, we analyzed participants’ final confidence ratings about their judgments. Not surprisingly, confidence was negatively correlated with category width, thus validating the measure, $r(65) = -.40$, $p = .001$. The negative sign of the correlation implied that participants generated larger intervals when they felt less confident about their estimates. Most importantly, however, confidence and psychological distance (coded $0=USA$, $1=France$) were unrelated, $r(65) = -.01$, ns. Thus, participants from both experimental conditions rated their confidence equally high, though their interval estimates differed in width. Apparently, any certainty differences related to a target object’s distance had already been expressed through appropriate adjustments of category width.

Study 3 corroborates the results obtained in the first study two studies. Increasing the psychological distance of a stimulus increases the coarseness of the reference scale that is used for providing a quantitative judgment about it. Importantly, results from the previous studies were replicated in a different judgment domain.

Study 4

So far, we established a consistent relationship between psychological distance and category width. As CLT proposes similar implications for construal level, (Trope & Liberman, 2010), Study 4 was designed to investigate how construal level affects category width. In particular, the same estimation task as in Study 3 was used, but this time the foods were either given an abstract category or a concrete exemplar label as a manipulation of construal level (cf. Bar-Anan, Liberman, & Trope, 2006; Fujita, Trope, et al., 2006; Wakslak & Trope, 2009). By their very definition, low-level construals put an emphasis on the specific details of an object, while high-level construals highlight its core meaning, function and goals (Trope & Liberman, 2010). Hence, the former are more suitable for narrowing down quantitative judgments than the latter, which is why we expect participants to use more fine-grained reference scales and to provide more precise judgments when low-level rather than high-level information is activated.

In the end of the study, after finishing the estimation task, participants answered an edited version of the *Behavioral Identification Form (BIF, Vallacher & Wegner, 1989)* as a check on the construal level manipulation. The BIF affords a linguistic measure of a person's current mindset abstractness (Fujita, Henderson, et al., 2006; Liberman & Trope, 1998).

Method

Participants. Sixty-six US-American participants agreed to take part in the study for 0.50 USD via MTurk (29 women, age $M = 32.36$ years, $SD = 12.18$) and were randomly assigned to either the category or the exemplar condition.

Materials and procedure. Materials and procedures were identical to Study 3 except for the two following changes regarding the experimental manipulation and the manipulation check. First, the construal level of the foods was manipulated by framing the items either in abstract categorical or concrete exemplar terms. Specifically, the photographs were either abstractly labeled as *fruits*, *nuts* or *vegetables* (high-level construal) or concretely denoted as

blueberries, pine nuts or beans (low-level construal). Labels appeared on top of each photo and were included in the question about the item quantity (“*What do you estimate the quantity of the blueberries [fruits] to be?*”).

Second, upon finishing the main task, participants answered a four item questionnaire that evaluated their preferences for abstract versus concrete linguistic expressions. The questionnaire was constructed according to the BIF principles (Vallacher & Wegner, 1989), a widely used tool for assessing a person’s construal level. In particular, each item consisted of a behavioral episode that was followed by one ends-related (high-level) and one means-related (low-level) alternative redescription of that behavior. One of the items was taken directly from the original questionnaire (*eating*) and three additional ones were created in accordance with the food-related cover story of the experiment (*sticking to a diet; going to the gym; having a healthy nutrition*, $\alpha = .56$). For instance, participants had to indicate whether they preferred *being healthy*” (high-level, coded as 1) or *“eating less”* (low-level, coded as 0) as an alternative identifications of *“sticking to a diet”*.

Results and Discussion

Scores were standardized and summed up as in the previous studies ($\alpha = .93$). We predicted higher category widths when the items were presented in categorical rather than exemplar format. Our expectations were confirmed. When the foods were framed abstractly as fruits or vegetables participants provided higher category widths ($Z = 1.81$) than when the items were framed on a more concrete level as blueberries or beans ($Z = -2.26$), $t(64) = 2.30$, $p = .025$, $d = .57$. Again, the same ordinal pattern was obtained in each of the ten items.

Moreover, we expected the preceding construal level manipulation to carry over to the subsequent BIF questionnaire (cf. Fujita & Roberts, 2010). Indeed, participants in the category condition indicated relatively stronger preferences for the high-level action identifications ($M = 2.56$) than participants in the exemplar condition ($M = 1.85$), $t(64) = 2.30$, $p = .025$, $d = .57$. Thus, the abstract versus concrete labeling of the foods did affect

participants' construal level at which they represented the items. Taken together, Study 4 provides convincing evidence that response category width do vary as a function of both, psychological distance and construal level.

Study 5

Thus far, our studies have demonstrated that manipulating the psychological distance and the construal level of a target object affects interval estimates about its attributes. Study 5 was designed to go beyond these results by manipulating participants' general mindset construal level independent of the target object itself. Previous research demonstrated repeatedly that construal level mindsets can be activated experimentally, affecting at what construal level objects are processed subsequently (see, e.g. Freitas, Gollwitzer, & Trope, 2004; Fujita, Trope, et al., 2006; Liberman, Trope, McCrea, & Sherman, 2007). One of the advantages of such task-unrelated mindset manipulations is that a-priori differences regarding the target (i.e., any differences independent of the experimental manipulation) can be ruled out as an explanation for later effects. Accordingly, in Study 5, participants first answered several how- or why-questions about maintaining physical health as a mindset manipulation of construal level (cf. Freitas et al., 2004) and then provided category width estimates of ten estimation problems.

Method

Participants. One hundred seventy US-American participants (86 women, age $M = 35.60$ years, $SD = 12.01$) agreed to participate in the present study via MTurk for 0.50 USD and were randomly assigned to either the how- (low-level construal) or the why-condition (high-level construal).

Materials and procedure. At the beginning of the experiment, participants read that their task was to work on two ostensibly unrelated questionnaire studies, which in fact were the experimental manipulation and the dependent measure. After reading the instruction, participants worked on the mindset manipulation (adapted from Freitas et al., 2004). In

particular, participants in the low-level construal condition were asked to provide four increasingly specific answers to the question “How can you improve and maintain your physical health?”. Participants in the high-level condition, in contrast, had to provide four increasingly abstract reasons for “Why should you improve and maintain your physical health?”. As the former task is about providing concrete means whereas the latter task is about generating abstract ends, the tasks prime low- and high-level construal, respectively.

Next, participants received the dependent measure that consisted of ten estimation problems. For instance, participants were asked to estimate “How many peanuts make an average 18 oz jar of peanut butter?”, “What amount of gasoline does a typical automobile use during its lifetime?”, or “How many e-mails are sent every day? (including spam, advertising, etc.)”. For each question, they could indicate their answers by moving two sliders on a scale. One slider was blue-colored and labeled “min.”, the other one red-colored and labeled “max.”. The scale was a 300 pixel long horizontal bar with only the two endpoints being labeled. The endpoints of each item’s scale were determined in a pretest of one-hundred participants who provided a simple mean estimate for each item. From the respective distributions of answers for each question, the 15th and the 85th percentile were rounded and taken as lower and upper endpoints, respectively. Thus, for instance, for the scale of the number of peanuts to make a jar of peanut butter, the pretest determined 100 peanuts and 3,000 peanuts as endpoints; for the amount of lifetime gasoline usage, the pretest yielded 4,000 and 50,000 gallons. To make participants familiar with the item format, they first worked on a sample question explicating the instructions in detail. Participants were informed to “Please move both sliders to provide a minimal estimate and a maximal estimate” and to click a next-button when they were satisfied with their final slider positions. Then, they worked on the ten estimation problems. The computer program coded the final slider position on a scale from 1 (lowest possible value) to 100 (highest possible value). After providing interval estimates for all ten questions, participants filled out demographics and were thanked for their participation in the study.

Results and Discussion

Category width scores were obtained by subtracting the position of the minimum-slider from the position of the maximum-slider. Thus, scores could potentially range from 0 (both slider have the identical position) to 99 (the minimum- and the maximum-slider positions at the lower and upper end of the scale, respectively). Negative intervals due to participants mixing up the two sliders were transformed into positive scores (overall, this applied to 4.2% of all answers). Finally, an average interval width over all ten items was calculated for each participant, $\alpha = .90$.

We expected the generation of concrete means as opposed to abstract ends in the mindset priming task to affect the width of the intervals in the subsequent estimation task. A mean comparison of participants' interval sizes confirmed our expectations, $t(168) = 2.23, p = .027, d = .34$. Participants provided wider intervals after having worked on the why- ($M = 29.64$) as compared to the how-version ($M = 25.69$) of the mindset priming task.

Study 5 substantiates the evidence for an association of construal level and response category width. Manipulating participants' mindset construal level, interval widths in a subsequent estimation task were wider when they were based on high-level as compared to low-level construals. Thus, Study 5 supports the idea that construal level per se is sufficient for affecting response categories, also when it is not related to the target object whatsoever.

General Discussion

People attune their mental scales and response categories to an object's distance and construal level. When an object is moved away from someone's egocentric perspective or when it is construed at a higher level of abstraction, people adjusts their mental space by widening response categories. Coarse units are used to characterize the vagueness of the abstract and distant, and fine-grained units are used to capture the specificity of the concrete and close. In support of this notion, five studies have shown that, first, a wider range of lengths becomes acceptable when estimating bridges in a distant versus close (Study 1) or

unlikely versus likely context (Study 2). Second, the number of food items in a bowl is judged with a higher category width from a distant as compared to a close perspective (Study 3). Third, wider intervals are generated when food items are described in high-level terms (Study 4). Finally, high construal level mindsets increase interval widths in a series of subsequent estimation problems (Study 5).

Many scholars have argued and empirically demonstrated that less is known about the distant than the near, because the former is by definition less often part of one's direct experience (Bar-Anan et al., 2006; Bar-Anan et al., 2007; Fiedler, 2007; Hamilton & Thompson, 2007; Steidle et al., 2011; Wakslak, Trope, Liberman, & Alony, 2006). As a consequence, judgments from a distant perspective involve a higher degree of ambiguity and uncertainty. To compensate for such differences, people attune their internal reference scales to the context in which the judgment takes place. Just like an experienced real estate agent can be more precise about judging the value of an apartment than an inexperienced prospective buyer, people are able to scale objects in terms of more fine-grained units when these are close to them rather than distant. Intriguingly, they exhibit this behavior even in situations where the factual amount of information is constant and only specific cues allude to an object's experiential distance, like in the studies presented.

In a similar vein, high-level construals allow for higher latitude than low-level construals, because they disregard an object's specific details for the benefit of emphasizing abstract information such as goals, functions and meanings. While concrete low-level information narrows down the perspective and allows for differentiations at a relatively high resolution level, high-level information is less instrumental for precise judgments as it focuses on general aspects that most objects have in common. Everybody has a relatively precise idea of a *coffee cup* and the simple fact that it is used for drinking coffee limits most of its attributes (such as size, content, or value) considerably. The more abstract construal *container*, however, puts an emphasis on the object's basic function, and consequently lacks

most of the details, which would be central for narrowing down concrete inferences about it. Containers can have many sizes and can differ greatly in terms of their contents and values. As a result, even if the object is the same, construing it as a coffee cup and not as a container renders its details more accessible and decreases the possible shapes it may assume. As the present research demonstrates, people do justice to this higher specificity by adjusting their internal response scales to the object's construal level.

Implications for Construal Level Theory

At the theoretical level, the concept of category width is pivotal for gaining insights into the psychophysical underpinnings of construal levels. Much research has been concerned with antecedents and consequences of construal level and distance (for an overview, see e.g., Trope & Liberman, 2010). However, at the “algorithmic level” (Marr, 1982) it is less established how construal level can be conceptualized beyond verbal descriptions. In accordance with the five studies presented, we suggest the width of response categories as one fundamental property of psychological distance and construal levels.

Past CLT research has not made an explicit distinction between semantic categories and response categories. Does the notion of construal level pertain to the abstractness with which a whole semantic category is represented or is it useful to consider the width or grain size of response categories in distinct attribute dimensions? Indeed, some findings demonstrate that high distance or construal level sensitizes people for different attributes (value, primary attributes) than low distance or construal level (probability, secondary attributes). The notion of category width, in contrast, affords a straightforward measure of people's sensitivity to specific quantities. In any case, the reported results suggest that it is worthwhile studying the influence of construal level on the properties of reference scales used for quantitative judgments. Future studies will have to clarify the specific processes through which construal level and distance affect response scales. Our research suggests knowledge-based certainty as one of the critical mediating factors. Future experiments may investigate

this relationship more closely and establish additional factors that explain the construal level-width association.

At a more pragmatic level, our studies have profound implications for conducting construal level research. Construal level is often measured by assessing a participant's general mindset abstractness. For instance, in the classical Navon letter task participants' reaction times toward global stimuli are compared with their reaction times toward local stimuli (Navon, 1977), the Behavioral Identification Form asks for preferences of means-related over ends-related behavioral descriptions (Vallacher & Wegner, 1989), and the Kimchi-Palmer figures test refers similarity judgments about geometrical figures to global or local features (Kimchi & Palmer, 1982). These tasks afford useful tools for assessing a participant's current mindset level of construal. However, in regard to specific stimulus objects, they must be considered rather indirect measures, as they do not directly tap into a person's representation of a particular object in a given context. We suggest category width as an easily applicable measure that is able to fill this void. Asking participants to provide interval estimates about an object's attributes represents a straightforward approach to measuring construal level.

Category Width as an Explanatory Construct

As the present research is concerned with a fundamental manifestation of distance and construal level, the concept of category width may add one more layer of understanding to other prevailing areas of related research. For instance, in a series of experiments Förster (2009) demonstrated a general link between global (local) processing and a focus on similarities (dissimilarities). Applying the notion of category width in future research may shed light on this intriguing relation: According to the present results, an increase in a person's processing level should lead to larger category widths. As broader, less restrictive categorization reinforces the recognition of similarities (Wallach, 1958) and as objects being categorized together are judged to be more similar (Goldstone, Lippa, & Shiffrin, 2001), the

interplay of global (local) processing and similarity (dissimilarity) focus may reflect the usage of wider (narrower) response categories.

A parallel argument can be made for the link between construal level and assimilation versus contrast (see Förster et al., 2008). Schwarz and Bless' (2007) inclusion-exclusion model suggests that assimilation occurs when information is included in a category whereas contrast occurs when it is excluded from it. As including an exemplar into a category essentially requires a broad conceptual scope (Isen & Daubman, 1984; Liberman et al., 2002), category width may assume an important mediational role in construal level's link to assimilation versus contrast. In support of this notion, the importance of category width for assimilation versus contrast has recently been demonstrated in consumer decision making: When a target's range (e.g., the perceived prestige range of a new car) is wide enough to overlap with its context (e.g., the prestige range of other cars), assimilation occurs. However, when it is too narrow to overlap, the object is contrasted away from its context (Chien, Wegener, Hsiao, & Petty, 2010).

Conclusion

The present research suggests response category width as a psychophysical underpinning of construal level and distance. Variation in category width can have important practical consequences on social categorization and discrimination, the perception of normality, and acceptance or tolerance limits in various domains of life. Therefore, the notion of category width is not only theoretically relevant for CLT, but in and of itself a vital component for understanding categorization – one of human's most fundamental and pervasive cognitive capacities.

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Figures



Figure 1. Item used in Study 1. Participants' task was to provide an interval estimate of the bridge's length. Dependent on condition, this photograph was either presented as "*Tamar Bridge*" (spatially close) or "*Pont au Change*" (spatially distant).



Figure 2. Item used in Study 2. The images were introduced as digital planning sketches and participants were either told that the bridges actually existed (high likelihood) or not (low likelihood).



Figure 3. Item used in Studies 3 and 4. Participants' task was to provide an interval estimate of the quantity of blueberries in the bowl. In Study 3, the photograph was either presented as “blueberries” (spatially close) or “brimbelles (blueberries)” (spatially distant). In Study 4, the photograph was presented as “blueberries” (exemplar) or “fruits” (category).

Latitude of Price Acceptance Across Psychological Distance

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Abstract

Whenever products are offered across different vendors, locations, or points in time, psychological distance is necessarily involved in the decision process. The present research investigates the consequences of these distances for consumers' price expectations and offer evaluations in terms of latitude of price acceptance (LPA). LPA defines the range of prices a consumer expects to pay for a certain product. Results indicate that with increasing spatial distance (Study 1), social distance (Study 2), and construal level (Study 3), consumers increase their LPA. A causal chain of experiments and a statistical mediation analysis (Studies 4 and 5) demonstrate that it is consumers' lower knowledge of typical prices in distant versus close locations that mediates the influence of distance on LPA. The consequences of distance-evoked differences in LPA for price evaluations and purchase intentions are investigated (Studies 4 and 6): Acceptability thresholds matter particularly for elevated (vs. average) prices at the boundary (vs. the center) of consumers' LPA such that expensive offers are more likely to be accepted from a distant perspective.

Price assessments and purchase decisions across psychological distances are ubiquitous. Goods from virtually any product class can be ordered from an abundance of different places. Consumers can choose whether they want to buy locally or purchase the very same product from a different city, a different country, or even a different continent. Traders must decide which offer is the best, when comparing commodity prices across vendors. Legal agreements and derivative markets make it possible to commit to purchase decisions months and years in advance. And consumers traverse social distances, when differentiating between their own and other people's, or between a friend's and a stranger's property. Indeed, whenever alternatives are available across different locations, times, or providers, psychological distance is necessarily involved in a decision.

Drawing on Construal level theory (CLT; Liberman & Trope, 2008; Trope & Liberman, 2010) as a comprehensive theory of psychological distance, the objective of the present research is to investigate the effects of these distances on consumers' price expectations, price evaluations and purchase decisions. Based on the idea that consumers feel less knowledgeable about prices in psychologically distant locations, we argue that their latitudes of acceptable prices increase with increasing psychological distance – a wider range of prices is considered acceptable when distance is high rather than low. As a consequence, evaluations of specific retail prices should vary with distance, too. With increasing acceptability limits, consumers should be more likely to accept elevated (vs. average) prices at the upper threshold (vs. the center) of their acceptability range and, therefore, they should be more likely to purchase products at such an elevated price level. Six studies will investigate these ideas experimentally.

Conceptual Background

The price that a consumer expects to pay for a specific product or product class when entering a store defines an critical reference point to which external retail prices are compared (Kalyanaram & Winer, 1995). Internal reference prices express powerful comparison

standards and tolerance limits that are used to evaluate the attractiveness of retail prices and, ultimately, to determine purchase decisions (Chandrashekar & Jagpal, 1995; Klein & Oglethorpe, 1987; Kumar, Karande, & Reinartz, 1998; Mayhew & Winer, 1992; Mazumdar, Raj, & Sinha, 2005; Winer, 1986).

Importantly, consumers do not hold a single, unitary representation of an internal reference price for a specific product. Rather, they embrace an entire range of acceptable values in the form of a reference price interval to express their price expectations (Cheng & Monroe, 2013; Janiszewski & Lichtenstein, 1999; Kalyanaram & Little, 1994; Monroe, 1971; Raman & Bass, 2002). This interval is referred to as a consumer's *latitude of price acceptance* (LPA). It is identified by the difference between the upper and the lower threshold of expected prices.

Latitudes of Acceptance

At a more general level, the concept of *latitudes of acceptance* originates in the literatures on psychophysical measurement (Thurstone, 1927a, 1927b; Torgerson, 1958) and social judgment theory (M. Sherif & Hovland, 1961; M. Sherif, Taub, & Hovland, 1958). In these literatures, latitude of acceptance is defined as “that range of stimulus values judged acceptable” with regard to a certain stimulus category (C. W. Sherif, 1963, p. 148). In psychophysics, latitudes of acceptance characterize the range of magnitudes or the “region” on a physical (e.g., weight, brightness) or social stimulus continuum (e.g., attitudes, evaluations, political orientations) associated with the same psychological response. Latitudes of acceptance are fundamental to virtually all evaluative processes as they determine what is considered acceptable or unacceptable, what is judged as good or bad, or whether to purchase a product or not (e.g. Hovland, Harvey, & Sherif, 1957).

