

Take a Different Look: How Concrete and Abstract Mindsets Affect
Individuals' Judgments and Decisions

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Declaration

I, Mariela E. Jaffé (born May 24th, 1986 in Vienna, Austria), hereby declare that I have written the submitted doctoral thesis “Take a Different Look: How Concrete and Abstract Mindsets Affect Individuals’ Judgments and Decisions” without any assistance from third parties not indicated.

(I) My cumulative dissertation is based on three manuscripts, one in revision and two submitted. I certify here that the articles in this dissertation concern original work. I contributed substantially and independently to all manuscripts in this dissertation with respect to the ideas, data collection, analyses, and writing of the manuscripts, which is reflected in me being first author. This characterization of my contributions is in agreement with my co-authors’ views.

(II) I only used the resources indicated.

(III) I marked all the citations.

Basel, _____

Mariela E. Jaffé

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Abstract

Taking a different look or a new perspective, studying a problem from afar or close up can affect individuals' judgment and decision-making. Construal Level Theory argues that depending on whether individuals construe on a more abstract (higher) versus more concrete (lower) level, they will attend to different pieces of information, which may result in different outcomes. This dissertation builds on Construal Level Theory and uncovers open questions concerning judgments of truth, diversity, dishonesty, and the use of decision-making aids. It aims at offering answers to these questions, which have so far not been considered from a Construal Level Theory perspective. Jaffé and Greifeneder (2017) find that the negativity bias regarding judgments of truth might attenuate or even reverse under high compared to low construal level. Looking at diversity, Jaffé, Rudert, and Greifeneder (2017) show that individuals might appreciate working with a dissimilar other under high construal level, but prefer a more similar counterpart under low construal level. Looking at dishonest behavior, Jaffé, Greifeneder, and Reinhard (2017) highlight that Machiavellianism has a stronger impact under high compared to low construal level. Finally, Jaffé, Reutner, and Greifeneder (2017) look at decision-making aids and provide support for the notion that a simple device like a coin flip might catalyze decisions, allowing for more affect-driven decisions where individuals might have been undecided before. In sum, the research projects of this dissertation advance our knowledge in regards to how and in which contexts abstract and concrete mindsets affect individuals' judgments and decisions.

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Preface

The presented thesis is a publication-based dissertation in line with the regulations at the Faculty of Psychology, University of Basel. It consists of three manuscripts. The aim of this framework is to place the single manuscripts within the bigger scope of my research program and highlight interrelations between the manuscripts.

The following three manuscripts are part of the dissertation:

- (1) Jaffé, M. E. & Greifeneder, R. (2017). *Negative is true here and now, but not so much there and then: On the impact of psychological distance on the negativity bias*. Manuscript submitted.
- (2) Jaffé, M. E., Greifeneder, R., & Reinhard, M.-A. (2017). *Manipulating the odds: The effect of machiavellianism and construal level on cheating behavior*. Manuscript submitted.
- (3) Jaffé, M. E., Reutner, L., & Greifeneder, R. (2017). *Catalyzing decisions*. Manuscript in revision.

Chapter 1: Introduction

We live in a complex and challenging environment that requires us to make a multitude of decisions every day. When should I get up in the morning? Would it be better to eat cereal or toast for breakfast? Or should I skip breakfast to be a bit earlier in the office and get some extra work done? And when arriving in the office should I first start working on my emails or finish the presentation that I have been postponing for days? Or, putting important things first, maybe I should finally mail that application for the new and exciting job opportunity in a different city? In all of these situations, individuals need to make decisions, which range from having only little impact on their life (such as the choice of breakfast) to being associated with severe changes (such as deciding to go for a new job in a new city). Some of these decisions are made in seconds, such as when shopping for groceries for breakfast under time pressure. Other decisions may require taking time, as individuals need to ponder every advantage or disadvantage that the new job may offer. In both cases the question arises of which aspects individuals take into account to make these decisions.

To navigate through daily life, and more specifically, to make these fast or profound decisions, individuals need to process information in their environment (Greifeneder, Bless, & Fiedler, 2018; Rateau, Moliner, Guimelli, & Abric, 2011). They need to process information about food options for breakfast, or about the potential implications of moving away to pursue a new career. By processing information, individuals make sense of their surroundings (Rateau et al., 2011). Simply put, individuals selectively attend to certain details and allot meaning to this information (Greifeneder et al., 2018). Individuals can differ inter- but also intra-individually in how and to which pieces of information they attend, and they can differ in regards to their processing style (e.g., Epstein, Pacini, Denes-Raj, & Heier, 1996; McElroy & Seta, 2003).

From a social psychologist's point of view, a multitude of research has already been conducted that attempts to provide answers to the question of how individuals process

information and how individuals' processing styles impact affect, cognition, and behavior (e.g., Förster & Dannenberg, 2010; Kahneman, 2011; Petty & Cacioppo, 1984, 1986; Trope & Liberman, 2003). Historically, the first models have investigated whether (and under which conditions) individuals process information more or less thoroughly. These dual processing models generally postulate two distinct systems or modes and compare effortful to not so thorough processing by, for example, using shortcuts. One famous model was introduced by Kahneman (2011), which differentiates between a System 1 and System 2 processing system. While System 1 is described as an automatic, fast, unconscious way of thinking, which is mostly based on heuristics (e.g., How do I actually feel about the new job), the processing style of System 2 is slower, more effortful, and more conscious and thorough (e.g., What are the advantages and disadvantages of taking a new job right now, Kahneman, 2011). Similarly, in the Elaboration-Likelihood-Model, another dual-process model focusing on persuasion, Petty and Cacioppo (1984, 1986) differentiate between a peripheral route and a central route of information processing. When individuals process along the peripheral route, they attend to more superficial information such as the number of arguments, while when they process along the central route, they much rather attend to the content or validity of the arguments. Once again, a more superficial and effortless processing style is opposed by a more profound processing style that requires a higher degree of involvement and capacity.

Newer models offer a complementary approach and shift attention more to individuals' perspective on their environment: Do individuals look at the environment holistically or do they focus on specific details? A highly influential model within this group is Construal Level Theory (Liberman & Trope, 2008; Trope & Liberman, 2003, 2010). In a nutshell, Construal Level Theory claims that depending on the mindset (the construal level), individuals attend to different pieces of information. Individuals can have a rather abstract mindset or a more concrete mindset, which influences whether they would focus more on the gist of information

(e.g., Is this the job that will allow me to fulfill my goals?) or on specific details regarding a target or event (e.g., Can I start on that date to make moving easier?).

All in all, this brief overview of exemplary models shows that individuals' processing style will influence which pieces of information individuals will attend to or think of when making a decision. As a consequence, their processing style is highly important for subsequent judgments and decisions. This present work will build on Construal Level Theory (Trope & Liberman, 2010) as a theory of explaining information processing and its influence on affect, cognition, and behavior. The theory and a selection of current research findings will be summarized in Chapter 2. However, the vast and versatile body of literature on Construal Level Theory still calls for further and innovative research to test its predictions and broad applicability regarding diverse questions. Depending on individuals' construal level, individuals might not only focus more on the gist of information versus specific details, but perhaps also more on positive or negative aspects. Would individuals with a different construal level therefore deem a statement more or less likely to be true when framed positively compared to negatively? Furthermore, when individuals focus more or less on the desirability or feasibility of an action, could this explain why individuals sometimes prefer diversity and sometimes similarity in groups? And how influential are values on the occurrence of honest versus dishonest behavior, depending on individuals' mindsets? Finally, could the usage of decision-making aids and the potentially associated shift in processing style allow individuals to make decisions in cases where they were undecided before? Different research and dissertation projects will be highlighted in Chapter 3 that make a significant contribution to finding answers to these open and important questions about judgments of truth, diversity of work groups, dishonest behavior, and aiding judgment and decision-making. Implications for research and practice are discussed in Chapter 4 and 5. The arguments presented will then allow for an overall conclusion in Chapter 6.

Chapter 2: Construal Level Theory as a Theoretical Background

Construal Level Theory starts from the assumption that individuals live in the here-and-now, but can psychologically traverse distance by thinking about today or the future, here or a faraway place, themselves or different others, with certainty or only a slight probability (Liberman & Trope, 2008). The reference point for this mental travelling is the “me, here, and now” (Trope & Liberman, 2010, p. 457) and depending on how far away an object, event or person is from this point it is more or less psychologically distant. Hence, taking a new job a year from now is psychologically more distant than starting a new job today; similarly, a job in another country would be psychologically more distant than a job in the city a person is currently living in. Most importantly, Construal Level Theory maintains that changes in psychological distance are closely associated with the level on which objects and events are mentally construed: psychological distance impacts individuals’ perspectives and therefore their processing styles (Liberman & Trope, 2008; Trope & Liberman, 2003).

Level of construal is defined as the mental representation or mindset of individuals. Individuals can have high level construals that are (compared to low level construals) relatively abstract, coherent, and superordinate mental representations. These representations retain the central features of an object (e.g., in the case of the concept “job”, for example, the content and associated responsibilities), and omit features that might be deemed more incidental (e.g., the color of the equipment in the office). Low level construals (compared to high level construals), would be more concrete representations, which include more details or contextual information (Trope & Liberman, 2010). Two aspects need to be taken into consideration. First, it is important to note that individuals construe on a continuum between very concretely to very abstractly and not in a dichotomy of either high or low construal level (Trope & Liberman, 2010). Second, although information may be omitted when moving to higher level construals, this does not mean that more abstract representations are more vague or impoverished. Instead, high level construals include other information about the general

meaning and the valence or value of the stimulus (Semin & Fiedler, 1988; Trope & Liberman, 2010).

Connecting both the concept of psychological distance and level of construal, Construal Level Theory points out that psychologically distant objects or entities are construed at a higher level and psychologically more proximal entities at a lower level (Liberman & Trope, 2008; Trope & Liberman, 2010). Therefore, psychological distance impacts construal level¹. Construal level then influences which pieces of information individuals take into account and may influence their affective, cognitive, and behavioral reactions (e.g., Bruehlman-Senecal & Ayduk, 2015; Eyal, Liberman, Trope, & Walther, 2004; Eyal, Sagristano, Trope, Liberman, & Chaiken, 2009; Fujita & Han, 2009; Fujita, Trope, Liberman, & Levin-Sagi, 2006).

Going back to the example: When thinking about mailing an application for a new job, individuals need to imagine a future scenario. This scenario might include new roles and responsibilities, meaning new work content, but also other information about a new city, a new workplace, a new apartment, eventually leaving behind family and friends as well as well-established routines such as the weekly running appointment with a colleague. Individuals cannot directly experience this scenario, as they only directly experience the here and now (Trope & Liberman, 2010). However, individuals can make plans and predictions, and these could critically differ depending on psychological distance (e.g., when would the job start) and construal level (e.g., am I thinking about the job more abstractly or concretely). This means that depending on individuals' more abstract or concrete mindset, they will look at different aspects of this "new job scenario". Individuals will, for example, likely focus more on (a) superordinate compared to subordinate information, (b) the desirability compared

¹ Construal level may also affect perceived distance, such as objects construed on a higher level are connected to other objects that span a wider range in time (Liberman & Trope, 2008). However, in this dissertation I focus on distance as a major determinant of construal level (unless construal level is manipulated directly, as will be illustrated below) and the impact of construal level on subsequent judgments and decisions.

to the feasibility of taking the new job, (c) are more, compared to less influenced by values and beliefs, and (d) possess more, compared to less self-control. These four aspects will be detailed below.

2.1 Superordinate Versus Subordinate Information

When individuals construe on a high level, they focus on central and goal-related features (labeled as high level features). When construing on a lower level, individuals additionally take more peripheral, contextual, and more goal-irrelevant features into account (labeled as low level features; Trope & Liberman, 2010). A hierarchy of information is constituted: central or high level features have greater impact on the meaning of an object or event, compared to more incidental, low level features. Accordingly, “changing a high level feature has a greater impact on the meaning of an object than does changing a low level feature” (Trope & Liberman, 2010, p. 441). This leads to differences in importance: central or high level features are superordinate, as they constitute the meaning of an object or event, and lower level features subordinate, as they are considered as more incidental or detailed information (Trope & Liberman, 2010). Depending on the psychological distance and the respective construal level, individuals may therefore focus more strongly on superordinate information, or take into account subordinate information, too.

These mechanisms can be illustrated with a study by Trope and Liberman (2000; Study 2), which fittingly investigated the exemplary context of job choices. Here, participants read job descriptions and were asked how much they would like to start working in the job. Within the job descriptions the authors varied whether the superordinate attribute, the job content, was interesting or not interesting, and whether a more subordinate attribute, some job-related training, was interesting or not interesting. Participants primed with a higher construal level (by making the decision for the future, which is psychologically more distant) had a stronger preference for the interesting job with uninteresting training, while this preference attenuated for participants primed with a low construal level (by making decisions

for tomorrow, which is psychologically closer). Participants who decided for the future, compared to participants who decided for tomorrow, apparently weighed the central, superordinate information more strongly (for another example in the context of evaluating essays, see Liviatan, Trope, & Liberman, 2008).

Construal Level Theory's assumptions on the centrality of information also apply to arguments in favor of or against an action (Trope & Liberman, 2010). The theory holds that arguments in favor are superordinate to arguments against something, as the subjective importance of cons depends on whether or not pros are present more than the reverse (Eyal et al., 2004; Herzog, Hansen, & Wänke, 2007). Common examples are medical treatments: Only if a medical treatment seems beneficial (has pros) might one consider and discuss the potential negative side effects (cons). If no benefits are apparent (no pros), potential side effects seem irrelevant instead (Trope & Liberman, 2010). Therefore, pro-arguments are considered to be superordinate, and con-arguments subordinate. The conceptual hierarchy of information matters when construing on a high level (i.e., in abstract terms, as here individuals focus on the superordinate features), but not when construing on a low level (as here individuals focus on both the superordinate and the subordinate features). Translated to the variable of valence, Construal Level Theory asserts that positive (more superordinate) compared to negative (more subordinate) information might gain in relative weight with increasing abstractness or higher level mindsets (e.g., Williams, Stein, & Galguera, 2014). Further evidence in support of this reasoning shows, for instance, that the mental salience of positive and societal outcomes of an action increases as social distance increases, and that framing persuasive messages in terms of gains compared to losses becomes more powerful when participants make judgments for socially distant versus proximal entities (Nan, 2007). However, only little research has investigated this differential weighing of positive (superordinate) and negative (subordinate) information in regard to different outcome variables, for example, judgments of truth, and open questions remain. Would individuals

with a high compared to low construal level deem a statement more or less likely to be true when framed positively compared to negatively? The first project of this dissertation (3.1) aims to analyze the influence of positive and negative information in judgments of truth.

2.2 Desirability Versus Feasibility Related Information

Construal level does not only impact the focus on superordinate versus subordinate information, depending on their mindset individuals can also attend more to desirability concerns or feasibility concerns when looking at actions or behaviors (Trope & Liberman, 2003). When thinking about the new job one might look at its desirability, how much it could advance one's career or how interesting the new position could be. By contrast, feasibility concerns could dominate one's thoughts, such as moving to a new place, leaving behind one's old job, friends, and eventually family, which could be less convenient. Construal Level Theory argues that when construing on a high level, individuals focus more on desirability concerns, as they involve the value of the action's end state and are therefore considered a superordinate piece of information. When construing on a low level, individuals should also take feasibility concerns into account, as they involve the means used to reach the end state and constitute a more subordinate piece of information (Liberman & Trope, 1998; Trope & Liberman, 2010).

Accordingly, the differential consideration of desirability versus feasibility is influenced by construal level and/or psychological distance, as exemplified by a recent study (Halamish & Liberman, 2017). Participants were told that they would sample playing cards from two different decks—either tomorrow or a year later. After sampling, participants would choose a deck, from which a card with a monetary bonus or penalty would be drawn that will then determine their compensation. In this scenario, sampling a lot of cards could be considered as desirable behavior, because it allowed participants to make a better-informed choice. Sampling more cards could also be considered as a behavior with relatively low feasibility, because it was associated with more time and more effort. The authors could show

that when deciding for the future (psychologically distant, associated with a more abstract mindset), individuals indicated the wish to sample a larger numbers of cards, presumably as they weighed desirability concerns more strongly than feasibility concerns. Conversely, when deciding for tomorrow (psychologically close, associated with a more concrete mindset), individuals indicated the wish to sample a smaller numbers of cards, presumably as they weighed feasibility concerns more strongly than desirability concerns. The consequences of the differential weighing of desirability versus feasibility concerns can be manifold for our society, as following social norms might be a desirable behavior that at the same time comes with a cost for the individual (Liberman & Trope, 1998). This dilemma between egalitarian standards and norms on the one hand versus individual costs on the other, might be fruitful grounds to answer questions related to diversity research. In general individuals might agree that diversity and inclusion of diverse others is an important aspect of an open society, but when being personally affected individuals might still prefer working with a more similar counterpart. In section 3.2 I will present some research, which is not a project of this dissertation but still ongoing work, that aims at shedding light on this dilemma: Why do individuals sometimes prefer diversity and sometimes similarity in groups?

2.3 The Impact of Values on Subsequent Behavior

Not only desirability and feasibility concerns may guide one's decisions and behaviors, but also one's values and beliefs. Values are concepts or beliefs; they pertain to desirable behaviors and transcend specific situations (Schwartz, 1992). Values guide the selection or evaluation of behaviors (Schwartz, 1992), and predict a broad range of meaningful decisions and behaviors (Bardi & Schwartz, 2003; Sagiv & Schwartz, 2004). According to Construal Level Theory, values are abstract, decontextualized, superordinate cognitive structures and as such constitute high level features (Eyal, Liberman, & Trope, 2009). Values and belief systems serve generally as high level behavioral guides (Trope & Liberman, 2010), and should therefore "be more readily applied to and guide intentions for

psychological distant situations” (Trope & Liberman, 2010, p. 453). When thinking about a potential job offer, a career choice should be more likely to be influenced by one’s values when thinking about an offer in a year from now compared to tomorrow, where other considerations (such as travel distance or benefit packages) might dominate.

Along these lines, Eyal, Sagristano, Trope, Liberman, and Chaiken (2009) showed that values had a greater impact on how individuals plan their distant future compared to their near future. When planning for the distant future values and behavioral intentions correlate more strongly, while this relation is attenuated when individuals plan for the close future (Eyal, Sagristano, et al., 2009). These findings are corroborated by the findings that participants in an abstract mindset compared to a concrete mindset tend to behave more honestly (given that most people value honesty) – except for situations in which dishonesty serves the greater good of another party and therefore other values, such as benevolence, were more salient (Rixom & Mishra, 2014). In both cases, participants’ behavior seemed to be impacted more strongly by their values when they were primed to be in an abstract compared to a concrete mindset. Further research has investigated consumer behavior (Fujita, Eyal, Chaiken, Trope, & Liberman, 2008), where product evaluation served as a dependent variable. Here, participants in the high level condition evaluated a DVD player more favorably when it was advertised as made of environmentally friendly material versus as coming with an easy to use manual, whereas participants’ evaluation in the low level condition did not differ. Going beyond the present findings, the second project presented in this dissertation (3.3) looks at dishonest behavior. More specifically, it investigates the influence of the value of Machiavellianism on the occurrence of honest versus dishonest behavior. Do Machiavellian tendencies translate into dishonest behavior more under high than under low construal level?

2.4 Self-Control

Depending on individuals’ mindsets, values and beliefs may be more or less influential for actions. Another particularly promising aspect is the application of Construal Level

Theory to explain how people resolve conflicting alternative motivations (e.g., finally finishing and submitting the application for a new job versus spending a bit more time surfing the web). To function effectively, one needs to postpone the immediate and more gratifying alternative and persist in goal-directed behavior that will lead to delayed benefits (Mischel, Shoda, & Rodriguez, 1989). The resolution of the conflict between these two opposing motivations requires future-oriented self-control (Mischel et al., 1989). In terms of Construal Level Theory, self-control requires individuals to make decisions that are consistent with distal, more high level goals, when being tempted by more immediate, low level rewards (Fujita & Carnevale, 2012; Trope & Liberman, 2010). Therefore, adopting a psychologically remote perspective as well as a more abstract mindset increases individuals' ability to exercise self-control (Eyal, Liberman, et al., 2009), as individuals should more strongly focus on the central, superordinate goals (high level features) and less on more incidental, subordinate goals (low level features). For instance, priming individuals with a higher construal level compared to a lower construal level resulted in a reduced preference for immediate over delayed outcomes (Fujita et al., 2006). Also, when testing for physical endurance, participants primed with a high level of construal held on to a handgrip longer than those primed with a low level of construal (Fujita et al., 2006). Further studies investigated the evaluative associations with temptation and actual choice behavior in respect to construal level (Fujita & Han, 2009), where the authors showed that higher level construals made it easier for individuals to associate temptations with negativity.

