

# How One Thing Leads to Another: Spillover Effects of Behavioral Mind-Sets

Alison Jing Xu<sup>1</sup> and Norbert Schwarz<sup>2,3</sup>

<sup>1</sup>Carlson School of Management, University of Minnesota; <sup>2</sup>Department of Psychology, University of Southern California; and <sup>3</sup>Marshall School of Business, University of Southern California

## Abstract

Cognitions involved in a goal-directed activity may influence people's behaviors in unrelated domains. We review evidence for such spillover effects and discuss the underlying processes in terms of behavioral mind-sets.

## Keywords

mind-set, spillover effect, motivation-cognition interface, interference

Would thinking about which of two elective courses you prefer make it more likely that you select and purchase a chocolate candy? Would making comparative judgments of animals (e.g., Which fly faster, dragonflies or butterflies?) increase the odds that you go on a date? Would being hungry make you buy more things, including nonfood items that cannot satisfy your hunger? The answer to these questions is "Yes!" But why would such influences emerge? In a nutshell, the first task (say, comparing elective courses) involves procedures (here, comparison processes) that are subsequently more accessible in memory. This increases the likelihood that those procedures will be applied to the next task (here, making purchase decisions about chocolate candies), leading the person to compare candies and select one instead of considering whether he or she wants any candy to begin with. Such spillover effects have been observed in many domains. We first review how they emerge from the previous use of mental procedures and then turn to the role of motivation.

## Behavioral Mind-Sets: A Theoretical Framework

*Behavioral mind-set* refers to a cognitive or motor procedure that is activated when a person performs a behavior while pursuing one goal and that procedure subsequently spills over to guide pursuit of a different goal (Wyer & Xu, 2010; Wyer, Xu, & Shen, 2012). Several conditions need to be met for a spillover effect to occur. First, procedures used to achieve goals can be represented at

different levels of abstractness in an associative network. Different situation-specific procedures (e.g., comparing physical attributes of animals, comparing two types of candies) are instantiations of the same general procedure (e.g., making comparative judgments) at the abstract level. Second, applying a situation-specific procedure to pursue a specific goal increases the accessibility of the general procedure. Third, this, in turn, increases the likelihood that the procedure will be applied to the next task, provided it is applicable. This conceptualization of behavioral mind-sets differs from the conceptualization in research that uses a mind-set terminology to describe people's implicit theories (e.g., whether people believe that their basic abilities are fixed or can be improved, referred to as a *fixed* or a *growth* mind-set, respectively; Dweck, 2006).

In the candy example, people who face a tempting box of candies may first decide whether to have any candy at all. Only at the next step might they proceed to compare the candies to select their preferred one. But if they just decided on their preference for elective classes, the highly accessible comparison procedures involved might spill over to the new task, leading them to focus on which candy they prefer without considering whether they want to eat any candy at all. As a result, they are more likely to choose a candy from the

## Corresponding Author:

Alison Jing Xu, University of Minnesota, 3-150 Carlson School of Management, 321 19th Ave. South, Minneapolis MN 55455  
E-mail: alisonxu@umn.edu

set than to reject all candies. In more general terms, the highly accessible procedures bearing on which to choose bypassed the decision of whether to choose, allowing an unrelated task to influence chocolate consumption (Xu & Wyer, 2007). Similarly, making comparative judgments of animals has been shown to increase the likelihood of selecting a potential dating partner instead of deciding not to select anyone (Xu & Wyer, 2008).

Next, we review empirical evidence from different areas of research and discuss its implications for the operation of behavioral mind-sets.

### Spillover Effects

The above examples illustrate the influence of a *comparative mind-set*, studied by Xu and Wyer (2007, 2008). They assumed that goal-directed behaviors often follow a sequence. People first decide whether or not to pursue a goal. If the answer is “yes,” and there are several options available, they next decide which option they prefer. Finally, they decide how to implement the choice. As discussed, making prior comparative judgments in unrelated domains may increase the accessibility of procedures that help in the decision of which to choose, thus bypassing the initial step of whether one wants to choose at all. Accordingly, activating a comparative mind-set can increase individual consumers’ purchase likelihood.

Theoretically, an impact of behavioral mind-sets can be more apparent when the procedure favored in the mind-set differs from the default processing strategy that people would use anyway, given the nature of the task and situation. Xu and Wyer (2012) tested this implication in the domain of persuasion. In general, messages are persuasive when they elicit agreement, but not when they elicit disagreement (Petty & Cacioppo, 1986). Can an unrelated preceding task influence how people respond to a persuasive message? To find out, Xu and Wyer first asked participants to list their thoughts about several propositions. Depending on condition, they received statements they were likely to agree with (e.g., “Reading enriches the mind,” “My university should not increase tuition fees”) or likely to disagree with (e.g., “Reading is bad for the mind,” “My university should increase tuition fees”). If this task induces a *bolstering* mind-set (i.e., generates supportive thoughts) or a *counterarguing* mind-set (i.e., generates nonsupportive thoughts), it should influence how participants process and respond to subsequent unrelated messages. However, this influence should be more apparent when a mind-set-induced response (agreement or disagreement) is not the default response to the new message in the first place. Supporting this prediction, results showed that when asked to evaluate an attractive