Latitude of Price Acceptance

In consumer research, the notion of latitudes of acceptance received particular attention with regard to reference prices (Kosenko & Rahtz, 1988; Lichtenstein & Bearden,

1989; Lichtenstein, Bloch, & Black, 1988; Mazumdar & Jun, 1992; Rao & Sieben, 1992; C. W. Sherif, 1963). According to range theory (Volkman, 1951; see also Janiszewski & Lichtenstein, 1999), LPA is pivotal for evaluating specific retail prices, because it determines whether offers are accepted or rejected. From this perspective, the upper and lower threshold of a reference range serve as critical reference points that people use to determine the value of any given stimulus within that dimension (Ostrom & Upshaw, 1968; M. Sherif & Hovland, 1961). Thus, for instance, a price of \$1.25 is judged less favorably within a low (\$.74 to \$1.49) rather than a high reference range (\$.99 to \$1.74), even when controlling for differences in mean prices (Janiszewski & Lichtenstein, 1999). Similarly, extending the range of available alternatives by adding an inferior decoy-option renders differences between two other options smaller (for the attraction effect, see Huber & Puto, 1983). And conversely, attribute values are perceived as more dissimilar within a narrower consideration range (Mellers & Cooke, 1994).

LPAs are crucial reference categories that consumers make use of in order to evaluate the quality of external retail prices. Yet, despite their significance for making evaluative judgments, LPAs are malleable constructs that are subject to a wide range of contextual factors (Kalyanaram & Little, 1994; Kosenko & Rahtz, 1988; Mazumdar & Jun, 1992). For several reasons, we believe psychological distance to be a critical determinant of LPA with significant consequences for consumer decision making. We will elaborate our reasoning as well as our hypotheses in the next sections.

Psychological Distance

Psychological distance is defined as the subjective experience that an object is close or far away from the self, from here, and from now (Liberman & Trope, 2008; Liberman, Trope, & Stephan, 2007; Trope & Liberman, 2003, 2010). It is conceptualized as the amount of direct experience with an object and measured from an egocentric point of view (Liberman & Förster, 2009). With reference to CLT (Trope & Liberman, 2010), an increasingly large body

of research has documented the significance of psychological distance for many different areas such as mental abstraction and categorization (Liberman, Sagristano, & Trope, 2002), visual perception (Wakslak, Trope, Liberman, & Alony, 2006), self-consistency (Eyal, Sagristano, Trope, Liberman, & Chaiken, 2009), length estimations (Maglio & Trope, 2011), and trend extrapolation (Henderson, Fujita, Trope, & Liberman, 2006). Particularly in consumer research, studies on psychological distance and construal level are well documented (for overviews, see Hamilton, 2014; Trope, Liberman, & Wakslak, 2007): Product evaluations (Kim, Zhang, & Li, 2008), effects of advertising (Martin, Gnoth, & Strong, 2009), and quality inferences based on price (Yan & Sengupta, 2011) and package size (Yan, Sengupta, & Wyer Jr, 2014) were shown to be subject to distance and construal level.

Psychological Distance Affects Latitude of Price Acceptance

The Role of Knowledge. Most pertinent to the present research, psychological distance can be expected to act as an essential regulator of knowledge (see Fiedler, 2007, for a similar argument). Defined by the amount of direct experience with an object, psychological distance is almost necessarily related to the amount of knowledge that is available about it. Objects that are experienced frequently (i.e., psychologically close objects) are represented at a higher level of resolution than objects that are experienced infrequently (i.e., psychologically distant objects). With an increase in experience (i.e., a decrease in distance), knowledge is accumulated.

At the empirical level, several lines of research provide support for the idea that knowledge increases with decreasing distance. At its core, CLT is built on the idea that reduced distance results in more fine-grained, more detailed mental representations that render specific knowledge more accessible (Fujita, Henderson, Eng, Trope, & Liberman, 2006; Henderson et al., 2006). When the amount of (visual) information is high, objects are conceptually associated with lower psychological distances (Steidle, Werth, & Hanke, 2011). Likewise, taking over an immersed instead of a distanced perspective reduces the feeling of

having limited knowledge (Kross & Grossmann, 2012). As a consequence, certainty and precision are higher when judging psychologically close rather than distant objects (Krüger, Fiedler, Koch, & Alves, 2014; Maglio & Trope, 2011).

Psychological Distance affects LPA via knowledge. Based on the idea that knowledge varies with psychological distance, we expect distance to affect LPA due to differences in price knowledge. When distance is high, consumers have only little knowledge about a product's typical price distribution. Lacking experiences with what is commonly paid for a product, consumers should be more willing to accept even relatively extreme prices. When distance is low, however, experiences with typical retail prices are more frequent and, therefore, consumers can be expected to narrow down their limits of acceptable prices. For instance, in their hometown, consumers accumulate many experiences with the prevailing price norms giving rise to very narrow and fine-grained representation of what prices can be considered acceptable. In contrast, in a rarely visited foreign city, consumers lack such specific price knowledge and, therefore, have to rely on coarser price representations when determining their acceptability limits.

The present research thus aims to marry two lines of research which so far have not yet been connected in order to derive novel hypotheses in an applied consumer context. On the one hand, previous research on CLT has demonstrated that people adjust the precision and width of their response categories to the psychological distance of the object to be judged – people characterize distal targets by coarser mental units and wider intervals than close targets (Krüger et al., 2014). On the other hand, previous research on price expectations has demonstrated that being knowledgeable and certain about market prices reduces the range of prices a consumer accepts to pay for a certain product (Kalyanaram & Little, 1994; Kosenko & Rahtz, 1988; Mazumdar & Jun, 1992).

Integrating these two lines of research, the present work applies the influence of distance on interval estimates in the price context and extends the existing literature by

investigating the mediational role of price knowledge in this regard. Moreover, by inquiring about purchase intentions and price attractiveness ratings, we are able to unveil the consequences of distance-evoked differences in quantitative judgments known from the CLT literature (Krüger et al., 2014; Maglio & Trope, 2011) in terms for their evaluative impact in the price domain.

Hypotheses

Based on our reasoning about the relationship of psychological distance, price knowledge and LPA, we expect consumer's LPA to increase with increasing distance. At the same time, we expect price knowledge to decrease with increasing psychological distance and to mediate the influence of distance on LPA. Moreover, drawing on range theory (Janiszewski & Lichtenstein, 1999; Volkmann, 1951) and social judgment theory (M. Sherif & Hovland, 1961), we expect distance-related differences in LPA to affect price evaluations and purchase decisions. The wider a consumer's tolerance limits, the higher the willingness to accept a specific retail price, because the likelihood that this particular price is included in the LPA is higher for wider intervals. Particularly, when it comes to judging prices at the upper boundary of the acceptability range (i.e., prices significantly above average market value), LPA should be of relevance, because, in this region of the price dimension, differences in LPA are more likely to affect whether a retail price is part of the interval, or not. However, when it comes to judging prices that are close to the center of the range, LPA can be expected to be of less concern, because average prices will be included in most consumers' LPA independent of the width.

Overview of the Studies

Six studies were designed to test our hypotheses. The first block of studies (Study 1-3) investigated the general relation of distance and LPA; the second block of studies (Study 4-6) explored the role of knowledge as an underlying psychological process as well as the implications of distance-related differences in LPA for consumer decision making. In

particular, in Study 1, we manipulated spatial distance by collecting data from two different cities comparing LPA in a bidirectional way (i.e., for each city, from a close and a distant perspective). In Study 2, drawing on the direct relationship of psychological distance and construal level (Trope & Liberman, 2010), we manipulated participants' mindset construal level before they indicated their LPA for a series of typical consumer products. And in Study 3, we manipulated social distance via ownership and assessed LPA for owners versus non-owners of a coffee mug.

Studies 4 and 5 followed an *experimental-causal-chain design* (Spencer, Zanna, & Fong, 2005) to establish the role of price knowledge as a mediator between distance and LPA. In particular, in Study 4, we manipulated spatial distance and measured its effect on price knowledge and LPA; additionally, a statistical mediation analysis was conducted. In Study 5, knowledge was experimentally manipulated to assess its causal influence on LPA in order to investigate the second path of the experimental causal chain. Finally, Studies 4 and 6 investigated the consequences of distance-evoked differences in LPA for evaluations of elevated versus average prices and purchase intentions.

We believe that these studies make a valuable contribution going beyond previous research for several reasons. First, despite the immediate relevance of psychological distance for modern consumer decision making, the implications of distance for price expectations have not yet been studied. With reference to psychological distance, several lines of prior research have focused on the importance of price as a product attribute (e.g., Bornemann & Homburg, 2011; Yan & Sengupta, 2011), yet this research is the first to investigate the direct consequences of distance on numerical price expectations and acceptability thresholds. Moreover, this investigation of the quantitative underpinnings of distance effects also contributes to the literature on CLT, particularly, with regard prior research on similarities (Goodman & Malkoc, 2012) and category inclusiveness (Liberman et al., 2002). We will return to these considerations in the general discussion.

Study 1: Spatial Distance

Study 1 was designed to investigate whether LPA varies across spatial distance. If consumers indeed only have little direct experience with typical retail prices in distant versus close places, we expected them to have wider tolerance limits when distance is high. We tested this idea by collecting price expectation data for a common act of consumption (i.e., eating a pizza) from the perspective of two different cities: Mannheim and Cologne. Participants from each city provided their LPA for both their current location at the time of the experiment (spatially close) and the respective other city (spatially distant). Thus, in the present design, price ratings for both cities are available from a close as well as from a distant point of view such that it is possible to disentangle any specific effect of either of the two cities from the effect of spatial distance.

Method

Participants. One hundred and twenty participants (47 men, 73 women; age $M = 22.30$, $SD = 2.97$) from the University of Mannheim and the University of Cologne took part in the present experiment. The study followed a 2 (*location of experiment*: Mannheim vs. Cologne) \times 2 (*target city*: Mannheim vs. Cologne) experimental design with the former and the latter factor varying between- and within-participants, respectively.

Materials and procedure. In this experiment, participants were asked to imagine being interested in going out for eating a pizza. Critically, in counterbalanced order, they did this from a spatially close and a spatially distant perspective, which implied thinking about Mannheim and Cologne. For each city, participants indicated their price expectations for a pizza in interval format as a measure of LPA. That is, they indicated a minimal and a maximal price “that a restaurant in Mannheim[Cologne] charges for a pizza” in Euro. After providing price expectations for both places, participants filled out demographics and were debriefed and thanked.

Results

LPA was calculated by subtracting the minimal from the maximal price for each city. Scores were submitted to a 2×2 mixed-model ANOVA. As predicted, a significant interaction term emerged, $F(1, 119) = 20.17, p < .001, \eta_p^2 = .15$ (see Figure 1). In particular, whereas Mannheim participants indicated a narrower LPA for the pizza in Mannheim ($M = €10.65$) than in Cologne ($M = €11.72$), paired $t(59) = 2.55, p = .014, d = .33$, Cologne participants indicated the exact opposite, namely, a narrower LPA for Cologne ($M = €9.50$) than Mannheim ($M = €11.11$), paired $t(59) = 3.80, p < .001, d = .58$ (these and all following effect sizes of paired t-tests are corrected for dependence between means, see Morris & DeShon, 2002). Neither of the two main effects reached statistical significance, $F_s < 1$.

Discussion

Study 1's results provide first support for the idea that LPA differs for close versus distant places. In the proximity, people are restrictive in their judgments and consider only a narrow range of prices as typical for a specific product. In the distance, however, people are more lenient with regard to their price expectations. Not having much direct experience with the typical price distribution, people adjust their reference categories by forming a wider LPA. Notably, judgments only varied as a function of the distance from which they were made, but not as a function of the particular city to be judged illustrating the pervasiveness of the psychological construal of the prices across the two cities.

Study 2: Construal Level

CLT suggests a direct relationship between psychological distance and construal level (Bar-Anan, Liberman, & Trope, 2006; Trope & Liberman, 2010). Priming high (low) construal level increases (reduces) perceived psychological distances of objects and events to the self (Liberman & Förster, 2009). Drawing on this reasoning, in Study 2, we manipulated participants' mindset level of construal before they indicated their LPA for a series of consumer electronics products that were handed to them by the experimenter. We expected

wider price latitudes for participants who were primed with a high- rather than a low-level of construal.

Method

Participants. Sixty-eight student participants (24 men, 44 women; age $M = 24.40$, $SD = 5.03$) from a large public university participated in the present study and were randomly assigned to one of two experimental conditions (i.e., high-level versus low-level construal). Due to the linguistic requirements of the manipulation, only native speakers were accepted as participants.

Materials and procedure. The study consisted of two paper-and-pencil questionnaires which were presented as independent studies to the participants. The first task was the construal level mindset manipulation. Drawing on previous work (Fujita, Trope, Liberman, & Levin-Sagi, 2006; Henderson et al., 2006; Wakslak & Trope, 2009), participants were provided with a list of 30 objects (e.g., flower, chair, mammal). For each of the 30 objects, dependent on condition, participants were either asked to “find the general category for each example” (high-level construal) or to “find a specific example of each category” (low-level construal). Generating abstract categories versus generating concrete examples primes high-level and low-level construal, respectively.

The second task consisted of the dependent measure and was presented as an unrelated consumer science study. In this part of the study, participants were brought five consumer electronics products (one at a time) to their individual cubicle and asked to provide their minimal and their maximal price expectation about it. The items were a *DSLR camera*, a *laptop*, a *computer keyboard*, a *digital camera* and a *webcam*. After exploring each product, participants answered the main dependent variable assessing LPA (“*The price for this [DSLR camera] lies in between ____€ and ____€.*”). Finally, they provided demographic information.

Results and Discussion

Due to significant absolute differences in prices between the products (e.g., laptop vs. webcam), LPAs were z-standardized, before an average score across items was calculated ($\alpha = .77$). As expected, the construal level priming affected LPA in the same way as psychological distance did in the previous study. Participants in the high-level construal condition ($Z = 0.17$) provided wider price ranges than participants in the low-level construal condition ($Z = -0.18$), $t(66) = 2.05$, $p = .045$, $d = .50$. Results were consistent across all five items.

Study 2's results demonstrate that LPA also varies as a function of construal level. Participants who were primed to construe their environment at a high level of abstraction provided wider LPAs than participants who were primed with a low-level construal. Notably, the products to be judged were identical between the two conditions. Differences in participants' mental construal of the products alone were sufficient to affect their price judgments.

Study 3: Social Distance

The goal of Study 3 was to investigate *psychological ownership* as a ubiquitous form of social distance in everyday consumer decision making. Psychological ownership can be defined as the "state where an individual feels as though the target of ownership or a piece of that target is 'theirs'" (Pierce, Kostova, & Dirks, 2003, p. 86). It goes beyond mere legal ownership, because it also entails the cognitive-affective states of liking and familiarity with a target object (Reb & Connolly, 2007). Owned objects become part of the *extended self* (Belk, 1988) and are more frequently part of a person's direct experience (Pierce et al., 2003). In line with the idea that ownership constitutes a facet of social distance, a direct link between ownership and construal level has recently been demonstrated (Irmak, Wakslak, & Trope, 2013).

In Study 3, we tested whether ownership influences LPA. To that end, participants

were either endowed with a coffee mug (owners) or not (non-owners) following Reb and Connolly's (2007) procedure to manipulate ownership. Then, they generated an interval estimate of the mug's price. We expected owners to form a narrower LPA than non-owners.

Method

Participants. Seventy-nine student participants (19 men, 60 women; age $M = 22.30$, $SD = 4.29$) from a large public university took part in the present experiment in exchange for a mug or chocolate of equal value. The study was part of a larger experimental session and participants were randomly assigned to either the owner or the non-owner condition.

Materials and procedure. In the laboratory, participants were seated at separate cubicles without visual access to each other. In total, they worked on several experiments for about 60 minutes. Right at the beginning of the experimental session, owners received a regular white coffee mug and brief written instructions stating that in addition to their financial compensation they would also receive a coffee mug which they "*now own and can take home after finishing the experiment*". In contrast, non-owners received neither a mug nor any instructions relevant to the present study, but immediately started working on unrelated experiments. Participants in both conditions worked on unrelated tasks for about 50 minutes before the beginning of the present study. During that period of time, owners in contrast to non-owners were given the opportunity to establish a feeling of psychological ownership for the mug (cf. Reb & Connolly, 2007).

Upon completion of the unrelated tasks, non-owners received the same mug as the owners did before. However, non-owners were instructed to "*return this mug to the experimenter [...] after finishing the experiment*" to ensure that none of them believed the mug to be theirs. Then, participants in both conditions worked on a questionnaire with the dependent measures. In particular, they first indicated their LPA for the mug ("*The price of my (the) mug lies in between ___ € and ___ €.*"). Next, they answered three questions assessing social distance. In particular, on 7-point rating scales, participants rated perceived

closeness (“*How close is the mug to you?*”), distance (“*How large do you judge the distance between you and the mug to be?*”), and liking of the mug (“*How much do you like the mug?*”). An explanatory note accompanied the closeness and distance question to increase their understandability. At the end of the experiment, participants filled out demographics, were thanked, debriefed, and could either take home the mug (owners) or received chocolate of equal value (non-owners) as compensation.

Results and Discussion

LPA was computed by subtracting the minimal from the maximal price estimate for the mug. Based on the high internal consistency of the social distance items ($\alpha = .75$; distance coded reversely), we computed an aggregate score by averaging the three respective scales. Data from one outlier were excluded for being more than 3.3 standard deviations above the mean response of all other participants (cf. Osborne & Overbay, 2004).

First, we analyzed the manipulation check. Providing evidence for a successful manipulation, participants in the ownership condition ($M = 3.87$) perceived the mug as socially closer than participants in the non-ownership condition ($M = 4.38$), $t(76) = 1.72$, $p = .044$, $d = .40$ (one-tailed). Next, we analyzed LPA. In line with our hypothesis, owners ($M = €2.39$) provided narrower expected price ranges than non-owners ($M = €3.35$), $t(76) = 1.99$, $p = .050$, $d = .45$. In fact, endowing participants with the mug and giving them additional time to establish a feeling of ownership toward it was enough to reduce their LPA by roughly 30%.

Study 3 replicates the effect of distance on LPA with regard to one of the most relevant forms of social distance for consumer decision making: psychological ownership. Owners who are relatively more familiar with a product provide a more specific price estimate for that product than non-owners who are relatively unfamiliar with it. Again, the mug to be judged was identical across conditions, participants’ construal of it was sufficient to affect their price expectations.

Studies 4-6: Underlying Psychological Process and Implications for Consumer Behavior

Thus far, three studies provided converging evidence for differences in LPA as a function of the spatial distance, the construal level and the social distance of the product to be judged. In the following studies, we will test our hypothesis that knowledge acts as a critical mediator between distance and LPA in an experimental-causal-chain design (Spencer et al., 2005) as well as via statistical mediation. In Study 4, we manipulate distance and investigate its direct effect on LPA and knowledge, as well as its indirect effect on LPA via knowledge. In Study 5, we investigate whether knowledge causally affects LPA by manipulating it in order to provide experimental evidence for our mediational hypothesis. Finally, Studies 4 and 6 explore the implications of distance-evoked differences in LPA for consumer behavior. In particular, we test our hypothesis that particularly elevated (vs. average) prices are evaluated more positively when consumers when psychological distance is high.

Study 4: Knowledge as a Mediator

People have less direct experience with psychologically distant rather than close objects. As a consequence, they are less knowledgeable about distant objects and have to resort to coarser response categories when judging them. Based on this reasoning, we designed Study 4 to measure knowledge as an underlying mechanism through which we expected psychological distance to affect LPA. We presented participants with five cities that differed in terms of their psychological distance. For each city, participants indicated their LPA for a typical consumer product (a cup of coffee) and their knowledge about its price distribution in the respective city. Then, they judged the attractiveness of an elevated price for that product. Because elevated prices are close to the boundary of most participants' acceptability range, their evaluation should be particularly susceptible to differences in LPA. Finally, participants indicated whether they would purchase the expensive product.

Method

Participants. Eighty student participants (26 men, 54 women; age $M = 22.29$, $SD = 5.85$) from University of Heidelberg participated in the current experiment.

Materials and procedure. Participants were presented with five cities in random order that differed in terms of their psychological distance. The cities were the participant's hometown (defined as the place where they spent most of their lives; participants entered the name of this city themselves), Heidelberg (their current place of living; on average participants lived there for about one year), Hamburg (a distant domestic city), Salzburg (a distant foreign city) and New York (a very distant foreign city).