2.5 Psychological Distance and Construal Level

As illustrated before, construal level influences which information individuals are more likely to attend to. Construal level can be primed directly (see Freitas, Gollwitzer, & Trope, 2004; Fujita et al., 2006), but can also be influenced by psychological distance. The originally defined dimensions influencing psychological distance are based on “the perception of *when* an event occurs, *where* it occurs, to *whom* it occurs, and *whether* it occurs“ (Trope &

Liberman, 2010, p. 442). The different dimensions feeding into psychological distance are therefore temporal distance (now versus a long time ago or far away in the future), spatial distance (here versus at a faraway place), social distance (me versus some foreign person), and hypotheticality (with certainty versus with only a small chance of occurring). These psychological distances are interrelated (see Bar-Anan, Liberman, Trope, & Algom, 2007; Fiedler, Jung, Wänke, Alexopoulos, & de Molière, 2015; Maglio, Trope, & Liberman, 2013).

Other articles have also highlighted that even more dimensions of psychological distance may exist, and these could also eventually influence construal level. Fiedler (2007) argues for the dimensions of informational distance (defined in terms of the amount of knowledge or relevant data possessed), experiential distance (defined as information being based on first-hand experience or second- and third-hand experiences), affective distance (defined as the modality or style of information presentation), and perspective distance (defined as the commitment and the motivational state of the decision maker). Future research is required to investigate whether these dimensions also impact the processing style of individuals by influencing their construal level.

Besides pointing out new dimensions of psychological distance, other lines of research indicate that the processing style can also be influenced by the nature of the environment, which is reflected in subtler, situational, or incidental cues (compared to direct manipulations of psychological distance and/or construal level). Mood, for instance, seems to critically influence individuals' processing style, because it provides information about the environment. Bad mood signals insecure environments, whereas happy mood signals a benign environment in which individuals could be more explorative (Förster & Denzler, 2012; Friedman & Förster, 2010; Schwarz & Bless, 1991). One could hypothesize that individuals might construe on a higher level and more abstractly in benign environments, and on a lower, more concrete level in environments that appear insecure. In line with this hypothesis, Isen and Daubman (1984) showed that good (bad) mood enhanced (reduced) the breadth of

categorization, which could be associated with a higher (lower) level of construal. Gasper and Clore (2002) found a more global processing style activated in happy individuals, while sad individuals showed a more local processing style. All in all, research suggests that mood signals information about the environment and influences individuals' processing style.

Within the third dissertation project (3.4) we investigate whether a more specific environmental cue might influence and change individuals' processing style. Within this project we analyze whether a simple coin flip, used as a decision-making aid, might affect the decision process and subsequently the type of information that is taken into account when making a decision. Could such a cue, which does not signal a benign or insecure environment, catalyze decisions by changing individuals' processing style?

2.6 Summary

As described above, construal level influences whether individuals focus more on superordinate or subordinate information, desirability or feasibility concerns, and whether their behavior is guided more or less strongly by values and associated with higher or lower self-control. Furthermore, more or less subtle environmental cues might directly or indirectly affect construal level by either providing information about the environment or by directly impacting psychological distance and construal level. Within this overview of the literature on Construal Level Theory, I highlighted several open and important questions: Would individuals with a different construal level deem a statement more or less likely to be true when framed positively compared to negatively? As individuals focus more or less on the desirability or feasibility of an action (depending on their construal level), could this explain why individuals sometimes prefer diversity and sometimes similarity in groups? How influential are values, such as Machiavellianism, on the occurrence of honest versus dishonest behavior, depending on individuals' mindsets? And finally, how could a shift in processing style by using a decision-making aid perhaps allow individuals to make decisions in cases where they were undecided before? The contribution of this dissertation to questions about

judgments of truth, diversity of work groups, dishonest behavior, and aiding judgment and decision-making will be presented in the next chapter.

Chapter 3: Open Questions Regarding Construal Level Theory

Within this dissertation I aim to find first answers to the open questions and to test Construal Level Theory's predictions pertaining to the consideration of superordinate versus subordinate information, the desirability versus feasibility of an action, and the influence of values and beliefs. To this end throughout different projects or studies, we varied the psychological distance or primed construal level and investigated the implications on subsequent judgments and decisions, as described in the sections below.

3.1 Project 1: Superordinate Versus Subordinate Information in Judgments of Truth

Jaffé and Greifeneder (2017) investigated how the differential weighting of negative (subordinate) and positive (superordinate, see section 2.1) information impacts judgments of truth. In this project, we built on research on the negativity bias in judgments of truth (Hilbig, 2009, 2012), which holds that the same message is deemed more likely true when framed negatively compared to positively. "The likelihood for bad weather is 20%" (negative frame) should be more likely deemed true compared to the message "The likelihood for good weather is 80%" (positive frame). Presumably this is due to the higher salience and more thorough processing of negative compared to positive information (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001) and that more thorough processing increases the perception of truth (Fiedler, 2000; also see research on the mere thought effect, Tesser, 1978). However, with regard to the assumptions made by Construal Level Theory, there might be more to the story of the negativity bias in judgments of truth. In particular, as positive information is considered superordinate, it should gain in weight and impact when individuals construe on a higher compared to lower level. Negative information should be considered more strongly, when construing on a lower level, as it would be considered as more subordinate information.

Therefore, we hypothesized that with increasing psychological distance, the negativity bias should be attenuated, meaning that the same information framed negatively compared to positively is more likely to be perceived as true in the here-and-now, but not so much in conditions of higher psychological distance. In the manuscript #1 attached, two studies are reported that provide support for this hypothesis: The negativity bias in judgments of truth is found under conditions of psychological proximity, but attenuates or even reverses under conditions of psychological distance. A third, preregistered study is suggested, to put these conclusions to another test. This manuscript #1 has been submitted and is awaiting review.

3.2 Additional Research: Desirability Versus Feasibility Regarding Diversity

In another line of research, which is not a project of this dissertation (but a manuscript in preparation), but allows for a first answer to the question regarding the preference of different or similar others, Jaffé, Rudert and Greifeneder (2017) applied the differential weighing of desirability and feasibility concerns to the context of diversity research. This line of research was inspired by contemporary institutions' and companies' strong emphasis on the importance of diversity (Society for Human Resource Management, 2009) and their alleged commitment to implement it. Yet, political interventions, such as the affirmative action policy in the USA or the German law passed in 2016 forcing companies listed in the stock exchange to have 30% women in their supervisory board, provide a hint that diversity is still not implemented throughout organizations and companies. A concrete example could be one of the major American strategy consulting companies, the Boston Consulting Group (BCG). BCG on the one hand declares diversity as one of their core values (Boston Consulting Group, 2017). However, when looking at the leadership team, it becomes apparent that so far only 22% of leaders are women (Boston Consulting Group, 2017), which may hint at all the work that is still required to bring the value of diversity to life.

Besides many explaining factors such as societal hurdles and restrictions, we aimed to provide a psychological argument based on Construal Level Theory for this mismatch

between stated values and current reality. This argument focuses on how managers, HR decision makers, and - more generally speaking - individuals per se construe the concept of diversity. When thinking abstractly about diversity, individuals might think of a more diverse team or group that offers opportunities for them, or consider a moral responsibility of adhering to a fair and equality-based selection policy when choosing a new member for a group. These are mainly desirability concerns that speak in favor of diversity. But when thinking more concretely about everyday work, different aspects of this story might be more important. Maybe when envisioning their day-to-day work in a group, individuals might think it could be easier to work with someone similar – someone who has studied at the same university, has the same background, speaks the same language, and has the same working habits and style. Wondering about efficiency, communication, and pleasantness of interactions, a more similar candidate could be preferred due to feasibility concerns. Depending on the mindset, individuals may therefore go for diversity due to its desirability or prefer similarity due to its feasibility.

In a first study, we investigated this trade-off by asking Swiss participants to choose a collaboration partner for a quiz. One of the potential partners was described as dissimilar from the participants (a business student from Chile), and the other as similar (a Swiss psychology student). To manipulate psychological distance, participants were either asked to make the choice for themselves (psychologically close) or for another participant of the study (psychologically more distant; manipulation adapted from Lu, Xie, & Xu, 2013). Our results display a significant association between psychological distance and choice of partner. When choosing for somebody else, the dissimilar person was chosen more often (probably reflecting thoughts such as “You should go for diversity ...”), whereas when choosing for oneself, the similar person was preferred (“... but I prefer to work with similar others”). In a second study participants were asked to build a study group by selecting two or three students from a selected set. We varied whether they would be part of this group (psychologically closer) or

not (psychologically more distant) and could show that the groups built were significantly more diverse in regards to nationality and subject of study when participants were not part of the group compared to when they were part of the group. These results offer a new (and complementary) explanation as to why intentions of promoting diversity are not always realized, even though managers, HR decision makers, and individuals generally agree on the value of diversity. This manuscript is currently in preparation. However, a preliminary conclusion drawn from this research could be that management and/or the government would need to decrease diversity-related feasibility concerns to encourage the emergence of a diverse workforce.

3.3 Project 2: The Impact of Machiavellian Beliefs on Dishonest Behavior

Looking at values such as Machiavellian beliefs, we investigated whether the differential influence of values on behavior could explain dishonesty in an applied setting. In general, honesty is a key pillar in our society (see Rosenbaum, Billinger, & Stieglitz, 2014; but also the value of benevolence in Schwartz, 1992), yet some (darker) values may promote dishonest behavior. Throughout two studies, Jaffé, Greifeneder, and Reinhard (2017) assessed individuals' Machiavellian beliefs (e.g., "The best way to handle people is to tell them what they want to hear", Christie & Geis, 1970) and investigated whether these would predict dishonest behavior, and more strongly so when individuals have a high construal mindset. Participants were either primed with high or low construal level and then asked to flip a coin and to self-report the outcome. The outcome was linked to a small bonus payment for themselves or a charitable organization, making it more (or eventually less) attractive to be dishonest about it. This measure ensures that whether or not a specific individual is being dishonest or honest remains unknown to the experimenter, as the outcome of the coin flip is only known to the participant, and only group-level deviations from chance level can be analyzed (Moshagen & Hilbig, 2017). An above chance winning probability indicates dishonesty on the group level. Consistent with the interaction hypothesis, in both studies, the

higher probability of receiving a bonus given self-serving conditions was associated with a stronger Machiavellian personality – but more so when individuals construed on a high level compared to a low level. The manuscript #2 attached summarizes the results of this research project and is currently under review.

3.4 Project 3: Changes in Processing Style may Catalyze Decision-Making

In the theoretical background section (Chapter 2) I hypothesized that subtle environmental cues, such as a coin flip used as a decision-making aid, might critically shift individuals' processing style by changing the decision-making process. In general some research assumes that individuals by default construe on a rather high, abstract level (Navon, 1977). A sudden increase of urgency or importance may then reduce psychological distance (temporal distance in case of urgency, and eventually social distance in case of importance) and result in a more concrete construal level. Individuals need to adjust their processing style as soon as the “standard procedure” is not applicable anymore.

Individuals may benefit from changes in processing styles, especially in a situation where, for example, in the case of judgment and decision-making, a more abstract construal level does not allow for a clear decision. Imagine finally having mailed not only one but two job applications and, being lucky, having received two job offers. Both offers have distinct advantages and disadvantages, and now you are torn between options. Changing the level of processing might allow for a new perspective: while both options might seem equally attractive on a (default) high level, they might differ on a lower level. Here, changing the processing style might allow individuals to make a decision where they were undecided before. A specific cue may elicit this change.

In everyday life, some individuals might already intuitively implement such a strategy. When being stuck with a difficult decision, they decide to use a decision-making aid such as a coin flip. From everyday experiences one knows that sometimes people simply flip a coin with, for example, heads standing for one option and tails for the other (Keren & Teigen,

2010). Based on the assumptions outlined above, I assume that this is not only a playable solution for unimportant decisions, but may actually be of greater relevance, even for complex decision scenarios. Jaffé, Reutner, and Greifeneder (2017) investigate situations in which individuals are asked to flip a coin, but do not necessarily have to adhere to the coin's outcome. Instead, the project focuses on the phenomenon that individuals report suddenly having a feeling of liking or disliking the outcome of the coin toss and using this feeling to subsequently make their own decision (which might indeed deviate from the option that the coin flip suggested). According to our rationale, the coin flip allows for a decision where individuals were undecided (or "stuck") before. That is, it catalyzes the decision-making process, presumably by changing individuals' perspectives on the decision problem, as further detailed in manuscript #3 (currently in revision) and below.

Jaffé, Reutner, and Greifeneder (2017) hypothesize that when individuals flip a coin, looking at the outcome may change the decision-making process. As the coin points to one option over the other, job A instead of job B, individuals focus on obtaining this option and engage in a more vivid representation of the same. By imagining how it would be to obtain the option, feelings related to it become more salient (individuals like or dislike the idea). These more salient feelings then influence subsequent decision processes. Suddenly, individuals do make a decision, although they apparently needed a decision-making aid before.

Within the manuscript of project 3, different studies are introduced that provide evidence that using a catalyst (such as a coin flip, a die, or a lottery wheel) leads to stronger feelings, more affect-driven decisions, and that a reliance on feelings can even increase performance in regard to certain decision-making problems. In one of the studies, for example, we show that using a catalyst leads to more affect-driven decisions. To this end we selected a paradigm introduced by Hsee and Rottenstreich (2004) that allows differentiating whether a decision outcome is reached via rational calculation or affect-based valuation (see

also Hsee, Rottenstreich, & Xiao, 2005). In particular, when asked how much one would like to donate for one versus four endangered animals, individuals can look at the facts and figures describing the number of endangered animals (a more rational approach). But they can also assess their feelings towards it (How-do-I-feel-about-it?). Hsee and Rottenstreich (2004) provided participants with either vivid or abstract information about the number of endangered pandas. They observed valuation-by-affect for pictures of pandas (vivid) as participants donated a similar amount irrespective of the number of endangered animals, but valuation-by-calculation when pandas were represented as dots in a table (abstract) as participants donated more for four compared to one endangered animal. Our study (Study 3 in the manuscript attached) mimics Hsee and Rottenstreich's (2004) abstract dot-condition to show valuation-by-calculation in the control group. In contrast, catalyst-participants that were asked to consult their feelings in reaction to a lottery wheel should be more likely to show valuation-by-affect even when presented with abstract information. As hypothesized, catalyst-participants displayed a lower sensitivity towards numbers (i.e., a smaller difference between donation amounts for one or four animals) compared to the control group, indicating that using a catalyst indeed led to more affect-driven decisions.

Going beyond the assumptions and the data provided in the manuscript, one can hypothesize that by flipping a coin, the ongoing decision process is changed. As individuals more vividly imagine obtaining the options, which results in more salient feelings, affective distance (Fiedler, 2007) might be decreased. Also, the decision problem is less hypothetical, as one option has been suggested over the other. Therefore, individuals' processing style might change from a more abstract to a more concrete construal level. This change, in turn, may then allow for decisions, where individuals were "stuck" between alternatives before. The change, induced by the coin, catalyzed the decision-making process.

3.5 Summary

All projects and studies described previously investigate this interplay of processing style and focus on high versus low level features in manifold and applied contexts. Project 1 highlights that individuals show an attenuated or even reversed negativity bias in judgments of truth under conditions of psychological distance, presumably due to a differential weighing of positive (superordinate) and negative (subordinate) information. Research on the differential consideration of desirability and feasibility concerns analyzes individuals' preference for diversity when construing on a high level compared to a preference for similarity when construing on a low level. Project 2 investigates the stronger impact of Machiavellian values on behavior under high compared to low construal level. In project 3 we investigated how a small environmental cue can serve as a decision-making aid, resulting in stronger feelings and more affective judgments and decisions. By flipping a coin, decisions can be catalyzed and individuals are eventually able to make a decision where they had difficulties coming to a conclusion before.

Depending on individuals' construal level (or processing style), the presented research supports the general notion of Construal Level Theory that individuals attend to different pieces of information, resulting in different judgments and decisions. In the last section of this dissertation the importance as well as adaptiveness of changes in processing styles are briefly summarized, and implications for research and practice discussed.

Chapter 4: Discussion and Implications for Research on Construal Level

The previously described projects of this dissertation show that different processing styles result in different affective, cognitive, and behavioral outcomes in the realm of judgments of truth, diversity preferences, and dishonest behavior. However, processing information at different levels of abstraction does not only lead to different outcomes, but is indeed considered a functional behavior (Brown, 1958; Burgoon, Henderson, & Markman,

2013). To maximize accuracy when making judgments and decisions regarding psychologically distant things, individuals are required to broaden their mental horizons by focusing on central characteristics (high level features); therefore, “as things become more psychologically distant, people think about them at progressively higher levels of abstraction” (Burgoon et al., 2013, p. 503).

Going beyond the application of Construal Level Theory to different contexts, the project on changing current processing styles by flipping a coin also highlights that not only the processing style per se, but the change (or shift) of the processing style might be of utmost importance. Bless and Burger (2016) argue that the change aspect is often neglected in theoretical conclusions (p. 298). In experimental research a confound exists when manipulating a certain variable (e.g., processing style): effects can either derive from (a) the absolute level of the processing style (abstract versus concrete) or (b) the change within the processing style (from more abstract to more concrete versus vice versa; see Bless & Burger, 2016). Investigating this distinction could highlight the importance of the *change* as a key variable that drives observed differences. By changing a variable, the associated salience and accessibility increases, meaning it draws on individuals’ attention (Bless & Burger, 2016). Project 3 can be seen as a first step with regards to the impact of changing construal levels. Flipping a coin may serve in exactly this manner: By changing individuals’ mindsets, they may more strongly focus on pieces of information that gain in weight due to the more concrete construal level. Maybe it is, in fact, this change in mindset (and not only the absolute level of abstract- or concreteness) that therefore impacts individuals’ behavior and catalyzes the decision-making process. One could therefore conclude that sometimes it might not be a specific mindset that is adaptive to cope with a certain decision – but instead the change within mindsets that allows individuals to come to a conclusion in cases where they were undecided before (see Bless & Burger, 2016).

Future research could continue to investigate the adaptive link between processing style and differences in affect, cognition, and behavior, to understand and predict behavior in numerous applied settings. Taking a next step, future research could also build upon the first findings from project 3 and deep-dive into the impact and potential adaptiveness of the *change* of individuals' processing style on outcome variables.

Chapter 5: Discussion and Practical Implications

Individuals' processing style influences the encoding and processing of information and therefore subsequent judgments and decisions. As discussed before, Construal Level Theory would argue that the capacity for mental abstraction is an adaptive mechanism (Ledgerwood, Trope, & Liberman, 2015), as it allows to extract general information that is relevant across a diverse array of contexts (Kalkstein, Hubbard, & Trope, 2017).

As highlighted in the last section, we would argue the change within individuals' mindsets might serve them well in different situations. Change increases the salience of the altered variables and individuals tend to focus more on these (Bless & Burger, 2016). Therefore, the focus on these altered variables, such as more salient feelings, may allow individuals to make decisions where they were undecided or "stuck" before (see project 3 on catalyzing decisions). Further research supports the idea of the benefits associated with changing individuals' processing styles and motivating individuals to take a different look. While in project 3 we focus more on the change from a more abstract to a more concrete mindset by decreasing psychological distance, other research projects indicate that increasing psychological distance might be advantageous, too. Bruehlman-Senecal and Ayduk (2015) showed that temporal distancing might be a means to cope with emotional distress (see also Kross, Gard, Deldin, Clifton, & Ayduk, 2012; Penner et al., 2016). By deemphasizing the concrete, malleable, and situation-specific features and by heightening the awareness of the impermanence of the negative emotional events and reactions, individuals' level of distress

can be reduced (Bruehlman-Senecal & Ayduk, 2015, p. 358; but see Watkins, 2011 for an overview on conditions on when abstraction may be adaptive versus maladaptive for clinical populations).

We would therefore argue that individuals may benefit in their everyday lives from a change in their mindset. Changing from the abstract to the concrete (or vice versa) might allow individuals to take a different perspective on a decision problem and allow them to make decisions or to implement better coping behavior, where they might have been “stuck” before. Given further research, individuals could actively use this knowledge and distance themselves when an abstract mindset is beneficial (e.g., with the help of imaginative techniques), and reduce psychological distance when focusing on details and subordinate information is advantageous (e.g., by flipping a coin).

Chapter 6: Conclusions

This dissertation highlights that depending on their mindset, individuals might be more or less likely to judge a negatively framed statement as true, prefer similarity over diversity, and behave more or less honest when having Machiavellian beliefs. Moreover, intraindividual changes in processing style by simply flipping a coin might allow individuals to make decisions where they had been undecided before. The research presented supports these notions and provides a further piece in the puzzle of how we make judgments and decisions in the complex environment of our everyday lives. Furthermore, it accentuates our ability to abstract and to change our processing style as a powerful, but also adaptive mechanism. This ability may help us cope with emotional distress and allows us to come to a conclusion when we are torn between options. So, if you feel “stuck”, go ahead and take a different look: It might critically influence what you see, what you think, how you feel, and in the end behave.

