

**Looking at the World from a Distance: Construal Level in Time Predictions and  
Counterfactual Thinking**

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## Summary

The main purpose of present thesis is to examine the role of psychological distance in two distinct types of predictions. First, the effects of distance on predictions of task duration are investigated. Second, we examine how people predict the consequences of real versus “more distant” counterfactual events. In the three papers that make up the thesis, construal level theory (CLT) was adopted as the main theoretical framework.

CLT states that as people mentally transcend the experienced self in terms of time, space, social distance, or hypotheticality, they increasingly rely on abstract high level construals over concrete low level construals to form mental representations. A wealth of research has demonstrated that this shift in construal level affects judgments in a variety of domains.

In Papers 1 and 2, the relation between distance/construal level and performance time estimates is investigated. With construal level manipulated by means of temporal distance to the task, degree of hypotheticality, and construal level priming, it is shown that abstraction causes task duration estimates to increase. As an explanation of this effect, the notion of *time contraction* is introduced as the mediating mechanism. Specifically, it is suggested that time units appear shorter as people move up in construal level so that more time units are needed to cover the same amount of work. Direct support for the operation of this mechanism was obtained in Paper 1.

The finding that temporally distant tasks were perceived as more time consuming than more imminent tasks stands in stark contrast to past research on future optimism (temporal distance tends to increase rather than decrease optimism), and perhaps also to common sense (tasks seem simpler and more manageable when viewed from a distance). Inspired by these observations, in Paper 2, we sought to investigate whether there would be a contrast between what people believe is the effect of temporal distance on duration estimates and what the

actual experimental findings indicate. The results showed that students with very little background in psychology had no consistent opinions regarding the direction of the effect. However, second year psychology students consistently predicted, in contrast to the actual results, that temporal distance would produce lower estimates. These results imply that the effect of distance on duration estimates reported in Papers 1 and 2 are non-trivial and that people seem to have a very limited “metacognitive” access to their own estimation behaviour.

In Paper 3, the relevance of CLT to counterfactual thinking is examined. It is suggested that since counterfactual possibilities, by definition, are more distant on the hypotheticality dimension than events that presumably are going to happen, counterfactuals should be conceived in more prototypical terms than ordinary predictions. It is hypothesized that for events with a clear valence, this focus on prototypicality should lead speculations of “what would have happened if...” to be more extreme than predictions of “what will happen”. In line with this, the results showed that when presented with critical situations that took a turn for the better or the worse, people evaluated the consequences of the better outcomes as better and the consequences of the worse outcomes as worse, when presented as counterfactuals rather than actual occurrences.

In sum, the thesis contributes to the literature on time predictions by showing that distance increases task duration estimates via how people represent time. The thesis also contributes to the field of counterfactual thinking by demonstrating that counterfactuals promote a focus on extreme consequences. More generally, the thesis adds to the growing body of research on CLT by presenting novel ideas on the effects of shifts in construal level.

## **List of Papers**

Kanten, A. B. (2011). The effect of construal level on predictions of task duration. *Journal of Experimental Social Psychology, 47*, 1037-1047.

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# Introduction

In daily life, people are often required to make predictions about the future, to make inferences about distant places, to consider hypothetical scenarios, and to take the perspectives of others. Thus, an important feature of human capacity is the ability to mentally transcend the experienced self in the here and now (Lieberman & Trope, 2008). For instance, decisions about one's summer vacation such as where to travel, which hotel to book, and what attractions to see, often have to be made well in advance. People sometimes need to form opinions about wars going on in far away countries, or to decide whether or not to take on jobs at distant locations. Furthermore, people not only need to understand the reactions of close friends, but also the point of view of more distant acquaintances, as for instance when giving professional advice. When one is trying to make predictions, it is generally a good idea not only to consider the most likely outcome, but also to entertain scenarios that have a more remote probability of occurring. Thus, people distance themselves from the experienced self on various dimensions of psychological distance. How do people do that? Proponents of construal level theory (CLT; Trope & Liberman, 2010) have demonstrated, through an extensive research program, that people traverse psychological distances by employing similar cognitive tools, namely the use of increasingly more abstract mental models. During the past decade, CLT has acquired the status of a leading contemporary theory in social cognitive science as it has been proven to have far reaching implications for a variety of domains such as negotiation (Henderson, Trope, & Carnevale, 2006), attribution (Nussbaum, Trope, & Liberman 2003), consumer choice (Malkoc, Zauberger, & Ulu, 2005), and self-regulation (Fujita, Trope, Liberman, & Levin-Sagi, 2006) to name a few.

With CLT as the main theoretical framework, the present thesis investigates the role of psychological distance in two types of predictions. First, the role of distance in predictions of task duration is examined. Specifically, we ask whether and in what way psychological

distance between the perceiver and the task, affects predictions of performance time. Do people estimate a different amount of time for a task when it is expected or highly likely rather than purely hypothetical? Does it make a difference for the predictions whether one plans to start working on a task tomorrow or a year from now? If so, what are the mechanisms involved? Also, do people have some intuitions about how temporal distance may affect duration estimates? The first two papers shed light on these questions. Although there exists much past research on time predictions (e.g., Buehler & Griffin, 2003; Buehler, Griffin, & Ross, 1994; Roy, Christenfeld, & McKenzie, 2005), systematic investigations on the effects of distance on task duration predictions (time on task) have been lacking. This is surprising given the vast literature on effects of distance in other domains (see Trope & Liberman, 2003, 2010, for reviews). As the second focus in the present thesis, the relevance of CLT to the domain of counterfactual thinking is investigated (Paper 3) (Roese, 1994, 1997; Teigen, 1998). The question explored is whether there are differences between how people predict the consequences of real versus “more distant” counterfactual events. Does simply framing an event as counterfactual rather than real, alter how people perceive the event’s consequences? For instance, in a scenario where a motorist drives off the road barely avoids hitting a tree, would judgments of what *would have happened if* the motorist had hit the tree, differ from judgments of what *will happen* when the motorist actually hits the tree?

In the following, I will first present the basics of CLT and related research before going in depth into the specific research questions. The introductory section on CLT includes past research directly relevant to the present thesis as well as previous research on effects of construal level/psychological distance in judgmental domains that is of a more peripheral relevance. This broad presentation of CLT was chosen as it serves to illuminate how the thesis’s papers contribute to the now rich research tradition on psychological distance and construal levels.

# Construal Level Theory

Whenever an object is a part of the perceiver's direct experience in the here and now, it can be said to be psychologically close (Wakslak, Trope, Liberman, & Alony, 2006). CLT (Liberman & Trope, 2008; Trope & Liberman, 2010) contends that the further away an object is removed from this reference point in terms distance in time, space, social distance, or hypotheticality, the more it will be represented by abstract, general, and simple high level construals and less by concrete, contextualized, and complex low level construals. Low level construals emphasize subordinate and incidental features of events, whereas high level construals convey the overall meaning and essence of available information. Any given object can be construed at multiple levels of abstraction. For instance, the representation "tiger" can be included in increasingly more superordinate categories (e.g., cats, mammals, animals). In the context of action hierarchies, lower level construals relate to how an action is performed, whereas higher level construals communicate why the action is performed (Trope & Liberman, 2003; Vallacher & Wegner, 1987). The action "reading a book" can be represented more concretely as "turning pages" or more abstractly as "learning". The same representation can be translated into different higher level abstractions. Which abstraction one chooses, depends on one's goals (Trope, Liberman, & Wakslak, 2007). If the goal is to kill time and not necessarily to learn something, "reading a book" could be represented more abstractly as "being occupied" or "being entertained". Thus, the process of moving up in construal level involves omitting concrete and unique details while relating the object to more superordinate knowledge structures. Although abstraction involves loss of details and secondary features, high level construals can highlight information not implied by low level construals. For instance, construing the action to read a book as "learning" entails more information about goal desirability than the more concrete representation "turning pages" (Liberman & Trope, 1998). As criteria for distinguishing between which features of an event that are more high

level and more low level, Trope and Liberman (2010) posit that a change in a high level feature impacts the meaning of an event more than a change in a low level feature. For instance, a university course would change more if the topics on the curriculum change than if the number of lectures changes, suggesting that the curriculum is a higher level feature than number of lectures offered. Also, Trope and Liberman state that the meaning of low level construals should depend more on the meaning of high level construals than vice versa. When deciding whether or not to attend a university course, the number of lectures offered should be considered important only if the topics on the curriculum are perceived as interesting. The topics on the curriculum however, should be considered important regardless of the number of lectures offered.

### **The Effects of Psychological Distance on Construal level**

Research supporting the idea that distance is associated with higher level processing is abundant. The central findings are described below.