For each of these cities, participants completed the following four dependent measures. First, they indicated how much knowledge they had about coffee prices in that specific location (*"How good do you judge your knowledge about coffee prices in [city] to be"*). Second, they indicated their LPA by providing a minimal and a maximal price estimate for a coffee in the respective city. Third, participants judged the attractiveness of a particularly expensive coffee (*"How attractive do you consider €2.50 as a price for a cup of coffee in [city]"*) and, fourth, they indicated their likelihood of accepting this offer (*"How likely is it that you would purchase a cup of coffee for €2.50 in [city]"*). The elevated price level was determined in a pretest with eleven independent participants who provided a single estimate for an average price of a coffee. We added an extra 50% to their mean estimate ($M = €1.69$, $SD = 0.23€$) and arrived at €2.50 as the elevated price used in the present study. Upon completion of all four items for each location, participants rated their price knowledge and LPA once more by rank-ordering the five cities in terms of the two dimensions. Finally, they were debriefed and thanked for their participation.

Results

Due to the repeated measurement of variables within the same participant, linear mixed models were used to analyze the data. To keep analyses consistent, all mixed models

followed the same procedure: Variables were standardized, covariance matrices were specified as unstructured and REML estimation procedures were used. Also, we combined both knowledge and both LPA ratings into a single knowledge and a single LPA variable, respectively.

First, we analyzed the effects of psychological distance on the four dependent variables computing four separate mixed models. With increasing psychological distance (dummy coded: higher values = higher distance), we expected (a) knowledge about coffee prices to decrease, (b) LPA to increase, (c) the evaluation of the elevated price to become more positive, and (d) purchase intentions to become more pronounced. Throughout all analyses, we entered the intercept and distance as within-participants factors as random effects to our model.

Statistical analyses confirmed all four hypotheses (see Figure 2). The higher the distance to a city, the lower participants judged their knowledge about coffee prices in that city to be, $F(1,79) = 187.98, p < .001$ (see Table 1 for regression coefficients). At the same time, LPA increased with increasing distance, $F(1,79) = 620.43, p < .001$. Moreover, when the city was more distant, participants evaluated the elevated coffee price offer more favorably, $F(1,79) = 61.13, p < .001$, and indicated higher purchase intentions for the coffee, $F(1,79) = 27.02, p < .001$. As another way to analyze the data, we coded for each participant whether the elevated price (€2.50) was included in the individual LPA (0 = no; 1 = yes). In a general linear mixed model for analyzing repeated measurements of binary data, the elevated price was more often included in a participant's LPA the higher the psychological distance, $F(1, 79) = 24.88, p < .001$.

Next, we analyzed our process model of knowledge mediating the influence of psychological distance on LPA in a mixed model mediation analysis. Following Bauer et al.'s (2006) procedure, a significant indirect effect of psychological distance on participants' LPA via knowledge emerged, 99% CI [.080, .248] (see Table 1 for regression coefficients).

Discussion

Study 4 extends the findings obtained in the previous studies in two crucial regards. First, the present results provide empirical evidence for the role of knowledge as a mediating variable between psychological distance and LPA. It is due to consumers' lower knowledge about the distribution of typical retail prices in a distant city that they accept a wider range of prices as compared with a close city where they are more price knowledgeable and, therefore, more restrictive in their judgments. Second, as a consequence of these distance-related differences in LPA, consumers are more likely to accept an expensive offer the higher its psychological distance. Results indicated that an offer priced 50% above the average product price is more likely to be included in a consumers' LPA when distance is high. Consequently, from a psychologically distant point of view, consumers are more willing to tolerate the elevated price as indicated by more positive attractiveness ratings and stronger purchase intentions.

Study 5: Knowledge as a Causal Influence

To validate the role of price knowledge as an underlying psychological process beyond statistical mediation, the purpose of Study 5 was to investigate knowledge's causal influence on LPA following the logic of an *experimental-causal-chain design* (Spencer et al., 2005). That is, after having demonstrated a causal relationship between distance and knowledge in Study 4, we now investigate the causal influence of knowledge on LPA. To that end, participants provided their LPA for a coffee with regard to a city they knew much about and a city they knew practically nothing about. To assess the unique influence of knowledge on LPA, we also assessed and controlled for differences in spatial distance of the two cities.

Method

Seventy-six US-Americans (52 men, 24 women; age $M = 31.43$, $SD = 8.52$) participated in this online experiment via Amazon's Mechanical Turk (MTurk; see Buhrmester, Kwang, & Gosling, 2011). At the beginning of the experiment, participants were

asked to enter the name of the US-American city that they “currently know most about” and the name of a city that they “practically don’t know anything about”. These two cities served as the within-participants manipulation of knowledge in the subsequent price estimation task.

Upon entering the two city names, participants were informed that we were interested in their price expectations for a regular 12oz. coffee. Next, they indicated their LPA for the first city (i.e., high- or low-knowledge; order counterbalanced) by selecting a minimal and a maximal price from a dropdown menu (“What do you estimate the typical selling price for a regular 12oz. coffee to be in [city]?”). Then, they answered the same item with regard to the respective other city (i.e., low- or high-knowledge). After providing ratings for both cities, participants indicated the spatial distance of each city on a 7-point rating scale. Finally, they filled out demographics and were thanked, debriefed, and compensated for their participation.

Results and Discussion

Replicating the correlational data from the previous study, knowledge had a significant causal influence on participants’ LPA, paired $t(75) = 2.69, p = .009, d = .31$. LPA was significantly narrower for the high- ($M = \$1.30$) than the low-knowledge judgment ($M = \$1.47$).

Additionally, we assessed whether this finding would hold even when controlling for differences in spatial distance. Note that this represents a rather conservative test of our hypothesis as we also excluded knowledge’s variance that is shared with distance. Due to the extremely high intercorrelation of distance and knowledge, standardized $\beta = .879, t(75) = 19.68, p < .001$, it was not possible to include both variables as predictors into the same regression analysis without running into the problem of multicollinearity. Therefore, we controlled for distance by restricting our analysis to those participants who indicated similar spatial distances for the two cities (i.e., all differences below the median of differences). Only including answers for similarly distant cities, LPA still varied across the high- ($M = \$1.30, SD$

= \$0.58) and low-knowledge judgment ($M = \$1.52$, $SD = \$0.77$), paired $t(38) = 2.41$, $p = .021$, $d = .41$.

Study 5 completes the picture with regard to role of knowledge for LPA. Consumers can be relatively certain when judging prices in a place they know much about; accordingly, they narrow down their LPA. For unfamiliar places, however, they have much less experience with the specific characteristics that might justify a particular price expectation – facing an impoverished informational background, price interval judgments are more lenient. Taken together, Studies 4 and 5 provide consistent statistical as well as causal evidence for the role of knowledge as an underlying process mediating the influence of psychological distance on LPA.

Study 6: Implications for Price Evaluations and Purchase Intentions

The central goal of Study 6 was to highlight the implications of distance-related differences in LPA for price evaluations and purchase intentions. If it is indeed the inclusion versus exclusion of a particular price in a consumer's individual LPA that determines how an offer is evaluated, LPA should be more relevant for the evaluation of an extreme versus an average price. Any price that is relatively close to the boundaries of the acceptability range should be more susceptible to differences in latitude of acceptance than a more central value, which, for most people, should be considered acceptable mostly independent of LPA.

To test these ideas, we investigated price evaluations and purchase intentions for a movie ticket as a function of price level (average vs. elevated) and spatial distance. According to *Variety* magazine, the average price for a movie ticket in the United States in 2013 was \$8.38 (Saperstein, 2013, July 19). Thus, we used \$8.00 and \$12.50 (i.e., \$8.38 plus ~50%) as ticket prices in the average and the elevated price condition. We expected distance to exert a stronger influence on evaluations of the elevated rather than the average price. Moreover, only

for the elevated price, we expected distance's influence on price evaluations to be mediated via LPA.

Note that the expected moderation of price level as well as the mediation via LPA also allow us to demonstrate the significance of LPA beyond the role of desirability versus feasibility concerns as a potential alternative account (desirable offers can be expected to become more attractive with increasing distance; see Liberman & Trope, 1998). We will return to this argument in the discussion section of this study.

Method

Participants. One hundred and fifty-five US-Americans (102 men, 53 women; age $M = 32.78$, $SD = 11.30$) participated in this study via MTurk. The experiment followed a 2 (spatial distance: low vs. high) \times 2 (price level: average vs. elevated) experimental design with the former and the latter factor varying within- and between-participants, respectively.

Materials and procedure. At the beginning of the experiment, participants entered the name of a spatially close ("the city where you are right now") and a spatially distant US-American city ("a city which is very distant from where you are right now"). Next, they answered the following dependent variables separately for both cities (city order was counterbalanced). First, participants indicated their expectations about the lowest and the highest price "that a movie theater in [city] charges for a movie ticket". Then, dependent on condition, they evaluated either the average (\$8.00) or the elevated ticket price (\$12.50) in terms of price attractiveness ("How attractive do you consider \$[price] as a price for a movie ticket in [city]?"; 7-point scale) and purchase intentions ("If you had to make a choice, would you purchase a movie ticket in [city] for \$[price]?"; dichotomous choice). After all judgments were provided for the first city (close vs. distant), participants answered the same items for the second city (distant vs. close). Finally, they indicated their price knowledge about each city on a five-point scale.

Results

First, we assessed the effects of psychological distance on LPA and knowledge as well as the relationship between the two. Replicating the results from the previous studies, acceptability ranges were wider for the spatially distant ($M = \$6.91$) than for the spatially close city ($M = \$6.18$), paired $t(154) = 3.47, p < .001, d = .28$. Also, knowledge was lower for the distant ($M = 2.37$) than for the close city ($M = 4.67$), paired $t(154) = 20.61, p < .001, d = 2.04$, and LPA and knowledge were negatively related, $\beta = -.16, t(86.69) = 3.06, p = .003$.

Price attractiveness ratings. We analyzed participants' price evaluations in a 2 (spatial distance: low vs. high) \times 2 (price level: average vs. elevated) mixed-model ANOVA. As predicted, a significant interaction emerged whereby the effect of spatial distance was more pronounced for the elevated ($M_{\text{close_city}} = 2.18$ vs. $M_{\text{distant_city}} = 3.49, t(75) = 6.25, p < .001, d = .72$) than for the average price ($M_{\text{close_city}} = 4.92$ vs. $M_{\text{distant_city}} = 5.58, t(75) = 3.79, p < .001, d = .43$), $F(1, 153) = 5.67, p = .018, \eta_p^2 = .04$. Also, the average price ($M = 5.23$) was judged as more attractive than the elevated price ($M = 2.84$), $F(1, 153) = 122.78, p < .001, \eta_p^2 = .45$, and prices were generally judged more favorably for the distant ($M = 4.55$) than for the close city ($M = 3.58$), $F(1, 153) = 52.53, p < .001, \eta_p^2 = .26$.

Next, we tested whether LPA similarly was more significant to evaluations of elevated rather than average prices in a linear mixed model analysis with LPA, price level (dummy coded: 0 = elevated; 1 = average), and their interaction term as predictors. We included LPA (within-participants factor) and the intercept as random effects to the model. Price level predicted attractiveness, $F(1, 147.81) = 119.04, p < .001$, LPA predicted attractiveness, $F(1, 60.42) = 5.94, p = .018$, and the interaction between the two was marginally significant, $F(1, 60.33) = 2.90, p = .094$ (see Table 2). We broke down the interaction term by analyzing the two price levels in separate mixed models. As expected, LPA predicted price attractiveness when price level was elevated, $F(1, 28.96) = 8.09, p = .008$, however not when it was average, $F < 1$. Thus, the results of the LPA-analysis dovetail nicely with the analysis of spatial

distance: Both LPA and distance are more predictive for attractiveness ratings of elevated rather than average prices.

To find out whether LPA mediated the effect of distance on price attractiveness ratings, we conducted a mixed effects mediation analysis (Bauer et al., 2006). We entered spatial distance as the predictor, LPA as the mediator, and price attractiveness ratings as the dependent variable. Analyzing only elevated prices, a significant indirect effect emerged whereby LPA mediated the influence of spatial distance on price attractiveness, 95% CI [.004, .135]. However, as to be expected from the previous analyses, the corresponding indirect effect for average prices did not reach statistical significance, 95% CI [-.098, .042].

Purchase intentions. We analyzed participants' purchase intentions in a generalized linear mixed model for analyzing dichotomous dependent variables. Mirroring the results of the price attractiveness ratings, the analysis indicated a significant effect of distance, $F(1, 153) = 10.43, p = .001$, a significant effect of price level, $F(1, 153) = 55.77, p < .001$, and – most pertinent to our main hypothesis – a significant interaction, $F(1, 153) = 4.99, p = .026$ (see Figure 3). To break down the interaction term, we conducted two separate McNemar tests. As expected, at the average price level ($N = 79$), there was no difference between the close (78.5% of participants indicated they would purchase the ticket) and the distant city (83.5%), $p = .48$. However, at the elevated price level ($N = 76$), spatial distance mattered considerably: Almost three times as many participants were willing to purchase the movie ticket in the distant (44.7%) as compared with the close location (15.8%), $p < .001$.

Inclusion of price in LPA. As an additional way to analyze the data we investigated, first, whether distance and price level affected whether the ticket's specific retail price (i.e., \$8.00 and \$12.50, respectively) was included in participants' LPA or not, and, second, whether price inclusion was related to attractiveness ratings and purchase intentions. For that purpose, we created a dummy variable that coded whether the retail price was included in participants' LPA (0 = not included; 1 = included). We submitted this price inclusion variable

to a linear mixed model analysis. Results indicated a significant main effects of distance, $F(1, 153) = 69.87, p < .001$, and price level, $F(1, 153) = 79.55, p < .001$. In particular, the retail price was more often included in participants' LPA in the distant (90.3% of LPAs include the retail price) rather than close city (63.2%), and when the price was average (95.5%) rather than elevated (57.2%). Most relevant with regard to our main hypothesis, these main effects were qualified by a significant interaction, $F(1, 153) = 41.42, p < .001$. Breaking down this interaction in two separate McNemar tests, at the average price level ($N = 79$), inclusion was at a very high level for both, the distant (98.7%) and the close city (92.4%), $p = .13$. At the elevated price level ($N = 76$), however, inclusion was about 2.5 times higher when distance was high (81.6%) rather than low (32.9%), $p < .001$.

Finally, we analyzed whether price inclusion mattered for price attractiveness ratings and purchase intentions. Highlighting the importance of LPA for consumer decision making, both price attractiveness ratings, $F(1, 153) = 200.07, p < .001$ ($M_{\text{included}} = 4.76$ vs. $M_{\text{not_included}} = 1.78$), and purchase intentions, $F(1, 153) = 41.63, p < .001$ (70.6% [included] vs. 8.3% [not included] of participants indicated they would purchase the ticket), were much higher when the retail price was included in a participant's LPA than when this was not the case.

Discussion

Study 6 highlights, the substantial consequences of distance-evoked differences in LPA for the evaluation of (elevated) retail prices as well as price level as a critical boundary condition for the effect of distance on purchase decisions to occur. Having wider acceptability limits in distant versus close locations, consumers are more likely to include an elevated price in their LPA and, as a consequence, evaluate an offer as more attractive. However, this effect of distance is attenuated (attractiveness ratings) or even vanishes completely (purchase intentions) when consumers judge average prices. At the theoretical level, this moderation by price level substantiates our reasoning about the significance of LPA particularly when it comes to judging values at the boundaries of the range – differences in acceptability limits do

not matter equally for all decision but they matter specifically for those decisions in which extreme rather than average values are to be judged.

Finally, Study 6's design is elucidative in terms of ruling out the role of desirability versus feasibility concerns as a potential alternative account to explain why offers appear as more attractive when distance is high. According to such an account (Lieberman & Trope, 1998), with increasing distance, people would focus less on the feasibility (e.g., retail price) and more on the desirability (e.g., utility) of an offer resulting in more positive evaluations of desirable products. And indeed, the main effects of psychological distance in our results generally support such reasoning. Yet, the interaction with price level that was obtained beyond these main effects highlights the critical role of LPA over and above the desirability account: If it was only for their higher desirability / lower feasibility that distant products become more attractive, this effect should be obtained for both elevated and average prices (note that, within each price level, the offer stays perfectly constant and it is only distance that varies). However, in support of the present research's account, results clearly indicate that price level moderates the distance effect. Moreover, providing additional evidence for the critical role of LPA, Study 6's mediation analysis revealed that distance's influence on price evaluations was mediated via LPA.

General Discussion

Psychological distance affects consumers' price expectations and, therefore, their price evaluations and purchase intentions. Consumers are more restrictive in their latitude of acceptance when judging prices of psychologically close rather than distant products. As a consequence, the very same offer can be rejected from a psychologically close perspective, where LPAs are narrow, but still be accepted from a psychologically distant perspective, where LPAs are broad.

Obtaining converging evidence across different methods, we investigated the impact of spatial distance (Studies 1, 4, and 6), construal level (Study 2), social distance (Study 3)

and knowledge (Study 5) on LPA. Spatial distance was manipulated by contrasting judgments across two cities in a bidirectional analysis (Study 1), by presenting participants with a list of experimenter-selected cities (Study 4), and by making participants self-generate close and distant locations (Study 6). Across these diverse operationalizations, results uniformly support our prediction of increasing LPA with increasing distance. Additionally, Studies 4 and 5 provide statistical as well as experimental evidence for knowledge as a mediator between distance and LPA. The more distant a product, the less knowledgeable consumers feel about its typical price distribution thereby increasing their LPA. Finally, Studies 4 and 6 investigated the implications of distance-evoked differences in LPA for consumer decision making. In particular, the evaluation of elevated relative to average prices was affected by LPA. Consumers' wider acceptability limits from a distant perspective increased the likelihood of elevated prices to be included in their LPA and, therefore, their intention to purchase the respective product.

Implications, Limitations and Future Research

Consumers employ price expectations as internal benchmarks to which they compare observed prices when making purchase decisions (Kalyanaram & Winer, 1995). The present research highlights the importance of psychological distance for the formation of such internal reference standards. We believe that the current approach has significant implications for several bodies of research as well as for the development of future marketing strategies.

Assortment size preferences. Goodman and Malkoc (2012) showed that consumers see different alternatives in an assortment as more alike and substitutable when distance is high rather than low (see Jing, Zixi, & Dhar, 2013, for a similar effect of construal level). The present research may add to the understanding of this finding: Building on the idea of more leniently defined category boundaries for distant versus close objects, it can be expected that product attributes are more likely to overlap. As a consequence, different alternatives should be perceived as more similar. Also, Liberman et al.'s (2002) demonstration of higher category

inclusiveness with increasing distance dovetails nicely with such reasoning. Distant, broadly defined categories highlight similarities and inclusive thinking, whereas close, narrowly defined categories highlight differences and exclusive thinking.

Beyond prices. The present research has been concerned with the formation of price expectations. However, other dimensions of consumer decision making may be affected by psychological distance in a similar vein. Acceptability thresholds are essential to most if not all dimensional criteria of product evaluation. For instance, customer satisfaction varies significantly as a function of whether beef is perceived as “tender” (Miller, Carr, Ramsey, Crockett, & Hoover, 2001), or whether waiting time is seen as “unacceptably long” (Chebat & Filiatrault, 1993). Drawing on the present research, future studies should investigate the influence of psychological distance on latitude of acceptance within other dimensions of product evaluation, too.

Factual distance versus psychological distance. Adopting the design of other psychological distance studies (Trope & Liberman, 2010), participants provided judgments either from a short or a long distance perspective for otherwise identical target items. Yet, in the case of price judgments, one might argue that (a) factual differences in prices as well as (b) factual differences in consumers’ knowledge about these prices may underlie the effects obtained in the present studies. With regard to factual differences in prices, several aspects of our studies took care of this potential confound: For instance, in Study 1, participants provided judgments for the same two cities either from a short or a long distance perspective, demonstrating the independence of the particular city to be judged from the effect of distance. Yet, the argument remains that factual differences in price knowledge may underlie the distance effects obtained in our studies. In this regard, Study 2 (priming construal level) and Study 3 (manipulating ownership), provide solid evidence for our idea that subjective construals are sufficient to produce the effect.