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Appendices

(1) Appendix A:

Jaffé, M. E. & Greifeneder, R. (2017). *Negative is true here and now, but not so much there and then: On the impact of psychological distance on the negativity bias*. Manuscript submitted.

(2) Appendix B:

Jaffé, M. E., Greifeneder, R., & Reinhard, M.-A. (2017). *Manipulating the odds: The effect of machiavellianism and construal level on cheating behavior*. Manuscript submitted.

(3) Appendix C:

Jaffé, M. E., Reutner, L., & Greifeneder, R. (2017). *Catalyzing decisions*. Manuscript in revision.

(4) Appendix D:

Curriculum Vitae

Appendix A

Negative is True Here and Now, but not so much There and Then:

On the Impact of Psychological Distance on the Negativity Bias

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Abstract

How do people judge the veracity of a message? The negativity bias in judgments of truths describes the phenomenon that the same message is more likely to be deemed true when framed negatively compared to positively. The present manuscript investigates whether this negativity bias is stronger in the here-and-now, that is, in conditions of low psychological distance. This notion is informed by Construal Level Theory, which holds that negative information is more salient and weighted more strongly in conditions of psychological proximity compared to distance. Against this conceptual background we hypothesize that a negativity bias can be observed in conditions of proximity, but attenuates or even reverses under conditions of distance. Two studies provide support by manipulating psychological distance. A final registered study is suggested to put our preliminary conclusions to a critical test. Implications of these findings in a time of uncertainty, alternative facts, and post-truth politics are discussed.

Keywords: negativity bias; judgments of truth; construal level; psychological distance

Introduction

Truthfulness is one of the cornerstones of our society. Daily interactions and communications strongly depend on our belief that other people share truths, not lies. Grice (1975) maintained that when engaging in interpersonal interactions individuals are expected and expect from their counterpart that they follow the maxim of quality, which states that one should not say what one believes to be false and one should also not say something for which one lacks adequate evidence. At the same time, individuals are aware that not everything they are told is true, as perhaps best illustrated by the choice of “post-truth” as the word of the year 2016 (Oxford Dictionary, 2016). Post-truth is an adjective described as “relating or denoting circumstances in which objective facts are less influential in shaping public opinion than appeals to emotion and personal beliefs” (Oxford Dictionary, 2016) and indicates that by sending emotional and belief-centered messages, communicators might try to bring across an eventually false message.

Faced with the task of discerning truth from falsehood, individuals are known to rely on a number of cues (e.g., Dechêne, Stahl, Hansen, & Wanke, 2010). One of these cues is the message’s frame, which may, for instance, be positive or negative. Past research has reliably demonstrated that messages framed negatively (e.g., the likelihood for bad weather is 20%) compared to positively (e.g., the likelihood for good weather is 80%) are perceived as more likely to be true (e.g., Hilbig, 2009, 2012). Here we further investigate this so called *negativity bias in truth judgments* against the background of Construal Level Theory, which holds that negative information is more salient and weighted more heavily in conditions of psychological proximity compared to distance. We hypothesize that the negativity bias is stronger in the here-and-now, but not so much there-and-then. In what follows we elaborate these conjectures.

The Negativity Bias in Judgments of Truth

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A wealth of evidence suggests that negative instances tend to be more influential than comparably positive ones (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001), an effect that applies, for instance, to everyday events, major life events (e.g., trauma), close relationship outcomes, social network patterns, interpersonal interactions, or learning processes. The authors argue that the self is more motivated to avoid bad self-definitions than to pursue good ones, and therefore bad information is considered to be more salient and diagnostic, and is processed more thoroughly compared to good information (Baumeister et al., 2001). In one study by Kahneman and Tversky (1984), for instance, participants performed different tasks in which they either lost or gained the same amount of money. The authors noted that participants reported more distress about losing a certain amount of money than joy about winning the exact same amount of money, illustrating that negative instances have a stronger effect on participants' mood than comparable positive ones. Similarly, prospect theory argues that the value function is steeper in the loss compared to the gain domain (Kahneman & Tversky, 1979).

Consistent with this general bad-is-stronger-than-good tendency, Hilbig (2009) first reported that formally equivalent messages are deemed more true when framed negatively compared to positively. This bias is referred to as the negativity bias in truth judgments. In a typical experiment, participants are provided with a number of statements, which are framed either negatively ("85% of attempted instances of rape are successful") or positively ("15% of attempted instances of rape are unsuccessful"). Participants are asked to judge the truth of the stated information. Results indicate that negatively framed statements are more likely to be evaluated as true than the content-wise identical, but positively framed statement (Hilbig, 2009, 2012). Using a multinomial processing tree model, Hilbig (2012) suggested that the bias is not driven by differences in knowledge, but reflects a response bias.

But why should negative information be perceived as more true? Negative instances attract more attention (Pratto & John, 1991) and are perceived as more informative (Peeters &

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Czapinski, 1990), perhaps because negative instances are more rare and more threatening (Dijksterhuis & Aarts, 2003; Lewicka, Czapinski, & Peeters, 1992; Peeters & Czapinski, 1990). As a result, negative (bad) information may be weighted more heavily than positive (good) information (Baumeister et al., 2001). Interestingly, this differential weighing of negative compared to positive information may be particularly prominent in the here-and-now, but less pronounced in conditions of psychological distance, as suggested by Construal Level Theory, as we detail next.

Construal Level Theory

Construal Level Theory (CLT, Liberman & Trope, 2009; Trope & Liberman, 2003, 2010) allows for novel predictions regarding the occurrence of the negativity bias in judgments of truth, as it makes predictions about how individuals process information, and more specifically about how different pieces of information are weighed. CLT starts from the assumption that individuals live in the here-and-now, but can psychologically traverse distance by thinking about the past or tomorrow, imagining being in different locations, or putting themselves in the shoes of others. The reference point for this mental travelling is the “me, here, and now” (Trope & Liberman, 2010, p. 457), and anything that is not on this zero-distance point is said to be more or less psychologically distant. Hence, an event taking place tomorrow is more psychologically distant than an event taking place today; similarly, the issues pertaining to another country are more psychologically distant than issues pertaining to one’s own country or country of origin. Critically, CLT maintains that changes in psychological distance are closely associated with the level on which objects and events are mentally construed: As a general rule psychologically distant objects or entities are construed at a higher level and psychologically more proximal entities at a lower level. To illustrate, when thinking about a forest on a low level, individuals might picture individual trees, focusing on different kinds of trees or their colors, reflecting a very concrete representation of the concept forest. In contrast, when thinking about the same forest on a high level,

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individuals may think about the totality of trees or the recreational and environmental opportunities a forest provides, reflecting an abstract representation.

Of particular importance in the present context are CLT's assumptions about the weighing of positive and negative information (Trope & Liberman, 2010). The theory holds that arguments in favor are superordinate to arguments against something, as the subjective importance of cons depends on whether or not pros are present more than the reverse (Eyal, Liberman, Trope, & Walther, 2004; Herzog, Hansen, & Wänke, 2007). Common examples are medical treatments: only if a medical treatment seems beneficial (has pros), one might consider and discuss the potential negative side effects (cons). If no benefits are apparent (no pros), potential side effects seem irrelevant instead. Because the conceptual hierarchy of information matters when construing on a high level (i.e., in abstract terms), but not when construing on a low level, CLT asserts that positive compared to negative information increases in relative weight with increasing psychological distance. Evidence in support of this reasoning shows that the mental salience of positive and societal outcomes of an action increases as social distance increases, and that framing persuasive messages in terms of gains compared to losses becomes more powerful when participants make judgments for socially distant versus proximal entities (Nan, 2007).

Intriguingly, these differences in information weighing allow for the novel prediction that the relatively stronger weighing of negative compared to positive information in truth judgments as observed in the negativity bias should be particularly apparent in the here-and-now (low level construal). With increasing psychological distance, however, the bias should attenuate (or maybe reverse), as positive information gains in weight.

Summarizing the arguments above, Construal Level Theory suggests that there may be more to the story of the negativity bias in judgments of truth as has previously been told. In particular, when individuals construe on a higher compared to lower level, positive compared to negative information gains in weight. Therefore, we hypothesize that with increasing

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psychological distance, the negativity bias should attenuate: the same information framed negatively compared to positively is likely perceived as more true in the here-and-now, but not so much in conditions of psychological distance.

The present studies

To test the hypothesis that the negativity bias in judgments of truth attenuates with increased psychological distance, we conducted two studies, in which we asked individuals to judge the truthfulness of different statistical statements. These statements were framed positively or negatively and either concerned participants' own country (psychologically proximal) or a foreign country (psychologically distant) to vary psychological distance (Liberman & Trope, 2008). A third and final registered study will be outlined that puts our preliminary conclusions to a critical test.

Study 1a (Non-registered)

Study 1a builds upon the materials used by Hilbig (2009, 2012). We used 20 statistical statements that were either framed positively or negatively (to manipulate valance) and concerned conditions that were psychologically proximal versus distant for our participants (to manipulate construal level). As the dependent variable, participants judged the truthfulness of each statement.

Methods

Participants. The study was conducted online and was distributed via different German-speaking and psychology oriented groups on Facebook. The study took about eight minutes to complete. Based upon prior research using similar material (Hilbig, 2009), we assumed effect sizes to be medium to large. The a-priori power analysis with an α -error probability of .05 and a power of .85 indicated a required sample size of 52 participants (Faul, Erdfelder, Buchner, & Lang, 2009). Fifty-eight individuals completed the questionnaire (10 males, 48 females; $M_{age} = 24.95$ years, $SD_{age} = 4.93$). Participants could take part in a lottery for three 10€ (approximately 10 US\$) Amazon vouchers as compensation.

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Design. Statements differed in regards to valence (between participants; random assignment) and psychological distance (within participants; random presentation). In addition to the two design factors, we counterbalanced across participants the positioning of the question labels on the horizontal axis (true left, false right vs. true right, false left). This counterbalancing was not analyzed. Data were analyzed as a 2 (valence: positive vs. negative; between) x 2 (psychological distance: proximal vs. distant; within) mixed design, with the statements' perceived veracity as the dependent variable.

Materials and Procedure. After giving informed consent, participants were provided with one exemplary item to familiarize them with the nature of the task. Participants were asked not to use any external sources (such as Google, etc.) and to provide their best guess if they did not know the answer. Following this introduction, participants were asked to judge the veracity of 20 items by rating them as *false* (coded as 0) or *true* (coded as 1). We used a set of slightly adjusted statements from Hilbig (2012), which were provided by the author via personal communication. All statements either focused on the participants' country of residence (proximal; here: Germany) versus a far away country (distant; here, e.g., Vietnam, Peru, Ghana), and are provided in Appendix A.

For exploratory reasons and following earlier research, we subsequently assessed the revised Life-Orientation-Test (Scheier, Carver, & Bridges, 1994) in its German version (Glaesmer, Hoyer, Klotsche, & Herzberg, 2008), as dispositional optimism or pessimism may play a role in evaluating statistical facts (see Hilbig, 2009). Finally, participants were asked to provide demographic information, were asked for further comments about the study, and were thanked for their participation.

Results

Overall, participants judged 9.98 statements as true (about 50%; $SD = 2.50$), and individuals ranged from a minimum of 3 to a maximum of 15 statements judged as true. On

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the individual statement level, the average ratings of truthfulness varied from .31 to .69.

Proximal and distant statements were averaged to form two separate indices.

To test our hypothesis, we calculated a mixed 2 x 2 ANOVA with valence as the between variable, distance as the within variable, and mean perceived veracity as the dependent variable. Results yielded a significant main effect for valence, $F(1, 56) = 15.50$, $p < .001$, $\eta^2 = .22$, reflecting that statements framed negatively were more likely to be judged as true compared to the same statements framed positively, $M = .56$, $SD = .12$, $M = .44$, $SD = .10$. Moreover, a significant main effect for distance was observed, $F(1, 56) = 8.14$, $p = .006$, $\eta^2 = .13$, reflecting that psychologically proximal compared to distant statements were more likely to be judged as true, $M = .54$, $SD = .16$, $M = .46$, $SD = .17$, respectively. In contrast to our hypothesis, there was no support for the predicted interaction between valence and distance, $F < 1$. Including the average Life-Orientation-Test score as a covariate into the analysis did not change the results, except for the main effect of distance, which was no longer significant, $F < 1.9$.

To further explore the lack of an interaction effect, we inspected the results on the individual item level (see Table 1). This inspection revealed that for four out of ten items in the condition of psychological proximity (statements related to Germany), no negativity bias occurred – meaning, that for 40% of the items, the premise of a negativity bias in the here-and-now was not met. For exploratory purposes, we decided to exclude these four items (Items # 16, 18, 19, and 20) from the average veracity score. As the items in the proximal and distant conditions differed content wise (see Appendix A), this only affected the scores in the proximal-condition, while the score for the distant-condition remained unchanged.

We then recalculated the mixed 2 x 2 ANOVA. While the main effect for valence remained significant, $F(1, 56) = 33.91$, $p < .001$, $\eta^2 = .38$, the main effect for distance was no longer significant, $F(1, 56) = 3.62$, $p = .062$, $\eta^2 = .061$. Most importantly, however, we now observed the predicted interaction between valence and distance, $F(1, 56) = 8.60$, $p = .005$,

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$\eta^2 = .13$, indicating that the strength of the negativity bias differed depending on psychological distance. Simple main effects indicate that in conditions of psychological proximity, negatively compared to positively framed items were more likely to be judged as true, $F(1, 56) = 34.26, p < .001, \eta^2 = .38$. In conditions of psychological distance, negatively compared to positively framed items were also more likely to be judged as true, $F(1, 56) = 5.62, p = .021, \eta^2 = .09$, but as expected (and as the significant interaction terms indicate), the effect size of the latter was much smaller than the effect size of the former.

Table 1

Veracity judgments (0 = false, 1 = true) for statements presented in Study 1a

Distance	Item #	Valence (Frame)				Mean Difference	<i>p</i>
		Negative		Positive			
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Distant	1	.59	.50	.66	.48	-.07	.596
	2	.69	.47	.55	.51	.14	.287
	3	.41	.50	.48	.51	-.07	.605
	4	.45	.51	.52	.51	-.07	.607
	5	.48	.51	.28	.46	.21	.108
	6	.48	.51	.14	.35	.35	.004
	7	.35	.48	.38	.49	-.03	.789
	8	.76	.44	.31	.47	.45	.000
	9	.45	.51	.31	.47	.14	.287
	10	.45	.51	.45	.51	.00	1.000
Proximal	11	.66	.48	.31	.47	.35	.008
	12	.62	.49	.17	.38	.45	.000
	13	.62	.49	.38	.49	.24	.068
	14	.76	.44	.62	.49	.14	.264
	15	.79	.41	.45	.51	.35	.006
	16	.59	.50	.69	.47	-.10	.421
	17	.55	.51	.31	.47	.24	.065
	18	.48	.51	.55	.51	-.07	.607
	19	.48	.51	.69	.47	-.21	.114
	20	.48	.51	.59	.50	-.10	.439

Discussion

Study 1a investigated whether the negativity bias attenuates with increased psychological distance, manipulated via spatial distance. Our primary analysis did not yield the predicted pattern of results. However, further inspection on the level of individual items revealed that the negativity bias did not show for four out of ten items in the here-and-now, which is surprising given the bias' robustness in prior research (e.g., Hilbig, 2009). Because the existence of a negativity bias in the here-and-now constitutes the logical premise for the hypothesized attenuation in psychological distance, we exploratorily excluded these four items and reran our primary analysis, now yielding the predicted interaction effect. In particular, for statements concerning participants' home country we found a strong negative bias, whereas this bias was still significant but much less pronounced for statements concerning a foreign country.

Of course, these results need to be treated with caution, since we selected items based on the outcome (but in line with the ex-ante specified premise). Nevertheless, to increase faith in the observed evidence, it appeared critical to replicate Study 1a with the narrowed set of items. To this end, we conducted Study 1b using a set of five items that showed a negativity bias in the here-and-now, and five items that showed no bias in conditions of psychological distance (see Appendix A). While commendable because it may bolster the conclusions of Study 1a, this selection of items comes with a methodological caveat that we will discuss in Study 1b.

Study 1b (Non-registered)

Study 1a provided evidence for the hypothesized effect, but only if the set of items is restricted to those that show a negativity bias in the here-and-now (the premise). Because this selection was ex-post, it appeared critical to replicate the observed finding with a different sample of participants.

Methods

Participants. The study was conducted as an online study advertised as a *study on the evaluation of statements* via psychology groups on Facebook and the email-pool of the online portal “www.forschung-erleben.de,” which communicates social psychological research to the German-speaking public. The study took about seven minutes to complete. Our a-priori power analysis with the assumption of a large effect size, an α -error probability of .05, and a power of .85 indicated a required sample size of 76 participants (Faul et al., 2009). Eighty-one individuals completed the questionnaire (19 males, 60 females, 2 no answer; $M_{age} = 25.52$ years, $SD_{age} = 5.78$). Participants could participate in a lottery for Amazon vouchers as compensation for their participation.

Design. The design is identical to Study 1a, with the following exceptions: Valence is manipulated between participants, and each participant reads five statements only. Data are therefore analyzed as a 2 (valence: positive vs. negative; between) x 2 (psychological distance: proximal vs. distant; between) design, with the averaged statements’ perceived veracity as the dependent variable. Participants were randomly assigned to one of the four conditions.

Materials and Procedure. Materials and procedures were identical to Study 1a, except for the reduced set of times as detailed above (see Appendix A).

Results

Overall, participants judged 2.36 statements as true (about 47%; $SD = 1.04$), and individuals ranged from a minimum of 0 to a maximum of 5 statements judged as true. On the individual statement level, the average ratings of truthfulness varied from .33 to .67. No statements were judged as true or false by all participants. For the subsequent analysis, we calculated a mean perceived veracity score over all five statements.

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Table 2

Veracity judgments (0 = false, 1 = true) for statements presented in Study 1b

Distance	Item #	Valence (Frame)				Mean Difference	<i>p</i>
		Negative		Positive			
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Distant	1	.62	.50	.33	.49	.29	.079
	3	.14	.36	.78	.43	-.64	.000
	4	.48	.51	.56	.51	-.08	.632
	7	.52	.51	.39	.50	.14	.413
	10	.47	.51	.78	.43	-.30	.056
Proximal	11	.57	.51	.10	.30	.48	.001
	12	.62	.50	.24	.44	.38	.012
	13	.38	.50	.43	.51	-.05	.760
	14	.71	.46	.62	.50	.10	.524
	15	.48	.51	.29	.46	.19	.213

To investigate whether the negativity bias occurs in conditions of psychological proximity, but attenuates or reverses in conditions of psychological distance, we calculated an ANOVA with valence and distance as independent variables and mean perceived veracity as the dependent variable. Our results yield no significant main effects, all F s < 2.33, p s > .131. But the hypothesized interaction between valence and distance was significant, $F(1, 77) = 16.12, p < .001, \eta^2 = .17$. Looking at simple main effects, results indicate that individuals in the proximal condition judged negatively framed items to be more true compared to positively framed items, $M = .55, SD = .22; M = .33, SD = .18$; respectively, $F(1, 77) = 14.10, p < .001, \eta^2 = .16$, reflecting the expected negativity bias. In contrast, participants in the distant condition judged negatively framed items to be less true compared to positively framed items, $M = .45, SD = .19; M = .57, SD = .16$; respectively, $F(1, 77) = 3.84, p = .054, \eta^2 = .05$. Including the average Life-Orientation-Test score as a covariate yielded a significant simple main effect between negative and positively framed statements in the condition of distance

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($F(1, 76) = 4.31, p = .041, \eta^2 = .05$), but no changes in the overall pattern of results or the other significance levels reported before.

Discussion

Study 1b sought to replicate Study 1a with a different sample of participants to attest to robustness of the effect. At least for the items employed, we can confidently state that a negativity bias is observed in conditions of low psychological distance, but no bias or even a reversal emerges when psychological distance increases. This is in line with CLT, which holds that positive information may become more influential compared to negative information in conditions of psychological distance. Note that both an attenuation (as in Study 1a) and a reversal (as in Study 1b) are consistent with the theoretical tenet that the relative weighing of positive compared to negative information changes with increases in psychological distance.

At least two important caveats need to be mentioned. First, Study 1a revealed that the negativity bias did not show for some items. This may reflect item specificities, in the sense that the bias works for some items but not for others. At the same time, it should be noted that the bias has proven robust in prior research (Hilbig, 2009, 2012). The second caveat is more fundamental: because we chose to manipulate psychological distance via different items for proximal versus distant countries, it is conceivable that the items differ systematically on dimensions other than psychological distance, and that these differences are responsible for the observed pattern of results. Study 2 is designed to address this concern.

