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Abstract

Although essential for psychology, introspective self-talk has rarely been studied with respect to its effects on behavior. Nevertheless, the interrogative compared with the declarative form of introspective talk may elicit more intrinsically motivated reasons for action, resulting in goal-directed behavior. In Experiment 1, participants were more likely to solve anagrams if they prepared for the task by asking themselves whether they would work on anagrams as opposed to declaring that they would. In the next three experiments, merely writing *Will I* as opposed to *I will* as part of an ostensibly unrelated handwriting task produced better anagram-solving performance and stronger intentions to exercise, which suggests that priming the interrogative structure of self-talk is enough to motivate goal-directed behavior. This effect was found to be mediated by the intrinsic motivation for action and moderated by the salience of the word order of the primes.

Keywords

self-talk, self-regulation, intention, linguistic categories

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How does the way in which you talk to yourself shape your future actions? What if asking yourself a question about your potential behavior increased the likelihood of that behavior? These questions come at a time when introspection is not only a valuable psychological method (Locke, 2009) but also a subject matter in and of itself (Albarracín, Hart, & McCulloch, 2006; Albarracín, Noguchi, & Earl, 2006). Despite the popularity of self-report and thought protocols as methods to understand behavior (Ericsson & Simon, 1980; Locke, 2009), how the form of one's thoughts influences actions has been rarely the focus of contemporary psychological investigation (for notable exceptions, see, e.g., Delaney, Ericsson, & Knowles, 2004; Dulany, 1991; Fischer & Zwaan, 2008). This article concerns how the declarative and interrogative form of thoughts can shape intentions and future behaviors in domains from intellectual performance to health. These processes are likely to be important to researchers in cognitive, social, clinical, health, and developmental psychology, as well as practitioners in clinical, educational, and work settings (see, e.g., Hettrema, Steele, & Miller, 2005).

As introspection often takes the form of self-talk (a conversation with oneself), the language used in this self-talk is likely to affect how the mental content of the talk is represented. The role of linguistic categories and structures in shaping the way

people construct mental representations of events (i.e., situation model) is well-known (Zwaan & Radvansky, 1998). For example, reading sentences with the perfective as opposed to the imperfective verb aspect (e.g., “The boy walked to the store” as opposed to “The boy was walking to the store”) leads to choosing pictures that show completed as opposed to ongoing events (Madden & Zwaan, 2003). Also, describing one's past actions in the imperfective as opposed to the perfective verb aspect (e.g., “I was solving anagrams” as opposed to “I solved anagrams”) activates detailed action-relevant knowledge, which in turn increases the likelihood of repeating the action in a new context (Hart & Albarracín, 2009). Therefore, the linguistic structure of self-talk should be equally likely to elicit thoughts that can influence the formation of intentions to perform a certain behavior.

What grammatical categories or structures can bring intentions to mind? Several independent lines of research and practice suggest that engaging in interrogative as opposed to declarative talk (e.g., *Will I* vs. *I will*) may lead to increased

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intrinsic motivation. For example, open-ended questions are often used in motivational interviewing in psychotherapy settings. The idea is to generate thoughts about accomplishing a goal without these thoughts being imposed by the therapist (Sheldon, Williams, & Joiner, 2003). Furthermore, rhetorical questions within a message have been shown to increase the persuasion of strong messages by inducing thoughts about the arguments contained in these messages (Burnkrant & Howard, 1984). Such rhetorical questions also increase the perception of the message source as less pressuring and therefore less threatening to the autonomy of the message recipient (Ahluwalia & Burnkrant, 2004). More generally, the question form compared with the direct form of requests (e.g., *Can you pass the salt?* vs. *Pass the salt*) is universally perceived to be more respectful of the addressees' autonomy (Hotgraves & Yang, 1990).

In sum, as illustrated in Figure 1, self-posed questions about a future behavior may inspire thoughts about autonomous or intrinsically motivated reasons to pursue a goal, leading a person to form corresponding intentions and ultimately to perform the behavior. In fact, people are more likely to engage in a behavior when they have intrinsic motivation (i.e., when they feel personally responsible for their action) than when they have extrinsic motivation (i.e., when they feel external factors such as other people are responsible for their action; Deci & Ryan, 2000) in diverse domains from education to medical treatment, to addiction recovery, to task performance (see, e.g., Hettema et al., 2005; Reeve & Deci, 1996; Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004; Williams, Grow, Freedman, Ryan, & Deci, 1996).

In the present study, a series of four experiments tested whether the behaviors and intentions following interrogative self-talk differed from those following declarative self-talk. Experiments 1 and 2 tested the effect of self-talk directly on behavior, and Experiments 3 and 4 tested the effect of self-talk on intentions. We expected that thinking *whether* one would work on a task (as opposed to simply thinking that one would; Experiment 1) would lead to better task performance. Also, given the often automatic influence of grammatical forms on thought (Zwaan & Radvansky, 1998), we hypothesized that being exposed to the word sequence *Will I* (as opposed to *I will*) might be enough to implicitly lead to the organization of thoughts in an interrogative form and corresponding behaviors (Experiment 2) and intentions (Experiments 3 and 4). Experiments 3 and 4 further investigated how this effect is moderated

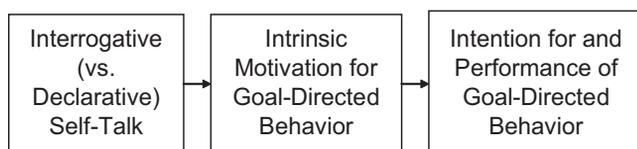


Fig. 1. The process of motivating goal-directed behavior through interrogative self-talk. Self-posed questions about a future behavior may inspire thoughts about autonomous or intrinsically motivated reasons to pursue a goal, leading a person to form corresponding intentions and ultimately to perform the behavior.

by the salience of the word order and mediated by intrinsic motivation.