Also, in the real world, factual distance and psychological distance can be expected to highly correlate. Taking the definition of psychological distance as amount of direct experience (Trope & Liberman, 2010) seriously, objects that are factually very close will have a much greater likelihood to enter an observer's direct experience and, therefore, to be perceived as closer also psychologically. Nevertheless, on theoretical grounds, it surely is possible to disentangle both types of distances and to create experimental setups that orthogonalize the two. Future research may unveil potential differences between factual and psychological distances and investigate whether and how they relate to consumers' price expectations.

Managerial Implications

Marketing strategies may benefit from taking psychological distance into account when determining optimal retail prices. With increasing distance and decreasing price knowledge, consumers accept a wider range of prices allowing retailers to raise the price level. For instance, the present research suggests that tourists would pay more for an identical product than locals. From a distanced perspective, tourists have less price knowledge and are thus less restrictive in their LPA. Similarly, marketing strategies that try to convince prospective customers of a product's novelty or exoticness may increase consumers' price tolerance limits towards these products. Conversely, by strategically inducing a short distance perspective onto a certain product, a competitor's elevated price level may not be seen as tolerable anymore from a consumer's point of view increasing the attractiveness of one's own lower priced product.

Conclusion

In today's globalized world, more and more options are available from a plethora of different places and vendors. The present research demonstrates that the psychological distance associated with an alternative has significant consequences for decisions about it. People know more about their immediate environment than they do about remote places. As a

consequence, they are restrictive in terms of accepting an offer in the here and now. In the distance, however, people are more lenient in their judgments and thus more willing to accept an offer which would likely be rejected in the proximity.

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Table 1

Study 4: Standardized beta-weights for the four linear mixed models and the mediation analysis

Predictor	Outcome Variable	β	<i>SE</i>	95% CI	<i>t</i> -value
Psychological Distance	Knowledge ^a	-.649	.047	-.743, -.555	-13.710***
	LPA ^c	.708	.028	.651, .765	24.908***
	Attractiveness	.326	.042	.243, .409	7.818***
	Purchase Intention	.235	.045	.145, .325	5.199***
	LPA ^{c'}	.545	.038	.469, .621	14.198***
Knowledge	LPA ^b	-.249	.045	-.339, -.159	-5.543***

Note: *** indicates $p < .001$. Superscript a, b, c and c' indicate the respective paths of the mediation analysis of psychological distance on LPA via knowledge.

Table 2

Study 6: Standardized beta-weights for the linear mixed models regressing price attractiveness ratings on price level and latitude of price acceptance.

Predictor	Outcome Variable	β	<i>SE</i>	95% CI	<i>t</i> -value
Price level		.584	.053	.478, .689	10.911***
LPA	Attractiveness	.129	.053	.023; .235	2.437*
Price level \times LPA		-.090	.053	-.196, .016	1.704 [†]
LPA [only elevated]	Attractiveness	.218	.077	.061, .375	2.844**
LPA [only average]		.050	.069	-.088, .188	.720

Note: *** indicates $p < .001$, ** indicates $p < .01$, * indicates $p < .05$, [†] indicates $p < .010$. The latter two analyses refer to the separate regressions that were conducted to break down the interaction only including judgments about either the elevated or the average price.

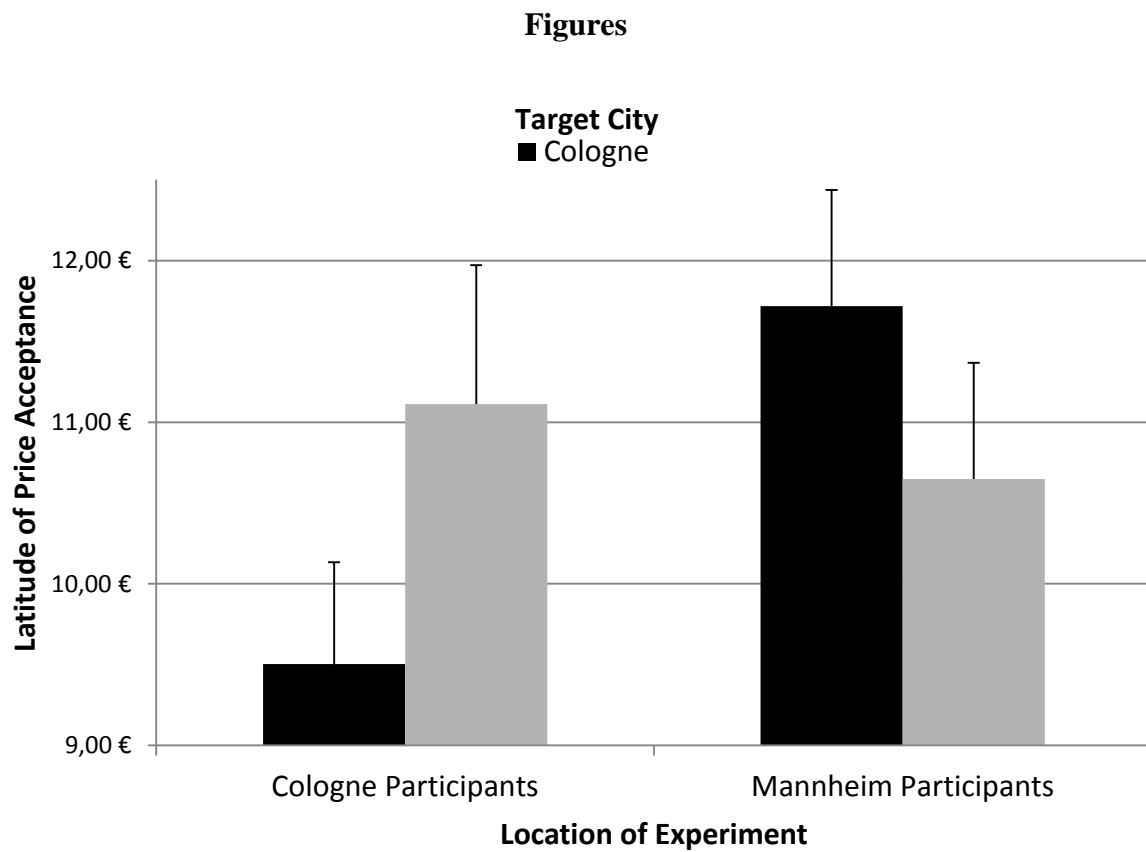


Figure 1. Latitude of price acceptance as a function of spatial distance in Study 1. Congruent judgments (Mannheim—Mannheim; Cologne—Cologne) and incongruent judgments (Mannheim—Cologne; Cologne—Mannheim) represent low and high spatial distance, respectively. Error bars display +1 SE.

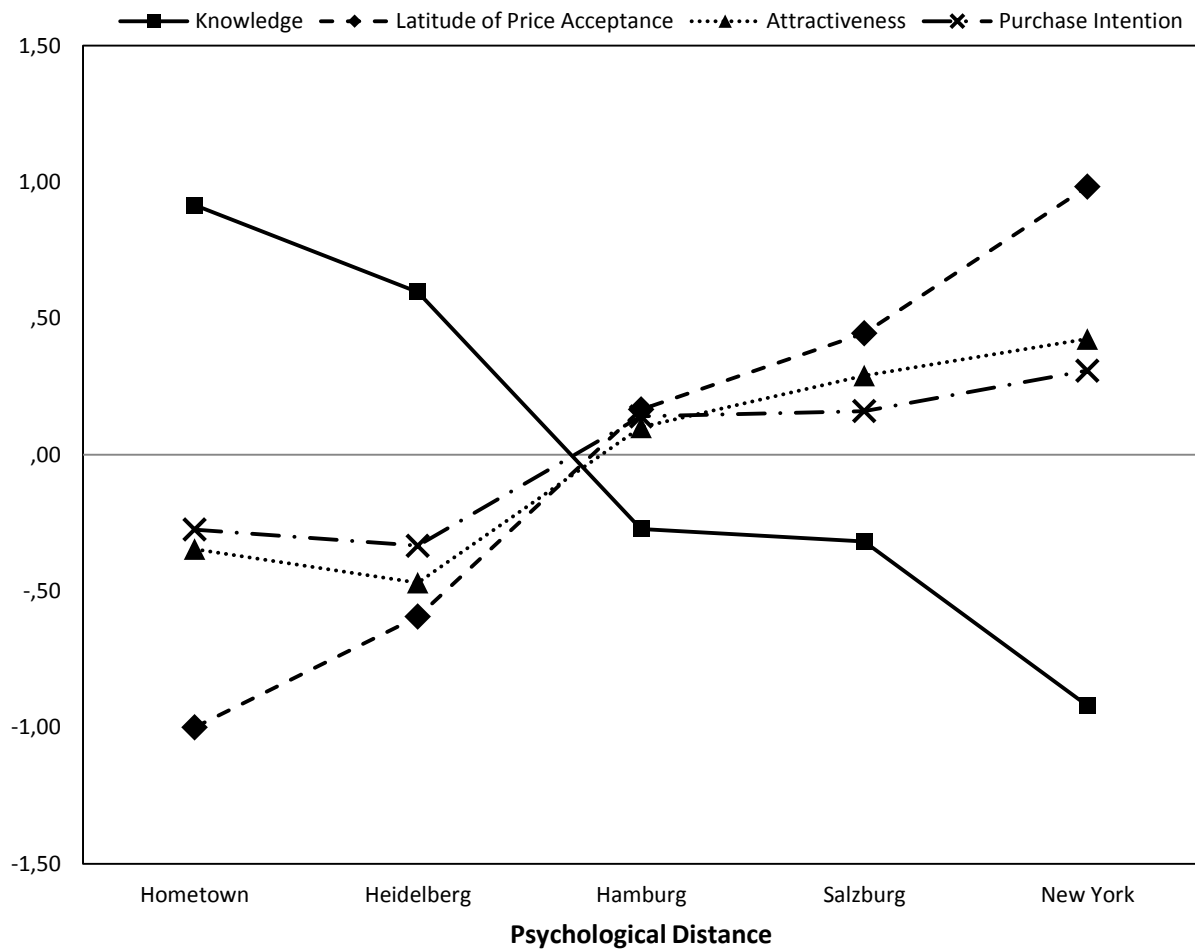


Figure 2. Knowledge, latitude of price acceptance, price attractiveness and purchase intentions as a function of psychological distance in Study 4. Y-axis displays z-standardized values.

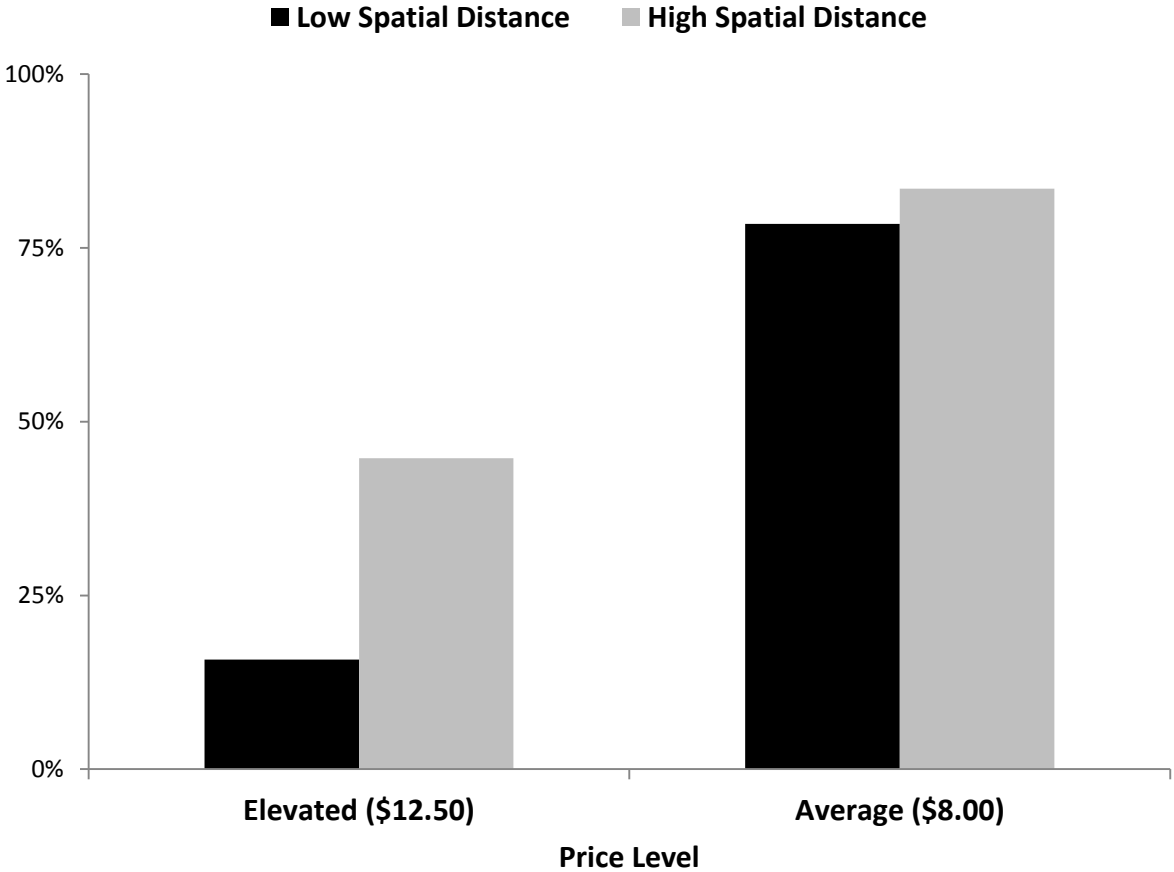


Figure 3. Percentage of participants indicating that they would purchase the cinema ticket as a function of price level and spatial distance in Study 6.

The Presenter's Paradox Revisited: An Evaluation Mode Account

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Abstract

Three experimental studies demonstrate that evaluation mode influences the assessment of product bundles. Consumers' preferences for product bundles are more pronounced in a joint evaluation mode, where the bundle is directly contrasted to its single counterpart (i.e., the bundle without its add-on), than in a separate evaluation mode, where the bundle is evaluated in isolation. An attentional explanation is suggested: Consumers pay more attention to the unique features of a product bundle (i.e., the add-on) and, therefore, prefer the bundle more strongly in joint rather than in separate evaluation. This account bears relevance for the *presenter's paradox* (Weaver, Garcia, and Schwarz, 2012), according to which presenters (i.e., people deciding what to offer to others) prefer bundle options, whereas evaluators (i.e., people deciding what to get for themselves) prefer single options. In the original research, presenters and evaluators provided judgments in joint and separate evaluation, respectively. Disentangling role (presenter vs. evaluator) and evaluation mode, our results show that, independent of role, people prefer bundle over single options in joint evaluations and are largely indifferent in separate evaluations. Thus, a substantial part of the original findings is attributable to evaluation mode. The presenter's paradox is revised in light of the present account.

For decades, product bundling has been a widely used marketing strategy to sell consumer products and industrial goods (Gaeth, Levin, Chakraborty, & Levin, 1991). At a general level, bundling can be defined as “the practice of marketing two or more products and/or services in a single ‘package’” (Guiltinan, 1987, p. 74). A very common form of product bundling is to include a small add-on to a main product. For instance, an mp3 player includes an additional music download, small toys are added to children’s cereal boxes, a bottle of shampoo comes with a sample of conditioner, or the booking of a hotel room includes a free dinner on the first night. The goal of these marketing strategies is to increase the attractiveness of an offer by including an additional item.

The Presenter’s Paradox

Recent research by Weaver, Garcia, and Schwarz (2012), however, suggests that the advantages of bundling as a marketing strategy may not be as straightforward as previously thought. In particular, the authors argue that a person’s role – that is, whether a person is a *presenter* or an *evaluator* – is a critical determinant of whether including an add-on to a main product increases or decreases an offer’s attractiveness. According to Weaver et al., presenters (i.e., people deciding what to offer to others; typically marketers) see an offer as more attractive when the add-on is included, despite the fact that the respective evaluators (i.e., people deciding what to get for themselves; typically consumers) find it more attractive without the add-on. As a consequence, a *presenter’s paradox* emerges whereby presenters may endorse bundling as a marketing strategy even though it may be detrimental from an evaluator’s perspective.

In Weaver et al.’s (2012) original research on the presenter’s paradox, several studies provided consistent evidence for these hypotheses as well as for differences in terms of the underlying processing styles how product bundles are assessed across the two roles. However, in their studies, presenters and evaluators were in different evaluation modes when judging the products. Whereas presenters were always able to assess both the bundle and the single

option (i.e., the bundle without the add-on) in a joint evaluation, evaluators could only assess either the bundle or the single option in separate evaluations that were collected in a between-participants design. Thus, evaluations of presenters and evaluators were made on different grounds. Although this experimental set-up may reflect many real-world situations, the present research disentangles the influence of people's role and their evaluation mode, in order to clarify their independent effects.

Evaluation Mode

At the theoretical level, the distinction between evaluating an option in isolation versus in the context of an alternative refers to the notion of *evaluation mode*. According to *general evaluability theory* (Hsee & Zhang, 2010), any evaluation is formed in one of two modes: *Joint evaluation mode* (JE) refers to decision contexts in which two or more values are available and can be directly compared, whereas *separate evaluation mode* (SE) refers to decision contexts in which only a single value is available that is evaluated in isolation. Thus, directly contrasting bundle and single option as in the case of presenters represents an instance of JE, whereas evaluating the bundle and the single option alone as in the case of evaluators represents an instance of SE. Importantly, past research has demonstrated significant preference reversals across many domains as a function of evaluation mode (for an overview, see Hsee, Loewenstein, Blount, & Bazerman, 1999).

The goal of the present research is to explore the consequences of evaluation mode when it comes to evaluating single versus bundle options, thereby shedding new light on the presenter's paradox (Weaver et al., 2012). In particular, we hypothesize that the attention that is paid to the bundle's add-on differs when it is presented in JE versus SE, and that this difference affects evaluations across the two modes. We expect consumers to be more likely to notice the add-on, and therefore to prefer the bundle more strongly, when both options are presented jointly than when the bundle is presented in isolation.

The Cancellation and Focus Model

Our reasoning is based on the cancellation and focus model (Dhar & Sherman, 1996; Houston & Sherman, 1995; Sherman, Houston, & Eddy, 1999), which makes predictions about the salience of shared versus unique features when comparing choice alternatives. According to this model, features that are shared across alternatives are cancelled out in the decision process, whereas unique features are salient and focused on – a hypothesis that was recently backed up by eye-tracking data (Sütterlin, Brunner, & Opwis, 2008).

Drawing on the cancellation and focus model, we predict differences in feature salience across evaluation modes when judging single versus bundle products. In JE, the add-on is represented as a unique feature that is only provided by the bundle option, whereas the main product is represented as a shared feature that is provided by both the bundle and the single option. Therefore, in JE, we expect the bundle's add-on to be more salient than the main product. In SE, however, unique and shared features do not exist because only a single option is available rendering neither the add-on nor the main product particularly salient.

Based on this account, the preference asymmetries across roles that were obtained in Weaver et al.'s (2012) research may be attributable to presenters and evaluators being in JE and SE, respectively. The added value of the bundle may have been more salient to presenters than to evaluators thereby increasing presenters' endorsement of the bundle over the single option.

Hypotheses

Directly contrasting a product bundle with a single product in a joint comparison highlights the added value of the bundle (i.e., the add-on) as a unique feature. Thus, we expect consumers in JE to prefer bundle over single options independent of their role. Formally:

H1: In a joint evaluation mode, bundle options are preferred to single options.

Moreover, because in JE the added value of the bundle is more salient than in SE, we expect the bundle to be perceived as more attractive in JE than in SE.

H2: Bundle options are perceived as more attractive in a joint evaluation mode than in a separate evaluation mode.

These first two hypotheses are concerned with the consequences of evaluation mode for the assessment of bundle versus single options; the next two deal with the underlying mechanism. Namely, we investigate whether contrasting a product bundle with its respective single version increases the salience of the add-on as a unique product feature, therefore making the add-on more salient in JE rather than SE. Formally:

H3: The added value of bundle over single options (i.e., the add-on) is more salient in a joint rather than in a separate evaluation mode.

Finally, we expect that add-on salience is related to preferences. When consumers pay more attention to the added value of a bundle, they should perceive it as more attractive than when they do not pay much attention to it.