Proposed Study 2 (To be registered)

Studies 1a and 1b provide preliminary evidence for a negativity bias in the conditions of psychological proximity, but an attenuation or reversal in conditions of psychological distance, consistent with the theoretical tenets of Construal Level Theory (Trope & Liberman, 2010). One caveat inherent to both studies is that different items were selected to compute the proximal versus distal veracity index. Study 2 is designed to address this caveat and put the

hypothesized reasoning to a critical test by using the same items for a proximal versus distal experimental condition. In particular, in a first step, five items that showed a robust negativity bias in the condition of psychological proximity in Studies 1a and 1b are selected (Items 11, 12, 13, 14, 15; see Appendix A). In a second step, within each item, Germany is replaced by Ireland. For German participants, items about Germany are psychologically more proximal than items about Ireland. We suggest Ireland because Germany and Ireland are socio-economically similar in many respects, and the same statement content is equally plausible in both countries.

Methods

Participants. The study will be conducted as an online study advertised as a *study on the evaluation of statements* via the platform “Clickworker”. Our a-priori power analysis with the assumption of a medium-effect size, an α -level of .05, and a power of .85, indicated a required sample size of 146 participants (Faul et al., 2009). As prescreening criteria we will require all participants to live in Germany. Participants will receive 0.75 € (approximately 0.75 US\$) as compensation.

Participants who do not give consent will be screened out from the survey. Additionally, eligible participants will be asked to indicate whether they see any reason as to why their data should not be used for statistical analyses at the end of the study. If there are a large number of participants who indicate that they do not want their data used for statistical analyses, we will recollect data to reach our target sample size.

Design. Participants will read five statements that differ in regards to valence (negative versus positive valence). All items have repeatedly shown to produce a negative bias in conditions of psychological proximity. Again, participants’ origin (Germany) will be used to manipulate psychological distance, guided by the notion that for German participants, statements about Germany are psychologically more proximal than items about a different place (e.g., Ireland). In addition to the two design factors we counterbalance across

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participants the positioning of the question labels on the horizontal axis (true left, false right vs. true right, false left). This counterbalancing is not analyzed. Our study therefore builds on a 2 (valence, random assignment) x 2 (distance, random assignment) between subject design. Perceived veracity over five items will serve as the dependent variable.

Materials and Procedure. Materials and Procedure are the same as in the Studies 1a and 1b, except for the fact that the same content will be presented in statements in the proximal and distant condition and only the name of the country varies (Germany vs. Ireland, Items 11, 12, 13, 14, 15; see Appendix A). Different to Studies 1a and 1b, the revised Life-Orientation-Test (Scheier et al., 1994) will not be assessed. We will assess demographic information (gender, age, and language proficiency) as well as how carefully participants completed the questionnaire (1 = *not carefully at all* – 9 = *very carefully*) and if they see any reason as to why we should not use their data. Finally, participants will be thanked for their participation.

Anticipated Analyses and Results

To investigate whether the negativity bias occurred in conditions of psychological proximity, but attenuated or reversed in conditions of psychological distance, we will calculate an ANOVA with valence and distance as independent variables and mean perceived veracity as the dependent variable, and anticipate a significant interaction between valence and distance. Simple main effects in the condition of proximity should indicate a strong negativity bias in conditions of proximity, but an attenuated or reversed bias in conditions of psychological distance.

Discussion

[to be actualized]

General Discussion

[to be actualized]

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Appendices

Appendix A. Overview of items used in Study 1a and 1b (*).

	Negatively framed	Positively framed
	Valence	
1*	In Afghanistan, 15% of all children die before their fifth birthday.	In Afghanistan, 85% of all children live beyond their fifth birthday.
2	40% of fatalities in the Vietnam War were civilians.	60% of fatalities in the Vietnam War were soldiers.
3*	In Japan, 17% of children live below the poverty level.	In Japan, 83% of children live above the poverty level.
4*	In Cameroon, 32% of the population cannot read.	In Cameroon, 68% of the population can read.
5	In Bangladesh, 19% of all children at primary school age do not attend school.	In Bangladesh, 81% of all children at primary school age attend school.
6	In Ghana, 18% of under-5-year-olds are nourished poorly.	In Ghana, 82% of under-5-year-olds are adequately nourished.
7*	In Peru, 17% of the population does not have access to clean drinking water.	In Peru, 83% of the population has access to clean drinking water.
8	In Kenya, 58% of pregnant women do not receive professional obstetrics.	In Kenya, 42% of pregnant women receive professional obstetrics.
9	In the Dominican Republic, 31% of the population does not have access to immunization measures.	In the Dominican Republic, 69% of the population has access to immunization measures.
10*	In Vietnam, 56% of the population has no access to clean sanitation.	In Vietnam, 44% of the population has access to clean sanitation.
11*	In Germany, 30% of all rape cases are never solved.	In Germany, 70% of all rape cases are solved.
12*	In Germany, 20% of all marriages end in divorce within the first 10 years.	In Germany, 80% of all marriages last for more than 10 years.
13*	In Germany, 25% of the elderly suffer from several chronic diseases simultaneously.	In Germany, 75% of the elderly do not suffer from several chronic diseases simultaneously.
14*	23% of first-year students in Germany give up their studies before they receive their final grade.	77% of first-year students in Germany finish their studies.
15*	In Germany, 20% of under-25-year-olds have already used illegal drugs at least once.	In Germany, 80% of under-25-year-olds have never used illegal drugs.
16	In Germany, 18% of under-17-year-olds smoke.	In Germany, 18% of under-17-year-olds do not smoke.
17	In Germany, 70% of all eggs come from chickens in laying batteries.	In Germany, 30% of all eggs come from free range or barn chickens.
18	10% of all Germans suffer from a disability	90% of all Germans do not suffer from a disability.
19	14% of German adolescents have a very xenophobic attitude.	86% of German adolescents are open towards foreigners.
20	In Germany, 10% of all suicide attempts are fatal.	In Germany, 90% of all suicide attempts are not fatal.

Notes: Items 1-10 are psychologically distant (high construal), Items 11-20 are psychologically proximal (low construal)

Appendix B

**MANIPULATING THE ODDS: THE EFFECTS OF MACHIAVELLIANISM AND
CONSTRUAL LEVEL ON CHEATING BEHAVIOR**

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Declaration of interests

Conflicts of interest: none.

Abstract

Individuals strongly differ in values they endorse, and these values might impact individuals' (dis)honest behavior. This project focuses on interindividual differences in Machiavellianism, which is the tendency toward cynicism and manipulateness, and the belief that the end justifies the means. We hypothesized that some situations are more conducive than others for Machiavellian values to translate into behavior. In particular, Construal Level Theory holds that individuals construe social situations on a low-and-concrete level, or a high-and-abstract level, and that values serve as high-level behavioral guides. Against this background, we hypothesized that interindividual differences in Machiavellianism should produce differences in dishonest monetary behavior when situations are construed abstractly. Two studies tested these considerations by means of a subtle, indirect measure of dishonesty. Participants were asked to toss a coin and self-report the toss' outcome. With this measure, an above-chance winning probability indicates dishonesty on the group level. In one condition this self-reported outcome was linked to a bonus payment for the individual. The self-focus that is characteristic for Machiavellianism was here predicted to translate into dishonest (self-serving) behavior. In a second condition, the bonus was linked to a payment for a charity. In this condition, the strength of Machiavellian values may be unrelated to self-reported bonus, or even reversed. Consistent with this interaction hypothesis, in both studies we found that the stronger the Machiavellian personality, the higher the self-reported probability of receiving a bonus – but only in the self-serving condition and when individuals were construing abstractly.

Keywords: Dishonesty; Machiavellianism; Construal Level Theory; Personality Traits & Processes; Micro-Based Behavioral Economics

**Manipulating the Odds: The Effect of Machiavellianism and Construal Level on
Cheating Behavior**

1 Introduction

Dishonest, deceitful, and fraudulent behaviors may cause severe damage on the individual, group, and societal level (Mazar & Ariely, 2006; Rosenbaum, Billinger, & Stieglitz, 2014). In today's world, there is no shortage of political and economic scandals, and many of these are characterized by persons in power abusing their opportunities to benefit themselves or a selective group. A prominent example is the recent "Dieselgate" affair (Matthews & Gandel, 2015), where Volkswagen is accused of having intentionally programmed diesel engines to activate emission controls only during laboratory testing (the diesel engines therefore appear "cleaner" than they actually are), which caused severe financial harm to customers and stakeholders, and negatively affected the environment in an unknown dimension. Dishonesty was also a major concern in the 2016 US election and in the BREXIT campaign, during which terms such as "alternative facts" or "post-truth" emerged and thrived. Given that honesty is one of the cardinal values in our society, this picture is rather puzzling. On one hand, one may conclude that behavior is no longer guided by values such as honesty. On the other hand, it is possible that values are still guiding behavior, but that different, more egoistic values dominate the behavior of powerful politicians and managers. This project touches on both perspectives by suggesting that values may guide behavior under some circumstances more than others, and that dishonest behavior surfaces when egoistic values and beliefs are particularly strong. More specifically, we suggest that a high level of Machiavellianism may result in dishonest behavior—especially when the dishonest behavior is self-serving and when individuals have an abstract representation of the

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situation, which is particularly likely in conditions of power (Magee & Smith, 2013; Smith & Trope, 2006). To delineate this hypothesis, we start our review of the literature by focusing on values.

1.1 Values of virtue and vice that guide behavior

Values are concepts or beliefs; they pertain to desirable behaviors and transcend specific situations. Values guide the selection or evaluation of behaviors (Schwartz, 1992, p. 4), and predict a broad range of meaningful decisions and behaviors (e.g., Bardi & Schwartz, 2003; Sagiv & Schwartz, 2004). One key model regarding values was established by Schwartz (1992), who suggested 10 basic human values: universalism, self-direction, stimulation, hedonism, achievement, power, security, conformity, tradition, and benevolence. Per definition, all values pertain to desirable end states (Schwartz, 1992), but this seems to relate to the desirability for both the individual and for society. These values could therefore be considered as values of virtue. For example, the value of security might be driven by the motivational goal of safety, harmony, and stability or society, of relationships, and of the self (Schwartz, 1992). Security values therefore might result in the pursuit of primarily individual interests (e.g., by staying healthy), but also collective interests (e.g., protecting the national security). This picture differs quite drastically for more “negative” and “dark” values and belief systems, which reflect more egoistic motives individuals might pursue. Individuals, for example, could score high on the personality trait Machiavellianism. Machiavellianism describes a belief system, with the tendency toward cynicism and manipulateness, and the belief that the end justifies the means (Gunnthorsdottir, McCabe, & Smith, 2002). Next to narcissism and psychopathy, Machiavellianism is considered as one of the three personality traits of the dark triad (Paulhus & Williams, 2002). To varying degrees, all three entail a socially malevolent character with behavior tendencies toward self-promotion, emotional

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coldness, duplicity, and aggressiveness (Paulhus & Williams, 2002, p. 57). These values are primarily linked to the pursuit of individual and not collective interests.

1.2 The power of the situation: When do values guide behavior?

Looking at the continuum between values of virtue and vice, it is apparent that individuals can strongly differ in the values and belief systems they endorse. However, depending on the situation, these values are more or less likely to impact their behavior. As an example, values have a stronger impact when individuals actually focus on their standards of behavior. A classical field experiment from social psychology depicts this notion: Beaman, Klentz, Diener, and Svanum (1979) placed a mirror behind a bowl of Halloween candy and asked children to take one piece only. Interestingly, the presence of a mirror led to decreased transgression rates in those children who mentioned their names and addresses before, meaning they were less likely to take more than one piece of candy. The authors argue that the mirror increased individuals' self-awareness, which makes a person more likely to focus on the standards of behavior. This method did not only work for children. Diener and Wallbom (1976) have shown that college students tend to cheat less on an intelligence test when they observe their reflection in a mirror.

Findings such as these attest that situational cues influence whether values impact behavior. To the extent that values are related to virtues, increasing the impact of values on behavior appears highly laudable. However, if values are related to vices, this strategy could also backfire. In particular, if the situational cues increase the salience of "dark" personality traits, individuals might be more likely to manipulate and cheat.

1.3 How does the mindset influence the impact of values on behavior?

Eyal, Sagristano, Trope, Liberman, and Chaiken (2009) showed that values exerted a greater impact on how individuals plan their distant future than their near future. When planning the distant future, values and behavioral intentions correlate

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more strongly, while this relation attenuates when individuals plan for the close future (Eyal et al., 2009). These findings are corroborated by Rixom and Mishra (2014), who showed that participants in an abstract mindset compared to a concrete mindset tend to behave more honestly – except for situations in which dishonesty serves the greater good of another party and therefore other values, such as benevolence, were more salient. In both cases, participants' behavior seemed to be impacted more strongly by their values when they were primed to be in an abstract compared to concrete mindset.

Findings such as these can be explained by Construal Level Theory (Liberman & Trope, 2008; Trope & Liberman, 2003, 2010), which holds that individuals may construe social situations on a high-and-abstract level, or a more low-and-concrete level. Abstract representations contain the gist of situations, meaning superordinate and central information, as well as information on the desirability of the situations. Concrete representations contain more and more details and subordinate information, as well as more information regarding the feasibility of actions in situations. The level of construal again depends on psychological distance. Subjectively distant objects or events are construed more abstractly, and subjectively close objects or events more concretely. In regards to values and belief systems, Construal Level Theory argues that these concepts generally serve as high-level behavioral guides (Trope & Liberman, 2010). Values are abstract and decontextualized by nature and should therefore be more readily applied to and guide intentions for psychologically distant situations (p. 453).

1.4 Dishonesty as a result of an abstract mindset and Machiavellian values

Against this background, we hypothesized that individuals' values impact their behavior particularly in conditions of psychological distance, and that interindividual differences in values channel whether this behavior is honest or dishonest in nature. More specifically, if values such as fairness prevail, individuals should be more likely to

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show honest behavior, particularly when construing abstractly. But this turns when dark traits prevail: then higher levels in Machiavellianism should be more likely to produce dishonest behavior.

We tested this idea in two studies. The first one took an exploratory approach. Here we assessed a variety of personality constructs to measure negatively connoted values. We then analyzed whether these values explain dishonest behavior more in conditions of abstract compared to concrete construal. The second study was of a confirmatory nature. Here, we focused on Machiavellianism and replicated the finding that individual differences in Machiavellianism explain honest versus dishonest behavior under abstract but not under concrete construal level.

2 Study 1

Study 1 tested the notion that negatively connoted values impact behavior particularly in conditions of abstract construal in an exploratory way. To this end, we assessed individuals' Machiavellianism trait scores as well as several other values and beliefs, which have proven to predict a multitude of different behaviors.

We included the 10 basic human values (Schwartz, 1992), given their predominance in the research field. Moreover, we included individuals' belief in a just world, which refers to the need of individuals to believe that their environment is a just and orderly place where people usually get what they deserve (Lerner & Miller, 1978). This belief is associated with reciprocal behavior, and we assumed that it could be related to honest behavior, because strong believers in a just world might fear the negative fate that would befall someone who cheats (Edlund, Sagarin, & Johnson, 2007).

We also included a set of values and personality traits that are more "dark" and potentially linked to more dishonest behavior. Machiavellianism and narcissism are both associated with tendencies towards self-promotion (Paulhus & Williams, 2002).

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Whereas Machiavellianism is described as the belief that the end justifies the means (Gunnthorsdottir et al., 2002), narcissism is associated with facets such as entitlement or dominance (Paulhus & Williams, 2002). The association between both personality traits and dishonest behavior have been investigated, and findings indicate that Machiavellianism could indeed be linked to the propensity to lie in different contexts (Baughman, Jonason, Lyons, & Vernon, 2014).

We also assessed individuals' belief in a competitive-jungle world (Duckitt, Wagner, du Plessis, & Birum, 2002), which was defined as the belief that "the social world is a competitive jungle characterized by a ruthless, amoral struggle for resources and power in which might is right and winning is everything" (p. 78). Some of the items clearly indicate that dishonesty might be an appropriate behavior (such as "You know that most people are out to "screw" you, so you have to get them first when you get the chance"), although this scale is more related to the study of prejudice, ethnocentrism, and intergroup hostility (Duckitt et al., 2002).

Last but not least, we also included the personality trait extraversion as a control variable, which to our knowledge is not associated with dishonest behavior (e.g., Giluk & Postlethwaite, 2015).

To test our hypothesis on whether and when these values would predict dishonest behavior, we relied upon a setting in which dishonest behavior would increase the likelihood of gaining a bonus payment, either for the individual or for a charitable organization.

2.1 Method

2.1.1 Participants and Design. One hundred and sixty male US-American participants were recruited for a “Personality study” via prolific academic¹. One hundred seventy-three participants started the study, but only 164 ($M_{age} = 32.29$ years, $SD = 11.24$) completed it by reporting an outcome regarding the coin toss, which served as our main dependent variable, and were therefore included in the analyses. Because men compared to women have been reported to show higher scores on dark triad values (Jonason, Li, Webster, & Schmitt, 2009), we recruited male participants only. Participants received £1.25 (approximately US\$1.5) as compensation and could gain another £0.5 as a bonus for themselves or charity.

The study used a mixed design with two independent variables that were orthogonally manipulated between participants: Construal Level (abstract vs. concrete) and the recipient (participants vs. a charitable organization) of a small monetary bonus, which could be won at the end of the experiment. Participants were randomly assigned to conditions. Furthermore we assessed individuals’ traits and values (see Materials). As the dependent variable we assessed the likelihood of participants winning a bonus payment of £0.5 (see Materials for the exact setup).

2.1.2 Materials and Procedure.

2.1.2.1 Assessment of participants’ values: Participants first completed several personality and value scales, such as the Twenty Item Values Inventory (Sandy, Gosling, Schwartz, & Koelkebeck, 2017), the Competitive Jungle Social World View Scale (Duckitt et al., 2002), the Narcissistic Personality Inventory (Raskin & Hall, 1981), MACH-IV scale to assess Machiavellianism (Christie & Geis, 1970), the Multidimensional Belief in a Just

¹ Research within the area of Construal Level Theory indicates the occurrence of medium to large effect sizes (classification according to Cohen, 1992). To achieve a power of .80 with an alpha-level of .05, we planned to assess 40 participants for the between subject cells (construal level and bonus recipient), resulting in a total of 160 participants.

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World scale (Lipkus, 1991), as well as a scale to assess Extraversion (John & Srivastava, 1999).

2.1.2.2 Manipulation of Construal Level. Next, participants completed a construal level manipulation. Participants were randomly assigned to a concrete or abstract mindset condition and construal level was manipulated by asking participants to either think about why (abstract level) or how (concrete level) they would try to reach an objective (Freitas, Gollwitzer, & Trope, 2004).

2.1.2.3 Assessment of cheating behavior. Subsequently, participants were introduced to a coin toss, with which we assessed cheating behavior on a group level. As cheating is not a socially desirable behavior, we decided to use a more anonymous and subtle paradigm to detect this behavior. This paradigm was developed from the Randomized Response Technique (Warner, 1965) and has been extensively used in the past to study dishonesty (Abeler, Becker, & Falk, 2014; Bryan, Adams, & Monin, 2013; Schindler & Pfattheicher, 2017). In this paradigm, participants are asked to toss a coin to determine whether or not they would win a bonus payment and in which they self-reported the outcome. Winning the bonus was coded as 1, and not winning the bonus was coded as 0. By this means, cheating cannot be detected on the individual level, as it is impossible for the researchers to know whether an individual actually tossed heads or tails. However, on the group level, a significant deviance from chance (.5) can be interpreted as indication of cheating and dishonesty in this group.

Within this setup we varied whether the bonus could be won for either the participants themselves (self-serving condition) or for a charitable organization (UNICEF; other-serving condition). Moreover, for methodological reasons, we counterbalanced whether the bonus was won for tossing heads or tossing tails.

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After self-reporting the result of the coin toss, participants were thanked and received the code for their compensation.

2.2 Results

In total, 118 out of 164 participants reported winning the bonus payment (72%). A binomial test indicated that this is higher than expected by chance (.50), $p < .001$. Theoretically, with a fair coin, half of the participants should have won the bonus, while the other half should not have won the bonus, so that a significant deviance from chance level is an indication of cheating on the group level. We analyzed the cheating behavior following the guidelines of Moshagen and Hilbig (2017) using the R package RRreg (Heck & Moshagen, 2017). Calculations revealed that within our sample, an estimated 44% of participants were prepared to cheat. Within the abstract construal level condition this number increased to 53%, whereas in the concrete condition it was 35%. In the condition where participants received a bonus, this number increased to 47%, and dropped to 41% when the recipient of the bonus was a charitable organization. The logistic regression analysis nevertheless indicated that neither the effect of condition, nor recipient, or the interaction of the two was significant (all $ps > .750$).

