Acta Psychologica 190 (2018) 188–198

Contents lists available at ScienceDirect

Acta Psychologica

journal homepage: www.elsevier.com/locate/actpsy

Close or far? Affect explains conflicting findings on motivated distance perception to rewards

Dario Krpan[a,*], Simone Schnall[b]

[a] Department of Psychological and Behavioral Science, London School of Economics and Political Science, Houghton Street, London WC2A 2AE, United Kingdom
[b] Department of Psychology, University of Cambridge, Downing Street, Cambridge CB2 3EB, United Kingdom

ARTICLE INFO

Keywords:
Approach and avoidance
Motivated perception
Economy of action
Distance perception
Eating

ABSTRACT

Research on motivated perception has yielded conflicting findings: Whereas Balcetis and Dunning (2010) showed that people approaching (vs. avoiding) rewarding objects (e.g. food) see them as closer, Krpan and Schnall (2014a) found the opposite. Furthermore, whereas Balcetis (2016) suggested that people who perceive rewarding objects as closer (vs. farther) should subsequently consume more, Krpan and Schnall (2017) showed that they actually ate less. We introduce affect as the missing link to explain these conflicting findings. Two experiments showed that approach and avoidance can either involve, or lack, an affective experience, which in turn determines how they influence perception, and how perception is related to behavior. Consistent with Krpan and Schnall (2017), *non-affective* approach (vs. avoidance) motivation made candies look farther; seeing candies as farther in turn predicted increased consumption (Experiment 1). In contrast, consistent with Balcetis and Dunning (2010), *affective* approach (vs. avoidance) motivation made these stimuli look closer; seeing candies as closer was associated with more being eaten (Experiment 2). Our findings therefore reconcile previous inconsistencies on motivated perception, and suggest that people's view of their surroundings is more dynamic than previously assumed.

1. Introduction

Traditionally, visual perception researchers have primarily examined how objective physical properties of the environment, such as an object's texture or geometrical shape, influence what people see (Kaufman, 1974; Michaels & Carello, 1981). Despite this trend, a small group of scholars has approached visual perception from a different angle, by proposing that even subjective psychological states can shape how people visually interpret their environment. Early on, Bruner and Goodman (1947) argued that people's needs and desires determine what they see. Similarly, Gibson (1979) theorized on the importance of one's ability to act in visual processing. However, notwithstanding these early theories, researchers have only recently started to more comprehensively investigate the extent to which behaviorally relevant factors indeed shape how people view their environment (for reviews, see Balcetis, 2016; Proffitt & Linkenauger, 2013; Firestone, 2013; Firestone & Scholl, 2016; Schnall, 2017a; Witt, 2017). For example, observers who were able to reach a target object using a reach-extending tool (e.g. a conductor's baton) judged it to be closer than those who did not have a tool and thus could not reach it (Witt, 2017; Witt, Proffitt, & Epstein, 2005). Moreover, when walking effort increased, as manipulated via a treadmill, participants estimated distances to target objects as farther (Proffitt, Stefanucci, Banton, & Epstein, 2003; White, Shockley, & Riley, 2013; Witt, 2017).

Although numerous studies following this so-called *economy of action* approach (Proffitt, 2006) have been carried out under the assumption that perception is in the service of action (i.e., it provides a read-out about possible actions in a given environment), very few studies probed directly whether perception itself is linked to everyday actions such as walking or eating. To address this issue, Krpan and Schnall (2017) relied on the dual systems account of behavior, according to which people's actions are shaped by two distinct processes—impulsive and reflective (Strack & Deutsch, 2004). The reflective system guides behavior through reasoning and rational thinking, which is cognitively costly (Vohs, 2006). Thus, whenever people's cognitive capacity is diminished (e.g. if they are tired or depleted), impulsive forces such as motivation take over (Hofmann, Friese, & Strack, 2009; Vohs & Faber, 2007). Based on the assumption that perception is shaped by impulses (see Balcetis, 2016; Krpan & Schnall, 2014a), Krpan and Schnall (2017) showed that it predicts actions only when people act impulsively. More precisely, distance estimates to candies predicted consumption for people who were tired or depleted (impulsive system).