H4: With increasing salience of a bundle option's added value (i.e., add-on), the bundle is perceived as more attractive.

The Present Studies

To test these hypotheses, we developed the following research plan. In Study 1, we extended the design of Weaver et al.'s (2012) first study by orthogonally manipulating evaluation mode and role to test for their independent effects. In Studies 2 and 3, we investigated add-on salience as a mechanism underlying preference asymmetries across evaluation modes. Following Spencer, Zanna, and Fong's (2005) recommendation to investigate hypotheses concerning mediators that are both measurable and manipulable in an *experimental-causal-chain* design, add-on salience was measured (Study 2) and manipulated (Study 3).

For three reasons, we believe that these studies make a novel and substantial contribution. First, Study 1 sheds new light on the presenter's paradox (Weaver et al., 2012) by assessing to what degree role and evaluation mode independently affect preferences for

bundle versus single products. Second, the present research brings together lines of research that were developed independently and had not been integrated before: Building on what is known about evaluation mode (Hsee et al., 1999; Hsee & Zhang, 2010) and the cancellation and focus model (Houston & Sherman, 1995; Sherman et al., 1999), we investigate attentional asymmetries across evaluation modes (Studies 2 and 3). Third, the present research has significant implications for the marketing of product bundles. If the added value of a bundle promotion indeed goes largely undetected when it is not contrasted against a single alternative, the potential of this marketing strategy may be significantly reduced. We will return to these points in the General Discussion.

Study 1

To test our hypotheses that (1) bundles are preferred to singles in JE and (2) that bundles are perceived as more attractive in JE than in SE, we replicated and extended the design of Weaver et al.'s (2012) first study. In the original study, the single option was an 8-gigabyte iPod Touch and the bundle option was the same iPod Touch along with a free music download. Presenters always received both options in a within-participants design, whereas evaluators received either the single or the bundle option in a between-participants design. Moreover, presenters indicated their preferences by making a choice between bundle and single, whereas evaluators indicated their willingness-to-pay (WTP) for one or the other option.

We extended the original methods in two regards. First, we expanded the design by introducing an evaluator condition in which both options were presented in JE, and a presenter condition in which both options were presented in SE to obtain a full factorial design. Second, we assessed both dependent variables (i.e., choice and WTP) for both roles.

Methods

Participants. Using the same data collection website as in the original study (Weaver et al., 2012), we collected data from 120 US-Americans (47 females; age $M = 31.37$, $SD =$

11.00) via Amazon's Mechanical Turk (MTurk; see Buhrmester, Kwang, & Gosling, 2011).

Design. The study followed a 2 (*role*: presenter vs. evaluator) \times 3 (*evaluation mode*: JE vs. SE/single first vs. SE/bundle first) \times 2 (*target item*: single vs. bundle) experimental design with the first two factors varying between and the latter within participants.

Participants in the two separate evaluation conditions (i.e., SE/single first and SE/bundle first) were also presented the other option (bundle and single, respectively) after having provided their initial judgment. Thus, choice data are also available for these participants. Note, however, that choices by their very nature represent JE rather than SE. Accordingly, only the first judgment in the SE/single first and SE/bundle first conditions was considered for analyzing preferences in SE.

Procedure. Participants received one of six scenarios, dependent on condition, which were taken and adapted from the original study (Weaver et al., 2012). In particular, presenters in the SE/single first [JE] condition read:

Imagine you are in charge of creating packages for iPods. You have the option to offer customers [either] an 8-gigabyte iPod Touch and cover [or the same 8-gigabyte iPod Touch and cover along with one free music download.]

The SE/bundle first condition was analogous, except that the bundle was mentioned instead of the single option. In the JE condition, where both options were presented simultaneously, the order of single and bundle option was counterbalanced.

Evaluators in the SE/single first [JE] condition read:

Imagine you are looking to buy a gift for a friend and you are considering purchasing an iPod Touch. In the store you see the following [two] iPod package[s] for sale: [You have the option to buy either] an 8-gigabyte iPod Touch and cover [or the same 8-gigabyte iPod Touch and cover along with one free music download.]

Just as in the presenter condition, the SE/bundle first condition was created by mentioning the bundle instead of the single option and the order of both options was counterbalanced in the JE condition.

Dependent Variables. In both JE conditions, presenters [evaluators] first answered a choice measure (“If your goal is to have consumers believe the package is more valuable [to choose the package you consider more valuable], which one would you choose?”). Then, they indicated customers’ [their own] WTP for both options in counterbalanced order (“How much do you think prospective customers [you] would be willing to pay for the 8-gigabyte iPod Touch and cover [along with one free music download?]”).

In the four SE conditions, the procedure was adjusted so that participants first expressed their WTP for one option without yet knowing about the existence of another option. After providing their answers, they received the respective scenario (presenter vs. evaluator) from the JE conditions, that is, they were presented with both options simultaneously and were thus able to indicate a choice. Finally, they indicated their WTP for the second, not-yet rated option.

Results

Choice. Overall, there was a strong preference for the bundle over the single option. In total, 89% of all participants chose the bundle, $\chi^2(1) = 73.63, p < .001$. This main effect was qualified by an interaction of role and evaluation mode, such that the bundle option was chosen more frequently by presenters than by evaluators, $\chi^2(1) = 6.99, p = .008$ (see figure 1). Nevertheless, the fact that 97% of presenters and 82% of evaluators chose the bundle, both $\chi^2(1) > 24.07, ps < .001$ (note that the rate of presenters choosing the bundle option is very similar to the 92% reported by Weaver et al., 2012), provides support for our hypothesis that consumers in JE generally prefer bundle over single options.

WTP in Separate Evaluation Mode. Analyzing only the first rating in the SE/single first and SE/bundle first conditions, WTP judgments were submitted to a 2 (*role*: presenter vs.

evaluator) \times 2 (*target item*: single vs. bundle) between-subjects ANOVA. Presenters ($M = 198.33$, $SD = 108.40$) expected their prospective customers to be generally willing to pay more than evaluators actually were ($M = 139.58$, $SD = 89.99$), $F(1, 75) = 6.71$, $p = .012$, $\eta_p^2 = .08$. No general preference for either option and no interaction were obtained, $F_s < 1$ (see table 1).

WTP in Joint Evaluation Mode. Joint WTP values were submitted to a 2 (*role*: presenter vs. evaluator) \times 2 (*target item*: single vs. bundle) mixed-model ANOVA. A main effect of target item emerged whereby participants were generally willing to pay more for the bundle than the single option, $F(1, 39) = 8.06$, $p = .007$, $\eta_p^2 = .17$. This main effect was qualified by an interaction of role and target item, $F(1, 39) = 6.30$, $p = .016$, $\eta_p^2 = .14$, suggesting that the trend to prefer the bundle was more pronounced for presenters than evaluators (see table 1).

As another way to analyze WTP in JE, we computed a *preference index based on WTP* by subtracting WTP for the single from WTP for the bundle such that each participant could be classified as preferring the bundle (positive scores), preferring the single (negative scores), or being indifferent (zero score). Submitting these scores to a 2 (*role*: presenter vs. evaluator) \times 3 (*preference based on WTP*: single vs. bundle vs. indifference) chi-square test of independence revealed that preferences were not equally distributed across roles, $\chi^2(2) = 8.50$, $p = .014$. Whereas presenters were more likely than evaluators to prefer the bundle (55% vs. 30%), $\chi^2(1) > 4.41$, $p = .036$, evaluators were more likely than presenters to be indifferent (58% vs. 33%), $\chi^2(1) > 4.01$, $p = .043$. Preferences for the single option were equally low for both roles (both 12%). Critically, considering only those participants who showed a preference, both presenters and evaluators preferred the bundle over the single option, both $\chi^2(1) > 4.84$, $p_s < .028$.

Joint Versus Separate Evaluation Mode. Finally, we analyzed the preference for bundles over singles across the two evaluation modes. To be able to compare SE (where data

were collected between-participants) with JE (where data were collected within-participants), we computed the difference between WTP for the bundle versus single for participants in JE, and we compared these values to the average difference between WTP for the bundle versus single across all participants in SE (obtained from subtracting the average WTP for singles from the average WTP for bundles in SE). As expected, participants in JE had a stronger preference for the bundle over the single than participants in SE, one-sample $t(40) = 5.10$, $p < .001$, $d = 0.80$ (see table 1).

Discussion

Evaluation mode affects consumers' preferences for bundle versus single options. First, bundle options are preferred to single options in JE, whereas consumers are largely indifferent between the two options in SE. Second, the relative preference for the bundle is more pronounced in JE than in SE. We believe that these findings were obtained due to the higher salience of the add-on in JE as compared with SE. Directly contrasting an offer of an iPod that includes a music download with an offer that does not presumably directed participants' attention to the download and increased their preference for that offer. The goal of the next two studies will be to investigate this idea experimentally.

In addition to these strong and consistent effects of evaluation mode, differences in bundle versus single preferences also emerged as a function of role. Presenters indicated relatively stronger preferences than evaluators for the bundle in (1) the choice measure, (2) the WTP measure in JE (however, not in SE), and (3) the preference index based on WTP. Thus, there still may be differences in terms of presenters' and evaluators' processing styles when evaluating bundles as suggested by Weaver et al. (2012). However, contrary to the original notion of the presenter's paradox, in none of the analyses did evaluators prefer the single option. In fact, a clear majority of evaluators chose the bundle when confronted with the same choice that presenters faced in the original study. Thus, although presenters tended

to overestimate evaluators' interest in the bundle, evaluators did not prefer the single option over the bundle.

Study 2

Studies 2 and 3 investigated the attention paid to the add-on as an underlying factor to mediate the influence of evaluation mode on bundle preferences in an *experimental-causal-chain design* (Spencer et al., 2005). Thus, in Study 2, we manipulated evaluation mode and assessed whether participants paid more attention to the added value of the bundle in JE versus SE. To that end, participants received a series of consumer products that came as a bundle (e.g., a camera plus a camera backpack). Participants in the SE condition only received the bundle version of each product, whereas participants in the JE condition received both the bundle and a single version of the same product (e.g., only a camera). After providing purchase intentions for all eight products, participants worked on a change detection task, which was designed to assess how salient the add-on was when purchase intentions were provided. The change detection paradigm has been used in both visual cognition research (Simons & Levin, 1997) and psycholinguistics (Sturt, Sanford, Stewart, & Dawydiak, 2004) to assess the extent to which certain stimuli are paid attention to and are carefully processed. If it is indeed the case that the add-on is more salient when a bundle is contrasted to its respective single version, then participants in JE should be more likely to detect changes in the description of the add-on than participants in SE.

Methods

Participants. Seventy-eight US-Americans (27 females; age $M = 32.94$, $SD = 10.23$) participated via MTurk and were randomly assigned to either the JE or the SE condition.

Procedure. Participants saw eight consumer products (e.g., laptop, coffeemaker, TV) in random order. Each product existed in a single, as well as in a bundle version. Product descriptions were taken from amazon.com; participants thus rated existing consumer products. For instance, the digital camera bundle was described as “*Canon PowerShot A2500*

16MP Digital Camera with 5x Optical Image Stabilized Zoom and 2.7-Inch LCD (Red) along with a Canon Deluxe Camera Backpack". The single version was identical to this bundle version except for the camera backpack not mentioned. To manipulate evaluation mode, participants in the JE condition saw both versions (i.e., single and bundle), whereas participants in the SE condition only saw the bundle version. After reading the description of a product, participants indicated their purchase intention ("How likely would you buy this option?"; 7-point scale).

After judgments were provided for all eight products, participants proceeded to the change detection task (in order not to influence participants' behavior in the initial evaluation task, they were not informed about this second task at the beginning of the experiment). In this task, participants received all eight product bundle descriptions a second time. This time, however, their task was to detect whether there was any difference in the description from the original version. From the eight items to be judged in this task, four items contained only a change to the add-on, two hybrid items contained changes to both the add-on and the main part, and two items contained no change at all (participants were informed in advance that there could be one, two or no changes to the original description). Participants first indicated whether they detected a change or not, and if they did, they described it briefly in a textbox. Change detections were only considered correct when the description correctly identified the change.

Results

Purchase intentions. Participants in JE ($M = 5.47$, $SD = 1.01$) expressed higher purchase intentions for the bundle than participants in SE ($M = 3.92$, $SD = 1.07$), $t(76) = 6.58$, $p < .001$, $d = 1.49$. Also, participants in JE expressed higher purchase intentions for the bundle than for the single item ($M = 3.50$, $SD = 1.16$), paired $t(38) = 9.57$, $p < .001$, $d = 1.54$. Purchase intentions for the bundle in SE were not significantly different from purchase intentions for the single in JE, $t(76) = 1.65$, NS.

Change detection. Across the six items in which an add-on change occurred, participants in JE ($M = 2.69$, $SD = 1.45$) detected more changes than participants in SE ($M = 1.46$, $SD = 1.12$), $t(76) = 4.19$, $p < .001$, $d = 0.97$ (see figure 2). Change detection for the two control items, where no changes occurred, did not differ across conditions, $t(76) = 1.33$, NS (for these two items the correct answer was to not mention any change).

Change detections for the two hybrid items were analyzed in a 2 (evaluation mode: JE vs. SE) \times 2 (type of change: add-on vs. main part) mixed model ANOVA. The critical interaction, $F(1, 76) = 20.70$, $p < .001$, $\eta_p^2 = .21$, indicated that participants in JE detected add-on changes ($M = 1.10$, $SD = 0.75$) more frequently than main part changes ($M = 0.38$, $SD = 0.59$), paired $t(38) = 4.74$, $p < .001$, $d = 0.77$, whereas participants in SE performed equally well across both types of change, paired $t(38) = 1.42$, NS. Yet, overall change detection performance did not differ across evaluation modes, $F < 1$. Lastly, participants were generally more successful at detecting add-on changes than main part changes, $F(1, 76) = 7.45$, $p = .008$, $\eta_p^2 = .09$.

Effects of change detection on purchase intentions. Participants expressed stronger purchase intentions for those bundles for which they correctly detected an add-on change ($M = 4.92$, $SD = 1.65$), as compared with bundles for which they did not detect it ($M = 4.42$, $SD = 1.72$), paired $t(63) = 2.38$, $p = .020$, $d = 0.28$ (14 participants that either detected none or all changes were not considered in this analysis). Moreover, in a mixed-effects regression model considering all six items where an add-on change was implemented (with change detection scores and the intercept included as random effects to the model), change detection significantly predicted purchase intentions, $F(1, 61.42) = 11.98$, $p = .001$.

Discussion

Study 2's results demonstrate that evaluation mode affects how much attention is paid to the different components of a product bundle. In JE, the contrast of the bundle with a single option highlights the difference between the two. JE renders the add-on salient and, therefore,

emphasizes the relative advantage of the product bundle, increasing its attractiveness. In SE, however, the contrast to the single option is missing. As a result, the add-on's salience and the bundle's attractiveness are lower as compared with JE. In this regard, the analysis of the two hybrid items is revealing: It was not the case that participants in either of the two evaluation modes were generally better at detecting changes. Instead, those in joint evaluation mode were specifically good at detecting changes in the add-on, whereas those in separate evaluation mode were equally good at detecting add-on and main part changes. Finally, results demonstrated that salience matters for purchase intentions: Participants who detected a change in the add-on indicated higher purchase intentions than participants who did not.

Study 3

The goal of Study 3 was to provide experimental evidence for the second path of our causal chain design by manipulating add-on salience and measuring its impact on bundle preferences. We designed two different SE conditions in which the bundle's add-on was either made salient or not and compared them to a JE condition. If JE indeed enhances the attractiveness of the bundle via add-on salience, then increasing the add-on's salience in SE should have a comparable effect on the bundle's attractiveness. Thus, we expected the bundle to be considered more attractive in JE and under high salience in SE than under low salience in SE.

Methods

Participants. One hundred and fifty US-Americans (55 females; age $M = 33.21$, $SD = 11.41$) participated in the present experiment via MTurk and were randomly assigned to one of three experimental conditions (JE, SE/high salience, SE/control salience).

Procedure. Participants in all three conditions judged the attractiveness of a product bundle comprised of a coffee maker and an additional milk frother, presented in a photograph. In the SE/control salience condition (see figure 3A), participants saw an actual promotional photograph of the bundle that was taken from the website of an online shop selling the

product. In this photograph, the milk frother was placed right next to the coffee maker within the same frame such that both items blended in. In the SE/high add-on salience condition (see figure 3B), the coffee maker and the milk frother were spatially separated and each of the two objects was placed inside its own frame, making the add-on much more conspicuous as it visually stuck out from the main item. In the JE condition, the bundle photograph from the SE/control salience condition was placed right next to a photograph of the single product alone (figure 3C). In all three conditions, participants judged the attractiveness of the bundle offer on a 7-point scale from “*very unattractive*” to “*very attractive*”. In the JE condition, participants also judged the single option on the same scale.

Results

As predicted, participants preferred the bundle more strongly in JE ($M = 5.62$, $SD = 1.34$), and in SE under high add-on salience ($M = 5.44$, $SD = 1.34$), as compared with the SE/control salience condition ($M = 4.76$, $SD = 1.77$), $F(2, 147) = 4.46$, $p = .013$, $\eta_p^2 = .06$. Contrast analyses revealed that there was no difference between JE and the SE/high salience condition, $t < 1$. Yet, both of these conditions differed significantly from the SE/control salience condition, $ts > 2.20$, $ps < .030$, $ds > 0.44$. Moreover, replicating the results from both previous studies, participants in JE preferred the bundle over the single option ($M = 4.66$, $SD = 1.33$), paired $t(49) = 3.47$, $p = .001$, $d = 0.50$. Lastly, the attractiveness rating of the single product in JE was only different from the attractiveness rating of the bundle in SE under high add-on salience, $t(102) = 2.99$, $p = .004$, $d = 0.59$, not under low add-on salience, $t < 1$.

Discussion

Study 3's results complete the causal chain of experiments: Manipulating the salience of the add-on, participants indicated higher attractiveness ratings for the bundle when the add-on was salient than when it was not. In fact, the preference for the bundle in SE can be as high as the preference for the bundle in JE as long as its added value is clearly noticeable.

However, not highlighting the add-on in SE makes the bundle appear less attractive than when the add-on is salient, and no more attractive than the single product in JE.

Study 3's results are consistent with our attentional account and with Study 2's finding that paying attention to the add-on increases the attractiveness of the bundle. Still, we cannot preclude alternative interpretations. The visual salience manipulation that was used in this study might have also affected the perceived numerosity of items in the bundle and, therefore, the attractiveness of the offer. Indeed, according to the Weber-Fechner-law and the concept of diminishing marginal utilities, the utility of two single items can be higher than the utility of the compound of the two. Note, however, that neither of these accounts would be mutually exclusive with regard to our attentional explanation.

General Discussion

Evaluation mode matters for the assessment of product bundles. In JE, attention is directed to the added value of a bundle over a single offer; in SE, this attentional advantage of the add-on is missing. As a result, first, consumers in JE prefer product bundles over single products and, second, consumers in JE prefer product bundles more than do consumers in SE.

The purpose of the present research was threefold: First, we sought to reinvestigate the presenter's paradox by also taking evaluation mode into account. Second, building on the cancellation and focus model (Houston & Sherman, 1995; Sherman et al., 1999), our goal was to explore attentional processes underlying people's preferences across evaluation modes. And third, we were interested in the managerial implications of evaluation mode for the marketing of product bundles. We will now discuss each of these aspects.

The Presenter's Paradox Revisited

Weaver et al. (2012) proposed a presenter's paradox whereby people in a presenter role prefer bundles over singles, whereas people in an evaluator role prefer singles over bundles. Yet, in the original research, presenters and evaluators provided their judgments in JE and SE, respectively. Disentangling role and evaluation mode, the present research sheds

new light on these findings. Both presenters and evaluators had strong and consistent preferences for the product bundle in JE, whereas neither role expressed a clear preference in SE. Thus, a substantial part of the effects described in the presenter's paradox is attributable to evaluation mode.

