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The shape of things to come: Exploring goal-directed prospection



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ABSTRACT

Through the ability to preview the future (i.e., prospection), people can anticipate how best to think, feel and act in just about any setting. But exactly what factors determine the contents of prospection? Extending research on action identification and temporal construal, here we explored how action goals and temporal distance modulate the characteristics of future previews. Participants were required to imagine travelling to Egypt (in the near or distant future) to climb or photograph a pyramid. Afterwards, to probe the contents of prospection, participants provided a sketch of their imaginary experience. Results elucidated the impact of goal type and temporal distance on mental imagery. While a climbing goal prompted participants to draw a larger pyramid in the near than distant future, a photographic goal influenced only the compositional complexity of the sketches. These findings reveal how action goals and temporal distance shape the contents of future simulations.

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1. Introduction

“Mental imagery not only allows us to predict the imminent or distant future, but also to consider many possible futures—or even many possible worlds.”

Moulton and Kosslyn (2009, p. 1274)

Whether preparing a tasty meal, insulting the boss or getting married, behavioral performance is reliably enhanced by prior episodes of goal-directed prospection (i.e., future-oriented thought, see Szpunar, 2010). By simulating potential courses the future may take (e.g., food poisoning, getting fired, irate in-laws), one can establish the optimal seasoning, curse or guest list for the particular task at hand. Fueled by a combination of personal recollections and semantic knowledge (e.g., Addis, Wong, & Schacter, 2007; Buckner & Carroll, 2007; Schacter, Addis, & Buckner, 2007; Szpunar, 2010; Tulving, 1985), prospection is an indispensable tool for navigating the complexities of everyday life. Through the ability to preview the future, people can anticipate how best to think, feel and act in just about any conceivable setting (Gilbert & Wilson, 2007, 2009; Golub, Gilbert, & Wilson, 2009; Suddendorf & Corballis, 2007). As Gilbert and Wilson observed, “We know that chocolate pudding would taste better with cinnamon than dill, that it would be painful to go an hour without blinking or a day without sitting. . .we know these things not because they’ve happened to us in the past, but because we can close our eyes, imagine these events, and pre-experience their hedonic consequences in the here and now” (2007, p. 1352).

Planning effectively for the future, of course, rests squarely on the quality of the mental simulations that are generated in the present (Bar-Anan, Wilson, & Gilbert, 2009; Gilbert & Wilson, 2007, 2009; Wilson & Gilbert, 2003). Failure to accurately simulate the fiery intensity of scotch bonnet chilies, for example, may result in a culinary concoction that fails to impress a

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spice-intolerant date. To optimize behavioral selection, prospection must not only be uniquely tailored to a desired outcome (i.e., goal), but also capture essential components of to-be-enacted events. Herein lies a troublesome feature of future previews, however. On occasion, mental representations deviate from the elements of real-world experience they are endeavoring to reproduce, prompting a raft of well-documented effects to emerge (for overviews see Gilbert & Wilson, 2009; Wilson & Gilbert, 2003). Most notably, when prospection goes awry, so too does the accuracy of people's affective forecasts and their ability to make effective future-oriented decisions (see Boyer, 2008; Gilbert, Gill, & Wilson, 2002; Morewedge, Gilbert, & Wilson, 2005; Wilson, Wheatley, Meyers, Gilbert, & Axsom, 2000).

Judgmental error aside, recent work has focused on what is unquestionably the most important aspect of prospection—the contents of future previews (i.e., the representations on which prospective judgments are based). In particular, valuable insights into how exactly people think about and describe the future have been garnered from Trope and Liberman's (2003, 2010) and Liberman & Trope, 2008 influential writings on construal level theory (CLT). According to this account, representations increase in abstraction as mental simulations shift from events in the immediate to distant future (e.g., going on vacation tomorrow vs. next year). While high-level construals are abstract, decontextualized representations that convey the gist or meaning of a prospective experience (e.g., enjoying a weekend break in Italy), low-level construals comprise concrete, detail-rich characterizations of an event (e.g., packing one's suitcase, driving to the airport, boarding the plane). Empirical support for CLT is widespread and compelling, having been documented across a range of spatial, temporal and linguistic measures (see Amit, Algom, & Trope, 2009; Arnold, McDermott, & Szpunar, 2011; Bar-Anan, Liberman, Trope, & Algom, 2007; Henderson, Fujita, Trope, & Liberman, 2006; Liberman & Förster, 2009; Stephan, Liberman, & Trope, 2010; Wakslak & Trope, 2009). Put simply, temporal distance impacts people's representations of the future.