* Corresponding author.
E-mail address: d.krpan@lse.ac.uk (D. Krpan).

https://doi.org/10.1016/j.actpsy.2018.08.008
Received 6 March 2017; Received in revised form 3 April 2018; Accepted 10 August 2018

In contrast, for those who were awake or not depleted eating was predicted by their dietary restraint towards candies (reflective system). Overall, Krpan and Schnall (2017) concluded that using perceptual estimates to predict a behavior requires considering whether it is regulated by impulsive or reflective forces.

Although Krpan and Schnall (2017) clarified when perception predicts action, the exact direction of this relationship remains controversial. Indeed, in their research, seeing candies as farther was linked to stronger self-reported motivation to eat them and to increased consumption. This would suggest that perceiving rewards as more distant generally reflects heightened motivation (see also Krpan & Schnall, 2014a). However, other theoretical accounts posit that motivation as a primary component of the impulsive system should have the opposite link to perception, and hence the relationship between visual estimates and behavior should also differ. In particular, Balcetis (2016) theorized that an urge to act towards everyday stimuli makes them appear as closer: In one of the representative findings, the motivational state of desire made people estimate distances to stimuli such as chocolate as smaller relative to less desirable objects such as feces (Balcetis & Dunning, 2010). Based on these effects, the authors also argued that perceiving objects as closer should be associated with increased behavioral frequency (e.g. eating more chocolate). Hence, although researchers generally agree that motivated behavior is linked to perception, the exact direction of the effects remains a point of debate. To resolve this issue, we first examine motivational processes that constitute the impulsive system.

1.1. Motivational underpinnings of the impulsive system

At the outset it is necessary to provide a definition of motivation. In line with other researchers we use the term as referring to psychological processes that increase the propensity to act regarding stimuli linked to the brain's reward circuitry, such as sugary foods (e.g. Avena, Rada, & Hoebel, 2008; Kelley, 2004). Although different motivational states can be triggered by physiological needs such as hunger, desirability of the target stimulus, or automatic influences from the external environment (e.g. Briers, Pandelaere, Dewitte, & Warlop, 2006; Moskowitz & Grant, 2009; Shah & Gardner, 2008; Strack & Deutsch, 2004), motivation can broadly be organized along a single dimension known as approach-avoidance (e.g. Elliot, 1999, 2006, 2008; Gray & McNaughton, 2003; Harmon-Jones, Harmon-Jones, & Price, 2013; Strack & Deutsch, 2004). Approach refers to any conscious or non-conscious visceral state that enhance the tendency to attain rewarding objects, whereas avoidance minimizes this tendency and makes people more likely to evade them (Hofmann, Friese, & Strack, 2009; Price, Dieckman, & Harmon-Jones, 2012; Strack & Deutsch, 2004).

Given that approach versus avoidance is a fundamental dimension of motivation, it has been placed at the core of the impulsive system. Indeed, in one of the most influential dual-systems accounts, Strack and Deutsch (2004) argued that it constitutes motivational forces directed at either approaching or avoiding everyday stimuli. In order to impact people's behavior, these two motivations need to override rational decision making that is at the core of the reflective system (Strack & Deutsch, 2004). This can occur under two circumstances—when they become strong enough to overcome reflective processes, or when people's ability to act rationally gets impaired because they are tired or depleted (Förster, 2003; Krpan & Schnall, 2017; Schmeichel, Harmon-Jones, & Harmon-Jones, 2010; Strack & Deutsch, 2004; Vohs & Faber, 2007).