Nevertheless, several intriguing results regarding the role factor provide starting points for future research. First, even though a clear majority of both presenters and evaluators chose the bundle in JE, it was still the case that evaluators did so to a lesser degree than presenters. Also, presenters indicated a higher WTP for the bundle than evaluators (however, this tendency was only statistically significant in JE). Thus, the proposal that presenters overvalue evaluators' appreciation for product bundles remains unchallenged. In this regard, it may well be that, even when holding evaluation mode constant, presenters and evaluators do engage in different processing styles that affect their product evaluations, as suggested by Weaver et al. (2012).

The idea that evaluators prefer the single option was, however, not supported by the present results. In Study 1, evaluators' WTP in SE was not higher for the single than for the bundle option (in fact the opposite trend was observed). Based on the present theorizing, it seems unlikely that consumers in SE would prefer singles over bundles – if anything, neither option should be preferred without a reference context, which is what our results suggest. In Studies 2 and 3, add-ons were used that might not have been as *mildly* favorable as the ones used in the original studies (such as the free music download in Study 1) – that may have contributed to the differences between the present and Weaver et al.'s (2012) results.

Weaver et al. (2012) suggested differences in holistic versus piecemeal processing to account for stronger preferences for singles and bundles, respectively. Holistic processing refers to an integrated focus on the big picture or the whole, whereas piecemeal or analytic processing refers to a segregated focus on an object's individual components (see, e.g., Nisbett, Peng, Choi, & Norenzayan, 2001). Interestingly, the present study's theorizing about

the psychological processes involved in JE versus SE can be related to this distinction of piecemeal versus holistic processing: Both JE and piecemeal processing foster the perception of a bundle's add-on as an individual component which is added to the main product to increase its value; both SE and holistic processing foster the perception of the bundle as a whole undermining the prominence of the bundle's add-on.

Finally, Weaver et al.'s (2012) and the present research can be reconciled when taking into consideration that, in many real-world situations, presenters and evaluators are in JE and SE, respectively. While presenters (often marketers) assemble choice options for other people, evaluators (often consumers) can only choose what has been provided to them. Thus, presenters are typically confronted with a wider range of options than evaluators which may provide them with a perspective more similar to JE than it is for evaluators.

The Role of Attention across Evaluation Modes

Previous research on evaluation mode has predominantly been concerned with attribute evaluability as a process through which evaluation mode affects preferences (Hsee, 1996; Hsee et al., 1999; Hsee & Zhang, 2010). By providing a contextual reference standard, the decision weight of certain attributes (particularly those that are hard to evaluate) is enhanced in JE, which can lead to preference reversals in comparison to SE. The present research suggests an additional route through which evaluation mode affects preferences. People tend to focus on features that are unique across options and cancel out features that are shared. The salience is higher for the former than the latter (Dhar & Sherman, 1996; Houston & Sherman, 1995). Applying this logic to JE versus SE, the present research provides evidence for differences in feature salience across evaluation modes. By definition, JE is about the comparison of at least two alternatives, whereas SE is about the evaluation of alternatives in isolation. Therefore, unique and shared features along with respective attention asymmetries only exist in JE not in SE.

Two predictions arise from this account: First, in JE unique features receive more attention than shared features, whereas in SE both types of feature receive comparable attention. Second, unique features receive more attention in JE than in SE. Both hypotheses are supported by Study 2's results: First, participants in JE were better at detecting add-on changes (i.e., unique features) than main part changes (i.e., shared features) whereas participants in SE did not differ in performance across change types. Second, participants in JE were generally much better at detecting add-on changes than participants in SE.

Furthermore, the present research highlights the importance of such attention asymmetries for the evaluation of product bundles. In Study 2, when participants correctly identified a change in the description of a bundle's add-on and, in Study 3, when the add-on was visually made salient, the attractiveness of the bundle increased considerably.

Implications for Consumer Behavior and Marketing

The present research has straightforward and substantial implications for the marketing of product bundles. Using an actual promotional image taken from an online shop, results of Study 3 indicated that not highlighting a bundle's added value can significantly undermine the potential of the marketing strategy. In fact, when the add-on was not made salient, the bundle's attractiveness was judged to be as low as that of the single product.

As a natural means of highlighting a bundle's added value over a single product, the present research suggests to directly contrast both alternatives. Pragmatically, shops selling bundles should present the respective single products as well with the purpose of making the bundle appear maximally attractive. Alternatively, by visually increasing the add-on's salience, a similar effect can be obtained (cf. Study 3). However, such marketing strategies may potentially backfire for add-ons with a negative utility. In the present studies, the add-on in the bundle always represented an advantage over the single alternative. Yet, when marketing add-ons with negative value, JE versus SE may actually decrease a bundle's attractiveness.

In conclusion, product bundling is a frequently used marketing strategy across a wide range of consumer domains. The present research demonstrates the pervasive role of evaluation mode and add-on salience for the assessment of product bundles, and that these factors should be taken into consideration when designing bundle marketing campaigns.

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Table 1

Effects of Evaluation Mode and Role on WTP (Study 1)

		iPod		iPod plus download		t-value (df)
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
SE	Presenter	209.70	124.39	186.37	90.45	.667 (37)
	Evaluator	131.65	73.19	147.50	105.51	.552 (38)
JE	Presenter	177.29	64.55	186.24	67.29	2.815 (20)*
	Evaluator	157.80	88.92	158.35	88.83	.709 (19)
SE		170.67	108.21	166.44	99.14	.181 (77)
JE		167.78	77.05	172.63	78.81	2.726 (40)**

Note. The final column displays t-values for comparing iPod and iPod plus download in the respective row (between and within participants for separate and joint evaluations, respectively). The last two rows display results averaged across both roles. ** indicates $p < .01$, * indicates $p < .05$

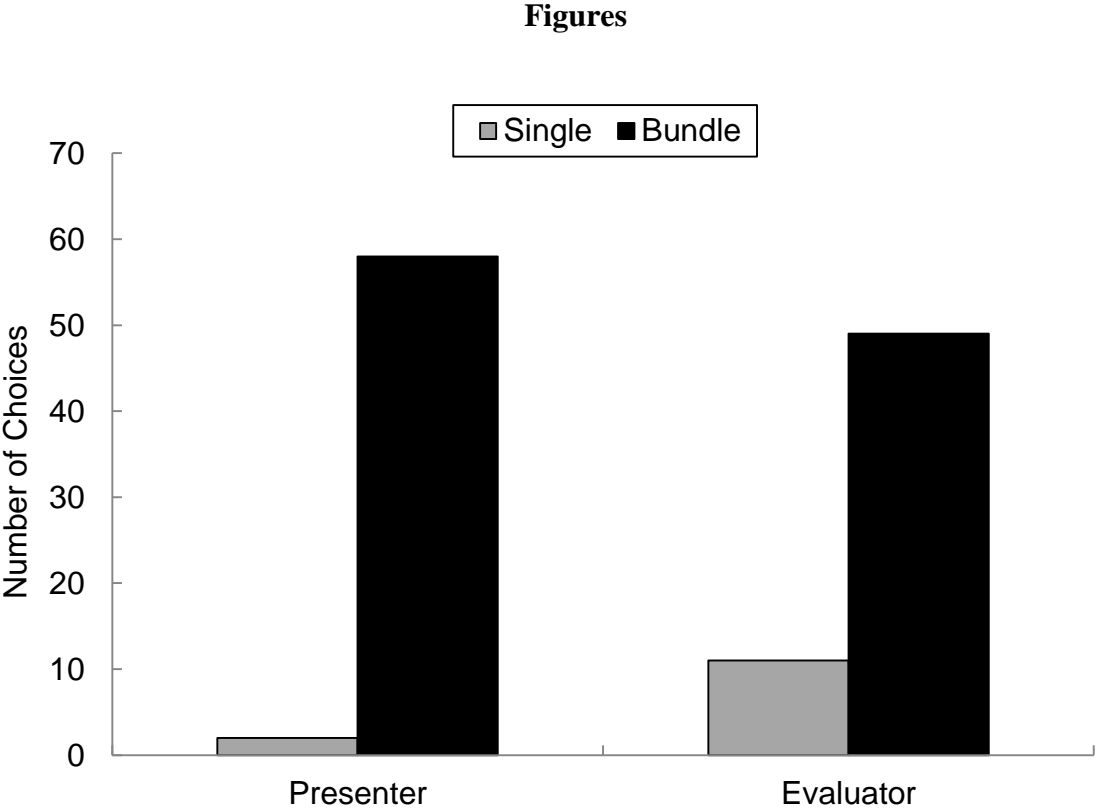


Figure 1. Choices of the single versus bundle option by role (Study 1).

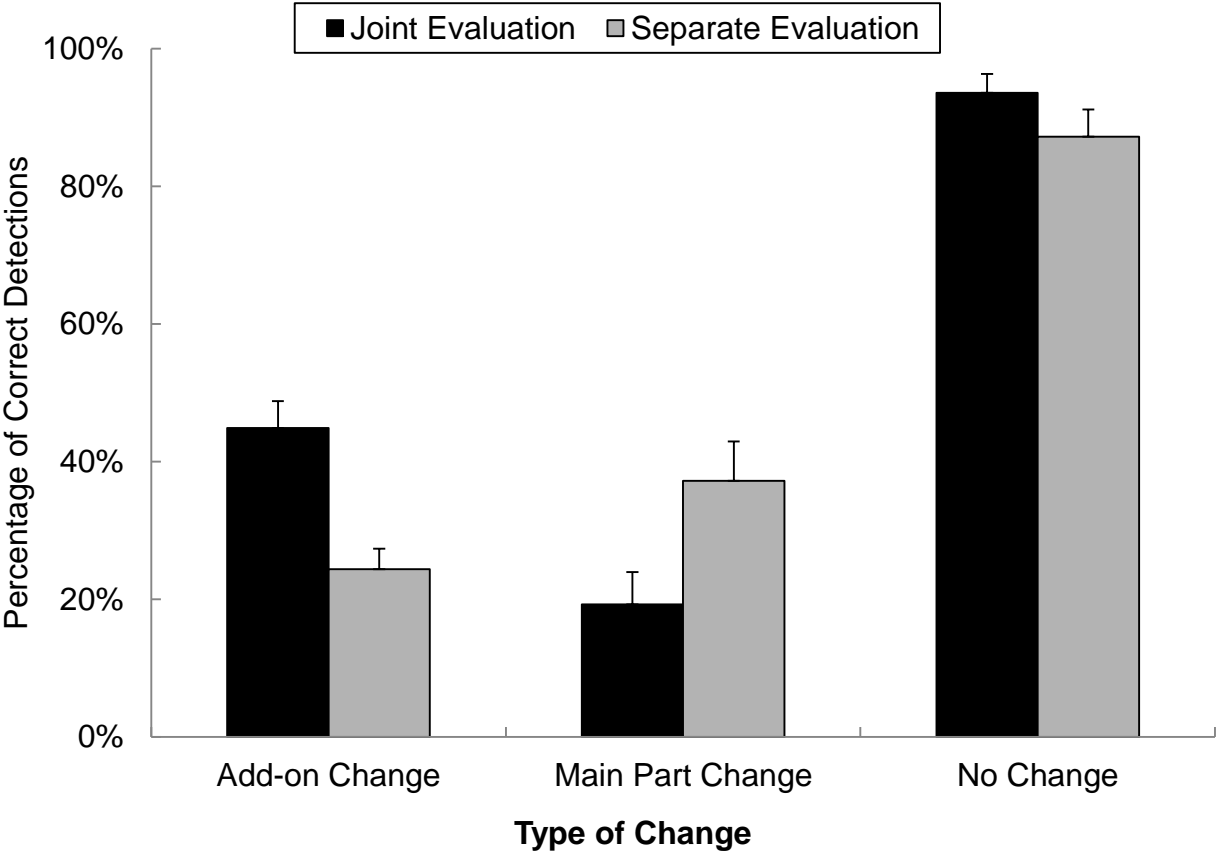


Figure 2. Change detections by evaluation mode and type of change (Study 2).



Figure 3A. SE/Control salience condition (Study 3). This image was also used as the bundle option in the JE condition.



Figure 3B. SE/High salience condition (Study 3)



Figure 3C. Single option used in the JE condition (Study 3)

Framing Effects in Consumer Judgment and Decision-Making

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Do consumers care whether ground beef is advertised as 75% lean or 25% fat? Does it matter whether a gamble offers \$50 for sure or a 50% chance to win \$100 and a 50% chance to win nothing? Does it make a difference whether a doctor communicates the outcome of a medical treatment as successful in 80% of all cases or as not successful in 20% of all cases?

From a normative point of view, the answer to these questions is pretty straightforward: It shouldn't. Expected utility theory assumes human behavior to be governed by various axioms of rationality (Von Neumann & Morgenstern, 1947); rational decision makers choose according to a prospect's expected utility and not according to the way in which it is portrayed. Granting that 25% fat is the same in other words as 75% lean, and 80% survival is the same as 20% mortality, the different descriptions should not affect consumers' choice of ground beef or patients' choice of a medical treatment. Put more generally, the way in which a decision is presented, its *framing*, should not affect a decision maker's preference as long as expected utilities stay invariant.

Yet, decades of research found that framing can have dramatic consequences for people's preferences and choices (Keren, 2011b; Levin, Schneider, & Gaeth, 1998). Despite their logical equivalence, people prefer ground beef that is 75% lean over ground beef that is 25% fat (Levin & Gaeth, 1988), a gamble that offers \$50 for sure over a gamble that offers a 50% chance to win \$100 (cf. Tversky & Kahneman, 1981), and a medical treatment that is successful in 80% of all cases over a treatment that is not successful in 20% of all cases (Wilson, Kaplan, & Schneiderman, 1987).

Questioning fundamental axioms of rational choice, framing effects are at the heart of the rationality debate of human decision making (Shafir & LeBoeuf, 2002). The present chapter will sketch this interesting debate as well as its implications for consumer behavior. We will first derive a general definition of what can be considered a framing effect. Next, to organize the comprehensive literature, we will discuss the most prevalent typologies with representative findings in the realm of consumer judgment and decision-making and the most

common accounts of framing effects. Finally, we will broaden the perspective by discussing moderators to see whether framing effects can be switched off, and by reviewing specific applications of the framing idea in the field of consumer research.

What Are Framing Effects?

Framing effects are said to occur when *equivalent* presentations of the same decision problem lead to systematically different decisions (Sher & McKenzie, 2006). Thus, at their core, framing effects are about the communication of a decision problem (Keren, 2011a) and are typically concerned with how choice alternatives are described and through which response mode answers are elicited. To define what can be considered a framing effect (and not just a preference between two actually different options), the equivalence of the frames is a critical criterion. Indeed, preference asymmetries across choice options that factually differ in their expected utilities would neither violate normative principles of rational choice nor would they be considered as framing effects. Preferences for a medical treatment with a 50% success rate over a treatment with a 60% failure rate are easily explained via differences in expected utilities without drawing on any psychological account about the representation of the decision problem. It is the preference of a treatment with a 50% success rate over the one with a 50% failure rate that cannot be accounted for by a rational actor's expected utilities as both outcomes are mathematically or logically equivalent.

Obviously, according to this definition, the standard of equivalence – like logical, formal, or mathematical equivalence – is essential for the demarcation of the effect. We will come back to a discussion of useful definitions of equivalence in a later section of this chapter. First, we will provide a general overview of the most important framing effects within common framing typologies.

Typologies and Examples of Framing Effects

To consolidate the vast and diverse literature on framing effects several attempts have been made to establish typologies that organize the plethora of findings. Subdividing framing

effects may be useful to the extent that different psychological mechanisms come into play in different areas of framing research. Thus, theoretical explanations for why framing effects occur are manifold and have to be tailored to the specific nature of the decision problem.

The probably most widely-cited typology of framing effects has been suggested by Levin, Schneider and Gaeth (1998). Based on (a) what is framed, (b) what the frame affects, and (c) how the effect is measured, the authors propose three distinct types of framing effects – *risky choice framing*, *attribute framing*, and *goal framing* – with the goal to resolve seemingly non-integrable, contradictory patterns of results from previous research and to tailor specific accounts and underlying mechanisms to a particular subset of findings.

Risky Choice Framing

In risky choice framing, people are confronted with two choice options that differ in their degree of risk. These options are either framed positively (i.e., in terms of gains) or negatively (i.e., in terms of losses). The most prominent example of risky choice framing – the *Asian disease problem* – was published in a seminal article by Tversky and Kahneman (1981). In the Asian disease problem, participants are informed that an unusual Asian disease is expected to kill 600 people, but that there are two alternative programs to combat the disease. Participants' task is to choose between the two programs. In the positive and the negative framing condition, the outcome of the two programs is described in terms of people saved and people dying, respectively. Essentially for a risky choice framing, the two options in each program differ in their degree of risk – that is, in both conditions there is one program with a riskless outcome (i.e., 200 people surviving; 400 people dying), and one program with an outcome that involves a specified degree of risk (i.e., 1/3 probability that 600 people are saved and 2/3 probability that no people are saved; a 1/3 probability that nobody will die and a 2/3 probability that 600 people will die).

Participants' choices in the Asian disease problem reflect a *preference reversal* across the two framing conditions: Whereas the majority of participants in the positive framing

condition (72%) prefers the riskless option, the majority of participants in the negative framing condition (78%) prefers the risky option. Thus, despite the logical equivalence of the frames, choices differ substantially as a function of the frames' valence. Based on prospect theory (Kahneman & Tversky, 1979), Tversky and Kahneman (1981) conclude that people are risk averse in the domain of gains and risk seeking in the domain of losses – an effect which is backed up by the notion of *loss aversion* (Kahneman & Tversky, 1984; Tversky & Kahneman, 1991), which states that a negative loss (e.g., -\$100) looms larger than its equivalent positive gain (e.g., +\$100). We will elaborate on the specific explanations for risky choice framing at a later point in this chapter.

Although much of the research concerning risky choice framing has been concerned with the Asian disease problem and its variants, risky choice framing has also received much attention in the field of consumer and marketing research. For instance, in a hypothetical scenario, Qualls and Puto (1989) asked a random sample of professional fleet managers to make a choice between awarding a maintenance contract for a fleet to one of two providers. Critically, one provider offered a fixed rate (riskless option), whereas the other provider offered a rate dependent on the number of vehicles in the fleet, which was not entirely predictable (risky option). Consistent with Tversky and Kahneman's (1981) earlier research, the fleet managers were more likely to choose the fixed rate and the flexible rate when the options were framed as positive and negative, respectively. And even financial planners, who deal with the evaluation of risky prospects as part of their professional life, were shown to be susceptible to risky choice framing in a problem conceptually analogous to the Asian disease dilemma in the domain of investment strategies (Roszkowski & Snelbecker, 1990).

Since Tversky and Kahneman's (1981) original publication of the Asian disease problem, a large number of studies across a wide range of domains has replicated the original results. A meta-analysis by Kühberger (1998) reported an average effect size of $d = .31$ across 136 studies that were concerned with risky decisions. Effects tended to be stronger when an

experimental paradigm was similar to Tversky and Kahneman's – for instance, with regard to response mode (choice vs. ratings), and differences in the level of risk between the two options (qualitatively vs. quantitatively).

Attribute Framing

The second class of Levin, Schneider and Gaeth's (1998) typology, attribute framing, is concerned with the most simple case of valence framing: A single attribute of a decision object is either framed in positive or in negative terms. Just as the glass can be half full or half empty, performance can be described in terms of success or failure rates, medical treatments in terms of survival or mortality rates, a conference in terms of what percentage of papers is accepted or rejected, or consumer satisfaction in terms of percentage of satisfied or of dissatisfied consumers (Beach, Puto, Heckler, Naylor, & Marble, 1996). As long as the dichotomous probabilities add up to 1, one frame is mathematically equivalent to the other – communicating the success rate logically implies the failure rate and vice versa.

Our introductory example of ground beef represents one of the most prominent examples of attribute framing (Levin, 1987; Levin & Gaeth, 1988). Consumers evaluated the quality of ground beef which was labeled as “75% lean ground beef” (positive frame) more favorably than when it was labeled as “25% fat ground beef” (negative frame) despite the logical equivalence of the two frames. Similarly, consumers evaluated soup advertised as 95% fat-free as healthier than a soup advertised as 5% fat (Sanford, Fay, Stewart, & Moxey, 2002). Not surprisingly nutrients deemed unhealthy are often advertised in a positive frame, as an abundance of product claims as X% fat-free (salt-free, etc.) shows. This kind of framing can be extended to many attributes that involve numerical quantities, for example, X% of the parts were made by American (domestic) versus non-American (foreign) workers (Levin, Jasper, & Gaeth, 1996). Likewise in the medical domain, a treatment is evaluated as more effective and is more likely to be recommended to another person or a family member when it is described with a “50% success rate” rather than a “50% failure rate” (Levin, Schnittjer, & Thee, 1988).