Together with the timing of an event, other influences loom large in shaping conceptions of the future. One potent, though largely understudied, factor concerns the goals around which prospection unfolds (Szpunar, 2010). Personal goals, in particular, have been shown to facilitate the organization and generation of detail-specific future representations (D'Argembeau & Demblon, 2012; D'Argembeau & Mathy, 2011). In so doing, these self-relevant construals drive prospection (Markus & Nurius, 1986) and serve a crucial preparatory function for future action (Pham & Taylor, 1999a, 1999b; Taylor, Pham, Rivkin, & Armor, 1998). Curiously, however, not all goals are conceptualized in the same manner. Presaging the principles of CLT, Vallacher and Wegner (1985) noted that goals/actions are represented in either a super- or sub-ordinate manner. Whereas superordinate (i.e., abstract) representations center on the overarching purpose of an action (i.e., *why* the action occurred), subordinate (i.e., concrete) characterizations focus instead on the specific means through which a behavior can be realized (i.e., *how* the action is performed).

Given therefore structural similarities in the properties of temporal construal and action identification, an interesting question emerges. Does temporal distance impact the representation of action goals? Preliminary evidence suggests that it does. Liberman and Trope (1998) presented participants with a series of to-be-imagined future activities (e.g., eating tomorrow or sometime next year), followed by statements pertaining to the *why* (e.g., getting nutrition) and *how* (e.g., chewing and swallowing) of each action (Vallacher & Wegner, 1989). The task was simply to select the description they believed described the activity most appropriately. Critically, a preference for superordinate (i.e., abstract) construal emerged when activities were slated to take place in the distant than near future (for related research, see Fujita, Henderson, Eng, Trope, & Liberman, 2006; Liviatan, Trope, & Liberman, 2008; Wakslak, Trope, Liberman, & Alony, 2006). Event representations tend to shift from subordinate (i.e., means to an end) to superordinate (i.e., end) characteristics as to-be-enacted goals increase in temporal distance (Liberman & Trope, 1998; Sagristano, Trope, & Liberman, 2002).

Beyond verbal descriptions of future activities however, less is known about the visual characteristics of prospective simulations. This gives rise to an important issue. When people generate mental images of the future (Atance & O'Neill, 2001; Moulton & Kosslyn, 2009; Suddendorf & Corballis, 1997) what do they look like? Moreover, are these representations shaped by the nature (goal-directed) and timing (temporal distance) of to-be-enacted future activities and how might this topic be explored empirically? Using a variety of methodological techniques (e.g., fMRI, TMS, patient studies), neuroscience research has revealed that imagery recruits the same underlying mechanisms as perception and action (see Kosslyn, Ganis, & Thompson, 2001). In addition, visual images retain the structural (e.g., spatial, organizational) properties of the objects/events they denote (Kosslyn, 1973, 1994; Rouw, Kosslyn, & Hamel, 1997). When one imagines sipping a strawberry daiquiri, for example, the resultant mental representation is supported, in large part, by the same perceptual and motoric operations that accompany the veridical experience. As a result, imagining and perceiving an object (or event) trigger equivalent subjective (e.g., emotional) responses. Given that processing objectives exert a direct influence on perception (e.g., Bar, 2009; Bar et al., 2006), what this suggests is that mental imagery likely serves as the primary medium through which action goals and temporal distance impact representations of the future (Moulton & Kosslyn, 2009). We explore this possibility in the current inquiry.

1.1. The current research

To elucidate how action goals and temporal distance shape the contents of prospection, participants were given a guided-imagery task in which they were asked to mentally simulate one of two goal-oriented activities. Specifically, participants were instructed to imagine travelling to Egypt to visit a pyramid either next week (i.e., near future) or in 10 years time (i.e., distant future). When on site, their task was to either to climb (i.e., energetic action) or to photograph (i.e., non-energetic

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