**Categorization.** To test whether psychologically distant events are identified by the use of broader conceptual categories, Liberman, Sagristano, and Trope (2002, Study 1) had people imagine themselves in various situations (e.g., camping, yard sale) either in the near or in the distant future, and asked them to classify objects related to each situation into as many categories they considered appropriate. As expected, the results showed that participants created fewer, and more inclusive categories in the distant future condition. Using the same scenarios, Wakslak et al. (2006, Study 1) obtained similar results when people were asked to imagine that the situations were either likely (near condition), or unlikely to take place (distant condition). The extent to which people rely on broad categories to form mental representations can also be studied by asking people to rate objects for category typicality. In another study by Wakslak et al. (Study 2), participants were led to believe that they were either likely or unlikely to receive various products, and asked to rate the extent to which each

product belonged to a given category. Wakslak et al. hypothesized that because typical exemplars should be regarded as good examples of the given categories regardless of construal level, only ratings of atypical exemplars should be affected by the probability manipulation. The results confirmed this prediction. Rated belongingness to for instance the category “clothing” decreased with probability for the atypical exemplars “purse” and “ring”, but remained unchanged for the typical exemplars “shirt” and “pants”. Wakslak et al. (Study 4) also investigated whether conceptually similar effects would emerge for the categorization of ongoing behaviour. Participants saw a short film on a computer of a person engaging in various activities they believed they were either likely or unlikely to engage in themselves as a second part of the experiment. As the measure of category inclusiveness, participants were instructed to press ENTER whenever they perceived that one meaningful action ended and another began. As expected, people in the unlikely condition segmented the behaviour into broader chunks than those in the likely condition. Henderson, Fujita, Trope, and Liberman (2006, Study 1) obtained parallel segmentation effects when they varied whether a film was described as depicting a scene from a spatially distant or close location. Also, Fujita, Henderson, Eng, Trope, and Liberman (2006, Study 2) found that participants described the content of a short video by more abstract linguistic categories when it was said to have been recorded in a foreign city rather than the city they were in.

***Action identification.*** As previously noted, representations that answer questions of *why* an action is performed are more abstract than representations that answer questions of *how* the action is performed. To investigate whether distance fosters the use of abstract *why* terms over concrete *how* terms, adapted versions of the Behavioural Identification Form (BIF) developed by Vallacher and Wegner (1989) have been frequently used. The BIF was originally developed to measure individual differences in action identification level, and provides 25 actions (e.g., “making a list”), each of which is followed by two statements that

can be used to describe the original action, one relating to an abstract *why* construal (e.g., “getting organized”) and the other to a concrete *how* construal (e.g., “writing things down”). For each action, people are asked to indicate whether they prefer the high or the low level restatement. Across several studies, psychological distance has been shown to be associated with more abstract responses on the BIF. Specifically, this effect emerged when participants were primed with phrases signalling low (vs. high) probabilities (Wakslak et al., 2006, Study 7), when they were identifying the actions of dissimilar (vs. similar) others (Liviatan, Trope, & Liberman, 2008, Study 1), when they were asked to imagine performing the actions in the distant (vs. near) future (Liberman & Trope, 1998, Study 1), and when the actions were said to pertain to a distant (vs. a near) location (Fujita et al., 2006, Study 1).

***Perception of self and others.*** Behaviour construed in terms of stable enduring dispositions represents, by definition, a higher level conceptualization than behaviour construed in terms of mental states or specific situational influences. It follows that people should be inclined to conceptualize psychologically distant as opposed to near behaviour in terms of underlying general traits. Several studies support this reasoning. For instance, Pronin and Ross (2006) asked participants to evaluate themselves on a range of personality traits according to how they were like in the past, present, and how they imagined they would be in the future. For each trait judgment, participants had the opportunity to choose the response alternative “variable, depends on the situation”. The results showed that people chose this alternative more often for the present self ratings than for both the past and the future self ratings. In a related vein, Nussbaum et al. (2003) suggested that the tendency to draw dispositional inferences from situationally constrained behaviour (the correspondence bias) should be enhanced from a distant perspective. In one of their studies, participants were presented with an essay which was supposedly written by a student who had been instructed to argue in favor of Israel’s withdrawal from Lebanon, and asked to predict to which degree

the position argued in the essay reflected the actual position of the author, either in the near future or in the distant future. As expected, people in the distant future condition predicted that the author's attitudes as well as behaviours were more in line with the essay than those in the near future condition. Similar results have been found for spatial distance (Henderson et al., 2006, Study 1). If distance induces a focus on general personality attributes, people should also expect distant behaviour to be characterized by greater cross-situational consistency than psychologically close behaviour. To investigate this possibility, Nussbaum et al. (2003) asked people to imagine an acquaintance engaging in a variety of different situations that either pertained to the near or distant future, and to rate how he or she would behave in terms of different personality dimensions (e.g., agreeableness, emotional stability). In line with their predictions, they found that the variability of ratings across the situations for each personality domain were lower in the distant future condition than in the near future condition, indicating higher cross-situational consistency. In addition, it also been found that people are faster to decide whether or not a series of general traits are self-descriptive when the traits pertain to a distant future rather than a near future self (Wakslak, Nussbaum, Liberman, & Trope 2008).

*Perceptual construal.* The use of higher versus lower level conceptual categories may be closely related to global versus local perception (Trope & Liberman, 2010). In line with this, Friedman, Fishbach, Förster, and Werth (2003) found that participants who had first attended to the gestalts rather than specific details of a series of maps later generated more atypical exemplars for a range of categories. Thus, since distance is associated with the use of more abstract higher level concepts that convey the general features of objects, distance cues could also facilitate a broader perceptual scope that captures the overall shape rather than the local details of perceived stimuli. Liberman and Förster (2009a) investigated this possibility. Participants were primed with temporal distance versus proximity by writing either about how they their life would be like in one year or the following day. Next, participants were

presented with a task frequently used to study effects on perceptual scope (Navon, 1977). Participants are presented with a series of large letters made up of small letters on a computer screen, and asked to indicate, as fast a possible, whether a target letter appears on the screen. Sometimes the target letter matches the global letter and sometimes the local letters. As expected, the results showed that temporal distance (vs. proximity) facilitated reaction times of global targets and delayed reaction times of local targets. Similar results were obtained with social and spatial distance primes.

***Origin of the distance-construal link.*** Why do people form more abstract construals of distant objects? CLT proposes that the link between distance and construal level has evolved because higher level construals of events and objects are more likely to remain unchanged as the psychological distance from the here and now increases (Liberman & Trope, 2008). Specifically, since high level construals are more general, they apply to a wider array of times, places, people, and hypothetical alternatives to reality than do low level construals, and are thus more useful when mentally traversing distances. For instance, the abstract goal to “to maintain physical health” is more invariant with increasing distance than the more concrete goal “to use a rowing machine”. In the distant future, at a location far away from here under different conditions, I might know that that I will maintain physical health, but whether I will use a rowing machine is more uncertain, making the high level goal a more useful representation than the low level goal. Similarly, whereas many people maintain physical health, not so many are using rowing machines, making the former construal more useful for traversing social distance. CLT further contends that the functional relationship between distance and abstraction has become overgeneralized, such that people continue to form high level construals of distant events even in situations where low level construals are not likely to change over distance (Trope & Liberman, 2010).

To obtain direct evidence for the notion that a common dimension of psychological distance underlies the four forms of distance, Bar-Anan, Trope, Liberman, and Algom (2007) presented participants with a photograph in which a word related to psychological proximity or distance (e.g., “friend” vs. “enemy”, “near” vs. “far”, “sure” vs. “maybe”) could either appear in a near or distant location from the perspective of the observer. Participant’s task was to categorize the word according its spatial distance as quickly as possible. The results showed that people were faster to identify the spatial positioning of the word when the word’s intrinsic psychological distance corresponded to its spatial location (e.g., the positioning of the word “tomorrow” was identified faster when it was presented as spatially close rather than distant from the observer). Also supporting the idea that the distances are interrelated, it has been found that spatial distance to another person enhances the use of polite language (politeness conceptualized as reflecting social distance) (Stephan, Liberman, & Trope, 2010), and that distance in time to an anticipated interaction partner increases social distance in terms of greater perceived interpersonal dissimilarity (Stephan, Liberman, & Trope, 2011).

### **The Effects of Construal Level on Psychological Distance**

The distance-construal link is hypothesized to be bidirectional. Specifically, CLT contends that since higher level construals afford more distance than low level construals, an object construed at higher levels becomes linked to other instantiations of the object that span a wider horizon of time, space, people, and alternatives to reality, leading people to associate the object with greater distance (Liberman & Förster, 2009b; Stephan et al., 2010). Several studies have investigated this possibility. For instance, Liberman, Trope, McCrea, and Sherman (2007) had participants contemplate either how (concrete condition) or why (abstract condition) another person would engage in several activities (e.g., “Ron is considering opening a bank account”, “Angela is considering subscribing to a newspaper”). For each activity, participants were asked to indicate how much time from now the actor would

perform the activity. As expected, results showed that people in the why condition estimated later enactment times than those in how condition. Similar results were obtained for enactment times for one's own actions as people estimated they would start working towards personal goals at later points in time when they had first contemplated why the goals were important rather than how they goals could be could be pursued. They also found that activities described in abstract rather than concrete terms (e.g., call a high school friend vs. dial the number of a high school friend), produced later enactment time judgments, both for oneself and others.