vacation spot that was likely to elicit agreeable thoughts, participants with a counterarguing mind-set arrived at less favorable evaluations than those with a bolstering mind-set. Evaluations of participants in the bolstering-mind-set group did not differ from those of a no-mind-set control group. Conversely, when participants evaluated exotic dishes that were likely to elicit disagreeable thoughts, such as scorpions and seahorses, those with a bolstering mind-set arrived at more favorable evaluations than those with a counterarguing mind-set, and evaluations did not differ between the counterarguing-mind-set group and a no-mind-set control group. In both cases, mind-sets exerted a pronounced influence when the procedures they rendered accessible differed from what people would otherwise do.

In a related study (Xu & Wyer, 2012), Republicans, Democrats, and Independents watched a video of a speech by John McCain, a speech by Barack Obama, or a segment of the presidential debate between the two. Next, participants watched a speech by Toyota’s president and a Toyota commercial aiming to enhance consumers’ confidence in its products. Finally, participants evaluated the brand Toyota. As expected, among Republicans, listening to McCain induced a bolstering mind-set, and listening to Obama induced a counterarguing mind-set, whereas the reverse was true for Democrats. While Independents developed a bolstering mind-set when listening to both McCain and Obama, their mind-set turned to a counterarguing one as they followed each candidate’s arguments in the debate. More important, these mind-sets carried over to how people responded to the Toyota materials by varying their tendency to agree or disagree, resulting in different evaluations of the brand.

### Interference Effects

Spillover effects of mind-sets are expected when the procedures activated by previous goal-directed activities facilitate goal pursuit on a subsequent task. Conversely, interference effects of mind-sets are expected when the activated procedures are incompatible with the procedures that would facilitate goal pursuit on a subsequent task. Supporting evidence has been observed in several different areas of research.

Individuals often encode information in the modality in which it is communicated (Wyer & Radvansky, 1999). Verbal information is typically encoded in terms of semantic concepts, and pictorial information is typically encoded in terms of visual images. When people process a human face, visual processing dominates. Asking perceivers to verbally describe the face they see impairs later face recognition by interfering with visual processing (Schooler & Engstler-Schooler, 1990). Consistent with the logic of behavioral mind-sets, Dodson, Johnson, and

Schooler (1997, Study 3) found that this interference effect was not limited to the face that participants were asked to describe. Instead, having described one face also impaired later recognition of another face, for which no description was required. Presumably, the verbal routine rendered accessible by describing the first face was applied to other faces, thus impairing encoding and recognition of all faces.

In the domain of problem solving, Moreau and Engeset (2016) found that solving well-defined problems can impair performance on solving subsequent ill-defined problems. Well-defined problems are characterized by a clearly specified initial problem state, a known goal state, and a known set of processes that can be used to achieve the goal state (e.g., building a LEGO house by following step-by-step instructions). For ill-defined problems, the initial problem state is open to interpretation, the cognitive strategies needed to generate solutions are uncertain, and the goal state is not specified (e.g., as in the Torrance Tests of Creative Thinking). Solving well-defined problems can activate a convergent-thinking mind-set, which interferes with the divergent processing required to solve ill-defined creative problems, resulting in poorer performance.

Activating a behavioral mind-set may also interfere with emotional processing in decision making. Testing this possibility in the domain of ethical behavior, Wang, Zhong, and Murnighan (2014) activated a cognition-based calculative mind-set by asking participants to work on a series of GRE math problems (vs. GRE verbal problems; Study 4). Next, participants played a modified ultimatum game, in which Player 1 decided how to allocate \$10, and Player 2 decided whether to accept his or her proposal. Importantly, only Player 1 knew the value of the endowment. Hence, when making a proposal, this player could lie about the endowment's value to increase the likelihood that Player 2 would accept the offer. As expected, inducing a calculative mind-set through a preceding math task increased the likelihood of lying from 12% in the control condition to 50% in the mind-set condition. A follow-up study showed that a calculative mind-set dampened participants' emotional reactions in the decision process, leading to more selfish behaviors in a dictator game.

### **Motivational Antecedents of Behavioral Mind-Sets**

In the studies reviewed above, behavior in one domain influenced subsequent behavior in an unrelated domain by facilitating or impairing the accessibility of an applicable procedure. Whereas these effects are cognitive in nature, other streams of research showed that motivations evoked in one domain can influence motivated

behavior in another domain. For example, tasting a delicious Hawaiian punch can motivate people to seek additional rewards in other domains, resulting, for example, in a higher desire for a massage (Wadhwa, Shiv, & Nowlis, 2008). Such motivational spillovers are limited to domains that can satisfy the underlying motive (here, a motive for hedonic rewards) and are not observed in domains that are irrelevant to the motive (Wadhwa et al., 2008). Domain-specific motivations (e.g., a desire to smoke induced by depriving habitual smokers of nicotine) can also make unrelated rewards seem less attractive (e.g., Brendl, Markman, & Messner, 2003). Such motivational effects are reflected in changes in desire and liking as well as willingness to pay, and individuals may or may not follow through on these desires.