Convincing evidence supporting the notion that sufficiently strong motivation can overcome reflective processes comes from research on embodied approach and avoidance motivation (Förster, 2003; Harmon-Jones, Price, & Harmon-Jones, 2014; Streicher & Estes, 2016; Van den Bergh, Schmitt, & Warlop, 2011). Indeed, certain bodily movements associated with getting closer to rewards or moving away from them can induce approach (or avoidance) and thus impact behavior regarding them (Cacioppo, Priester, & Berntson, 1993; Strack & Deutsch, 2004). For example, flexing one's arm—a motor movement evolutionarily linked to pulling desired objects closer—boosted approach motivation and thus increased the consumption of delicious cookies compared to extending the arm—a motor movement linked to pushing them away (Förster, 2003). This influence occurred outside of the realm of the reflective system because people did not consciously consider that arm positions exerted an impact on their eating.

In other circumstances approach and avoidance motivations may not be sufficiently strong to override reflective forces and impact actions. However, they can exert control over behavior if people's ability to act rationally is impaired because they are tired, depleted, or habitually low in self-regulatory capacity (Hofmann, Friese, & Strack, 2009; Hofmann, Friese, & Wiers, 2008; Schmeichel et al., 2010). To demonstrate this, researchers assessed the strength of spontaneously occurring motivations regarding desirable beverages and foods by employing implicit association tests specifically designed to probe automatic approach and avoidance tendencies (Hofmann, Friese, & Strack, 2009; Ostafin, Marlatt, & Greenwald, 2008). Whenever people's cognitive capacity was diminished due to ego-depletion, approach resulted in higher quantities of foods and drinks consumed relative to avoidance, whereas this effect did not occur for people who were not depleted. In line with these findings Krpan and Schnall (2017) showed that perception as an impulsive precursor of behavior predicted candy consumption only for depleted participants, but not for those who were rested and thus acted in line with their dietary restraint towards candies.

Overall, previous research indicates that approach and avoidance are core motivational forces that constitute the impulsive system and guide behavior outside of people's deliberate decisions. Given that the present paper aims to resolve discrepant findings regarding how motivation shapes perception and its relationship to behavior, we next outline these discrepancies in relation to approach and avoidance.

1.2. Approach versus avoidance motivation, perception, and action: a discrepancy in the motivated perception literature

The critical inconsistency regarding motivational influences on perception is that approach (vs. avoidance) was found to both increase and decrease perceived distance regarding rewarding stimuli. In particular, Balcetis and Dunning (2010) induced the motivation to approach (= drink) water by making participants consume salty pretzels, whereas they evoked avoidance by making participants quenched. Thirsty (vs. quenched) participants subsequently estimated a rewarding stimulus, namely a bottle of water to appear as *closer*. The authors further argued that this perceptual bias has a functional role in propelling action—it should energize people to eventually undertake approach behaviors such as drinking (see Balcetis, 2016). In contrast, Krpan and Schnall (2014a) obtained opposing effects when inducing approach motivation via either arm flexion (Cacioppo et al., 1993) or a cognitive procedure (Friedman & Förster, 2005a): Compared to avoidance, approach *increased* perceived distance to rewarding stimuli such as pleasant words or images of tasty foods. The authors proposed the following explanation behind this effect—whereas approach is a natural reaction to rewards (Strack & Deutsch, 2004), avoiding these stimuli is an incompatible response, thus resulting in a cognitive inconsistency that reduces perceptual estimates (for a more elaborate discussion, see Krpan & Schnall, 2014a, 2017). Overall, based on these findings, it remains unclear how exactly motivation influences perception, and how perception in turn predicts motivated behaviors such as eating.

One possible reason behind this discrepancy is that approach and avoidance can occur in two fundamentally different ways (Friedman & Förster, 2005a). Sometimes, motivation is accompanied by a conscious affective experience. For example, people may feel positive affect when anticipating eating an ice cream, but negative affect when encountering a spider. Such “affective” motivational states can either arise naturally (e.g. the experience of desire to attain a stimulus) or are induced via