Investigating the effect of construal level on distance estimates in terms of probability, Wakslak and Trope (2009) primed participants with high versus low level construal mindsets by making them either generate superordinate categories or subordinate exemplars of a series of words, and presented them with several scenarios, each describing a person who was considering whether or not to do something (e.g., "Scott is deciding whether or not to do a cooking class.", "Rachel is considering whether or not to get a pet"). For each scenario, participants estimated the probability that the actor would do the activity. As expected, results showed that abstract priming led to lower estimated probability than concrete priming. Similar results were obtained when people were primed with global versus local perception via a variant of the Navon task (Navon, 1977) in which the target letters were always either global or local. Using a similar manipulation of perceptual construal, Liberman and Förster (2009b) found that global (vs. local processing) led to longer distance estimates along all four dimensions of psychological distance. In two of their studies, participants estimated the spatial distance between themselves and a sticker in the same room to be larger (Study 2), they also indicated to have a less close relation to their best friend (Study 3), after being primed with global rather than local perception.

Thus, past research suggests that psychological distance leads to the use of higher level construals, and that the use of higher level construals imparts a sense of distance. Interestingly, Bar-Anan, Liberman, and Trope (2006) showed by using the Implicit Association Test (Greenwald, McGhee, & Schwartz, 1998), that these associations operate at a mere conceptual level. Specifically, they found that when participants could use the same response key to identify words related to distance (proximity) or abstract (concrete) words (CLT congruent conditions), reaction times were faster than when participants could use the same response key to identify words related to proximity (distance) or abstract (concrete) words (CLT incongruent conditions).

### **Psychological Distance and Construal level: Judgmental Consequences**

A host of studies have demonstrated that the association between distance and construal level can play an important role in various kinds of judgments. Some key findings are presented below.

*Primary versus secondary features in choice and evaluation.* When people are evaluating the attractiveness of a choice option, CLT states that they give greater weight to high level features and less weight to low level features of the option with increasing psychological distance to the outcome. This implies that when high level aspects are more positive than low level aspects, perceived attractiveness of an option will increase with distance, whereas when high level aspects are more negative than low level aspects, an option will seem less attractive as function of distance (Trope & Liberman, 2003). In a study investigating these predictions, Liberman and Trope (1998) asked participants to imagine that they considered undertaking a series of actions either in the near or distant future, and to indicate the likelihood of what they would decide. For each action, both a high level and low level feature could be either high or low in positive value. The value of the high level aspect was manipulated by varying the desirability of the action's end state (which corresponds to

the *why* aspect). For instance, in one scenario, participants were asked to indicate their likelihood of attending a guest lecture that was either described as being about decision processes in organizations (high desirability) or about data collection strategies (low desirability). The value of the low level aspect was manipulated by varying the actions' feasibility (which corresponds to the *how* aspect). In the guest lecture scenario, the timing of the lecture was either described as being convenient (high feasibility) or inconvenient (low feasibility). Results showed that judged likelihood for undertaking the actions increased with time when desirability was high and feasibility was low, and decreased with time when desirability was low and feasibility was high. Further support for the differential weighing of desirability and feasibility as function of distance was obtained in a subsequent study where participants explicitly attached greater significance to desirability concerns and less significance to feasibility concerns when the decision dilemmas were presented as distant rather than close in time. Similar effects of distance on desirability versus feasibility considerations have been reported both for social distance (Liviatan et al., 2008) and for hypotheticality (Todorov, Goren, & Trope, 2007).

The effects of distance on the relative weight assigned to primary versus secondary features of choice options have also been studied beyond the desirability-feasibility distinction. For instance, Trope and Liberman (2000) found that participants indicated a stronger preference to experience a series of hypothetical events in the distant (vs. near) future when the events were more positive from a high level perspective (general meaning and broad implications) rather than from a low level perspective (concrete details and circumstances). The effect of temporal distance was the direct opposite when high level values were more negative than low level values. For instance, participants indicated a stronger preference to experience writing a promised letter to their parents in the distant future, whereas eating a cake when on a diet was more strongly preferred in the near than in the distant future.

Investigating the implication of these findings to product evaluation, Trope and Liberman reasoned that features directly relevant to the products' goals constitute a higher level construal than goal irrelevant features, and should therefore have a larger impact on evaluations made from a distant as opposed to proximal perspective. Participants were asked to imagine that they had purchased a new radio set, either in the near future or in the distant future. Half of the participants were further asked to imagine that the radio set turned out to be very useful in the sense that it had very good sound, but that a built-in clock turned out quite useless because it had very small digits that were hardly visible unless one stood right in front of it. The other half were asked to imagine that the radio set turned out to be less than useful in terms of listening to radio programs because of bad reception at the location it was meant for, but that the built-in clock turned out to be very useful. Thus, the radio either had a positive high level feature combined with a negative low level feature or vice versa. Ratings of how happy they would be with their purchase served as the dependent measure. As expected, rated satisfaction increased with time for the good radio with a poor clock and decreased with time for the poor radio with the good clock. Trope and Liberman reported conceptually similar results for judgments of job preferences in which jobs either consisted of an interesting main job (high level) and uninteresting training (low level) or vice versa.

Distance has also been shown to affect the relative impact of primary versus secondary information when people make judgments about the actions of other people. Liviatan et al. (2008) presented participants with a person that was as either similar (socially close) or dissimilar (socially distant) to themselves in terms of various attitudes. They were told that this person had received a job offer and that their task was to try to figure out whether he or she had accepted it or not. In order to make this judgment, they were informed they could receive more information on the job in question with regards to a subset of ten criteria. Half of the ten criteria were central to job related decisions (e.g., salary, working, job security), and

the other half were secondary to such decisions (e.g., room characteristics, office supplies, dinner options). They were then asked to rate the extent to which they were interested in receiving more information on each of the ten criteria. Subsequently, they indicated which of the criteria they would actually choose under the instruction that they should only choose those criteria they found important. Results showed that although participants generally were more interested in central criteria than in secondary criteria, the difference between interest ratings for primary and secondary features was larger in the dissimilar condition than in the similar condition. The same pattern of results was obtained for the actual choices: Although participants generally chose more central than secondary criteria, participants chose more secondary features when the target was similar rather than dissimilar.

In a subsequent study, Livatan et al. showed that the association between distance and an increased focus on primary over secondary information also can be important in the evaluation of other's performance. They asked participants to evaluate the quality of either a well or a poorly written essay (primary information manipulation) that was supposedly written by a fellow student who had either attended the same courses as themselves or different courses (social distance manipulation). Before reading the essay, participants read a note attached to it implying the author as either a high or low performer in physics (manipulation of secondary, less relevant information). In line with their predictions, they found that essay quality had a larger impact on essay evaluations when the author was socially distant as opposed to close, and that ability in physics had a larger impact on essay evaluations when the author was a socially close student (high ability in physics led to more positive essay evaluations).

**Comparisons.** Psychological distance does not only affect judgments via how people represent any single object, but distance has also been shown to influence judgments via how different objects are compared. Based on past work suggesting that when people are asked to

compare objects that seem to be non-comparable (e.g., a vacation and a television set), they try to make them comparable by means of abstraction (e.g., both are activities involving relaxation) (Johnson, 1984), Malcoc et al. (2005) reasoned that distance to outcomes in choice situations should lead to a greater consideration of non-alignable features. To investigate this, Malcoc et al. asked participants to evaluate two described brands of potato chips and informed them that they would receive their brand of choice either at the end of the session, or at the end of the semester. One of the brands was designed to be better on its alignable features (e.g., six vs. nine grams of fat), and the other brand was designed to be better on its non-alignable features (e.g., somewhat stale vs. distinct potato flavour). Participants indicated their preference by allocating 100 points between the options. In line with the predictions, it turned out that the number of points assigned to the non-alignable better option was higher in the distant future condition than in the near future condition. Malcoc et al. also obtained participants' open ended descriptions of how they arrived at their judgment, which, as hypothesized, revealed more mentioning of non-alignable features when the outcome was distant rather than close in time.

***Pros and cons.*** When considering whether or not to do something, arguments against an action are subordinate to arguments in favour of the action. This is because the importance of con arguments depends more on the presence of pro arguments than vice versa (Trope & Liberman, 2010). For instance, a person faced with an option to buy an SUV, would not inquire about the downsides of owning one unless he or she perceives that owning one entails some advantages. In contrast, information about the advantages is important regardless of whether there are any downsides or not. Thus, in terms of CLT, pros constitute a higher level construal than cons. As a consequence, pros should become increasingly more salient than cons as the psychological distance between the perceiver and the action increases.