In a next step, we included the different personality and value measures (mean-centered) into the analysis and calculated separate logistic regressions with construal level, bonus recipient (both dummy coded with 0 = abstract construal level / participants as bonus receiver; and 1 = concrete construal level / charity as bonus receiver) and the respective value measures on the likelihood of winning the bonus.

We first started analyzing the impact of the dark triad variables Machiavellianism and narcissism. In accordance with previous research, we found that Machiavellianism significantly predicts cheating behavior, $b = 4.75$, $SE b = 2.84$, *Likelihood Ratio Test* = 7.88, $p = .005$. This effect was qualified by an interaction between bonus recipient

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and Machiavellianism, $b = -6.04$, $SE b = 3.12$, *Likelihood Ratio Test* = 7.33, $p = .007$ and by the predicted three-way interaction between bonus recipient, construal level, and Machiavellianism, $b = 6.39$, $SE b = 3.84$, *Likelihood Ratio Test* = 3.83, $p = .050$. To disentangle the reported three-way interaction, we calculated correlations between Machiavellianism and the probability of winning the bonus for the four conditions of abstract construal level * participant as bonus recipient ($r = .38$, $t(40) = 2.56$, $p = .014$), concrete construal level * participant as bonus recipient ($r = -.01$, $t(35) = -0.04$, $p = .966$), abstract construal level * charity as bonus recipient ($r = -.17$, $t(37) = -1.05$, $p = .302$), concrete construal level * charity as bonus recipient ($r = .03$, $t(44) = 0.21$, $p = .834$). For participants as bonus recipients, higher values on Machiavellianism led to an increasing probability of “winning” the bonus – but more so under abstract and less under concrete construal level. For charity as bonus recipients, the interaction is opposite. Under abstract construal level, higher values on Machiavellianism led to a decreasing probability of “winning” the bonus, while under concrete construal level the relationship appears to be weaker. Nevertheless the two two-way interactions are not significant, $ps > .108$. Figure 1 summarizes the findings.

(Figure 1)

Figure 1. Depiction of the three-way interaction between bonus recipient, construal level and Machiavellianism values (mean centered).

Narcissism, in contrast, was not a significant predictor for dishonest behavior. No main or interaction effects reach significance, all *Likelihood Ratio Tests* < 0.86 , all $ps > .354$ (see Table 1 for the exact inferential statistics for this and all following regression analyses). Going beyond the dark triad, we analyzed the impact of jungle

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world views and, turning more towards the values of virtue, belief in a just world. Both belief systems did not significantly predict dishonest behavior. The same applies for the 10 basic human values of Schwartz.

As predicted, extraversion was not significantly related to dishonest behavior, all *Likelihood Ratio Tests* < 3.46, all *ps* > .062. Table 1 summarizes the results of all analyses conducted².

² Analyses revealed numeric instabilities when estimating the full model for Belief in A Just World, Tradition, Self Direction, Achievement, and Extraversion. We therefore omitted one interaction term (construal level and bonus recipient) that is neither conceptually important nor proved to be empirically relevant in the present study.

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Table 1.

Summary of Study 1 regression analyses results.

Value / Trait	Predictor	<i>b</i>	<i>SE b</i>	<i>Likelihood Ratio Test</i>	<i>p</i>
Narcissistic Personality Inventory	Construal Level	-0.44	0.98	0.22	.636
	Bonus Recipient	0.17	0.80	0.05	.832
	Value / Trait	2.10	2.80	0.58	.445
	Construal Level x Bonus Recipient	-0.59	1.35	-0.06	1.00
Competitive Jungle Social World View	Construal Level x Value / Trait	-3.36	6.18	0.44	.509
	Bonus Recipient x Value / Trait	-2.67	3.85	0.49	.483
	Construal Level x Bonus Recipient x Value / Trait	6.15	7.54	0.85	.355
	Construal Level	-0.58	0.87	0.48	.488
Multidimensional Belief in a Just World	Bonus Recipient	0.12	0.77	0.02	.881
	Value / Trait	0.23	0.34	0.48	.489
	Construal Level x Bonus Recipient	-0.47	1.22	0.15	.703
	Construal Level x Value / Trait	-0.51	0.76	0.47	.494
Conformity (10 basic values)	Bonus Recipient x Value / Trait	-0.57	0.55	1.14	.287
	Construal Level x Bonus Recipient x Value / Trait	0.68	0.95	0.52	.471
	Construal Level	-0.61	0.71	0.72	.397
	Bonus Recipient	0.07	0.77	0.01	.925
Conformity (10 basic values)	Value / Trait	-6.37	4.42	5.78	.016
	Construal Level x Bonus Recipient	-	-	-	-
	Construal Level x Value / Trait	6.61	5.25	5.80	.016
	Bonus Recipient x Value / Trait	6.64	4.56	4.18	.041
Conformity (10 basic values)	Construal Level x Bonus Recipient x Value / Trait	-5.44	5.56	0.83	.364
	Construal Level	-2.15	1.88	2.32	.128
	Bonus Recipient	0.27	0.80	0.12	.733
	Value / Trait	0.43	0.50	0.78	.378
Conformity (10 basic values)	Construal Level x Bonus Recipient	0.04	2.51	0.00	.988
	Construal Level x Value / Trait	2.49	2.24	1.90	.168
	Bonus Recipient x Value / Trait	-1.20	0.72	3.11	.078
	Construal Level x Bonus Recipient x Value / Trait	-2.98	2.63	1.82	.177

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Value / Trait	Predictor	<i>b</i>	<i>SE b</i>	<i>Likelihood Ratio Test</i>	<i>p</i>
Tradition (10 basic values)	Construal Level	-1.73	2.02	2.76	.097
	Bonus Recipient	0.05	0.78	0.00	.946
	Value / Trait	0.49	0.45	1.38	.240
	Construal Level x Bonus Recipient	-	-	-	-
	Construal Level x Value / Trait	0.97	1.97	0.29	.590
Benevolence (10 basic values)	Bonus Recipient x Value / Trait	-0.73	0.70	1.11	.291
	Construal Level x Bonus Recipient x Value / Trait	0.38	1.34	0.08	.776
	Construal Level	-0.50	0.87	0.33	.564
	Bonus Recipient	0.03	0.79	0.00	.974
	Value / Trait	0.72	0.62	1.64	.201
Universalism (10 basic values)	Construal Level x Bonus Recipient	-0.53	1.26	0.18	.673
	Construal Level x Value / Trait	-0.08	0.86	0.01	.922
	Bonus Recipient x Value / Trait	-0.84	0.85	1.05	.306
	Construal Level x Bonus Recipient x Value / Trait	0.54	1.27	0.18	.674
	Construal Level	2.35	2.66	1.02	.312
Self Direction (10 basic values)	Bonus Recipient	2.70	2.83	1.12	.289
	Value / Trait	1.21	0.92	3.14	.076
	Construal Level x Bonus Recipient	-4.27	3.56	1.69	.194
	Construal Level x Value / Trait	-1.28	1.07	2.08	.149
	Bonus Recipient x Value / Trait	-1.20	1.10	1.58	.209
Stimulation (10 basic values)	Construal Level x Bonus Recipient x Value / Trait	1.68	1.35	1.83	.176
	Construal Level	-1.52	1.13	3.71	.054
	Bonus Recipient	-0.57	0.80	0.52	.470
	Value / Trait	1.42	0.91	3.20	.074
	Construal Level x Bonus Recipient	-	-	-	-
Stimulation (10 basic values)	Construal Level x Value / Trait	-0.62	1.35	0.16	.686
	Bonus Recipient x Value / Trait	-1.79	1.11	3.21	.073
	Construal Level x Bonus Recipient x Value / Trait	-1.44	2.55	0.42	.517
	Construal Level	-0.73	1.04	0.61	.436
	Bonus Recipient	0.17	0.79	0.05	.826
Stimulation (10 basic values)	Value / Trait	0.08	0.57	0.02	.889
	Construal Level x Bonus Recipient	-0.50	1.41	0.12	.732
	Construal Level x Value / Trait	0.40	0.97	0.19	.663
	Bonus Recipient x Value / Trait	-0.64	0.77	0.72	.396
	Construal Level x Bonus Recipient x Value / Trait	-0.70	1.27	0.32	.569

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Value / Trait	Predictor	<i>b</i>	<i>SE b</i>	<i>Likelihood Ratio Test</i>	<i>p</i>
Hedonism (10 basic values)	Construal Level	-0.48	0.82	0.36	.550
	Bonus Recipient	0.07	0.76	0.01	.925
	Value / Trait	0.03	0.43	0.00	.950
	Construal Level x Bonus Recipient	-1.07	1.51	0.58	.447
	Construal Level x Value / Trait	0.01	0.73	0.00	.991
Achievement (10 basic values)	Bonus Recipient x Value / Trait	-0.11	0.67	0.03	.874
	Construal Level x Bonus Recipient x Value / Trait	-1.40	1.39	1.17	.279
	Construal Level	-1.26	1.01	2.27	.132
	Bonus Recipient	0.08	0.79	0.01	.920
	Value / Trait	0.83	0.65	2.25	.133
Power (10 basic values)	Construal Level x Bonus Recipient	-	-	-	-
	Construal Level x Value / Trait	-2.65	1.54	4.03	.045
	Bonus Recipient x Value / Trait	-0.37	0.80	0.22	.638
	Construal Level x Bonus Recipient x Value / Trait	1.09	1.57	0.51	.473
	Construal Level	-3.39	4.35	2.02	.155
Security (10 basic values)	Bonus Recipient	0.06	0.76	0.01	.937
	Value / Trait	-0.04	0.48	0.01	.932
	Construal Level x Bonus Recipient	2.00	4.51	0.33	.566
	Construal Level x Value / Trait	2.73	3.04	1.86	.173
	Bonus Recipient x Value / Trait	0.15	0.61	0.06	.813
Extraversion	Construal Level x Bonus Recipient x Value / Trait	-3.73	3.17	3.30	.069
	Construal Level	-0.55	0.85	0.42	.519
	Bonus Recipient	0.23	0.82	0.08	.782
	Value / Trait	0.83	0.65	2.03	.154
	Construal Level x Bonus Recipient	-0.80	1.30	0.39	.531
Extraversion	Construal Level x Value / Trait	-1.22	0.93	1.89	.169
	Bonus Recipient x Value / Trait	-1.74	0.88	4.77	.029
	Construal Level x Bonus Recipient x Value / Trait	1.87	1.44	1.31	.252
	Construal Level	-2.17	2.12	3.45	.063
	Bonus Recipient	-0.32	0.77	0.17	.678
Extraversion	Value / Trait	-0.23	0.55	0.18	.672
	Construal Level x Bonus Recipient	-	-	-	-
	Construal Level x Value / Trait	-1.47	1.89	0.87	.351
	Bonus Recipient x Value / Trait	0.15	0.81	0.03	.858
	Construal Level x Bonus Recipient x Value / Trait	4.68	4.54	2.94	.086

2.3 Discussion

Results from our first exploratory study suggest that higher scores of Machiavellianism lead to an increasing likelihood of winning a bonus. In line with our theorizing, this relation differs depending on participants' construal level and the recipient of the bonus payment. Most importantly, when participants can win a bonus for themselves and construe the task under abstract construal, a significant positive correlation between Machiavellianism scores and winning probability occurs, attesting to increased cheating behavior. But this correlation drops to zero under concrete construal. The relations between Machiavellianism, construal level, bonus recipient, and dishonest behavior are especially interesting as they seem to be unique for this personality trait. Other values of vice such as jungle world view or personality factors that should not influence honest or dishonest behavior were not related to cheating, and this correlation was not influenced by either construal level or bonus recipient. Having said this, the exploratory nature of Study 1 needs to be acknowledged and addressed in Study 2.

3 Study 2

Study 1 provides first support that when individuals construe abstractly, stronger Machiavellian tendencies increase the probability of winning a bonus in self-serving conditions, but to a lesser extent in other-serving conditions. However, this first study was exploratory by nature. Study 2 was therefore conducted to replicate these findings in a confirmatory study, focusing on Machiavellianism and the self-serving bonus condition.

3.1 Method

3.1.1 Participants and Design. Sample size was determined based on the effect size of Study 1, a power of .90, and an alpha-level of .05, resulting in 242 participants.

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Two hundred forty two male US-American participants were recruited for a “Personality study” via prolific academic³. Individuals who had participated in Study 1 were not able to participate. Two hundred forty two participants ($M_{age} = 30.21$ years, $SD = 9.84$) completed the study by self-reporting the coin toss’ outcome, which served as our main dependent variable. Participants received £0.66 (approximately US\$0.66) as compensation and could gain another £0.5 as a bonus for themselves.

The study used a mixed design with Construal Level (abstract vs. concrete, dummy coded with 0 = abstract construal and 1 = concrete construal) as an independent between factor with random assignment. Individuals’ level of Machiavellianism served as a second independent variable. The likelihood of participants winning a bonus of £0.5 for themselves was the dependent variable.

3.1.2 Materials and Procedure. The setup was similar to Study 1 with the following changes. First, all participants could win the bonus payment for themselves. Second, participants completed the MACH-IV scales only.

3.2 Results

In total, 160 out of 242 participants reported winning the bonus payment (66%). A binomial test indicates that this proportion of wins was higher than expected by chance (.50), $p < .001$. We analyzed the cheating behavior by again following the guidelines of Moshagen and Hilbig (2017) using the R package RRreg (Heck & Moshagen, 2017). Calculations revealed that within our sample, an estimated 32% of participants were prepared to cheat. Within the abstract construal condition this number decreased to only 19%, while in the concrete construal condition it was 44%. The logistic regression analysis indicated that construal level was a significant predictor

³ Although the requirements of the study indicated that we were only recruiting male participants, two participants indicated their gender as female. Because it is unclear whether these data points represent true answers or reflect “misclicking,” we decided to retain these “female” data points in the sample.

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for dishonesty ($b = 1.22$, $SE b = 0.66$, *Likelihood Ratio Test* = 4.37, $p = .037$). Concrete construal participants were more likely to act dishonestly than participants in an abstract construal condition. When including Machiavellianism (mean-centered) as a predictor into the model, construal level remains a significant predictor, ($b = 1.55$, $SE b = 1.07$, *Likelihood Ratio Test* = 4.58, $p = .032$). Machiavellianism itself significantly predicted dishonesty, too ($b = 3.63$, $SE b = 2.27$, *Likelihood Ratio Test* = 4.72, $p = .030$). Most importantly, the predicted two-way interaction between the two predictors was significant, $b = -3.91$, $SE b = 2.38$, *Likelihood Ratio Test* = 4.58, $p = .032$ (see Figure 2).

(Figure 2)

Figure 2. Depiction of the two-way interaction between construal level and Machiavellianism values (mean centered).

To disentangle the two-way interaction, we calculated correlations between Machiavellianism and the probability of winning the bonus for the two construal level conditions. In the abstract condition, higher Machiavellianism scores were associated with a higher probability of winning, $r = .17$, $t(117) = 1.86$, $p = .066$, while Machiavellianism was not associated with a higher probability of winning in the concrete construal condition, $r = -.04$, $t(121) = -0.42$, $p = .675$. The significant two-way interaction indicates that these two slopes are different from each other.

3.3 Discussion

The results from Study 2 replicate the findings from Study 1 in a confirmatory setting with a new sample. While stronger Machiavellianism values increased the likelihood for dishonest behavior under abstract construal level, there was no such relation under concrete construal. As predicted by Construal Level Theory, values

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impacted behavior more strongly when construing on a more abstract level – and we show that this also applies to “dark” and negative values.

Interestingly, we observed that cheating was more pronounced in conditions of low level construal. This main effect of construal was neither predicted nor present in Study 1. Since we used the same set-up as in Study 1, and recruited participants from the same population, it appears presently prudent not to speculate about this main effect.

4 General Discussion

In this manuscript we investigated the impact of Machiavellian values on (dis)honest behavior using a coin toss paradigm. Results suggest that Machiavellianism significantly predicts dishonest behavior with higher levels of Machiavellianism being associated with a higher probability of winning a monetary payment. Importantly, this relation is more pronounced in situations where individuals have a more abstract compared to concrete mindset, and when they personally benefit from the dishonest behavior.

These results provide first answers to the puzzling picture of rising dishonesty and manipulateness in our society, as suggested by the examples of the Volkswagen emission scandal and the spreading of alternative facts during the US election and BREXIT campaigns. Our project taps into two different lines of explanations: First, behavior might still be guided by values, but situational aspects influence individuals' mindset or more specifically their construal level and can strengthen or weaken this value-behavior link. Second, as values are still guiding behavior, it is nevertheless important to look at the specific values that might influence the specific behavior in a given situation. It is crucial to determine whether the specific values are values of virtue (such as honesty) or values of vice (such as egoism, or more specifically in regards to the research of this project: Machiavellianism). This manuscript provides evidence that

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Machiavellianism is associated with dishonest behavior, and that stronger levels of endorsement relate to a stronger likelihood of showing dishonest behavior – especially when individuals have an abstract mindset.

Rising levels of dishonesty may be particularly problematic because the protagonists of political and economic scandals are people who are equipped with power. The implicit societal contract with individuals seizing power is that this power comes with a certain level of responsibility. Society expects both managers and politicians to be honest and fair, and actions that transgress these expectations lead to reduced trust. An article by Ezra Dyer from *Popular Mechanics* (2015) summarized the actions of Volkswagen as “outright cynical deceit” and Martin Winterkorn, the then CEO of VW, personally apologized for having “broken the trust of our customers and the public” (Rushe, 2015), showing that more than pure financial harm had been incurred. One could now cynically speculate that people with the urge for power score especially high on values of vice such as Machiavellianism and therefore can be expected to cheat. Alternatively, one might speculate that conditions of power increase the likelihood of Machiavellian values to translate into behavior. Previous research has argued that power increases the psychological distance one feels from others (Magee & Smith, 2013; Smith & Trope, 2006), and this psychological distance then leads to more abstract information processing (Trope & Liberman, 2010). As values impact behavior more when individuals construe in an abstract compared to a more concrete mindset, it is likely that egoistic values translate into egoistic behavior for powerful individuals.

We therefore argue that there is no easy solution to tackle the rise of dishonesty. Making values more salient appears to be an easy fix, and different studies have shown that increasing self-awareness might indeed increase honest behavior (Beaman et al., 1979; Diener, Fraser, Beaman, & Kelem, 1976; Diener & Wallbom, 1976). Nevertheless

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our results suggest that this pathway can be a double-edged sword. Depending on the nature of the values that individuals pursue, strengthening the value-behavior link can lead to both: more honest but also more dishonest behavior.

This warning might sound gloomy, but it also serves as a silver lining: In situations where individuals construe abstractly, for example, in situations where they hold social power over others, values have a stronger impact on behavior. In this project we focused on the downside of this effect, showing that higher levels of Machiavellianism lead to more dishonest behavior. At the same time, values of virtue should similarly exert a stronger impact on behavior – and individuals pursuing values such as honesty should be more likely to show honest behavior and less manipulateness. In support of this reasoning, we find that low levels of Machiavellianism are associated with lower levels of dishonest behavior. Therefore, societies may benefit by putting those in positions of power who are guided more by virtue than by vice.