In contrast to risky choice framing, which involves the joint evaluation of two alternative options (e.g., the two different programs in the Asian disease dilemma), attribute framing involves only a single alternative that is evaluated in isolation (e.g. ground beef). Note that this also changes the nature of preference reversals (also called bidirectional framing effect, see Wang, 1996): In attribute framing, a preference reversal can only be obtained in terms of a majority of participants favoring an option (e.g. purchasing ground meat) in one framing condition and a majority of participants *not* favoring the option in the other condition.

In general, research on attribute framing quite consistently provides evidence for a *valence-consistent shift*: Choice options are evaluated more positively when presented in positive rather than in negative terms. Although there is evidence for moderators in attribute framing (e.g., Freling, Vincent, & Henard, 2014), in their review, Levin, Schneider and Gaeth (1998) do not report a single study in which a negative frame produces more favorable evaluations than the respective positive frame and conclude that the research on attribute framing “presents the clearest evidence of a homogeneous phenomenon” (p. 160) from all the three types of framing effects within their taxonomy.

As a potential explanation to account for the occurrence of attribute framing effects, differences in category accessibility and priming have been discussed (Levin et al., 1998) – positive and negative frames produce predominantly positive and negative associations, respectively. We will dwell on the mechanisms behind attribute framing after discussing goal framing, the third and final class in Levin et al.’s (1998) taxonomy.

Goal Framing

Goal framing is concerned with the potentially beneficial consequences of engaging in a certain behavior versus the potentially detrimental consequence of not engaging in it. Thus, it refers to the goal – attaining a gain versus avoiding a loss – which an individual adopts when performing a certain behavior. For example, the decision to change the energy provider

can be framed as saving money (attain gain) or as preventing unnecessary costs (avoid loss) by switching from the old provider.

Goal framing is similar to attribute framing as it involves the judgment of a single rather than multiple options. It is, however, different from attribute framing as both frames describe a behavior as concordantly good (or concordantly bad). Goal frames do not characterize a specific aspect as positive in one framing condition and as negative in the other condition (such as presenting ground beef either as lean or as fat). Instead, goal framing focusses on a behavior's positive consequences; yet, these consequences are either presented as positive because of gaining something (e.g., save money) or they are presented as positive because of not losing something (e.g., avoid unnecessary costs). Thus, in goal framing, both frames promote the same action or result (e.g., change energy provider) but for different reasons whereas, in attribute framing, an object's attribute is either presented in positive or in negative terms.

Levin and colleagues propose loss aversion as an underlying mechanism to explain goal framing. As losses loom larger than gains (Tversky & Kahneman, 1991), people should be more likely to take an action that avoids a loss rather than one that attains a gain (for a discussion, see section below).

Much research on goal framing is motivated by how appeals should be framed to be most persuasive. The simple prediction is that pointing out how a behavior can prevent losses should be more effective in motivating the behavior than pointing out how the same behavior attains gains. In a field experiment conducted by Ganzach and Karsahi (1995; see also Thaler, 1980), credit card owners received a marketing pamphlet that framed the benefits of credit card usage either in terms of gains obtained from using the card (e.g., paying by card is convenient, *no* danger that money will be lost or stolen) or in terms of losses suffered from not using it (e.g., paying by cash is less convenient, danger that money will be lost or stolen). Results of two hundred forty-six credit card owners indicated that 54.8% of the customers in

the loss-frame condition and 23.6% of the customers in the gain-frame condition used their credit card within the first month after receiving the pamphlet. Also, customers in the loss-frame condition charged their credit card with more than twice the amount than those in the gain-frame condition. Thus, the loss-frame pamphlet was much more effective in promoting credit card usage than the gain-frame pamphlet in several respects.

Whether gain-framed or loss-framed messages or appeals are more persuasive has extensively been researched with respect to health behavior and consumption of health-related products. In line with the credit card example above, a widely-cited article by Meyerowitz and Chaiken (1987) presents evidence for women's higher engagement rates in breast self-examination (BSE) under a loss- versus a gain-frame. In the loss frame condition, participants were told that "women who *do not do* BSE have a *decreased* chance of finding a tumor", whereas, in the gain frame condition, participants were told that "women who *do* BSE have an *increased* chance of finding a tumor" (p. 504). Results indicate that women who were made aware of the negative consequences from not doing BSE had a more positive attitude towards it than women who were made aware of the positive consequences from doing BSE. Moreover, in a follow-up study 4 months after the initial experimental session, women in the loss-frame condition reported a higher frequency of actually having performed BSE than women in the gain-frame condition. Similar to Meyerowitz and Chaiken's results, a loss-framed advertising slogan for a grape juice ("don't miss out on preventing clogged arteries") elicited more liking for the brand than an analogous gain-framed slogan ("prevent clogged arteries") (Lee & Aaker, 2004).

Yet, the literature is not as consistent as one would want it to be as there are also findings for gain-framed advertising appeals to be more persuasive (e.g., Rothman, Martino, Bedell, Detweiler, & Salovey, 1999). Indeed Rothman and Salovey (1997) claimed loss-frames to be only more effective for promoting behavior that detects health problem, such as BSE, but gain-frames to be more effective for promoting behavior that prevents the onset of a

disease. Although results regarding the effectiveness of an ad for a mouth rinse are in line with this claim (Rothman et al., 1999), they are inconsistent with Lee and Aaker's (2004) findings reported above.

To make matters even more complicated for applied purposes, it is not always clear whether the gain or loss relates to the action and non-action (attaining health or preventing misery vs. missing out on attaining health or failing to prevent misery), as in the research cited above, or to the focused end-state (health or happiness vs. disease or misery). Obviously, there are several critical variables that moderate the effects of goal framing (see section below on moderators of framing).

Alternative Typologies of Framing effects

Levin and colleagues' (1998) classification and, in particular, their claim that different types of framing map onto distinct underlying mechanisms has not remained without criticism. Keren (2011) questioned among other things whether the underlying processes of the three types are indeed distinctively different and pointed out that the categories are not necessarily conceptually different but overlapping. The latter, however, might also apply to alternative typologies that aim to organize the framing literature. In any case, several authors suggested alternative typologies to organize the literature.

For instance, Soman (2004) suggested to differentiate between *outcome framing*, *structure framing* and *task framing*, which refer to different components of a decision problem. In his framework, outcome framing characterizes the way in which an outcome is described such as when communicating a numerical quantity in terms of gains versus losses (Tversky & Kahneman, 1981), or when scaling an amount of money in different currencies (Raghubir & Srivastava, 2002). Likewise, monetary outcomes can be framed in terms of amount of interest or rate of interest. In this regard, Soman also subsumes one particularly interesting variant of framing as outcome framing, namely the aggregation and disaggregation of gains and losses. The same costs can result from a base price and a surcharge or a higher

base price and a rebate. In one study, participants preferred an insurance with a \$1600 premium per year that offered a \$600 rebate in case of not filing any claims over an insurance with a \$1000 premium that included a deductible of \$600 (Johnson, Hershey, Meszaros, & Kunreuther, 1993). In both cases consumers had to pay \$1600 in case of a claim and \$1000 in case of no claim. However, first the difference in subjective utility between the loss of \$1600 and \$1000 is more than compensated by the gain of \$600, and second adding the subjective utilities of the losses of \$1000 and \$600 is more negative than the one resulting from the loss of \$1600 (see prospect theory account below). Note that in this case, although both options look mathematically equivalent, in real life the option with the rebate actually implies losing the opportunity to invest the \$600 and is therefore the worse option.

A popular strategy in pricing is to break down or segregate costs into smaller units to make them seem less severe. According to such a *pennies-a-day strategy*, a few cents per day seem negligible and are accepted more willingly than a larger yearly fee (Gourville, 1998). Contrariwise, aggregation of small savings into larger sums makes them look more significant: Consumers required a mean saving of \$56 per year to switch their telephone company but it took monthly savings of \$11.75 (equivalent to \$141 a year) on average to make them switch (Gourville, 1998). Interestingly, the preference for segregation of costs over aggregation is inconsistent with prospect theory. Apparently small losses are truly neglected.

The second class in Soman's (2004) taxonomy, structure framing, refers to the arrangement of the decision problem and concerns, for instance, whether information is presented sequentially rather than at once (Tversky & Kahneman, 1981), or whether several aspects of a decision are presented in isolation versus as a compound (Soman & Gourville, 2001).

And, finally, task framing refers to the nature of the response task that is used to elicit the answer such as choosing versus rejecting one of two options (Shafir, 1993). An interesting

application of task framing is found in customization: Often consumers can configure their purchase by adding options to a base model or starting from scratch. In other cases, the default comes fully equipped but consumer can choose to drop features. In line with loss aversion, a laboratory study found that consumers ended up with more options and a more expensive purchase when they stripped down a default model compared to beefing up the base model (Park, Jun, & MacInnis, 2000). In this vein, many studies showed that when a default option is provided consumers are likely not to change it (e.g., Johnson & Goldstein, 2003). For instance, due to different insurance laws in two US states a comparison between the two states provides a natural experiment (Johnson et al., 1993). In one US state where a motor insurance premium included the right to sue for pain and suffering, about 75% of drivers retained that right and only about 25% waved that right for a lower insurance premium. In the neighboring state, where the default insurance did not contain the right to sue for pain and suffering, only about 20% chose to pay extra to acquire that right.

Another recurring theme throughout several framing typologies is the distinction between *framing in a strict sense* versus *framing in a loose sense*, which is concerned with different definitions of equivalence across the frames (Keren, 2011a; Kühberger, 1998). Framing in a strict sense refers to logical or mathematical equivalence such as in the Asian disease dilemma. Framing in a loose sense refers to linguistic redescriptions of the same decision problem or to changes in the response mode such as, for instance, when framing a task as contributing versus withdrawing from a public resource pool (Aquino, Steisel, & Kay, 1992), or when choosing versus rejecting one out of two options (Shafir, 1993).

Finally, Druckman (2001, 2011) differentiates between *frames in communication* versus *frames in thought* (for a similar distinction, see Kahneman, 2000). Frames in communication characterize specific emphases on a message's content such as, for example, the importance of economic issues in a political debate. Frames in thought, in contrast, refer to an individual's construal of a particular message: A person with an economic frame of

mind may look specifically for economy-related information in a political message. Thus, in many situations, frames in communication versus frames in thought are concerned with a speaker's utterance and a listener's interpretation, respectively.

Discussion

Framing is a multidimensional construct. Indeed, highlighting the need for well-conceived typologies, several authors have called for an organization of the literature in order to clarify the plethora of theoretical constructs and experimental paradigms that have been used in the past (Druckman, 2001; Keren, 2011a; Levin et al., 1998). From a theoretical perspective, these taxonomies are essential to understand the distinct psychological mechanisms that are involved in the different types of framing effects. In the next section, we will discuss the specific accounts that have been put forth to explain the occurrence of framing effects and how they map onto the different types discussed.

Beyond the various accounts of framing, differences between the types of framing effects can also be found at the empirical level. In their narrative meta-analysis, Levin et al. (1998) found the valence consistent shift in attribute framing to be the most consistent framing effect within their classification system. Yet, in terms of effect sizes, Piñon and Gambaro (2005), found attribute framing ($d = 0.260$) to produce smaller effect sizes than the risky choice ($d = 0.437$) and the goal framing paradigm ($d = 0.444$). Thus, framing effects do not only differ in terms of their theoretical foundations, but also in terms of their empirical robustness.

Accounts of Framing Effects

Prospect Theory

To explain the preference reversal obtained in the original demonstration of the Asian disease problem and other risky choice frames, Tversky and Kahneman (1981) drew on *Prospect Theory* as a descriptive model of decision making under uncertainty (Kahneman & Tversky, 1979). At its core, prospect theory suggests a value function whereby a subjective

value is assigned to each possible (objective) outcome. Three basic principles characterize this value function: First, outcomes are construed either as positive deviations (gains), or as negative deviations (losses) from a reference point. Second, the function is concave in the domain of gains and convex in the domain of losses. Thus, for instance, the difference between \$10 and \$20 is perceived as greater than the mathematically identical difference between \$110 and \$120. Third, the value function is steeper for losses than for gains implying a larger negative impact of losing \$10 than the corresponding positive impact of winning \$10.

Now, consider the subjective utilities which are implied by the different outcomes of the Asian disease problem within this framework (see Figure 1). Due to the value function's shape, 200 people being saved has a higher utility than a 1/3 probability that 600 people will be saved. As a consequence, the sure option is preferred when the choice is framed in terms of "lives saved". In contrast, when talking about "lives lost", the sure option of 400 people dying is less attractive than a 2/3 probability of all 600 people dying. Thus, due to the concavity and convexity of the value function, the certain and the risky option are asymmetrically attractive for gains and losses.

A similar account based on prospect theory (Kahneman & Tversky, 1979) has been suggested to explain goal framing. However, instead of focusing on the value function's negatively accelerating shape, the explanation for goal framing is based on the function's different slopes for gains versus losses. According to the notion of *loss aversion* (Tversky & Kahneman, 1991), a negative outcome has a larger absolute value than the identical positive outcome – the value function's slope is steeper in the negative than the positive domain. Thus, with regard to goal framing, the consequences of an action weigh heavier when it is framed as avoiding losses rather than as obtaining benefits. For example, Meyerowitz and Chaiken's (1987) classical finding of higher rates of BSE performance in the loss frame condition can be explained by the value function's steeper slope in the negative domain – the decreased chance

of finding a tumor when not engaging in BSE weighs heavier than the increased chance of finding one when engaging in it.

Prospect theory serves as an empirically well-founded framework that helps understanding and integrating framing effects of various typologies (e.g. risky choice framing, goal framing, outcome framing, task framing). Yet, Kahneman and Tversky (1979) introduced the theory as a *descriptive model* of decision making under risk rather than as an *explanation* of such behavior. For prospect theory to be regarded as an actual explanation for framing effects, it needs to be backed up by psychological principles that provide reasons for the specific slope and shape of the value function. For instance, the value function's differences in slope for gains versus losses may root in a general *negativity bias* of giving greater weight to negative as compared with positive information (Rozin & Royzman, 2001). Likewise, the function's concavity and convexity may be attributable to such fundamental psychophysical laws as the Weber-Fechner law and the economical principle of diminishing marginal utility.

Category Accessibility and Priming

Perception and cognition are essentially guided by mental categorization processes (Bruner, 1957). Human information processing is characterized by pre-organizing informational input and by differentiating it along the mental structures that are activated at the moment of encoding. Activated concepts *prime* the activation of related concepts. Different semantics evoke different associations.

Drawing on category accessibility and priming as fundamental principles of human cognition, Levin and colleagues (1998) suggested an account for attribute framing. In attribute framing, logically identical information is either presented in positive or in negative terms such as success versus failure rates or winning versus losing proportions. As a consequence, the frames should evoke different associations in the recipient's mind: Success rates and winning proportions activate predominantly positive associations; failure rates and losing proportions active mostly negative associations.

For instance, in Levin and Gaeth's (1988) study on the framing of ground beef that was already introduced at the beginning of this chapter, one may easily imagine that upon hearing the word "fat" consumer think of fat, how it looks, how it tastes and how unhealthy it is. In contrast, the word „lean“ elicits completely different associations about the beef such as healthiness or high nutritional value. And, indeed, support for this idea of spreading activation can be found in the additional measures that were assessed in the study. The framing manipulation did not only affect judgments directly related to the greasiness of the beef, but also judgments related to its taste experience.

Related arguments to explain attribute framing have been put forth based on the notion of *confirmation bias* (Klayman & Ha, 1987): Once a certain evaluative tone – be it positive or negative – is communicated by the framing manipulation, people are more likely to continue their information search in a confirmative rather than disconfirmative fashion. Thus, when hearing about the success rate of a medical treatment, people are more likely to generate information that supports the treatments' success rather than its failure and vice versa. As a result, their information sample will be skewed towards the evaluative tone of the frame and preferences are formed correspondingly.

Compatibility

Compatibility has been suggested as another account of attribute framing drawing on principles that are similar to category accessibility and priming (Keren, 2011a). According to the *compatibility principle*, “the weight of a stimulus attribute is enhanced to the extent that it is compatible with the required response” (Shafir, 1995, p. 248). For instance, when the stimulus material is presented in an auditory mode, a vocal response is faster than a pointing response due to the higher correspondence between presentation and response mode. Any transformation of incompatible input and output modes requires additional mental processing that is potentially effortful and error-prone (Slovic, Griffin, & Tversky, 1990).

In framing research, the compatibility principle is particularly applicable to situations in which the manipulation concerns the response mode used to elicit the answer such as choosing versus rejecting, or expressing like versus expressing dislike (i.e., task framing, Soman, 2004). In a series of decision problems, Shafir (1993) provided participants with impoverished options that had mostly average attributes as well as with enriched options that had both many positive and many negative attributes. For instance, in one of their studies, participants chose between two vacation packages for spring break. Package A came with “average weather, average beaches, medium-temperature water, and average nightlife”, whereas package B came with “lots of sunshine, gorgeous beaches, very cold water, and no nightlife”. Because of the higher compatibility of positivity and choosing, and negativity and rejecting, the enriched option was both more often chosen and more often rejected than the impoverished option. Similar findings that support the significance of the compatibility principle have been documented for choosing versus matching tasks when evaluating the quality of bets (Slovic, 1995).

Conversational Logic and Implicatures

At its heart, framing is concerned with communication. Any information that is communicated by a frame – particularly when it is conveyed in an impoverished informational environment such as in a scientific experiment – is enriched with the receiver’s pragmatic inferences about the sender’s intentions. The conversational account focusses on the principles of cooperative communication to explain framing effects.

According to Grice (1975), effective communication is based on *conversational implicatures*. Implicatures characterize the meaning of an utterance that goes beyond its literal or strictly implied message. For instance, logically the utterance “Tom had two beers yesterday” implies that Tom had two or more beers: Even if he had five beers, the utterance would still be true. Based on the logic of conversation, however, most listeners would infer

that Tom had *exactly* two beers, because otherwise an utterance such as “Tom had at least two beers yesterday” would have been more appropriate (for a review, see Wänke, 2007).

The idea that utterances carry information beyond their literal content and, therefore, convey different implicatures can be applied to framing (McKenzie & Nelson, 2003; Sher & McKenzie, 2006; Wänke, 2007). Sher & McKenzie (2006) argued that a chosen frame *leaks information* that is not part of the explicit description but part of the background knowledge the person choosing the frame has. Whereas the amount of water in a glass is exactly the same when the glass is described as half empty or half full, the chosen frame may convey other information. When the glass is described as half full it evokes the comparison to an empty glass or one that was empty before whereas describing the glass as half empty tacitly implies a deviation from a full glass. In other words, although formally equivalent, both statements differ in their pragmatic meaning. Likewise, McKenzie and Nelson (2003) showed that when the outcome of a new therapy lay above the previous survival rate for a disease, a large majority of speakers chose to express this rate in a survival frame (e.g., 25% survival). In contrast, a mortality frame was chosen when the survival rate lay below a previous reference point. From this perspective sensitivity to communicated frames is highly rational and it makes sense to prefer a therapy that is described in terms of its survival rate compared to one where its mortality rate is given.

In this realm it is interesting to note that framing effects in the Asian disease problem disappeared when the problem was presented as a statistical rather than a medical problem (Bless, Betsch, & Franzen, 1998). In fact, when participants considered the task as a statistical problem, either of the two options was chosen by about 50%, which suggests that they realized that both options were statistically equivalent and chose at random. Presumably, choice of words was seen as less diagnostic when the task was to calculate expected values.