Investigating this possibility, Eyal, Liberman, Trope, and Walther (2004) asked participants to

generate pros and cons for undertaking a series of actions involving another student (e.g., spending time with the student in the cafeteria) that either pertained to the near or distant future. In line with their predictions, results showed that participants generated more pros and less cons as function of temporal distance. Eyal et al. also showed that temporal distance influenced participants' judged likelihood of actually performing the behaviours via the increased proportion of pro arguments. In a related study, Herzog, Hansen, and Wänke (2007) investigated whether distance and the associated shift from low to higher level construals would make it easier to generate pros than cons. In their study, participants read that a city council planned to offer free public parking spots for one week either next week or in one year. Participants were asked to either generate four arguments in favour of the plan or four arguments against it, and to indicate how easy it had been to come up with the arguments. Participants also indicated their attitudes towards the free parking plan. As expected, results showed that participants in the distant future condition found it easier to generate pros and harder to generate cons than those in the near future condition. It was also found that participants exhibited more positive attitudes towards the plan when it was distant rather than near, and that this effect was mediated by ease of retrieval.

***Values and moral principles.*** Values are, by definition, relatively abstract and decontextualized structures. It follows from CLT that values will be more readily activated and used as a basis of judgments and choices when people contemplate psychologically distant (vs. close) events. In a study by Eyal, Liberman, and Trope (2008), participants imagined several moral transgressions (e.g., a sexual intercourse between siblings) taking place either in the near future or in the distant future, and were asked to evaluate the actions in terms of wrongfulness. Each transgression contained contextual details that rendered the actions somewhat less offensive (e.g., the siblings used contraceptives and they did it just once). As predicted, participants in the distant future condition judged the actions to be more

wrong than those in the near future condition. In line with these findings, Eyal et al. showed in subsequent studies that transgressions performed by another person rather than oneself (manipulation of social distance) were conceived as more morally wrong, and that virtuous acts (e.g., adopting a disabled child) were viewed more positively when construed from a temporally distant rather than proximal perspective.

Importantly, distance should only increase moral concerns to the extent that people identify with the values in question to begin with. Testing this hypothesis, Agerström and Björklund (2009) asked people to imagine themselves in a moral dilemma in which a selfish motivation clashed with a higher level altruistic value. The scenario asked people to imagine that they either in the near future or in the distant future, were taking out the garbage in a cold rain. They were further asked to imagine that they in advance had forgotten to sort their garbage, and that just throwing it away without sorting it into the appropriate bins would be very convenient for them. As a measure of moral concern, participants were asked to indicate the likelihood that they would throw away the trash without sorting it, the guilt they would experience had they thrown away their unsorted trash, and how immoral they perceived not the sorting the trash to be. Subsequently, supposedly as part of an unrelated study, participants indicated the extent to which they valued saving the environment and how important personal convenience was for them. As expected, results showed that only participants who perceived saving the environment as more important than personal convenience indicated greater moral concern when the moral dilemma was described as temporally distant rather than near. Similarly, Eyal, Sagristano, Trope, Liberman, and Chaiken (2009) found in a series of studies that individual values served as a stronger behavioural guide for distant future than for near future situations. In one of their studies, participants first indicated their endorsement of 25 general values (e.g., respect for tradition). At a later date, participants were asked to imagine themselves in several situations either in

the near future or in the distant future. Each scenario included potential behaviours (e.g., attending a family reunion) that matched one of the values measured in the initial value questionnaire. Participants' task was to indicate the extent to which they intended to perform the proposed behaviours. As predicted, using multilevel linear models, Eyal et al. found that values predicted intentions to perform the corresponding behaviours better when the behaviours pertained to the distant rather than the near future.

In a related vein, building on CLT, Kivetz and Tyler (2007) suggested that more distant temporal perspectives shift one's self-conception from a pragmatic sense of self to a more idealistic self-conception. The pragmatic self is primarily driven by practical considerations, whereas the idealistic self is concerned with expressing one's core values and higher level principles. Accordingly, they hypothesized that near future preferences should be guided by a concern for concrete instrumental benefits (e.g., financial rewards), whereas preferences for the distant future should be guided by an intrinsic motivation to affirm one's higher level values and identity. Investigating whether time perspective would affect preferences via self-activation, Kivetz and Tyler asked participants to imagine their life either in the near or in the distant future, and to indicate how they thought they would be like at that time by selecting three out of six given characteristics. Half of the items were consistent with idealistic self-activation (e.g., "fulfilling my inner potential"), and the other half with pragmatic self activation (e.g., "mostly guided by practical considerations"). Subsequently, participants were asked to imagine that they were opening a new bank account in one of two banks. Bank A was described to better on the attributes assumed to be important for the pragmatic self (e.g., "good interest rates on credits cards") whereas bank B was described to be better on attributes assumed to be important for the idealistic self (e.g., "customers are treated with respect and dignity"). Participants indicated their extent to which they preferred the one bank over the other. In line with their predictions, results showed that the temporal

distance (vs. proximity) prime shifted participants' preferences towards Bank B, and that this effect was mediated by idealistic self-activation. Also consistent with the idea that values play a larger role in distant (vs. near) future decisions, Rogers and Bazerman (2008) found that participants selected more "should" choices as the temporal distance to the outcomes increased.

***Predictions.*** When people make predictions about how events will unfold, CLT states that people take into account contextual, unique, and incidental information in predictions about the psychologically close, whereas predictions about the more psychologically distant are to a larger extent based on schematic representations that highlight the gist of available information (Trope & Liberman, 2010).

When people predict how well they will perform on upcoming tasks, Armor and Sackett (2006) suggested that a focus on high level construals should make people more prone to conceptualize tasks in terms of their abstract meaning and implications for one's own ability. As a consequence, they argued, performance predictions regarding hypothetical tasks should motivate for more unrealistic optimism than predictions regarding real tasks. In line with this, they found that people predicted to solve more questions than they actually did on a GRE-like test when it was presented as hypothetical at the time of prediction rather than when participants actually expected to perform the test. Moreover, and in line with CLT, they found that participants in the hypothetical condition remembered fewer concrete details about the test, judged it to be more diagnostic of their own ability, and indicated that it was more important to do well than participants in the expected condition.

Since low level construals generally facilitate more concerns about difficulties and feasibility than high level construals, CLT is largely consistent with the vast literature suggesting that people are more optimistic regarding distant than near future outcomes (e.g., Gilovich, Kerr, & Medvec, 1993; Kanten & Teigen, 2008; Sheppard, Ouellette, Fernandez,

1996). Importantly, however, CLT does not state that predictions necessarily become more optimistic as a function of temporal distance to the outcomes. Prediction of distal outcomes should only promote optimism to the extent that high construals facilitate more optimism than low level construals. Thus, if low level construals imply a high likelihood of desired outcomes, distance should not automatically increase optimism (Trope & Liberman, 2010). Investigating this possibility, Nussbaum, Liberman, and Trope (2006) asked participants to predict their performance on a quiz task, either in the same experimental session, or 1 month later in a another experimental session. As a manipulation of low level information, half of the participants were informed that the quiz would have multiple choice format (easy) whereas the other half were told that it would have an open ended format (difficult). Question format constitutes a low level feature of the task because it specifies details about the task rather than the general meaning of it, and should thus, according to CLT, have a larger impact on near future predictions than distant future predictions. Indeed, results showed that whereas participants in the near future condition were more confident in doing well when the question format was multiple choice rather than open ended, participants in the distant future condition were equally confident across format conditions. Moreover, whereas temporal distance increased optimism when the task had an open ended format, confidence in doing well were unaffected by temporal distance when the task had a multiple choice format.

Because high level construals are more simple and coherent than low level construals, they impose fewer possible interpretations of information. As a consequence, the world may be perceived as less variable and ambiguous when viewed from a distance. Based on this reasoning, Henderson et al. (2006) suggested that when information about the central tendency of an event's category is given, spatial distance should make atypical events (that deviate from the central tendency) seem less likely and at the same time make typical events seem more likely. Henderson et al. presented participants with a series of scenarios each

describing the central tendency of an event's category (e.g., number of visits to health centre per student has been .39 to .51, with an average of .45; ratio of women to men on campus has been .47 to .52, with an average of .49). The events were either described as located at their home university in New York, or at a university in Italy. For half of the scenarios, participants were asked to estimate the probability that a typical event would occur next year (an event falling within the provided range of values), whereas for the other half of scenarios they were asked to estimate the probability that an atypical event would occur next year (an event falling outside the range of stated values). As expected, results showed that spatial distance increased perceived likelihood for typical events and decreased perceived likelihood for atypical events. To further demonstrate that predictions of spatially distant events are to a larger extent based on central tendencies, participants in a subsequent study were presented with graphs depicting either downward or upward trends describing changes over six years for various events related to the academic year (e.g., satisfaction with food quality). For each graph, the last case was always a deviation from the overall trend (e.g., an increase in food satisfaction from the last year when the overall trend was negative). In this study too, the information pertained either to their home university or to a university abroad. Participants estimated the probability that next year would be consistent with the overall trend, as well as the probability that next year would follow the deviation from the last year. As expected, perceived likelihoods went up for trend consistent outcomes and down for deviation consistent outcomes when the events were described as spatially distant rather than close.

## **Research Questions and Methodology**

Through three papers, the present thesis extends past research on CLT. As stated earlier, Paper 1 investigates the role of distance and construal level in predictions of task duration. As an extension of Paper 1, Paper 2 asks how people's intuitions about possible effects of temporal distance on task duration estimates relate to the actual experimental

findings. In the final paper, we examine whether there would be systematic differences between how people construe the consequences of factual versus identical counterfactual events. Below, I first describe the rationale behind each of the papers. Then, the methodological approach is outlined.