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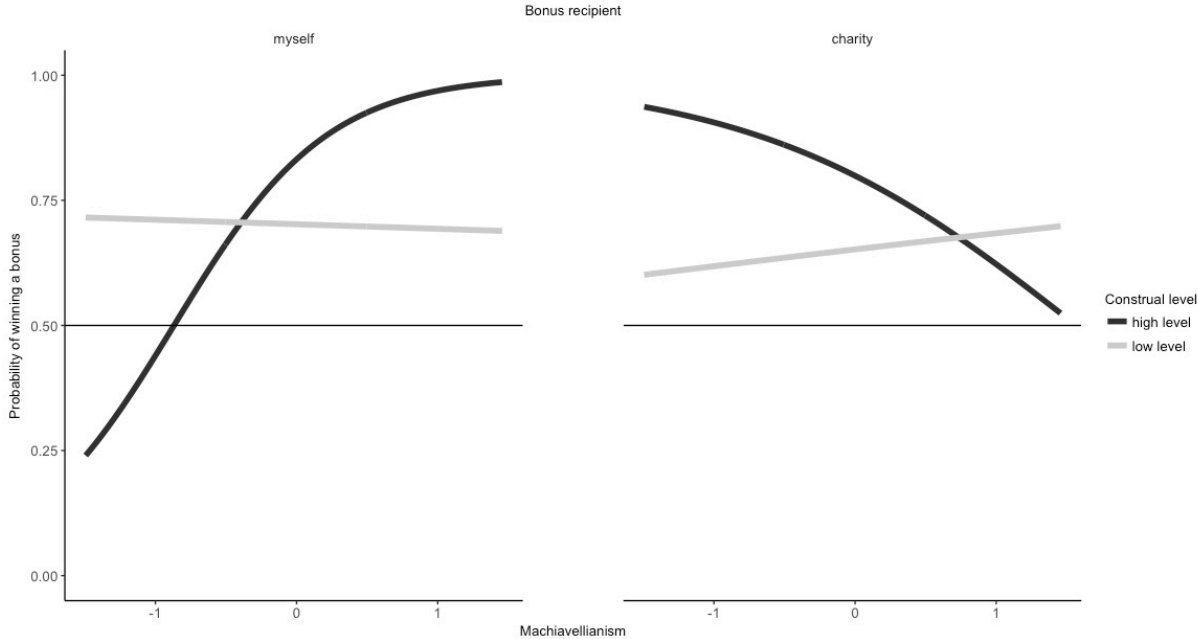
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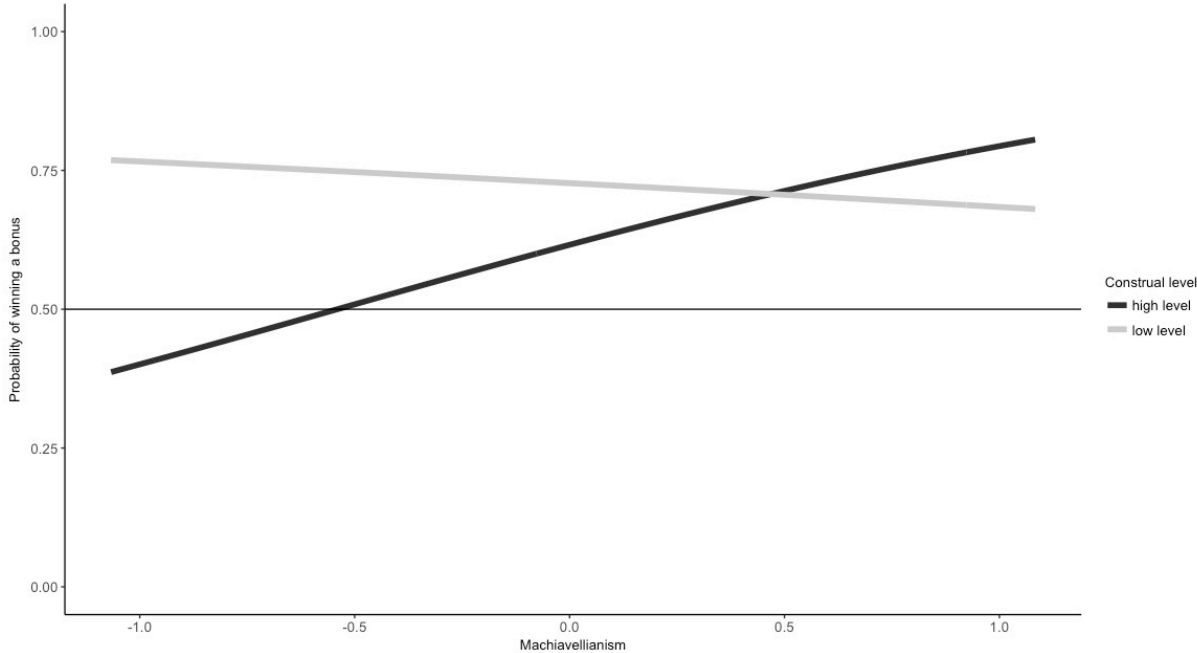
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(Figure 1)



(Figure 2)



Appendix C

CATALYZING DECISIONS

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CONTRIBUTION STATEMENT

In this manuscript we investigate the notion of *catalyzing decision* by using a decision-making aid such as a coin-toss or a die, a *catalyst*. These aids result in random outcomes, which individuals do not necessarily follow. Instead we assume that using a catalyst strengthens feelings (e.g., satisfaction/dissatisfaction, approval/disapproval). In line with previous work on the interplay between feelings and cognitions on subsequent processes, these strengthened feelings can then affect judgment and decision-making processes. Although the body of research on feelings and cognition is greatly impactful, this notion has not been investigated and integrated so far. We aim to tap into this gap with this manuscript.

Our research builds upon previous findings such as the feeling-as-information paradigm (Schwarz 2012) or two-process models of value evaluations (Hsee and Rottenstreich 2004), and goes beyond by investigating the catalyzing phenomenon that seems to be commonly known among individuals. We provide four studies in different consumer settings, using different catalysts, and find support for our hypothesis that using a catalyst strengthens feelings and influences subsequent behavior. We discuss the theoretical implications of these findings for the literature on feelings as well as psychological distance, but also switch to the perspective of individuals and discuss the potential and limits of implementing this strategy in everyday life.

ABSTRACT

When individuals are undecided, they sometimes flip a coin or use other aids that produce random outcomes to support decision-making. Such aids lead to clear results, but interestingly individuals do not necessarily follow the aids' suggestion. Instead when looking at the outcome, individuals appear to like or dislike it, and then decide according to this feeling. Here we argue that a decision aid renders a decision quasi-factual. As a result, feelings are strengthened and their impact on judgments and decisions is increased. We refer to this process as *catalyzing decisions* and to the aid as a *catalyst*. Study 1 provides evidence that using a catalyst leads to stronger feelings. Study 2 replicates this finding using a different catalyst, and rules out alternative explanations. Study 3 shows that a catalyst leads to more affective-driven decisions regarding donation behavior. Study 4 relies on the Iowa Gambling Task, in which reliance on feelings increases performance. Using a catalyst leads to preferring more advantageous decision options after collecting affective learning experiences.

Keywords: social cognition, affect, feelings, preferences, decision-making

CATALYZING DECISIONS

Every day individuals are faced with many decisions. Some are clear-cut, but for others they are torn between options and remain undecided. To support decision-making, individuals sometimes use aids or procedures that produce random outcomes, such as a coin toss or rock-paper-scissors. For instance, Francis Pettygrove and Asa Lovejoy once tossed a one-cent coin to decide on the name of a fledgling site, now called Portland, Oregon. In this case, the coin's outcome determined the decision. Yet, interestingly, individuals don't always end up following the coin's suggestion. For instance, a friend of one of the authors once had to make a difficult career decision between two jobs after graduating from his law studies. He was indecisive between two offers. On the one hand was a very well paid position in a prestigious law firm, which would probably require high commitment and a lot of overtime. On the other hand was a position in a smaller company, which was not as well known and also paid less, but allowed for more flexibility in working hours. Both jobs had distinct advantages and disadvantages, making it difficult to come to a conclusion. The friend drafted lists of pros and cons, thoroughly considered the options, and talked to other people. In the end he tossed a coin. The coin suggested going for the well-paid job with long working hours – but suddenly the friend felt dissatisfied with the outcome and *knew* that he actually didn't want to take that job, and decided to take the other job instead. He suddenly had a feeling regarding the options, and made his own decision based on this feeling. By using the coin, he was no longer undecided.

This example of sudden feelings regarding the decision options as the result of a coin toss is not an isolated case. In a short survey that we conducted via Clickworker, all 31 participants were familiar with flipping a coin to make a decision, and 87% indicated that they themselves

already had applied that strategy. Participants were also familiar with other decision-making aids such as rolling a die or playing rock-paper-scissors. But what happens exactly when individuals use a random decision making aid, such as a coin flip, to finally make a difficult decision? Here we argue that when flipping a coin, a decision becomes quasi-factual, as if decided. As a result, feelings are strengthened and their impact on judgments is increased. We refer to this process as *catalyzing decisions* and to the aid as a *catalyst*. We borrow the term catalyst from natural science, as it is an additional component in the decision-making setting that initiates or accelerates the decision process. Providing initial support to this reasoning, 58% of participants in our short survey indicated that the coin toss elicited a feeling, such as tension or excitement (32%), but they also reported having felt happy or sad (21%) – depending on the outcome of the coin toss. Apparently, flipping a coin may be more than an aid that shoulders the burden of choice, but may strengthen feelings that help individuals to decide where they have previously been undecided.

On the level of psychological processes, we argue that the catalyst renders the decision quasi-factual, that is, as if decided. Out of all possible outcomes, a choice has been made, which is not binding, but nevertheless can feel very real and has come closer. As a result, decision options may be imagined more vividly and with more details, and elicit stronger affective reactions. Consider evidence reported by Williams and Bargh (2008), who observed that closeness leads to stronger affective reactions when reading an embarrassing self-disclosure. Relatedly, Strack, Schwarz, and Gschneidinger (1985) reported that emotional reactions to past events are stronger when these are imagined on a more concrete (how they occurred) compared to an abstract level (why they occurred). Addressing the same notion in a very different context, Bandura (1999) pointed out that individuals distance themselves from atrocities or other actions

with very severe consequences by reducing vividness. Vividness is reduced, for instance, by using euphemisms (such as *collateral damage* to refer to civilians killed during bombing attacks) or dehumanizing measures (such as referring to prisoners by a number instead of their name). If disastrous acts become vivid despite this general tendency, emotional reactions are extremely strong. A particularly powerful real-world illustration of the impact of vividness was the airing on European TV of a picture of a dead refugee child who had been washed ashore close to Bodrum, Turkey in 2015. The picture shows the dead child, still wearing his clothes, lying facedown in the sand. This one incident elicited stronger affective responses than the month-long, but more abstract media coverage of the refugee crisis. Media reports mirrored these strong reactions by asking what should change Europe's attitude to refugees if not this picture (Independent 2015), while the New York Times (2015) argued that the distressing image could "act as a catalyst for the international community to finally halt war in Syria".

Stronger affect, in turn, is likely to be more salient and thus stands a higher chance of influencing judgment and decision-making (Albarracín and Kumkale 2003; Loewenstein and Lerner 2003; Raghuram and Menon 2005). Indeed, a plethora of findings suggests that feelings are used in decision-making, and may even constitute a critical ingredient (Bechara et al. 1997; Clore 1994; Clore, Gasper, and Garvin 2001; Gigerenzer 2007; Kahneman 2011; Schwarz 2012). From a philosophical perspective, it has been argued that feelings are the counterpart to rationality, a conflict between "divinity and animality" (Haidt 2001, 815). The classical view states that feelings are a disruptive factor in making decisions, but more recent works question this view (Loewenstein and Lerner 2003; Pham et al. 2001). Extant research suggests that reliance on feelings (next to thoughts) in judgments and decisions is not a phenomenon confined to very limited circumstances, but rather the automatic default operation of everyday life

(Schwarz and Clore 2007). The feeling-as-information account, for example, suggests that feelings, just like pieces of content information, can be used as information to make decisions (e.g., Pham 2008; Schwarz 1990). For instance, individuals might ask themselves *how-do-I-feel-about-it?* (similar to the situation where one assesses one's own satisfaction with the outcome of the coin toss) and then rely on this feeling to arrive at a decision (I feel so good about the decision object, I seem to like it, Pham 2008).

In support of these conjectures, for instance, Hsee and Rottenstreich (2004) showed that providing more vivid information, such as pictures compared to text, leads to judgments that are more affect-driven. Also Greene et al. (2001) argue that judgments in moral dilemmas differ depending on the potential to engage individuals' emotions. Dilemmas become more emotionally engaging, when being described as more "up close and personal" (S. 2106) and therefore individuals are slower to accept calculating decisions when human lives are at stake. Both empirical contributions thus illustrate that the experience of affect may result in stronger reliance on feelings in judgments and decisions. As further discussed later, this influence is *ex ante* neither good nor bad, and governed by highly flexible and adaptive processes (e.g. Huntsinger, Isbell, and Clore 2014).

To summarize, aids that produce random outcomes may render the decision quasi-factual, that is, as if decided. As a result, feelings are strengthened and their impact on judgments is increased. In other words, a decision has been catalyzed, that is, psychologically initiated or accelerated. Against this background, we hypothesize that participants using a catalyst (catalyst-participants) compared to participants without a catalyst (control-participants) report stronger affective reactions, and that these affective reactions may inform subsequent decisions and

preference judgments. Four studies that use different catalysts and different decision paradigms are reported in support.

STUDY 1

Study 1 investigates whether a catalyst may strengthen feelings, which individuals consciously experience and report. During the study, participants made five decisions and tossed a coin before each. Half of the participants were asked to ignore the outcome (control condition), and half were asked to think of the coin as a decision aid (catalyst condition). We hypothesized that feelings would be strengthened for catalyst-participants. Moreover, we hypothesized that catalyst- compared to control-participants report more disapproval and approval as well as more dissatisfaction and satisfaction with the coin's outcome (depending on whether the coin toss resulted in pointing to an option that felt *bad* versus *good*). Complementing the picture, we further hypothesized that control compared to catalyst-participants would report more indifference regarding the coin's outcome.

Method

Participants. The study was conducted online, advertised as *Visit to a restaurant: Choose your menu* on the platform Clickworker, and took about eight to nine minutes to complete. Assuming a medium effect, and setting alpha to .05 and power to .80, we aimed to recruit 40 participants per cell (Faul et al. 2007). Seventy-eight individuals participated (38

males, 40 females; $M_{age} = 35.76$ years, $SD_{age} = 11.35$). Participants received 0.75€ (approximately US\$0.75) as compensation.

Design. Throughout the study participants chose five courses of a restaurant meal. For each course they were asked to decide between two options. Before making the decision a coin was tossed. As a between factor we either asked participants to use the coin toss as a decision-making aid that randomly suggests an option (catalyst-condition) or we labeled the coin toss as irrelevant and asked participants to ignore it completely (control-condition).

Materials and procedure. Participants gave informed consent, and were first asked to indicate any specific dietary preferences (e.g., being a vegetarian or eating gluten-free). We used this information to tailor the menu options such that all participants could eat what they were offered as choices. Subsequently, participants were introduced to the coin toss, which was integrated into the study as an animated GIF-image of a spinning coin that stopped randomly at either heads or tails. Participants could give the coin toss as many tries as they wanted. This was done to increase their faith in a random process. In the catalyst-condition participants learned that heads meant the coin suggested the option on the left and tails meant the coin suggested the option on the right. In the control-condition, participants were asked not to let the coin distract them from making their decisions.

All participants then proceeded to the decision about their first course. Two options were offered (e.g., tuna carpaccio with fresh horseradish versus quinoa-pesto salad with nut-bread), one on the left and one on the right side of the screen. The coin would then be tossed and either pointed to one option (therefore making a suggestion; catalyst-condition) or appeared in the

middle of the screen (therefore making no suggestion; control-condition). Subsequently, participants were asked to decide by clicking on one of the options. This procedure was repeated for all five courses of the menu.

After choosing the fifth course, participants were asked how much attention they had paid to the outcome of the coin toss (heads or tails) (1 = *not at all*; 7 = *very much*) and how much they had been interested in the outcome of the coin toss (heads or tails) (1 = *not at all*; 7 = *very much*); these items served as manipulation checks. Participants were then asked to which extent they experienced a reaction of (a) indifference, (b) annoyance, (c) disapproval and/or approval to the outcome of the coin toss, (d) dissatisfaction and/or satisfaction as a reaction to the coin tosses (1 = *not at all*; 7 = *very much*). At the end, participants were asked if, immediately after the coin tosses, they had a feeling which option they would (not) prefer (1 = *no feeling at all*; 7 = *very strong feeling*).

Finally, participants were asked to provide demographic information including gender and age, and about the carefulness of completing the questionnaire. Participants were thanked and received their compensation.

Results

To compare answers of participants in the catalyst-condition and control-condition, we calculated t-tests for independent samples. When a significant Levene test indicated that variances were not equal, we report the corrected results.

Manipulation check. Catalyst-participants indicated having paid more attention to the outcomes of the coin toss compared to control-participants, $M_{catalyst} = 3.26$, $SD_{catalyst} = 1.96$, and $M_{control} = 2.05$, $SD_{control} = 1.57$, respectively, $t(72.63) = 3.00$, $p = .004$, $r = 0.33$. Catalyst-participants were also more interested in the coin toss' outcome compared to control-participants, $M_{catalyst} = 2.51$, $SD_{catalyst} = 1.75$, and $M_{control} = 1.79$, $SD_{control} = 1.36$, respectively, $t(71.73) = 2.03$, $p = .046$, $r = 0.23$.

Feelings. In support of our hypotheses, catalyst- compared to control-participants felt more strongly which option they would prefer immediately after the coin tosses, $M_{catalyst} = 3.85$, $SD_{catalyst} = 2.17$, and $M_{control} = 2.10$, $SD_{control} = 1.70$, $t(71.84) = 3.95$, $p < .001$, $r = 0.42$. Moreover, catalyst- compared to control-participants reported stronger feelings of disapproval and/or approval ($M_{catalyst} = 4.08$, $SD_{catalyst} = 1.68$, and $M_{control} = 1.92$, $SD_{control} = 1.38$, $t(76) = 6.19$, $p < .001$, $r = 0.58$) as well as dissatisfaction and/or satisfaction ($M_{catalyst} = 3.49$, $SD_{catalyst} = 1.60$, and $M_{control} = 2.51$, $SD_{control} = 1.55$, $t(76) = 2.73$, $p = .008$, $r = 0.30$).

In contrast, compared to catalyst-participants, control-participants indicated more indifference regarding the coin toss ($M_{catalyst} = 4.51$, $SD_{catalyst} = 1.81$, and $M_{control} = 5.77$, $SD_{control} = 1.74$), $t(76) = -3.13$, $p = .002$, $r = 0.34$. No statistically significant differences occurred regarding annoyance ($M_{catalyst} = 4.13$, $SD_{catalyst} = 1.64$, and $M_{control} = 4.74$, $SD_{control} = 1.96$), $t(76) = -1.51$, $p = .136$, $r = 0.17$.

Additional analyses. To rule out that catalyst-participants simply followed the coin's suggestion when making their choices, we analyzed the occurrence of dependencies between the outcome of the coin toss and the choices made by calculating a χ^2 -Tests for each of the five menu

courses. None of these tests indicates dependencies (all χ^2 s < 1), except for course four, where a slight tendency for choosing the option the coin was not pointing to was observed, $\chi^2(1) = 3.13$, $p = .067$.

Discussion

Study 1 provides first experimental evidence that flipping a coin may strengthen feelings. Specifically, catalyst- compared to control-participants reported stronger immediate feelings of which option they would (not) prefer. Furthermore, catalyst-participants reported stronger feelings of disapproval versus approval and dissatisfaction versus satisfaction concerning the outcome of the coin. Complementarily, control-participants were more indifferent to the outcomes of the coin tosses.

STUDY 2

Study 1 revealed that a decision aid that is used as a catalyst (compared to just being present yet ignored) strengthens feelings. At least two explanations that are different from the suggested process may be advanced. First, it could be argued that control-participants felt discouraged from reporting feelings, because reporting feelings might indicate that they did not properly follow instructions, that is, ignore the coin tosses, as participants were asked to report their feelings as reactions towards the coin toss. To formally address this account, study 2 was designed such that all participants should pay attention to the catalysts. This change also addresses a second alternative account, which holds that control- compared to catalyst-

participants were distracted by the ignoring-task and therefore paid less attention to their feelings.

Compared to study 1, two further changes were introduced: we additionally assessed feelings directly after each decision, and used a different catalyst.

Method

Participants. The study was conducted as an online study and advertised as *Visit to a restaurant: Choose your menu* on the platform Clickworker and took about eight minutes to complete. Taking into account that study 1 revealed small to medium effects, and setting alpha to .05 and power to .80, we aimed to recruit 90 participants (Faul et al. 2007). Eighty-seven individuals participated (47 males, 38 females, 2 no answer; $M_{age} = 35.97$ years, $SD_{age} = 12.39$). Participants received 0.90€ (approximately US\$0.90) as compensation.

Design. As in study 1, participants hypothetically chose five meal courses in a restaurant. For each course they were asked to decide between two options and all participants were always provided with the decision aid. Importantly, we varied the number of times from zero to five that participants received a suggestion from the aid, producing zero to five catalyst- versus control trials. Number of suggestions (zero to five) was treated as between participants factor, and participants were randomly assigned to one of the six factor levels.

Materials and procedure. The study used the same menu options as study 1. Participants received a link to the online study, gave informed consent, and learned from the instructions that

they would be choosing a five-course meal. Participants were then introduced to a die that served as a decision-making aid, which would be rolled before each decision. Crucially, if the die outcome was a one or two, it suggested choosing the left or the right option, respectively, thus serving as a catalyst (catalyst-trial). In contrast, if the die outcome was a three, four, five, or six, the die did not make a suggestion (control-trial). Participants could roll the die for testing as often as they wanted.

Subsequently, participants proceeded to the decision about their first course. Two options were offered, one on the left and the other on the right side of the screen. The die would then be rolled above these options (see appendix A for screenshots) and either indicated a suggestion by appearing above one option (catalyst-trial) or in the middle of the screen below the two options (control-trial). Participants were then asked to make a decision by clicking on one of the options. After making their choices, participants were asked if the die had made a suggestion for one of the menu options (*yes* vs. *no*, as manipulation check). We also asked participants to indicate, which of the following options would best describe their reaction right after the die roll: *satisfaction*, *dissatisfaction*, *indifference*, or *annoyance* (forced-choice item). Finally, we asked if rolling the die elicited an immediate feeling of which option they would prefer or not prefer (1 = *no feeling at all*; 7 = *very strong feeling*). This procedure was repeated for all five courses.