Against this background, research into behavioral mind-sets raises an intriguing possibility: A domain-specific motivation (say, hunger) may motivate a domain-specific behavior (eat food) that entails procedures (acquire food for consumption) that are applicable beyond the specific domain (acquire products in general), which may result in spillover effects that are not suitable to satisfy the motive (e.g., acquire more binder clips when hungry). Xu, Schwarz, and Wyer (2015) explored this possibility by testing whether hungry people are more likely to acquire objects that cannot satisfy their hunger, such as a set of binder clips. The logic of behavioral mind-sets further predicts that hungry people's increased acquisition of binder clips is not driven by an increased desire for them—binder clips cannot satisfy the hunger motive and are merely acquired because hunger rendered a general acquisition procedure more accessible. This distinguishes spillover effects driven by behavioral mind-sets from motivational spillovers, which are accompanied by changes in valuation (e.g., Brendl et al., 2003; Wadhwa et al., 2008).

Xu and colleagues (2015, Study 1) first tested whether hunger indeed increases the accessibility of general acquisition concepts. Participants were shown 22 words and 22 nonwords, flashed one at a time on a computer screen for 50 ms each. Following each flash, participants wrote down the word if they had recognized it or recorded an "X." Of the 22 words, 4 were hunger-related (e.g., "hunger," "starve"), 9 were semantically related to acquisition (e.g., "acquire," "want"), and the rest were control words. As expected, hungrier participants were more likely to recognize both hunger-related and acquisition-related words, indicating that hunger increased the accessibility of both concepts.

More importantly, the hunger-induced acquisition mind-set had behavioral consequences. In one study, participants were asked not to eat for 4 hr prior to participating in a food test. On arrival in the lab, some participants first examined binder clips, decided how

many they wanted to take, and then reported their evaluation of the binder clips before proceeding to a cake taste test. Other participants first completed a cake taste test that provided enough food to satisfy their hunger before they examined binder clips. Hungry as well as satiated participants did not evaluate the binder clips as particularly attractive and, more importantly, did not differ in their evaluations. Nevertheless, they differed dramatically in how many binder clips they took for their personal use—hungry participants took 70% more (Xu et al., 2015, Study 4). Three additional studies replicated this observation, showing that hunger increases the acquisition of nonfood items without increasing liking of these items. Presumably, this increased acquisition of items that cannot satisfy one's hunger emerges because the routines geared toward acquiring items that can satisfy one's hunger spill over to other domains, resulting in a general acquisition pattern.

## Conclusions

The studies reviewed here shed light on how cognitive or motor activities in one situation may activate a behavioral mind-set, which subsequently affects behavior in a different, unrelated domain. Such spillover effects occur when situation-specific procedures used to achieve goals increase the accessibility of the general procedure they instantiate, which, in turn, is reapplied in later situations. A given behavioral mind-set may have either a positive effect, if the activated procedure facilitates subsequent goal pursuit, or a negative effect, if it interferes with the optimal procedure that should be used. Moreover, a behavioral mind-set can be triggered by either actual utilization of the procedure or the motivation to use the procedure.

The activation and persistence of a behavioral mind-set follow the general rules of knowledge accessibility (Förster & Liberman, 2007; Higgins, 1996). In the studies reviewed here, a behavioral mind-set became accessible because a cognitive or motor procedure had been activated recently, either through past behavior or through preparation for future goal pursuit. A behavioral mind-set can also become chronically accessible when a procedure has been used frequently (Wyer & Xu, 2010). If not reinforced through usage, the accessibility of a behavioral mind-set deteriorates over time, but probably at a slower rate than the accessibility of semantic concepts (Smith & Branscombe, 1987). Although a behavioral mind-set is usually activated during goal pursuit, it can be reapplied independently of the goal that initially activated it.

Behavioral mind-sets can play a crucial role in understanding how one thing leads to another, often without

the actor's intention. Future research may fruitfully address strategies that can curb spillover effects, reducing the unintended impact of past activities.

## Recommended Reading

- Xu, A. J., Schwarz, N., & Wyer, R. S., Jr. (2015). (See References). Shows that hunger promotes the acquisition of nonfood objects that cannot satisfy hunger.
- Wyer, R. S., Jr., Xu, A. J., & Shen, H. (2012). (See References). Provides a conceptualization of behavioral mind-sets and reviews their impact on goal-directed behaviors.

## Declaration of Conflicting Interests

The author(s) declared that there were no conflicts of interest with respect to the authorship or the publication of this article.

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