### **Paper 1 – Construal Level and Predictions of Task Duration**

Past research has demonstrated that people tend to underestimate how much time they need to complete tasks. This phenomenon, often referred to as the planning fallacy, has been demonstrated for tasks as diverse as furniture assembly (Byram, 1997), academic projects (Newby-Clark, Ross, Koehler, & Griffin, 2000; Sanna, Park, Chang, & Carter, 2005), Christmas shopping (Buehler & Griffin, 2003), and large scale software projects (Moløkken-Østvold et al., 2004). Over-optimistic time predictions seem in large parts to be due to cognitive properties of how people construct scenarios (Kahneman & Lovallo, 1993). Specifically, people tend to envision planning scenarios that spell out the steps needed to bridge the present to the desired end state without considering relevant past experience, likely interruptions, potential obstacles and so on (Buehler et al., 1994). Attention to past experience, however, does not necessarily improve estimation accuracy as both remembered and predicted task durations tend to be biased (Roy & Christenfeld, 2007, 2008; Roy et al., 2005).

In the time prediction literature, participants are either asked to predict completion times (on what date will you finish) (e.g., Buehler et al., 1994), or task duration (performance time, or time on task) (e.g., Burt & Kemp, 1994). Since completion time estimates are more inclusive than task duration estimates (completion time estimates include predictions of when one will start working on the task, time taken by interruptions, and so on), biased completion and duration estimates may not always be governed by the same underlying principles. Indeed, in one of the few studies that have asked participants to provide both estimate types

for the same tasks, Buehler et al. (1991) found that while completion estimates tended to be overly optimistic, estimates of time on tasks were on the average unbiased. Other research on completion time estimates has revealed systematic underestimation, whereas research on task duration predictions has revealed a more mixed picture of both underestimation and overestimation (Halkjelsvik & Jørgensen, submitted; Roy et al. 2005). Thus, duration and completion predictions should be treated as separate estimates. In the present research, we explored the role of construal level in predictions of time on task.

How should distance and construal level affect predictions of task duration? Since high level construals direct attention to features that are stable with increasing distance, they impose a wider mental perspective. For instance, the high level representation “food” applies to a wider array of times, locations, individuals, and alternatives than the more concrete representation “steak” (Trope & Liberman, 2010). Thus, attention to higher level construals is associated with the act of zooming out and focusing on the big picture. In line with this, as noted earlier, distance primes have been shown to lead to faster reaction times for global relative to local visual targets (Liberman & Förster, 2009a). In addition, Maglio and Trope (2011) found that when a depicted travel route was described as being geographically distant rather than near, the length of the travel route where estimated using larger units of measurement. We suggest that this expansion of one’s mental horizon also affects people’s task duration estimates via changes in how they represent units on the time dimension. Specifically, as one’s temporal horizon expands, the duration of an hour or one day is perceived as increasingly smaller. One hour is short and insignificant when construed from the perspective of this year, but looms larger when viewed as a part of this morning. When people estimate task durations, we suggest that the elasticity of time relative to the more object-like quality of tasks, moving up in construal level causes time to contract relative to tasks, leading people to perceive that more time units are needed to cover the same amount of

work. Thus, we predicted that distance and a focus on higher level construals would lead people to estimate tasks to require more time.

## **Paper 2 – Temporal Distance and Task Duration Estimates: Experimental Evidence versus People’s Beliefs**

Decades of social psychological research have established that people tend to construe the future in overly positive terms (Armor & Taylor, 1998; Taylor & Brown, 1988). For instance, people tend to believe they are less likely than their peers to experience negative events such as attracting a serious disease and getting involved in an accident, and more likely than their peers to experience positive events such as having a mentally gifted child and getting a well paid job (e.g., Alicke, Klotz, Breitenbecher, Yurak, & Vredenburg, 1995; Perloff & Fetzer, 1986; Weinstein, 1980). Moreover, as previously noted, degree of optimism tends to increase as the temporal distance to the outcomes increases. For instance, from a temporally distant rather than proximal perspective, people predict they will earn more money (Sheppard et al., 1996), perform better on tasks (Gilovich et al., 1993; Nisan, 1972; Savitsky, Medvec, Charlton, & Gilovich, 1998), score higher on positive traits and lower on negative traits (Kantén & Teigen, 2008), and that they generally will experience more positive affect (Heller, Stephan, Kifer, & Sedikides, 2011).

Future optimism might also be intentional. Armor, Massey, and Sackett (2008) found that people generally prescribed optimism when asked to indicate whether it would be best for a protagonist in a hypothetical scenario to make an overly pessimistic, accurate, or overly optimistic prediction. Participants also indicated that they themselves would make optimistic predictions, and that they believed the protagonist would too. Thus, it seems that people are aware of the future optimism phenomenon, and that they think that overly optimistic predictions entail some advantages.

Future optimism phenomena may seem to stand in contrast to the distance to task-hypothesis tested in Paper 1. As stated above, when people predict task durations, distance to the task might lead to higher (and hence less optimistic) time estimates. Given the vast literature in other domains suggesting that temporal distance tends to increase rather than decrease optimism (e.g., Gilovich et al., 1993), and that people seem to know that predictions about the future often are overly optimistic (Armor et al., 2008), we suspected that there might be a contrast between what people *believe* is the effect of temporal distance on task duration estimates, and their actual time estimates. This possibility was examined by comparing people's predictions of experimental results with the actual experimental findings.

### **Paper 3 – Consequences of Factual Versus Counterfactual Events**

Counterfactual thoughts refer to the events that did not happen, but could have happened. Sometimes people contemplate how things could have been better (upward counterfactuals), and sometimes how things could have been worse (downward counterfactuals) (Markman, Gavanski, Sherman, & McMullen, 1993). Past research has demonstrated that people frequently entertain counterfactual alternatives to reality. Upward counterfactuals are generally more common (Epstude & Roese, 2008). People often contemplate how life could have been better and ponder the possibilities they failed to grab. Upward counterfactuals serve to pinpoint the causes of misfortune and thus provide useful prescriptions for future behaviour (Roese, 1997). Downward counterfactuals may help people to accept the status quo by directing people's attention to the contrast between reality and a much worse counterfactual alternative (Roese, 1994).

In the literature on counterfactual thinking, it has been concluded that the content of counterfactual thoughts are heavily constrained by reality (Byrne, 1997). That is, people are assumed to make minimal alterations to reality when generating counterfactuals (Byrne, 2002). However, in an unpublished study, Teigen and Kobbeltvedt found that participants

who were asked to indicate whether they had entertained thoughts about how the things they were thankful for in life could have turned out differently, tended to report counterfactuals that were the direct opposite of what they had attained. For instance, the counterfactual alternative to being born in Norway was to be born in a war zone, or in a third world country (rather than in a somewhat less prosperous country). This might reflect a general tendency to construe counterfactuals as polar opposites rather than as minimally different from reality. Since counterfactual events are, by definition, more distant on the hypotheticality dimension than factual events, they should be modelled on a higher level of construal. Accordingly, as high level construals tend to be schematic and decontextualized, we suggest that thoughts about avoided losses and missed successes are likely to be conceived in terms of prototypical (catastrophic) losses and prototypical (extraordinary) successes. Moreover, for events with a clear valence, it follows that this focus on prototypicality should lead consequences of counterfactual events (“what would have happened, if...”) to be perceived as more extreme than the consequences of identical, presumably factual events (“what will happen, when...”). In line with the idea that distance leads people to conceive events in more extreme terms, Liberman et al. (2002, Study 2) found that participants perceived a good and bad day in their life to be better and worse respectively, when the days pertained to the distant rather than the near future. Similarly, we predicted that when confronted with situations that take a turn for the better or the worse, people will evaluate the consequences of the better outcomes as better, and the consequences of the worse outcomes as worse, when presented as counterfactual rather than factual occurrences.

### **Methodological Approach**

In all studies, students attending courses at the university served as participants. They were invited to respond to questionnaires which they in most cases completed during their mid-time breaks. The sole exception was Study 2 in Paper 1, where students in Oslo were

recruited by e-mail to participate in a web based questionnaire created by means of an online survey generator (Qualtrics). None of the questionnaires took longer than 15 minutes to complete.