After choosing the final course, participants were prompted for several summary judgments. In particular, we asked how much they were interested in the outcomes of rolling the die (1 = *not at all*; 7 = *very much*) and if the die elicited an immediate feeling of which option they would prefer or not prefer, separately for catalyst-trials and control-trials (1 = *no feeling at all*; 7 = *very strong feeling*). We also asked participants if, while rolling the die, they had wished that it would be pointing to one option over the other (*never to five times*, coded 1 – 6 in the

analysis). At the end of the survey, participants were asked to provide demographic information including gender and age. Participants were thanked and received their payment.

Results

To check whether participants understood the set-up, we analyzed the manipulation check question if participants indicated that the die made a suggestion when it actually pointed to one option over the other. Out of 87 participants, 77 answered these questions correctly for all five trials, eight individuals made one mistake, one participant made two mistakes, and one made four mistakes. We checked whether excluding the participants changed the pattern of the results, which was not the case. We thus report the results for the entire sample.

Strengthening Feelings. Looking at the question of whether rolling the die elicited an immediate feeling of which option participants would (not) prefer, we calculated a mixed model (see Judd, Westfall, and Kenny 2012) with type of trial as independent and strength of an immediate feeling of preference as dependent variable, with trial and participants as random factors. Participants reported having stronger immediate feelings in catalyst- compared to control-trials, $M_{catalyst} = 2.65$, $SD_{catalyst} = 1.82$, and $M_{control} = 1.95$, $SD_{control} = 1.54$, $t(34.91) = 3.20$, $p = .003$.

Frequency of feelings. To analyze whether emotional reactions towards the die outcomes differ depending on catalyst- versus control-trials, we collapsed the results of the five rounds and calculated χ^2 Tests with type of trial as independent and the resulting feeling as dependent

variable. There was a significant association between condition and the reported feeling $\chi^2(3) = 30.17, p < .001$. For catalyst trials, 23.3% of participants indicated a reaction best described as satisfaction, 9.6% as dissatisfaction, 57.1% as indifference, and 10% as annoyance. In contrast, in control-trials, only 6.5% of participants indicated reacting in a way best described as satisfaction, 6.9% as dissatisfaction, but 66.7% indicated indifference and 19.9% annoyance. In catalyst- compared to control-trials, participants were 3.6 times more likely to indicate satisfaction and 1.4 times more likely to report dissatisfaction as the predominant reaction. In control- compared to catalyst-trials, participants were 1.15 times more likely to indicate indifference and 1.96 times more likely to indicate annoyance as best describing the reaction elicited by the outcome of the die roll. Analyzing standardized residuals, we can further conclude that feelings of satisfaction were reported significantly more often in catalyst-trials, and significantly less often in control-trials, than would be expected by chance ($z = 3.2$ and $z = -3.2$, respectively; all other standardized residuals, $zs < |1.91|$).

Frequency of recommendations. To check whether the number of suggestions (zero to five) is associated with the frequency of the specified feelings, we calculated bivariate correlations. Interestingly, the number of recommendations correlated significantly positively with frequency of satisfaction, $r(87) = .26, p = .016$, and significantly negatively with frequency of annoyance, $r(87) = -.26, p = .016$, meaning that the more recommendations the die made, the more feelings of satisfactions and less feelings of annoyance were reported. The remaining correlations were not significant, $rs < |-.13|$.

Summary evaluations after making all decisions. To compare the strength of immediate feelings of (not) preferring an option for catalyst- compared to control-trials (two separate questions), we calculated a paired samples t-test. For catalyst-trials, participants indicated stronger immediate feelings than for control-trials, $M_{catalyst} = 2.32$, $SD_{catalyst} = 1.74$, and $M_{control} = 1.74$, $SD_{control} = 1.40$, respectively, $t(56) = 2.64$, $p = .011$, $r = 0.33$. Furthermore, to check for alternative explanations we analyzed whether participants differed in their interest for the outcome of the die roll, depending on having received more or less suggestions. We calculated a linear regression to predict interest in the outcome of the die roll based on the number of suggestions, which was not significant, $F(1, 86) = 1.38$, $p = .244$.

Discussion

Study 2 was conducted to replicate the findings from study 1 with a different catalyst, a die, to gauge the results' generalizability. Furthermore, study 2 was designed to rule out alternative explanations that questioned the suitability of the control group. This was achieved by providing the decision aid to all participants in all trials, yet varying whether the aid provides a suggestion and thus serves as a catalyst (catalyst-trials) or not (control-trials).

Results of study 2 corroborate the hypotheses, as participants reported stronger feelings in catalyst- compared to control-trials. Moreover, feelings of satisfaction were reported significantly more often in catalyst-trials, and significantly less often in control-trials, than would be expected by chance. Furthermore, the more suggestions participants received the more feelings of satisfaction and less feelings of annoyance were reported.

Interestingly, feelings of dissatisfaction did not significantly vary between catalyst- and control-trials. At first glance, this appears to be in conflict with our hypothesis that when the die points to the option that feels wrong, dissatisfaction arises. However, dissatisfaction may also arise when the aid does not make a suggestion. As a result, dissatisfaction may be present in both catalyst- and control-trials, but for different reasons.

STUDY 3

Studies 1 and 2 show that an aid strengthens feelings when it acts as a catalyst. This occurred for two different aids, a coin and a die, and may therefore attest to generalizability. Building on this evidence, study 3 was designed to take the next step, namely to experimentally demonstrate that decision aids such as tossing a coin or rolling a die may influence decision processes and outcomes. To this end we selected a paradigm introduced by Hsee and Rottenstreich (2004) that allows differentiating whether a decision outcome is reached via rational calculation or affect-based valuation (see also Hsee, Rottenstreich, and Xiao 2005). In particular, when asked how much a specific object is worth, individuals can look at the facts and figures describing the object (a more *rational* approach). But they can also assess their feelings towards it (*How-do-I-feel-about-it?*). To differentiate these two pathways, Hsee and Rottenstreich (2004) asked participants how much they would donate for an endangered animal (e.g., a panda). Taking the rational approach, individuals may look at the quantitative aspect or *scope* and consider how many panda bears they are being asked to donate money for. In this case they determine *value by calculation*, and four pandas should receive a larger donation than one panda. Alternatively, taking the affect-based approach, individuals may consult their feelings

towards the target – how much do they like pandas? Here they determine *value by affect*, and may therefore help irrespective of the number of endangered animals.

Hsee and Rottenstreich (2004) provided participants with either vivid or abstract information about the number of endangered pandas. They observed valuation-by-affect for pictures of pandas (vivid), but valuation-by-calculation when pandas were represented as dots in a table (abstract). Put differently, picture-participants donated a similar amount of money irrespective of the number of endangered animals, whereas dot-participants donated more for four compared to one panda.

Study 3 mimics Hsee and Rottenstreich's (2004) abstract dot-condition to show valuation-by-calculation in the control group. Because catalysts strengthen feelings as shown in studies 1 and 2, we further reasoned that catalyst-participants are likely to show valuation-by-affect even when presented with abstract information. As a result, catalyst-participants should display a lower sensitivity towards numbers (i.e., a smaller difference between donation amounts for one or four animals) compared to the control group, just as Hsee and Rottenstreich's (2004) picture group did.

Method

Participants and design. The study was advertised as a study on *Endangered Animals* on the German online platform Workhub and took about five minutes to complete. Not knowing the effect sizes in this combination of paradigms, we followed study 1 and aimed for 40 participants per cell. Two hundred and twenty six individuals participated (139 male, 84 females, 1 other, 2

no answer; $M_{age} = 32.76$ years, $SD_{age} = 12.17$). Participants received 0.60 € (approximately US\$ 0.60) as compensation.

We used a 3 (condition: catalyst vs. control-wheel vs. standard-control) x 2 (scope: one vs. four endangered animals) x 4 (animals: pandas vs. dolphins vs. elephants vs. polar foxes) mixed design, with the factor animals as repeated measures. The dependent variable was the amount of money donated for the animals. As the outcome in study 3 is a continuous dependent variable and not a binary one as in prior studies, we used a lottery wheel with 51 options (the number referred to possible donations between 0 and 50€) as catalyst.

Materials and procedure. Participants received a link to the online study, gave informed consent, and learned from the instructions that we were interested in donation behavior regarding different animals. Before participants started, catalyst and control-wheel participants learned about a critical ingredient of the study: a lottery wheel. Participants learned that they would be asked to turn the wheel before making a decision. Catalyst-participants were told that the resulting number might elicit a helpful gut feeling. Control-wheel participants were told that they would need to remember the resulting number as we would be asking them about it later on. Standard-control participants did not see a lottery wheel and simply learned that some pages might take some time to load and were asked to be patient (the loading time was fixed to the time that the other groups needed to turn the lottery wheel). All participants were informed that we were interested in their donation behavior and would be asking them how much they would donate for one (four) exemplars of different endangered species.

Subsequently, we asked participants to imagine that a team from the local zoological institute discovered some exemplars of an endangered species in a remote region. Half of the

participants were then offered the possibility to donate for one animal, the other half of participants for four animals. Remodeling Hsee and Rottenstreich's (2004) valuation-by-calculation condition, the number of animals was indicated by either one or four dots in a table. Catalyst and control-wheel-participants then turned the wheel and learned about the outcomes. Catalyst-participants were told that they may use this number as a recommendation and to check their gut feeling. Control-wheel-participants were asked to memorize the number. Standard control-participants simply saw a blank screen for 3 seconds (the time it took the other groups to turn the wheel). All participants then saw the table with the animal type and number of endangered animals again and were asked to indicate how much they would donate on a scale from 0€ to 50€ (in 5€ intervals). Control-wheel-participants were asked to enter the number that they had memorized before in an open text box.

The first scenario contained pandas, the second dolphins, the third elephants, and the fourth polar foxes. At the end of the study, control-wheel-participants learned how many numbers had been memorized correctly, and we asked participants about their demographics (sex, age, German language proficiency, and education). We also asked about actual donation behavior for charity in general and for animals in specific in the last 12 months. Participants were thanked and were offered monetary compensation.

Results

Participants donated between 0 and 50€ for the different animals, with a grand mean of 14.46€ ($SD = 11.65$). To test the hypotheses, we calculated a 3 (condition: catalyst vs. control-wheel vs. standard-control) x 2 (scope: one vs. four animals) x 4 (animals) mixed ANOVA with

condition and scope as between factors and animals as within factor. Donation behavior was the dependent variable. We observed a significant main effect for animals, $F(3, 660) = 2.70$, $p = .045$, $\eta^2 = .012$, indicating that donation behavior differed for different animals. In particular, mean donations for pandas were 14.71€ ($SD = 12.80$), for dolphins 14.94€ ($SD = 12.91$), for elephants 14.67€ ($SD = 12.66$), and for polar foxes 13.52€ ($SD = 12.42$; see appendix B for further details). We also observed a significant main effect for scope, $F(1, 220) = 7.42$, $p = .007$, $\eta^2 = .033$, showing that overall participants donated more for four animals than for one animal.

Crucially, the predicted interaction between condition and scope was observed, $F(2, 220) = 3.33$, $p = .038$, $\eta^2 = .029$, suggesting that the conditions differed in their behavior in regards to scope (see figure 1). Replicating Hsee and Rottenstreich's (2004) valuation-by-calculation results, both control-wheel and standard-control-participants donated more money for four compared to one animal, $F(1, 220) = 10.21$, $p = .002$, $\eta^2 = .044$ and $F(1, 220) = 3.45$, $p = .065$, $\eta^2 = .015$, respectively. In contrast, catalyst-participants were less sensitive to scope, and donated a similar amount of money irrespective of the number of endangered exemplars, $F < 1$. This conceptually mimics Hsee and Rottenstreich's (2004) valuation-by-affect group. All other main or interaction effects were not significant, all $F_s < 2.60$.

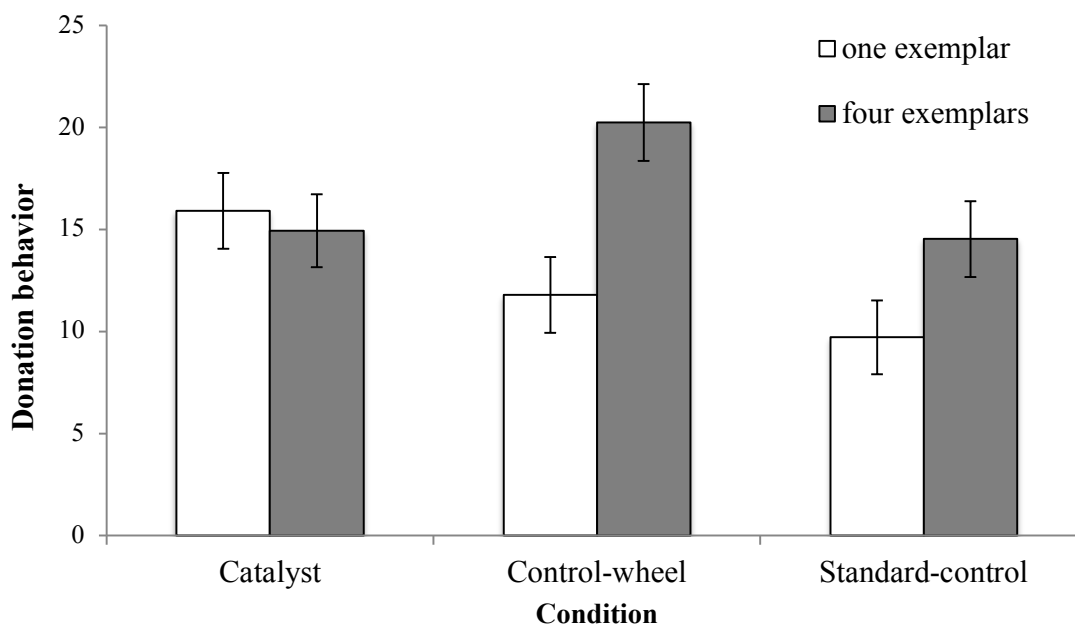


Figure 1. Donation behavior (in €) as a function of condition and scope (error bars reflect standard errors).

Further analyses. For anyone familiar with Tversky and Kahneman's (1974) seminal work on anchoring, lottery wheels may be tightly associated with anchoring effects. As a result, the existence of anchoring effects may appear plausible. We used a two-pronged approach. First, to minimize anchoring effects ex ante, we fixed the outcome of the lottery to a constant equal for catalyst and control-wheel-participants (33 for pandas, 15 for dolphins, 23 for elephants, 29 for polar foxes). Second, we inspected the above-reported ANOVA from an anchoring perspective. Standard-control-participants were not provided with any *anchor* and therefore should differ in their donation behavior from both other groups, if anchoring occurred. We observed a non-significant main effect for condition, $F(2, 220) = 2.60$, $p = .077$, $\eta^2 = .023$. Post-hoc comparisons with Tukey HSD revealed a non-significant difference between the catalyst and standard-control, $p = .161$, and the control-wheel and standard-control, $p = .091$. Hence, by tendency, standard-control-participants donated less money than catalyst and standard-control-participants.

Irrespective of this, however, our main result is that catalyst-participants were not affected by scope, which appears incompatible with an anchoring effect.

Readers may be further interested in the effects of donation behavior habits. To investigate, we included participants' general and animal-specific donation habits as covariates in the above described analysis. We followed the procedure suggested by Muller, Yzerbyt, and Judd (2008) and checked for redundancy between the covariate and the independent variables by calculating the same mixed ANOVA with condition and scope as between factors and animals as within factor, but donation habits in general and specifically for animals as dependent variables (Yzerbyt, Muller, and Judd 2004). The analysis did not yield significant results (all F s < 1.21), indicating no redundancy between the covariate and the independent variables. Therefore we calculated the mixed ANOVA with condition and scope as between factors and animals as within factor, but included reported donation habits in general and specifically for animals as two covariates. All main and interaction effects remained significant and effect sizes were of similar magnitude.

Discussion

Study 3 was designed to demonstrate that individuals relying on catalysts use feelings to determine value. To this end, we relied on Hsee and Rottenstreich's (2004) abstract (dot) condition, in which participants determine value by calculation. Because catalysts strengthen feelings as shown in Studies 1 and 2, we reasoned that catalyst-participants are likely to show valuation-by-affect even in the abstract (dot) condition. As a result, catalyst-participants should display a lower sensitivity towards numbers (i.e., a smaller difference between donation amounts

for one or four animals) compared to control groups. Results are in support, as catalyst-participants donated a similar amount of money irrespective of the number of endangered animals, whereas participants in both control groups were sensitive to scope, that is, donated more money for four compared to one animal. We conclude from these results that catalysts may not only strengthen feelings (Studies 1 and 2), but that these feelings may influence decision-making. Note that study 3 used yet a different decision aid—the lottery wheel—which again speaks for generalizability beyond the here employed methods.

STUDY 4

Study 3 suggests that using a catalyst may result in more affect-driven decision-making. In Hsee and Rottenstreich's (2004) paradigm, reliance on affect is neither good nor bad. In fact, one could even argue that affect-driven decisions are less precise, as the information regarding number of endangered animals (scope) is not taken into account. In this situation, if one deemed scope an important variable, using a catalyst results in worse decisions. Yet, reliance on affect can result in both worse and better decisions, depending on the relation between the felt input and the decision target (Schwarz and Clore 2007). To investigate whether catalysts may not only affect but in some conditions even *improve* decision making, we selected a task in which reliance on feelings is said to increase the likelihood of beneficial decisions: the Iowa Gambling Task (IGT; Bechara et al. 1997; but for a different perspective see Maia and McClelland 2004).

The IGT works as follows: IGT-participants draw 100 cards from four decks labeled A, B, C, and D. Each card carries a gain: 100 USD for decks A and B; 50 USD for decks C and D. Some cards also carry losses: For decks A and B, these losses are so high that they, in the long

run, outbalance the gains, resulting in net losses (A and B are therefore *bad* decks); in contrast, for decks C and D, the cumulated losses are lower than the cumulated gains, so that drawing cards from decks C and D leads to positive nets (*good* decks). Participants are not informed about these contingencies before the game, but are assumed to learn these while sampling from the four decks and looking at the feedback resulting from the choices they make.

One IGT finding of particular interest here is that, on average, healthy participants decide advantageously after about 50 to 80 trials. Interestingly, they do so without being able to consciously explain why C and D are the better options, that is, they “decide advantageously before knowing the advantageous strategy” (Bechara et al. 1997). In particular, participants start to select more cards from the good decks around trials 20 (Bechara et al. 1994), but more pronouncedly make beneficial decisions from trials 50 onwards as they begin to express a *hunch* about the nature of the decks (Bechara et al. 1997). Presumably, this is because, between 10 and 50 trials, feelings regarding the different decks develop, which then guide decisions before participants have a conscious understanding of the underlying contingencies. Apparently then, there is a window between about 20 to 50 decisions, in which healthy participants begin to generate feelings towards the risky choices before knowing what the risky choices are. If a catalyst strengthens feelings, its impact should be particularly apparent in this so-called pre-hunch period.

Against this background, we hypothesize that if a decision catalyst strengthens feelings, participants in the catalyst condition should show advantageous preferences at an earlier point in time compared to control-participants. Study 4 was designed to test this hypothesis. Notably, we stopped the IGT after 40 rounds (i.e., within the pre-hunch period), and asked for preference judgments after blocks of ten rounds to investigate changes over time.

Method

Participants and design. The study was conducted as an online study and advertised as *Investment game* on the German platform Workhub and took about eleven minutes to complete. Since the IGT has been subject to criticism (e.g. Maia and McClelland 2004), and since effect sizes in online studies are difficult to predict ex ante, we aimed for high power and recruited 308 individuals (188 males, 114 females, 6 no answer; $M_{age} = 30.66$ years, $SD_{age} = 10.94$). Participants received 2€ (approximately US\$2) as compensation.

Design. We used an adaptation of the original IGT: a stock-market investment scenario created by Bollon and Bagneux (2013). Instead of using different decks of cards, the authors designed the study with four different companies, and participants could invest in these companies by buying stocks. Investing in a company corresponds to drawing a card, as in each round participants need to choose one company to invest in and then learn about the payoff (see Bagneux et al. 2013; Bollon and Bagneux 2013).