A speaker does not only choose slightly different words to express different things. The way something is framed apparently also carries meaning for the receiver. A similar

example comes from comparative questions. For example when asked whether traffic contributes more than industry or less than industry to air pollution 45% of the respondents thought traffic contributes more. When the question was framed differently and respondents were asked whether industry contributes more than traffic or less than traffic to air pollution only 24% thought traffic was the main polluter (Wänke, 1996; Wänke, Schwarz, & Noelle-Neumann, 1995). The reason for such asymmetric comparison judgments lies in respondents focusing on the (grammatical) subject of the comparison and neglecting the referent (Tversky, 1977). Presumably they assume that the speaker chose this particular comparison object as the subject because this is the target of interest (Wänke & Reutner, 2011). In a similar vein, pragmatic assumptions can account for task framing effects: Apparently people understand defaults as recommended options and are therefore hesitant to depart from it and accept the default (Johnson & Goldstein, 2003; McKenzie, Liersch, & Finkelstein, 2006).

Moderators of Framing Effects

While theoretical explanations are still being debated, there is little doubt regarding the phenomenon's significance for applied fields. Framing allows for shifting preferences without changing an object's actual properties by merely altering the object description or the response format. In this vein, products and services can gain an advantage over their competitors, rendering framing a powerful strategy for practitioners, from policy makers over advertisers to salespeople. In order to better understand under which conditions framing effects occur in applied settings, researchers in the areas of marketing, consumer and health psychology dedicated much of their work on what moderates framing effects on persuasion and decision making (Covey, 2014; Updegraff & Rothman, 2013). In the remainder of this section, we want to introduce various receiver characteristics that qualify whether framing can be assumed to have an effect on consumer choice. We will then turn to the framing of persuasive messages, and consider which frame is expected to work best with whom. Finally, we will broaden our perspective on framing research and discuss findings from related areas

that are still very much related to the idea of framing, although they may not fulfill the equivalence criterion in its strictest sense.

When framing choice options puff out

As a marketer, you may ask whether framing is a viable technique for promoting your product to the clientele in mind. From the consumer perspective, however, you may consider framing a manipulation of your self-guided choice (Brehm, 1966)(cf. chapter XY this volume). Furthermore, assuming invariant product utility across frames, falling prey to frames comes at the risk of making a bad choice. From either perspective, the question arises whether there are conditions under which framing effects are likely to fizzle out.

To a great extent, this question has been addressed from the perspective of dual-process models of decision making (Epstein, 1998; James, 1890) and attitude change (Chaiken & Eagly, 1989; Petty & Cacioppo, 1986)(cf. chapter XY this volume). As a common denominator, these models propose two modes of thinking, one of which is analytical and one of which relies on affect and simple heuristics. Whether people process information analytically or in a heuristic way depends on people's processing motivation and capacity (Chaiken & Eagly, 1989; Petty & Cacioppo, 1986). Only if processing motivation and capacity are high enough, people are likely to think analytically, and therefore, to discount the irrelevant information provided by the frame (see Kahneman & Frederick, 2007).

In line with this notion, the Need for Cognition (Cacioppo & Petty, 1982)(see chapter XY in this volume), a construct used to describe inter-individual differences in intrinsic processing motivation, has been identified as a moderator of framing effects. That is, studies show that choices are less affected by frames for individuals high rather than low in Need for Cognition (Simon, Fagley, & Halleran, 2004; Smith & Levin, 1996). McElroy and Seta (2003) further found that individuals with a disposition to think analytically are less influenced by choice framing than are less analytical individuals.

More compelling evidence for the causal role of processing motivation in resisting framing effects is obtained from studies in which processing motivation is manipulated experimentally. McElroy and Seta (2003) varied the personal relevance of the decision. Only in the low involvement condition, framing effects had been obtained. In other studies, processing style was manipulated in a more direct manner. In order to induce an affective processing style, Fagley, Coleman, and Simon (2010) asked participants to focus on their feelings. Indeed, framing effects on risky choice increased for participants who had received this instruction.

As mentioned above, analytical processing does not only depend on processing motivation but consumers also have to be capable of analyzing the information. Provided with a risky choice, for instance, only consumers able of calculating the expected utility of both options will be able to realize their objective equivalence. Indeed, empirical findings suggest that high math skills enable consumers to compare alternatives and buffer against framing effects on risky choice (Peters, 2012; Peters et al., 2006), at least for individuals motivated to elaborate on the information (Simon et al., 2004). This finding is complemented by studies demonstrating that susceptibility to framing effects may be reduced, when information is not provided in an abstract numerical format, but a format familiar to the decision maker (Garcia-Retamero & Dhami, 2013).

Capacity constraints however, are not a necessary condition for framing effects to occur. In fact, a cognitive load manipulation did not alter the influence of a win- vs. loss-frame on risky decisions. Yet, cognitive load had a main effect on decisions for the sure option. People for whom capacity was reduced by high load tended to choose the easy-to calculate sure option more often than those in the low load condition (Whitney, Rinehart, & Hinson, 2008). Future research is needed to corroborate the notion that easy-to-calculate options are preferred over hard-to-calculate ones – a finding that was in line with the heuristic use of processing fluency as a basis for evaluations (Winkielman, Halberstadt, Fazendeiro, & Catty, 2006)(cf.

chapter XY, this volume). Pertinent to the starting question, however, there was also a main effect of the frame: Win-frames as opposed to loss-frames caused more risk-averse choices in both, the load and the no-load condition. One may speculate that despite unconstrained capacity, participants' motivation to carefully process the information was not high enough.

As a rationale for practitioners, framing appears a viable strategy for shifting preferences, at least if consumers are either unmotivated or unable to engage in analytical thinking. Arguably, in real-life these conditions are often met. Consumers tend to be cognitive misers, thus heuristic processing may be the default rather than the exception (see Chaiken & Ledgerwood, 2012). Yet, conditions of minimal capacity and motivation do not necessarily constitute a good soil for framing effects. The processing of the frame and its integration into the decision already requires some motivation and capacity. When under severe time constraints, individuals actually disregard the framing information and choices thus remain unaffected (Igou & Bless, 2007).

Framing persuasive messages to match the receiver

One research domain that markedly advanced the identification of moderating conditions is persuasion research. In principle, the effects obtained in the studies on choice also pertain to the framing in the domain of persuasion. For instance, the persuasive impact of irrelevant information is increased for individuals low as opposed to high in Need for Cognition (e.g., Haugtvedt, Petty, & Cacioppo, 1992) or personal involvement (e.g., Petty, Cacioppo, & Schumann, 1983). However, the question addressed in persuasion research goes beyond identifying whether frames do have an effect or not. It addresses the question whether it was worth fitting the message frames with the receiver characteristics (e.g., Cesario, Higgins, & Scholer, 2008; Higgins, 2000, 2005; Rothman et al., 1999).

For an illustration, consider a message meant to persuade consumers of buying an isotonic drink. As anticipated in the paragraph on goal framing, an advertiser may point out that the drink offers a gain (e.g., "Drink X, get energized!") or that it prevents a loss (e.g.,

“Drink X, get rid of tiredness!”). Although both frames provide different reasons for consuming the drink, they focus on the same goal and promote the drink by emphasizing its benefits (e.g., Lee & Aaker, 2004; Yi & Baumgartner, 2008). However, the advertiser may also use a negative frame, demonstrating the disadvantage of *not* using the product, and announce the absence of a gain (e.g., “No Drink X, no energy”), or the presence of loss (e.g., “Without Drink X, tiredness will become your enemy!”). Which message do you expect to work best? The answer is: It depends on whom you are trying to persuade.

Given the prominence of dual-process theories of persuasion, it may not come as a surprise that the differential framing effects have been studied for indicators of processing motivation and capacity. However, whereas a recent meta-analysis is in support of a moderating function of dispositional processing motivation, the direction is not clear: Some studies suggest that positive frames are more effective for motivated than unmotivated receivers, while some other studies lead to the opposite conclusion (Covey, 2014).

A theoretical framework, more closely related to the question of how to match a frame with a receiver is regulatory focus theory (Higgins, 1997). According to this theory, goal-attainment is achieved via two foci, a promotion and a prevention focus. In a promotion focus, individuals strive for self-fulfillment and aspiration; in a prevention focus, they try to fulfil their duties and obligations. In the former, people tend to be eager, whereas in the latter people tend to be vigilant. And finally, in a promotion focus people tend to be sensitive toward possible wins, but a prevention focus sensitizes people towards positive losses. Hence, a win frame has been proposed and demonstrated to create a fit with a promotion focus, but loss frames should be more appealing when recipients are in a prevention focus (Cesario, Grant, & Higgins, 2004; Lee & Aaker, 2004). Note that a fit does not require matching the frame with the dispositional focus. The situational regulatory focus can be induced by the message itself. That is, a message that highlights a promotion goal is more persuasive when depicted as a possible win than a loss (e.g., “Boost your energy!” versus “Do not miss

boosting your energy!”). Vice versa, a message concentrating on a prevention goal is less effective when framed as a gain (e.g., “Avoid a cold!”) than when framed as a loss (e.g., “Do not miss avoiding a cold!”).

Fit Effects beyond Framing

In the previous paragraph we have reported a series of fit effects. Hence, the application of well-studied frames (e.g., positive vs. negative frame; gain vs. loss frame) in persuasion can be optimized by matching the frames with characteristics of the target clientele. Given the practical significance of matching messages with the receiver, fit effects have been studied for numerous message aspects, other than the frames reported in this chapter. Many of those fit effects suppose a rather broad definition of framing based on a very lenient conceptualization of equivalence across the frames. However, the respective message variation is often referred to as framing, and due to their practical relevance we reiterate some of them here.

One such thing is that messages can consist of language describing either an endorser’s thoughts or on an endorser’s feelings. It has been shown that the former works better with persons who tend to evaluate things based on their thoughts (i.e., cognitively-oriented persons) and men whereas the latter works better with people who tend to evaluate issues based on their affective reactions (i.e., affectively-oriented persons) and women (Mayer & Tormala, 2010). Thus, companies should carefully consider their clientele when phrasing advertising copy that “they feel” or “think” that consumers will “enjoy” or “profit from” their new product.

Further, many studies have elaborated on the interplay of linguistic frames and processing styles on persuasion outcomes. For instance, against the backdrop of Construal Level Theory (Trope & Liberman, 2010)(cf. chapter XY this volume), the persuasive impact of describing a product’s benefits in concrete versus abstract terms depends on temporal distance. Some weeks prior to the release, an upcoming computer should be advertised by an abstract description (e.g., “The computer includes modern processor technology”). At the

point of sale, however, it was advisable to describe the product in a concrete fashion (e.g. “The computer has a 3.9 GHz i7-Haswell processor”). A series of other message characteristics (e.g., highlighting why to use the product vs. how to use it) has been shown to create a fit effect with temporal distance on persuasive outcomes (e.g., Fujita, Eyal, Chaiken, Trope, & Liberman, 2008). Whereas consumers could aggregate concrete features into an abstract category, disaggregation from abstract to concrete is much more difficult or even impossible. Note that, in this context, the equivalence of the frames is much more debatable than in classical risky choice or attribute framing where equivalence at least in logical terms is incontestable. Thus, one may argue whether to still consider these findings as framing effects. We will elaborate on this discussion of equivalence and the resultant definition of framing in the subsequent section.

Equivalence and the Rationality Debate

Framing effects gain much of their appeal from the fact that preference shifts or even reversals are obtained for *equivalent* choice alternatives that only differ in the way in which they are presented. Indeed, the rationality debate that accompanied framing research from its very beginning – namely, the discussion whether framing effects violate the invariance axiom of rational choice (Tversky & Kahneman, 1986) – is only pertinent in the light of some reasonable standard of equivalence. Preference reversals across *inequivalent* choice options neither represent a challenge to human rationality nor do they violate normative theories of choice (cf. Thaler, 1980).

The definition of equivalence thus is of central relevance when talking about framing effects – but what exactly does it mean for frames to be *equivalent*? Arguably, there is more than a single standard according to which one might define whether two frames may be considered equivalent. And, indeed, a glance at the literature reveals that equivalence has been characterized in many different ways like, for instance, as “objective” (Levin et al., 1998), “unquestionable” (Quattrone & Tversky, 1988), “effective” (Tversky & Kahneman,

1981), or “formal” equivalence (Kühberger, 1998). However, the value of adding such adjectives with regard to clarifying the notion of equivalence has been questioned (Sher & McKenzie, 2006). Adding a qualifying adjective may simply raise the question of how to define the respective qualifier – what exactly does it mean for two frames to be “objectively” or “formally” equivalent?

Qualifying equivalence as “logical” or “mathematical” equivalence, however, is a different case. Logical equivalence can be unambiguously defined by computing the expected utilities implied by each frame. However, as Sher and McKenzie (2006, 2011) argue, there is no normative problem with logically equivalent frames generating preference asymmetries: Let us assume that there are two logically equivalent frames A and B. Whenever there is some background condition C (neither explicitly stated in frame A nor in frame B), whose likelihood differs as a function of whether frame A or frame B was chosen, the mere fact that the speaker chose A rather than B leaks information about the likelihood of C. Given that C bears some relevance to the decision problem, preference asymmetries across the two frames A and B can be attributed to differences in the likelihood of C and, therefore, may be entirely reasonable from a rational point of view.

For instance, in one of their studies (Sher & McKenzie, 2006), participants received one empty cup and one cup filled with water at the beginning of the experiment. Then, they were asked to pour half of the water from one cup into the other. After this procedure, both cups were roughly identically filled with water. Nevertheless, when instructed to move “the half empty” (vs. “the half full”) cup to one of the corners of the table, 69% (vs. 46%) of the participants chose the cup that was full (empty) at the beginning of the experiment. Thus, despite their logical equivalence, the two frames “half empty” and “half full” conversationally leaked different information about which cup the experimenter wanted to be moved and thereby affected participants’ choices.

Based on their research, Sher and McKenzi (2006) suggest *information equivalence* as a benchmark when considering framing effects to be at odds with rational decision making. Information equivalence refers to the idea that frames need not only be logically equivalent, but also equivalent in terms of their information leakage, that is, in terms of the pragmatic intents that can be inferred from the mere usage of the particular frame. In the water cup experiment, the two frames evoked different inferences about the experimenter's intentions and thus were not informationally equivalent. Note that in the light of this argument, judgments about human rationality derived from framing research have to be considered much more carefully, because participants' responses are interpreted as picking up on subtle linguistic cues (such as the experimenter's choice of words) rather than as not following basic rules of logical reasoning.

Arguably, the concept of information equivalence may be considered a very strict conceptualization of the equivalence idea. Yet, it illustrates the importance of thoroughly analyzing the particular equivalence standard before prematurely calling human rationality into question.

To reconcile different concepts of equivalence, Keren (2011a) recently suggested to not define equivalence as a universal property, but to restrict it to particular dimensions. For instance, in the 75% lean versus 25% fat ground beef example, the two frames indeed are logically equivalent. Yet, at the same time, they were shown to differ on the trustworthiness dimension – a butcher presenting his beef in terms of 25% fat is considered more trustworthy than a butcher relying on the 75% lean frame (for trust–choice incompatibility, see Keren, 2007). Thus, any identification of equivalence between two frames should address the specific dimensions that are involved (and probably also relevant dimensions which are not involved). Likewise, any conclusion about human rationality has to be considered in the light of the particular equivalence standard: Not detecting logical differences between simple percentages would surely qualify as irrational behavior. However, being able to notice small linguistic

nuances and interpreting them as hints toward a certain option appears to be quite rational from a pragmalinguistic perspective.

Above and beyond the rationality debate, framing effects are intriguing for being necessarily involved in real-world decision making. At the end of the day, any decision has to be framed in a certain way, which may substantially influence the decision outcome. A superficially small policy change regarding organ donation from an opt-in to an opt-out default can increase the donor rates by almost 60% (Johnson & Goldstein, 2003).

Governments cannot avoid making a decision about which choice model to adopt. In this regard, insights from the behavioral sciences on the pervasive influence of framing effects can be used in order to make informed decisions about how to optimally construct a choice context.

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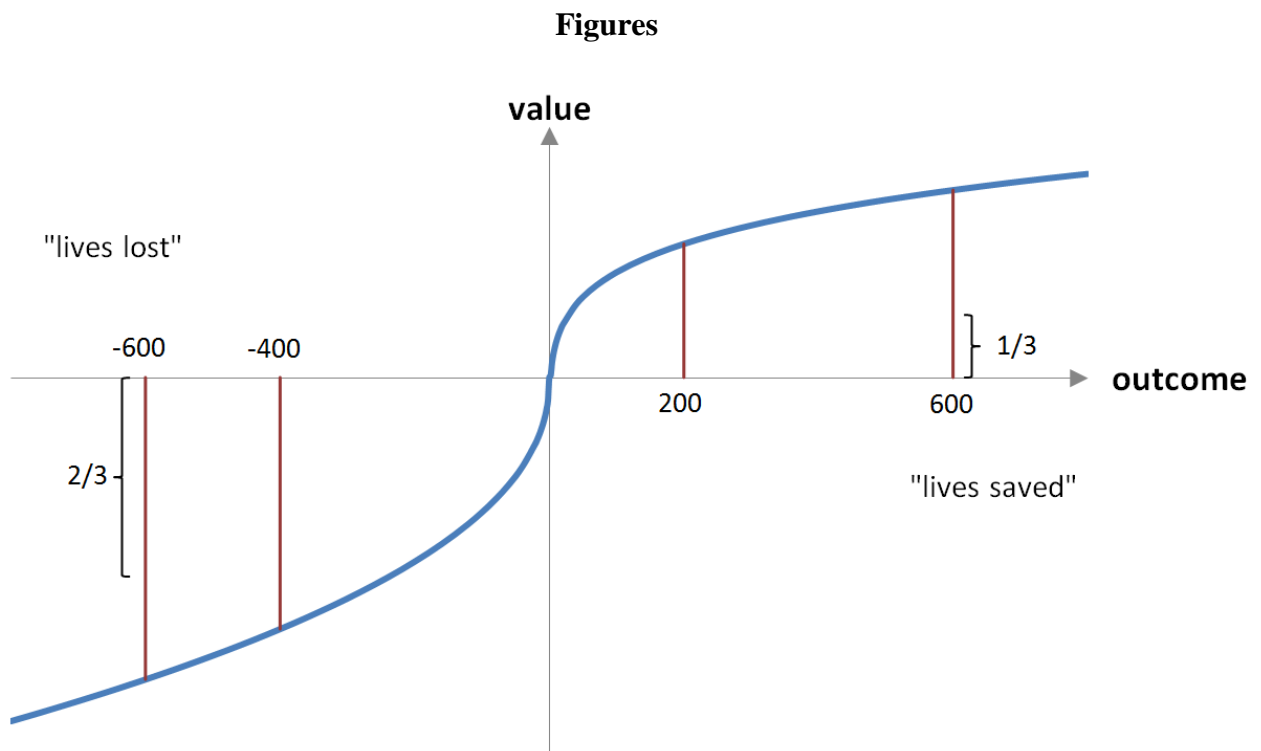


Figure 1. The Asian disease dilemma explained by prospect theory's value function. In the domain of gains ("lives saved"), the value of saving 200 lives is more positive than 1/3 the value of saving 600 lives. In the domain of losses ("lives lost"), however, the value of 400 people dying is more negative than 2/3 the value of 600 people dying. As a consequence, the certain option is preferred in the domain of gains, whereas the uncertain option is preferred in the domain of losses.

Epilog

My PhD not only culminated in this dissertation, but also in approximately €25.00 of Pfand-money. I hereby declare that money to be used to buy office games. The winners of those games shall be worshipped.

A finished dissertation may read as a success story. However, the present dissertation arose from defeat. In three consecutive Christmas parties, Team Hiwis won against Team Mitarbeiter at the CRISP Olympics. From time to time, I still cry myself to sleep even though it were the Portuguese to be blamed.

At the time Andi bought the talkmaster for our office, I was skeptical. In retrospect, my skepticism was a huge mistake and requires an apology. The talkmaster proved to be the single most useful tool in our office and at times the only reason I pursued this work. If there is any humble advice I may pass on to further generations of PhD students, it is to buy a talkmaster early on.

The statement from the acknowledgements that without André “a lot of this never would have been possible” is a lie. In fact, a lot of this would have been much better without him.

I am still the second best dart player in the corridor. It is official. Scores are written on the black board in my office. Next to the word *picha* in capital letters.

What happened in Barefootpark shall stay in Barefootpark. Yet, what happened in Barefootpark shall never be forgotten.

Good, I never watched *Cabin in the Woods*. After all, life is finite.

Thank you so much. You were all great.

Tobias