All studies, with the exception of Study 1 in Paper 3, had an experimental design that involved randomized allocation to two or more conditions. For data analyses, we employed standard, widely used statistical techniques (e.g., different variants of ANOVA analyses), that should not require further explications. Of note however, for Study 5 in Paper 1, we employed a relatively new way of assessing mediation, namely the bootstrap approach proposed by Preacher and Hayes (2004, 2008). This method may be more appropriate than the more conventional Baron and Kenny (1986) steps. According to Baron and Kenny, in a simple mediation model where an independent variable  $X$  is assumed to affect a depended variable  $Y$ , via a mediator variable  $M$ , a researcher can conclude that mediation is present if it can be shown that  $X$  predicts  $Y$  (path  $c$ ), that  $X$  predicts  $M$  (path  $a$ ), and that  $M$  predicts  $Y$  when  $X$  is controlled for (path  $b$ ). Depending on whether the effect of  $X$  on  $Y$  is reduced or completely eliminated after the inclusion of  $M$  (path  $c'$ ), partial or complete mediation can be said to have occurred. One of the main criticisms of this approach is that the presence of mediation is not tested directly, but is rather inferred logically through multiple steps, which increases the likelihood of Type 2 error (Hayes, 2009). For instance, in small samples the  $a$  or the  $b$  coefficient may turn out non-significant simply because of low statistical power (Preacher & Hayes, 2004). Another important point is that that there is often little reason to reject the presence of  $ab$  even though  $c$  is non-significant. For instance, in many simple mediation models, one could imagine the existence of another mediating variable not specified in the formal model that works in the opposite direction than  $M$ . Thus, the absence of  $c$  might indicate that two mediators are cancelling each other out (Hayes, 2009). Usage of the Baron and Kenny Steps is often accompanied by the Sobel test, which is a formal test of the

significance of the indirect effect (Sobel, 1982). The Sobel test however, requires that the sampling distribution of the indirect effect is normal (Shrout & Bolger, 2002). This is unproblematic as long as the sample size is sufficiently large, but when the sample size is moderate to small, such as in many psychological experiments, the sampling distribution of  $ab$  tends to be skewed, making it less straightforward to make inferences based on the Sobel test (Bollen & Stine, 1990; Preacher & Hayes, 2008). As an alternative to the Baron and Kenny Steps and the Sobel test, bootstrapping is starting to catch on in the literature. The bootstrap approach to mediation has the advantage that it directly tests the existence of  $ab$  without making any assumptions about normality. In bootstrapping, a large number of new samples are built from the original sample. Cases are drawn from the original dataset with replacement, and each new sample has the same  $n$  as the original sample. The number of re-samples can be specified by the researcher, but at least 5000 are recommended. The indirect effect  $ab$  is computed for each bootstrap sample. In order to obtain a  $ci\%$  confidence interval for the existence of an indirect effect, these values are ordered from lowest to highest. The ordinal position of the lower bound is identified by applying the formula  $k(.5 - ci/200)$ , and the formula  $1 + k(.5 + ci/200)$  is applied for identifying the ordinal position of the upper bound ( $k =$  number of re-samples). If the values between the lower and upper bound do not include zero, the researcher can, with  $ci\%$  certainty, claim that the mediation effect is not zero (the point estimate is the mean  $ab$  calculated over the  $k$  samples) (Hayes, 2009).

***Methodological considerations.*** As noted above, participants typically responded to questionnaires in classroom contexts. This strategy of data collection enables one to obtain large amounts of data in a short amount of time. However, data collection in such settings also has obvious disadvantages. The number of participants involved is often large, which makes it difficult for the researcher to make sure that the participants are paying attention, taking the study seriously, and that they do not inspect each others' responses and adjust their answers

accordingly. Such sources of “noise” pose a particular threat to experimental designs where the effect to be tested is of a fragile character, such as when the studies involve priming, subtle manipulations, or when the expected effect size is small. Although it is hard to completely rule out that the outcomes of some studies could be affected by some of these reliability and validity threats, care was taken to minimize the effects on extraneous factors on the effects under study. Specifically, during most data collections, an experimenter was present to monitor the participants. It was made clear that they should not talk to each other during the experiment and that they should work through the questionnaires from beginning to end without attending to other tasks. Still, some of the studies included in the present thesis would perhaps be better suited for a more controlled laboratory context (e.g., studies involving priming), but the present strategy was selected because of restraints on time and resources. Nevertheless, to the extent that the lecture context sometimes entails disadvantages for certain kinds of studies, these disadvantages should be more likely to produce false negatives than false positives. Thus, if a study performed in a lecture context produces the expected results, it is reasonable to assume that that the same results also would have emerged in a laboratory setting.

In recent years, data collection by the use of web surveys has become quite common. As previously mentioned, we employed this strategy in one of our experiments. Like paper and pencil surveys in the context of large lectures, online surveys provide a less than ideal setting for detecting causal relationships. It is difficult to know whether participants are giving the task at hand full attention and so on. The use of web surveys also poses the possibility that the same participant completes the questionnaire more than once (although in the absence of rewards, it is difficult to imagine the motivation for this). Still, the use of web surveys can have some advantages. By receiving the questionnaire online, participants can decide for themselves when they will complete it, and may thus be more motivated and

attentive when they eventually decide to do so. Supporting the use of web based surveys as a viable strategy to conduct experiments, Paolacci, Chandler, and Ipeirotis (2010) found that classical effects in the judgment and decision making literature (e.g., anchoring, framing effects), were just as robust when the data were collected using web surveys, as when using a more traditional paper and pencil approach.

## **Summaries of Results**

### **Paper 1: Kantan, A. B. The Effect of Construal Level on Predictions of Task Duration.**

In a series of experiments, I examined the role of construal level/distance in predictions of the time needed to perform tasks. As elaborated on earlier, it was hypothesized that distance and the associated shift from low to higher level construals would cause time units to appear smaller, so that more time units are needed to cover the same amount of work. In line with this, Experiment 1 showed that when participants imagined a task a year ahead rather than in the more imminent future, work time estimates were up to 60% larger. This effect could not be attributed to differences in work motivation, or perceived time available. In Experiment 2, similar effects on duration estimates were obtained using a different manipulation of distance, namely whether the task in question was described as hypothetical or real. Experiment 3 showed that estimates also increased when a high level (vs. low level) construal level mindset was activated outside the context of the estimation task via a priming procedure. The subsequent studies sought to gain direct evidence for the hypothesized time contraction mechanism. Specifically, Experiment 4 asked participants to indicate on a depicted horizontal line the distance they thought was appropriate to illustrate the duration of one hour, after they had been primed with either a high or low level construal mindset. As predicted, participants in the high level condition drew shorter line lengths than those in the low level condition. Finally, in a test of the full model, Study 5 showed that a measure of time contraction mediated the relationship between temporal distance and work time estimates.

## **Paper 2: Kanten, A. B., & Teigen, K. H. Can People Predict the Effect of Temporal Distance on Task Duration Estimates?**

As noted above, there are reasons to assume that the effect of temporal distance on task duration estimates might be at variance with people's intuitions (Armor et al., 2008). Accordingly, in Paper 2, we investigated people's ability to predict this effect. In the first of two studies, we replicated earlier results by demonstrating that participants' estimates of how many hours they would need to type fifty pages of an old handwritten diary, were higher when they imagined the task in the distant rather than in the near future. In the second study, we asked participants in several student groups to predict the results of this study. Students with very little background in psychology had no consistent opinions regarding the direction of the effect, although they suspected that there would be a difference between the conditions. However, second year psychology students predicted, in contrast to the actual results, that temporal distance to the task would lead to lower estimates, possibly because of a greater familiarity with the future optimism phenomenon.

## **Paper 3: Teigen, K. H., Kanten, A. B., & Terum, J. A. Going to the Other Extreme: Counterfactual Thinking Leads to Polarised Judgements.**

In order to test the hypothesis that moving from the factual to the counterfactual promotes a focus on extreme (prototypical) outcomes, a series of five experiments were conducted. In Study 1, preliminary support for this idea were obtained by the finding that participants who were asked to come up with autobiographical incidents that could have turned out otherwise, tended to report counterfactual outcomes that were opposite from rather than just different from the factual outcomes. In the subsequent studies, participants were presented with situations that took a turn for the better or the worse. Studies 2 and 3 showed that consequences of positive and negative counterfactual events were perceived as better and worse respectively, than the consequences of the same factual events. To take one example, in

a scenario where a protagonist applied but did not receive financial support to run an internet shop, judgements of *what would have happened if* the protagonist had received support were more positive than judgments of what *will happen* in an alternative scenario where the protagonist actually received support. Extending these findings to probability judgments, Study 4 showed that estimated probabilities for success were higher for positive counterfactual events than for identical factual events. Also, Study 5 showed that when presented with accident scenarios describing two potential outcomes, one severe and one less severe, participants perceived the probability of serious injuries to be higher for counterfactual severe accidents than for factual severe accidents.

## **General Discussion**

The present thesis contributes to the growing body of research on CLT by exploring the role of construal level in two judgmental domains. First, the thesis reports the first systematic investigation of the role of distance in task duration estimates, which revealed strong support for the idea that estimates increase as function of distance/construal level via the contraction of time units. The combination of relatively large effect sizes and people's inability to predict that estimates increase with distance makes this finding particularly fascinating. Second, while much of past research has focused on the triggers and consequences of counterfactual thinking (Epstude & Roese, 2008; Roese, 1997), we compared evaluations of counterfactual events and evaluations of the same factual ones, making us able to present compelling evidence for the idea that counterfactuals are conceived in more prototypical/extreme terms than factual occurrences.