Participants played the investment game for 40 rounds. In each round they were asked to choose one out of four companies, BUC, JOR, NEP, and KAM, that they wanted to invest in. Companies BUC and JOR (decks A and B in the original IGT) were associated with high gains but also high losses and on average resulted in net losses. Companies NEP and KAM (decks C and D in the original IGT) were associated with smaller gains, but also smaller losses, and on average resulted in net gains. After every ten rounds, participants were asked about their preference between two companies each, first between company BUC and NEP (decks A and C)

and then between JOR and KAM (decks B and D). This pairing made sure that participants always had to make a preference judgment between one good and one bad company and that the frequency of losses was stable within a single decision (BUC and NEP are both associated with frequent losses and JOR and KAM with infrequent losses). This choice was informed by a literature review pointing out that instead of preferring good to bad options, participants prefer infrequent losses over frequent losses (Steingroever et al. 2013). The type of judgment was coded as factor judgment type (pair one: BUC-NEP and pair two: JOR-KAM). As the game was played over 40 rounds, participants made four preference judgments: after 10, 20, 30, and 40 rounds. This factor was coded as block (one to four).

We therefore used a 2 (condition: catalyst vs. control) x 2 (judgment type: pair one vs. pair two) x 4 (block one to four) mixed design, with judgment type and block as repeated measures. The dependent variable was preference for the good versus bad company. For exploratory analysis we also assessed judgment certainty and ease of judgment making. Although we were mainly interested in participants' preferences after the different experimental block, we also analyzed their choice behavior on a trial-by-trial basis. However, because the coin was tossed only after each block of ten trials, investigating the effect of a catalyst on trial-by-trial decision-making is not possible here.

Materials and procedure. Participants gave informed consent and learned from the instructions that they would be playing an investment game and would be asked to make investment choices over a course of time. The investment game was adapted from Bollon and Bagneux (2013). Each month (or trial) participants would be asked to choose from four

companies, BUC, JOR, NEP and KAM. Depending on market trends, the stock rates could rise and would result in winning money or could fall and would result in the loss of money.

Participants were given a virtual starting capital of 2000€. Furthermore, they learned that in between the investment game trials, they would be asked about their preferences for the different companies and that the game would continue afterwards. Participants were asked to collect sufficient information on all companies and to make their preference judgments as quickly as possible. As a result, they should sample from all decks throughout the 40 rounds.

Catalyst-participants then learned about an important ingredient in the study: a coin toss. Before each of the preference judgment, catalyst-participants would be asked to toss a coin, look at the outcome and assess their feelings towards the outcome. After that they would be asked to make their own judgment, which didn't need to adhere to the coin's suggestion. We used a computer simulated coin toss. Before starting the investment game, catalyst-participants were allowed to give the coin toss a try as often as they wanted. They were then informed about the meaning of the outcome of the coin toss - that heads would result in a suggestion of the right decision option, and tails of the left option, or vice versa.

All participants then started the investment game and received feedback on their choices after every trial. After 10 rounds the investment game was paused. Catalyst-participants were then prompted to toss the coin, look at the outcome, and asked whether the outcome elicited a negative or positive feeling (1 = *negative*; 7 = *positive*). All participants were asked about their preferences – first for pair one and then for pair two. Moreover, all participants were asked how uncertain or certain they felt regarding their preference judgment (1 = *very uncertain*; 7 = *very certain*) and how difficult it was to make the preference judgment (1 = *very difficult*; 7 = *very easy*). Participants then continued with the investment game, and the above procedure was

repeated after trials 20, 30 and 40. To ensure that the first coin toss would result in the same suggestion for all participants, we fixed the outcome to the worse option. The outcomes of the remaining seven coin tosses were drawn randomly.

At the end of the study, participants were asked about demographic information including gender and age. Furthermore, we asked about their knowledge regarding stock trading (1 = *no knowledge at all*; 7 = *a lot of knowledge*). Participants were thanked and received their compensation.

Results

Of our 308 participants only 9 indicated having a good knowledge of stocks (scale points of 6 and higher). On average participants indicated having only little to moderate knowledge in regard to investments, $M = 2.55$, $SD = 1.50$.

To assess preference in the investment game, we coded the preference for the better companies (NEP and KAM) as 1 and the preference for the worse companies (BUC and JOR) as -1. Preferences varied over all four blocks, after 10 trials: $M = -.10$, $SD = .73$; after 20 trials: $M = .00$, $SD = .72$; after 30 trials $M = -.02$, $SD = .75$; after 40 trials $M = .05$, $SD = .79$.

To test the hypotheses, we calculated a 2 (condition: catalyst vs. control) x 2 (judgment type: pair one vs. pair two) x 4 (block one to four) mixed ANOVA with condition as between factor and judgment type and block as within factors. Preference was the dependent variable. We selected a mixed ANOVA despite the fact that the dependent variable is dichotomous, since the mixed ANOVA allows for parsimoniously testing a repeated design and is known to be robust against violations of its assumptions (Ito 1980; Wilcox 1993). To correct for sphericity for

within factors in our data, we report the Huynh-Feldt estimate in the following section. Results reveal a significant main effect for block, $F(2.87, 918) = 3.33, p = .021, \eta^2 = .011$, as preference differed across the different blocks in the investment games. Importantly, this main effect was qualified by the predicted interaction between block and condition, $F(3, 918) = 3.19, p = .023, \eta^2 = .010$. The interaction pattern, see figure 2, displays that while the control-participants' preference remains at chance level, catalyst-participants show a change and prefer the objectively better companies more often at the end of the investment game. Simple effects analyses are in support, as after 40 trials preferences significantly differ between catalyst and control-participants, $F(1, 306) = 6.27, p = .013, \eta^2 = .020$. All other main effects and interaction effects are not significant, all F s < 1.68.

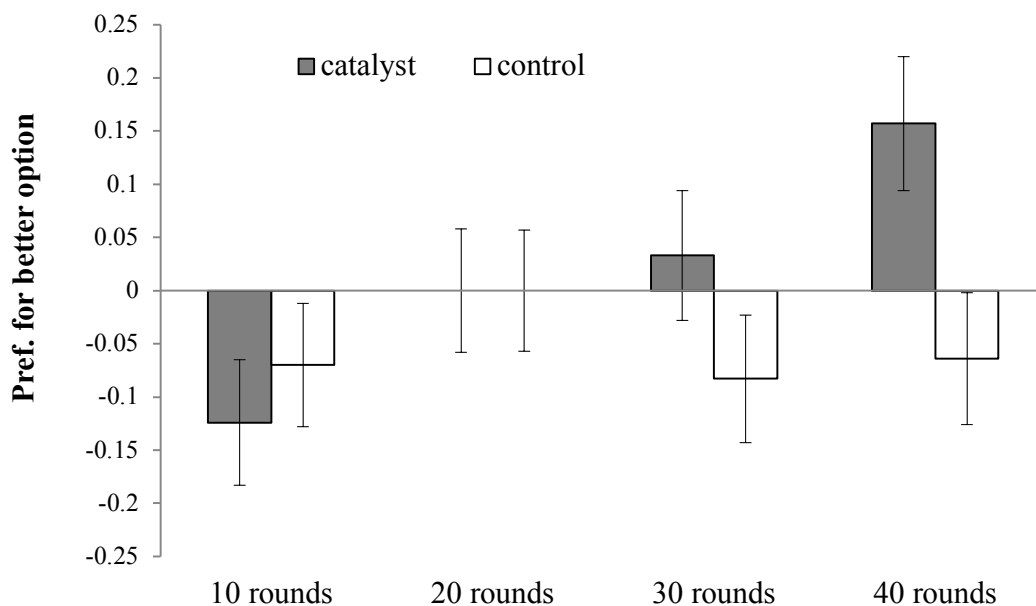


Figure 2. Preference for the better companies as a function of condition and decision number (error bars reflect standard errors).

Additional analysis. Alternatively to our prediction, one could also ask if catalyst-participants simply preferred the option that the coin was pointing to, as an anchoring effect might have occurred (Tversky and Kahneman 1974). To rule out this possibility we calculated a new variable called coin validity, which was set to 1, if the coin pointed to the worse option, and 2, if the coin pointed to the better option. We then calculated a t-test for the different judgments with preference as dependent variable. Results were significant only for pair two after 10 trials, $t(150) = -2.27, p = .024$, indicating a tendency for participants to prefer the better option more often, if the coin pointed to it. All other t-tests did not indicate any significant results (all t s $< |1.16|$), therefore we conclude that anchoring is not a sufficient explanation for the obtained effects.

Certainty and ease of judgment. We also tested, in an exploratory fashion, if using a catalyst not only affects preference judgments but also perceived certainty and ease of judgment formation. Both evaluations could also be seen as feelings (certainty and ease) that might be strengthened by using a catalyst. To investigate this idea we tested whether conditions differed regarding judgment certainty and found a significant main effect for condition, $F(1, 306) = 9.00, p = .003, \eta^2 = .029$: Catalyst-participants felt more certain in regards to their judgments compared to control-participants ($M = 4.94$ and $M = 4.54$, respectively; see table 1 for more details).

Table 1

Means and standard deviations of judgment certainty and ease of judgment, separately for condition, judgment type, and block.

	Pair one				Pair two			
	Catalyst		Control		Catalyst		Control	
Judgment certainty								
Block	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
1	4.80	1.49	4.06	1.81	4.72	1.61	4.26	1.84
2	4.95	1.59	4.60	1.81	5.05	1.55	4.80	1.76
3	4.99	1.54	4.53	1.79	5.13	1.55	4.79	1.63
4	4.88	1.54	4.44	1.71	5.01	1.54	4.82	1.73
Ease of judgment								
1	4.72	1.56	4.22	1.76	4.66	1.66	4.26	1.83
2	4.79	1.51	4.54	1.75	4.85	1.59	4.78	1.70
3	4.84	1.58	4.50	1.73	5.01	1.60	4.61	1.66
4	4.71	1.58	4.28	1.69	5.00	1.57	4.65	1.71

Similarly we found a significant main effect for condition on perceived ease, $F(1, 306) = 6.37, p = .012, \eta^2 = .020$, showing that catalyst-participants felt the judgments were easier to make compared to the control group (see table 1 for more details).

Sampling behavior. To analyze the variability in sampling (selecting the different companies), we calculated the mean proportion of choices in percent from the good and the bad companies overall. When comparing catalyst and control-participants regarding mean

proportions for good and bad companies, we did not find any differences: on average, catalyst-participants chose to invest in good companies in 45.21% of trials ($SD = 18.40$) and control-participants in 44.12 % of trials ($SD = 19.12$), $t(306) < 1$. Perhaps this reflects that participants were instructed to sample from the companies such that they could draw well-informed preference judgments. Note that the trial-by-trial sampling decisions were not preceded by coin tosses, so that no differences as a function of the catalyst were hypothesized. Interestingly, the fact that sampling was similar across conditions rules out the potential alternative explanation that differential conceptual knowledge played an active role.

Discussion

Study 4 indicates that using a catalyst can result in more advantageous decision preferences. In particular, after 40 IGT rounds, catalyst-participants showed a stronger preference for good companies compared to control-participants. Next to this stronger preference after the end of the game, catalyst-participants were also more certain with regard to their decision and found them to be easier to make. One way to look at this is that certainty and ease are also feelings, which might be strengthened by using the decision aid as a catalyst. Yet, in this case, both feelings of certainty and uncertainty should be stronger and cancel each other out when results are analyzed on the aggregate level, which is not compatible with the here observed main effect in the catalyst-condition. We therefore prefer a second perspective: As participants feel what they prefer and can make decisions based on their feelings, this increases certainty and perceived ease.

Catalyst-participants' stronger preference for the good companies occurred in the course of the pre-hunch period (Bechara et al. 1997), where feelings towards the different options, but not declarative knowledge about the game's logic, should have developed. In support of this reasoning, control-participants had not developed a preference for the better companies. This pattern cannot be explained by different experiences or knowledge throughout the game, as sampling behavior did not differ between catalyst and control-participants across the four blocks.

It should be mentioned that the role of feelings in the IGT has been debated. Maia and McClelland (2004), for instance, suggest that the somatic marker hypothesis might not suffice to explain the obtained results and assume that the IGT promotes explicit reasoning. They provide support that participants have more knowledge about the game than implied by Bechara et al. (1997). On the other hand, based on a review of the literature, Turnbull, Bowmann, Shanker, and Davies (2014) suggest that knowledge (or *conscious awareness*) is readily achieved, but in form of an unfocused emotion-based *gut-feeling*. It thus seems that even if knowledge is accrued, feelings still seem to be an important factor in advantageous IGT decisions.

Summing up, study 4 suggests that catalysts may not only increase reliance on affect in decision preferences, but also may prove advantageous. Notably, this should only be the case in circumstances where feelings are a valid input, as further discussed below.

GENERAL DISCUSSION

The present research's objective was to investigate how commonly used decision-making aids with random outcomes, such as a coin-toss or a die, may influence decision-making. Such aids lead to clear results, but interestingly individuals do not necessarily follow the aids'

suggestion. Instead, individuals report experiencing a feeling in reaction to the aid's suggestion, and then make their own decision. Putting this anecdotal evidence to test, we here propose that decision aids function as catalysts, which render the decision quasi-factual, that is, as if decided. Out of all possible outcomes, a choice has been made, which is not binding, but nevertheless can feel very real. As a result, decision options may be imagined more vividly and with more details, and elicit stronger affective reactions, that impact subsequent decision processes.

Four studies were designed to test the notion of catalyzing decisions. Study 1 provides first experimental evidence that flipping a coin may strengthen feelings. Specifically, catalyst-compared to control-participants reported stronger immediate feelings of which option they would (not) prefer. Study 2 replicates study 1 with a different catalyst, and furthermore rules out alternative explanations with regard to the control group. Study 3 demonstrates that individuals relying on catalysts use feelings to determine value. In particular, adapting a paradigm introduced by Hsee and Rottenstreich (2004), we observed that control-participants are sensitive to numeric scope—donating more money for a higher number of endangered animals, presumably because they derive value by calculation—, whereas catalyst-participants were scope-insensitive—donating a similar amount of money irrespective of the number of endangered animals, presumably because they derive value from affect. Finally, study 4 indicates that using a catalyst does not only increase the reliance on affect, but can result in preferences for objectively more advantageous decision options. In particular, using a stock-market variant of the Iowa Gambling Task (Bollon and Bagneux 2013), catalyst-compared to control-participants developed a stronger preference for the good companies (decks). Next to this stronger preference, catalyst-participants were also more certain with regard to their judgments and found them to be easier to make.

All in all, four studies show that relying on decision aids may strengthen feelings, which may then influence subsequent decision processes and outcomes. The four studies used different decision aids and relied on various methodological paradigms, with the aim of attesting to the results' generalizability.

Becoming quasi-factual

The present notion of catalyzing decisions receives conceptual support from a variety of existing studies. We assume that when using a catalyst (e.g., a coin toss), the decision becomes quasi-factual, as if decided, as the coin toss points to one option over the other. Quasi-factual may alternatively be referred to as less hypothetical. According to Construal Level Theory, hypotheticality is one dimension of psychological distance (Trope and Liberman 2010). Several lines of research suggest that when psychological distance is reduced, feelings towards decision options are strengthened. For instance, Williams and Bargh (2008) observed that individuals primed with proximity compared to distance were more affectively moved when reading an embarrassing self-disclosure. Other studies have shown that psychological distance affects the importance of feelings in a decision process. In a study by Freitas, Salovey, and Liberman (2001), participants were more likely to prefer a positive but not diagnostic assessment compared to a negative, diagnostic one when it was expected in the close future. Feeling good, by being able to avoid negative social comparisons or thinking about one's own liabilities, was prioritized over superordinate concerns of self-improvement (see also Liberman and Trope 2008).

The aim of this paper was to investigate how spontaneous affective reactions in response to a catalyst may affect decision processes and outcomes. This does not, however, exclude the

possibility that catalysts may trigger more deliberative cognitive processes. According to Construal Level Theory (Trope and Liberman 2010), reduced distance is associated with lower levels of cognitive construal, that is, with less abstract and more concrete mental representations (Liberman and Trope 1998; Trope and Liberman 2003). When construing at a low level, individuals assign more weight to details, to subordinate information, to cons, and considerations about feasibility (Trope and Liberman 2010). Since using the catalyst can be seen as bringing decision objects closer, one could argue that individuals should construe on lower levels, which may result, for instance, in the consideration of more details or giving more weight to cons. For instance, in study 4, one could argue that catalyst participants construed the different companies on lower levels and therefore integrated both positive and negative information into their preference judgments. At the same time, the observation that catalyst-participants considered less information in study 3 is not easily compatible with a cognitive framing. On a speculative note, we suggest that both affective and cognitive processes may be triggered by the catalyst. Future research may fruitfully address the cognitive aspects, and also investigate to which extent implications of affective and cognitive processes align or diverge.

Broader implications: when to use a catalyst?

Helping individuals to make difficult decisions, especially when they are undecided, may prove beneficial both on the individual and on the societal level. For instance, signing up for insurance or choosing a financial savings plan for retirement are important decisions that are difficult to make and individuals might postpone making them as long as possible. The Annual Report of the Social and Behavioral Sciences Team (Executive Office of the President, National

Science and Technology Council) points out that federal policies support the goal of retiring with financial security by encouraging private savings, protecting workplace pensions, and providing Social Security retirement benefits. Nevertheless, data suggests that making the decision is difficult: only 42 percent of active duty service members make the decision to participate in the Thrift Savings Plan (TSP). This number is especially interesting when comparing it to the number of Civilian Federal employees, who are automatically enrolled and have to opt out if they do not want to participate, where 87% participate (National Science and Technology Council 2015). Not making the decision results in a reduced amount of savings for the individuals, as interests and compound interests are forfeited, and higher risks for society, as the public may need to cover for gaps in individual saving plans. Moreover, not making the decision may produce a very aversive and unpleasant state. If using a catalyst enables individuals to make difficult decisions where they were undecided before and would have postponed making a choice, they and society may benefit on the levels of finance and well-being.

Nonetheless, the specific circumstances under which the use of a catalyst can be beneficial need to be further researched. We assume that using a catalyst strengthens feelings, and others have suggested that relying on feelings can influence and even improve decision-making (Gigerenzer 2007). However, it is important to note that feelings can serve as a basis of accurate as well as mistaken inferences, depending on the relationship between feelings and the target (Schwarz and Clore 2007). Feelings may prove beneficial, for instance, when sufficient background knowledge is possessed, in that individuals who trust their feelings can predict outcomes of future events better than individuals with lower trust in feelings (Pham, Lee, and Stephen 2012). Relatedly, in the IGT, feelings as somatic markers are assumed to provide valid

decision input about which decks are to be avoided (Bechara et al. 1997). In sum, if decision quality benefits from including feelings, using a catalyst can be advantageous.

Interestingly, above, we have discussed the benefits of using a catalyst in terms of decision accuracy. But it would seem that there are other ways of being beneficial, too, as study 4 suggests. In particular, the exploratory analyses in study 4 revealed that catalyst-participants do not only prefer the objectively better companies/decks, but are also *more certain* about their judgments and found them *easier* to make. It seems that as participants feel what they prefer and can make decisions based on their feelings, this increases certainty and perceived ease. Reversely, post-decisional regret and dissonance may be decreased. However, in the case where considering feelings lead to less accurate decisions (see above), increased certainty and ease, and less regret and dissonance, could prove treacherous. However, it is not always normatively obvious what the better decision or judgment is. Consider opting for a healthy diet and therefore giving up on yummy but unhealthy food choices. Is it better to increase the probability for a longer life, or to enjoy life as much as one can today? This example illustrates that with respect to accuracy, the normative better option is not always obvious, given that the future is uncertain. The psychological benefit of not being doubtful or unsatisfied, however, persists even in decisions such as these. Speculating further, decision certainty or ease could even constitute one reason as to why individuals use a decision-making aid with a random outcome in the first place: although they do not know if their decision benefits from using a catalyst, considering their feelings may ease the decision process and increase certainty in regard to the outcome.

APPENDICES

Appendix A: Screenshots of setup in study 2.

Der Würfel wird nun geworfen ...



"1" empfiehlt Option A:

Karotten-Ingwer-
Suppe mit
Grünerntaschen

"2" empfiehlt Option B:

Schwarzwurzel-
cremesuppe mit
Nusskrokant

Der Computer hat nun für Sie den Würfel geworfen. **Das Ergebnis des Würfelwurfs ist EINS.**



Option A:

Karotten-Ingwer-
Suppe mit
Grünerntaschen

Option B:

Schwarzwurzel-
cremesuppe mit
Nusskrokant

Bitte klicken Sie auf "Weiter".

Appendix B: Descriptive statistics from study 3.

Means and standard deviations of donation behavior (in €), separately for condition, scope and animals.

Animals	Scope	Catalyst		Control-wheel		Standard-control	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Panda	1	17.16	15.12	12.16	12.45	9.615	9.28
	4	14.88	10.41	20.56	14.58	14.32	12.26
Dolphin	1	16.35	13.26	13.24	13.65	9.74	10.82
	4	14.88	10.77	19.72	13.25	16.08	14.20
Elephant	1	15.27	11.72	11.62	11.37	11.54	12.52
	4	15.00	11.04	20.56	13.46	14.32	14.35
Polar fox	1	14.87	12.61	10.14	11.58	7.95	7.84
	4	15.00	11.15	20.14	13.23	13.38	14.38

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