### **Construal Levels and Specific Mechanisms**

Since the first empirical tests of CLT around the turn of the century (e.g., Liberman & Trope, 1998; Trope & Liberman, 2000), CLT has become extremely popular among researchers in social cognition, and the theory continues to be applied to ever new empirical

domains. It is an elegant and broad theory that offers an integrative framework for understanding an impressive range of apparently unrelated phenomena. Still, the general nature of CLT can sometimes make it hard to predict and interpret effects of distance. In many cases it is possible to infer different mechanisms from CLT that may explain the same experimental results. With regards to the relationship between distance and task duration estimates for example, one could alternatively speculate that distance and the associated shift from low to high level construals, affect duration estimates via what kind of information people rely on when making predictions. Specifically, it is well known that predictions based on an “inside view” (a focus on singular information, step by step planning), tend to turn out more optimistic than predictions based on an “outside view” (with a focus on distributional, past experience) (Buehler et al., 1994; Kahneman & Lovallo, 1993). Since abstraction is associated with attention to general features of events, one could in the absence of the time contraction experiments, have put forward a reasonable hypothesis that the relative focus on distributional over singular information is the key mediator in the relationship between distance and task duration estimates. Also, the general nature of CLT sometimes makes it hard to predict the direction of distance effects as it is often possible to infer mechanisms from CLT that pull in opposite directions. In our example, one could have hypothesized that since high level construals are more schematic than low level construals, distant tasks should be construed as simpler than proximal tasks, and thus be perceived as less time consuming. This would also have been in line with the finding that unpacking has been shown to increase task duration estimates (Kruger & Evans, 2004).

Sometimes distance probably simultaneously triggers mechanisms with opposite implications for the results, so that experimental outcomes become dependent on whichever of these mechanisms that “wins out” in any given situation. This may also be the case in predictions of task duration perhaps making the belief that task duration estimates decrease

with distance, evident among our sample of psychology students in Paper 2, not entirely wrong. Indeed, evidence for a link between distance and more optimistic task duration estimates have been reported by Armor and Sackett (2006). As previously noted, they suggested that abstraction should motivate for more unrealistic optimism as higher level construals activate thoughts about the tasks' broader meaning. Although their primary focus was on predictions of performance rather than on task duration estimates, in one study they asked people to estimate how much time they would need to complete the first half of a scavenger hunt which was either described hypothetical or as a real upcoming task. This led to lower (more optimistic) estimates for hypothetical tasks. The tasks used in Paper 1 however, were possibly not sufficiently engaging to evoke this optimism effect. Generally, this example illustrates that it can be problematic to make bold generalisations based on effects of construal level as shifts in construal level may produce divergent effects depending on subtle variations in the judgmental context.

Reflecting the ambiguousness of how construal level might impact a given phenomenon, there is actually a number of examples in the literature of similar studies reporting different effects. For instance, it has been suggested that construal level is important for the emergence of assimilation versus contrast effects. An assimilation effect occurs when evaluation of a target is pulled *towards* the context, whereas a contrast effect implies that the evaluation of a target is pulled *away from* the context. Förster, Liberman, and Kuschel (2008) proposed that since high level construals facilitate the use of broad inclusive categories, such construals should make one likely to include the context and the target in the same category, with *assimilation* as a result. Low level construals, on the other hand, which emphasise the unique characteristics of objects, should make one more likely to perceive the context and the target as belonging to separate categories, with *contrast* as a result. Investigating this possibility, Förster et al. (Study 1) first induced participants to adopt either a global or local

processing mindset and thereafter primed participants with words either related or unrelated to aggressiveness via a word puzzle task. In the third phase, participants were asked to rate a described person with respect to hostility and belligerence. As expected, participants in the global condition rated the target person more negatively after being primed with aggressiveness words (assimilation), whereas participants in the local condition rated the target person less negatively after being with primed with aggressiveness words (contrast). Thus, this study suggests that abstraction enhance the likelihood of assimilation and reduce the likelihood of contrast. However, these findings seem to contradict results reported by Henderson and Wakslak (2010a). In their study, participants were primed with words related to either adventurousness or recklessness and asked to evaluate, on related dimensions, a sky diver who was either described as being spatially near or distant. Results showed that semantic priming led to an assimilation effect in the proximal condition, but not in the distant condition. As an explanation of these results, Henderson and Wakslak suggested that since low level construals facilitate attention to local information, an ambiguous target construed at lower levels should entail a sense of unfamiliarity and uncertainty. This in turn, they argued, makes people prone to use momentarily accessible information as basis of judgment, leading to assimilation. When a target is construed at higher levels however, the target is connected to more general knowledge (e.g., stereotypes, general attitudes), making less room for momentarily accessible information to influence judgment. Thus, from different lines of reasoning, both derived from CLT, Förster et al (2008) predicted and found a link between low level construals and contrast, whereas Henderson and Wakslak (2010a) predicted and found a link between low level construals and assimilation. Moreover, while Förster et al. argued that a focus on high level construals should lead to assimilation, Henderson and Wakslak argued that a focus on high level construals should make one resistant to context effects. Addressing this discrepancy, Henderson and Wakslak pointed out that they, in

contrast to Förster et al. (2008, Study 1), introduced the construal level manipulation after rather than before the semantic prime. They speculated that when the construal level prime is introduced before the semantic prime, it influences how broadly people construe the semantic prime, whereas when the construal level manipulation is presented afterwards, it influences how broadly people think about the target. This difference, they suggested, might have opposite consequences for judgement. However, in another study by Förster et al. (Study 3) examining self-evaluations rather than evaluations of others, the manipulations were actually sequenced in the same order as in Henderson and Wakslak's study. Specifically, in this study, participants first compared themselves with a person either high or low in athletic ability, and then rated their expected athletic abilities according to either the near future or the distant future. In line with their first study, results showed that imagining one's athletic abilities in the distant future led to assimilation, whereas imagining one's athletic abilities in the near future induced contrast. Thus, before any clear conclusions can be made about how abstraction is related to assimilation and contrast phenomena, further research efforts have to be made.

Another discrepancy in the literature concerns how level of construal relate to perceptions of similarity. Day and Bartels (2008) argued that as high level thinking directs attention away from concrete aspects and towards central features of stimuli, objects more similar on the abstract level than on the concrete level, should be perceived as increasingly more similar as people move up in abstraction. Conversely, objects more similar in concrete aspects should be perceived as increasingly less similar as function of construal level. In line with this, they found, for instance, that the action "going to the dentist" was perceived to be more similar to the action "joining a health club" (similar on the abstract level; e.g., both actions have health benefits), and less similar to the action "getting a tattoo" (similar on the concrete level; e.g., actions involve needles, physical discomfort), when the actions were

imagined to take place in the distant rather than the near future. However, Förster (2009) suggested that since abstraction is associated with the use of increasingly more inclusive categories, high level construals should generally facilitate search for similarities among stimuli, whereas low level construals should generally facilitate search for dissimilarities. In line with this, in a series of experiments he found that participants generated more similarities and fewer differences between objects when they were primed with a high as opposed to a low level processing mode. This was true both for objects that were more similar on the abstract level, and for objects that were more similar on the concrete level. In one study, participants were first asked to either focus on the overall shape of a map, or to attend to the map's details (processing mode manipulation). They were then asked to compare a dolphin and a shark, and to write down as many similarities or differences they could find, and also to rate how similar they found the animals to be in general. Dolphins and sharks are similar on the concrete level as both animals have grey skin, small eyes, a dorsal fin, and so on, but dissimilar on the abstract level as they are examples of mammals and fish respectively. Following Day and Bartels's theorizing, abstraction should in such cases reduce perceptions of similarity. Inconsistent with this, Förster showed that participants induced with an abstract processing mode, generated more similarities and fewer differences than those induced with a concrete processing mode. Moreover, abstract (vs. concrete) processing mode priming led participants to perceive the animals as being generally more similar to each other. There are however, differences between the conflicting studies, as for instance that Day and Bartels asked people to make judgements about actions, while Förster asked participants to make judgements about concrete objects and events. Still, it is difficult to imagine how this aspect could have produced the divergent results. Thus, exactly how construal level relates to similarity judgments remains open to further scrutiny.

Recent work on how construal level/distance relates to affect also entails some interpretational ambiguities. Fuzzy trace theory (Rivers, Reyna, & Mills, 2008) states that categorization of stimuli as either good or bad is a central component of gist-based processing. In line with this, Critcher and Ferguson (in press) reasoned that people in an abstract as opposed to concrete mindset should be more sensitive to, and as a result will react more strongly to, affective information. Critcher and Ferguson found, as predicted, that participants' moods were more affected by subliminal priming of valence-laden words, when they initially had generated abstract rather than concrete descriptions of a set of behaviours (mindset manipulation). Moreover, in another study, they found that participants who were offered free candy, ate an amount that was more in line with their previously stated liking for candy (measured in a pre-test), after they had been primed to adopt an abstract (vs. concrete) processing mode. However, these results seem to be at odds with findings reported by Williams and Bargh (2008). They primed participants with a sense of physical distance or proximity by asking them to mark of either close or distant coordinates on a Cartesian plane. Subsequently, participants rated the degree to which they liked a book excerpt describing embarrassment. Results showed that participants primed with a sense of distance liked the excerpt more than those primed with closeness. In another study, using the same distance manipulation, they found that a book excerpt depicting a violent scene elicited more emotional distress when participants were primed with closeness rather than distance. Importantly however, while Critcher and Ferguson manipulated construal level directly, Williams and Bargh manipulated physical distance. This might suggest that spatial distance cues can trigger processes that are independent of processes related to shifts in construal level. Indeed, Williams and Bargh did not interpret their findings in terms of CLT, but maintained that physical distance cues affect peoples' affective reactions because of the adaptive importance of monitoring physical distance relations to one's caretakers and potential

predators. Still, a negative relationship between distance and the strength of affective reactions could also be construed as consistent with CLT, as past research has demonstrated that remembered positive and negative life events are more likely to elicit congruent emotional reactions when people describe the events in concrete and vivid terms (Strack, Schwarz, & Gschneidinger 1986). It is important to note however, that a link between closeness and stronger emotional reactions is inconsistent with research on affective forecasting, which have shown that people tend to overestimate the intensity and durability of their affective reactions to future events (Wilson & Gilbert, 2003). Thus, the relationship between distance/construal level and affective reactions seems to be of a complex nature, and research efforts should be made to resolve the apparent inconsistencies in existing research.

Relevant for the above discussion, in a recent follow-up study to the present thesis's Paper 3 where we found that consequences of counterfactual events were consistently evaluated as more extreme than identical factual ones, Terum and Svartdal (submitted) have investigated whether this effect also holds for affective reactions. This would be a reasonable expectation as more extreme consequences should be likely to elicit more extreme emotional reactions. However, in light of the above discussion, both directions of influence can be conceived as plausible. Terum and Svartdal (Study 4) presented participants with several scenarios, each describing protagonist who either avoided or did not avoid a negative outcome. In the latter case, participants evaluated the protagonist's affective reaction to the negative factual outcome, whereas in the former case they evaluated how the protagonist would have reacted *if* the negative outcome had occurred. They also included a condition where participants made consequence judgements similar to those described in Paper 3. Results showed that consequence judgements replicated our earlier findings. That is, consequences of negative outcomes were evaluated as worse when presented as counterfactuals. In contrast, participants evaluated the affective reactions to be more severe in

the factual than in the counterfactual cases. This might reflect that factual events are construed in more vivid terms than counterfactual events, but this suggestion remains speculative as no measure of vividness was included in the study. Generally, due to the fact that it is often possible to envision multiple mechanisms by which psychological distance may impact a given phenomenon, mediation analyses often seem necessary in order to obtain a sound argument for the existence of one specific mechanism.

### **Psychological Distance**

An impressive amount of research has shown that the four dimensions of distance yield similar effects on representation, evaluation, and judgment, thus justifying the term “psychological distance” as an umbrella concept (Trope & Liberman, 2010). However, since distance in space is directly perceived and thus more concrete, space may represent a more fundamental dimension than the other distances. In line with this, Boroditsky (2000) suggested that comprehension of temporal concepts is grounded in more concrete experiences with spatial distance. Specifically, she suggested that people’s thoughts about time are structured through spatial metaphors. Supporting the idea that space is more fundamental than time, she found that priming thoughts about space affected how participants interpreted ambiguous questions about time, but that priming thoughts about time did not affect how participants interpreted ambiguous questions about space. Furthermore, Casasanto and Boroditsky (2008) found that when participants were presented with lines of varying lengths on a computer screen, judgements of stimulus durations were affected by the length of the lines, but that line length judgments were unaffected by durations of exposure. If other distances are indeed “abstracted” from spatial distance, physical distance may yield relatively more pronounced effects or effects not detectable with other dimensions (Henderson & Wakslak, 2010b). Thus, even though an effect of spatial distance is observed, it is not unproblematic to claim that the same effect also would appear with the more abstract

distances. Generalizations across distance dimensions should also be made with caution due to various structural differences between them. For instance, while time is one-dimensional and uncontrollable, social distance can be conceived as having multiple dimensions and is partly controllable (Liberman & Förster, 2009b; Trope & Liberman, 2010).

### **Potential New Directions**

In the years to come, more psychological phenomena will probably be shown to be affected by psychological distance and construal level. In our own research, we have started to explore the relevance of construal level to the outcome bias, which is the tendency to evaluate a decision's quality based on the outcome (Baron & Hershey, 1988). Sometimes information on outcomes can serve as a useful heuristic to evaluate decision quality, as for instance in cases where evaluators only have limited access to the information that was available to the decision maker at the time of the decision. However, this heuristic may be overgeneralized to situations where it is inappropriate, namely to situations where the evaluator has access to the same decision criteria as was available to the decision maker. Through several studies Baron and Hershey (1988) obtained evidence for this phenomenon. In one study, they found that a physician's decision to go ahead with an operation that had an 8% mortality rate, was evaluated as better when the operation was successful (the patient survived) than when it failed (the patient died as result of the operation). How should construal level affect the outcome bias? Since concrete construals are associated with increased attention to the concrete circumstances, the outcome of a decision may be less important, and situational factors may be considered more important as people move down in construal level. Specifically, from a low level rather than high level perspective, people might to a greater extent realize that decision quality can be relatively independent of the outcome, with the result that the outcome bias may be eliminated or reduced. We have obtained preliminary evidence for this proposition. Specifically, in an unpublished study, participants

were primed with either a high or low level construal level mindset by answering a series of “why?” or “how?” questions related to an activity (see Freitas, Gollwitzer, & Trope, 2004). Then, they were asked to evaluate the quality of decisions that had either a positive or negative outcome. One of the scenarios described a psychiatrist who decided to release a psychiatric patient with a history of violence from a closed institution, while knowing that there was a 5% chance that the patient would commit new acts of violence. Half of the participants read that the patient attacked an innocent person shortly after the release, whereas the other half read that the patient never committed any new acts of violence. Results showed that whereas there was a robust outcome bias in the high level condition, judgements of decision quality were unaffected by the outcome manipulation in the low level condition. Thus, the outcome bias seems to require a relatively abstract construal style to appear. We are currently planning more experiments to obtain more evidence for this hypothesis.

The time contraction mechanism studied in Paper 1, could also be relevant to domains beyond duration judgments. For instance, our findings suggest that the temporal distance between two events will be perceived as smaller at higher levels of abstraction, a phenomenon that could have implications for how people experience coincidences (Falk, 1989). A coincidence can be defined as a “remarkable concurrence of events or circumstances without apparent causal connection” (Soanes & Stevenson, 2004, p. 279). Some coincidences are more obvious than others as for instance if you plan to go to Paris and find out that a close friend is also planning to travel to Paris on the exact same day as yourself. However, what if you are departing on the 1<sup>st</sup> of June and your friend two weeks later? Is it still a coincidence? From a high level perspective, one might think of the traveling dates as belonging to the same month rather than being 14 days apart, making the situation more likely to be perceived as a surprising coincidence.

It could also be interesting to investigate the tendency for task duration estimates to increase as function of distance in real world professional contexts, as this effect has obvious implications not only for everyday planning, but also for companies. For instance, in the software industry it is common practice to calculate the costs of a software development project by having an expert estimate the number of work hours the project most likely will require. Past research has demonstrated that these estimates often turn out too optimistic, producing costly budget overruns (e.g., Moløkken-Østvold et al., 2004). As we did not obtain measures of actual duration in our studies, we can not draw any conclusions about to what extent the estimates were too optimistic or pessimistic. What our results imply however, is that estimates produced from more distant perspectives, are likely to be higher. Thus, it could for instance be interesting to examine whether real world software projects that are estimated from a temporally distant perspective, are more likely to turn out less optimistic than estimates that are made at closer range.

We cannot be completely sure that the more extreme consequence judgments for counterfactual (vs. factual) events in Paper 3, were produced by changes in abstraction level. Thus, it would be interesting to examine whether converging results would be obtained with other manipulations of construal level. One possibility would be to procedurally prime abstract versus concrete processing modes, and ask people to predict the consequences of positive and negative events. Such a study could also include measures of emotional impact in order to directly test whether shifts in construal level yield opposite effects on evaluations of consequences versus affective reactions (Terum & Svartdal, submitted).

### **Final Remarks**

By the advent of CLT, scholars gained a powerful analytic tool for understanding a variety of phenomena. It enables students of human behaviour to draw conceptual links between phenomena that, until now, have been studied within separate research traditions.

The present thesis illustrates this strength by presenting evidence for a key role of construal level in domains as diverse as counterfactual thinking and time predictions. In addition, the hypothesized time contraction mechanism is of a general character and may thus, as noted above, also be relevant for phenomena unrelated to duration judgments. At the same time, CLT's generality makes it possible to overlook important distinctions and even draw contrasting inferences about the role of distance and abstraction in a variety of fields. My hope is that the research described in the present thesis will stimulate research on time estimation, counterfactual thinking, and on construal levels in general that may ultimately lead to a more fine grained understanding of which effects CLT does and does not predict.

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