Experiment 1

Method

Participants and design. Fifty-three introductory psychology students enrolled in the study in exchange for course credit. The design in Experiment 1 included two cells (question vs. assertion thought), and the outcome measure was the number of correctly solved anagrams in an anagram-solving task.

Procedure. Participants were instructed to prepare for an anagram-solving task by taking 1 min to think either *whether* they would work on anagrams or simply *that* they would work on anagrams. Immediately after this thinking task, participants worked on the anagram task. Ten words were presented simultaneously on the computer screen (e.g., *when*, *cause*, and *itch*), and the task was to rearrange the letters in each word to form a different word (e.g., *hewn*, *sauce*, and *chit*, respectively). Participants were given 10 min to complete the task by typing the 10 new words. No hints for the solutions were provided. At the conclusion of the experimental session, participants were asked what they thought the purpose of the study was and then were debriefed.

Results and discussion

None of the participants guessed the purpose of the study. The participants solved significantly more anagrams when they were told to think about *whether* they would do anagrams ($M = 2.60$, $SD = 1.72$) than when they were told to think that they *would* do anagrams ($M = 1.84$, $SD = 1.42$), $t(49) = 2.11$, $p = .04$, $g = 0.6$. Nonetheless, these results were obtained with explicit instructions. The next experiment was an attempt to examine whether incidentally exposing participants to the interrogative form (i.e., verb and then subject) can produce the same effect.

Experiment 2

Method

Participants and design. Participants were 50 introductory psychology students, who received course credit for their participation. The experimental design included four cells (word primes: *Will I*, *I will*, *I*, and *Will*). The number of correctly solved anagrams was the dependent measure.

Procedure. We told participants that we were interested in people's handwriting practices. With this pretense, participants were given a sheet of paper with space to write down 20 times one of the following words or word pairs: *Will I*, *I will*,

I, or *Will*. Then they were asked to work on a series of 10 anagrams in the same way participants in Experiment 1 did. At the end of the experimental session, participants were asked what they thought the purpose of the study was and then were debriefed.

Results and discussion

None of the participants guessed the purpose of the study. The priming manipulation had a significant effect, $F(3, 46) = 3.13$, $p = .035$, $\eta^2 = .2$. As shown in Figure 2, the *Will I* prime produced better performance than any other prime, $t(46) = 3.1$, $p = .003$, $g = 1.03$. In contrast, there were no significant differences across the *I will*, *I*, and *Will* primes, $t(49)s < 1$, n.s. The results suggest that the same effect of self-talk occurs when participants are exposed to only the interrogative form of the self-talk. Moreover, the presence of our single-word controls ensured that the effect was due to the pairing of words, not the recency of *I* versus *will*.

In the next two experiments, we tested the effect of the interrogative form on intentions. In Experiment 3, we also wanted to confirm that the effect of the interrogative form depends on parsing the two word primes as a meaningful sequence. On the basis of research showing that performing a behavior leads to applying the same behavior in a subsequent context (Gollwitzer, Heckhausen, & Steller, 1990; Xu & Wyer, 2008), we predicted that writing random as opposed to meaningfully sequenced numbers would reduce the perception of the word sequence as meaningful and hence diminish its effect.

Experiment 3

Method

Participants were 46 introductory psychology students, who enrolled in the study in exchange for course credit. The

procedure was the same as in the previous experiment except that before the priming manipulation, which included only the *Will I* and *I will* primes, participants were asked to write down either a patterned (e.g., 2 4 16 64 2 4 16 64) or a random (e.g., 2 5 4 1 8 3 9 2) sequence of 24 numbers to ostensibly clear their mind for the next handwriting task (i.e., writing *Will I* or *I will*). After the word primes, participants reported their intentions to exercise by writing the physical activities they planned for the next week and the number of hours they planned to devote to each.

Results and discussion

None of the participants guessed the purpose of the study. The total number of hours of intended exercise was examined in a 2 (number-sequence prime: patterned vs. random) \times 2 (word prime: *Will I* vs. *I will*) analysis of variance. We expected that incidental exposure to a random as opposed to an ordered sequence of numbers would decrease the participants' perception of the word order as a meaningful sequence, and hence weaken the effect of the interrogative form. The analysis of variance revealed a significant interaction between the two study factors, $F(1, 42) = 4.14$, $p = .048$, $\eta^2 = .09$. As shown in Figure 3, participants previously primed with patterned sequences had stronger intentions to exercise in the *Will I* as compared with the *I will* condition, $t(42) = 7.45$, $p < .001$, $g = 3.05$. However, this effect disappeared when participants had previously written random sequences, $t(42) = 1.06$, n.s.

The results from Experiment 3 are important in establishing that perceiving the primes as a meaningful pattern of words is necessary for the effects of word order to emerge and that the interrogative form can influence intentions. Nonetheless, our first three experiments did not show that the interrogative form facilitates intrinsic motivation. This assumption was tested in Experiment 4.

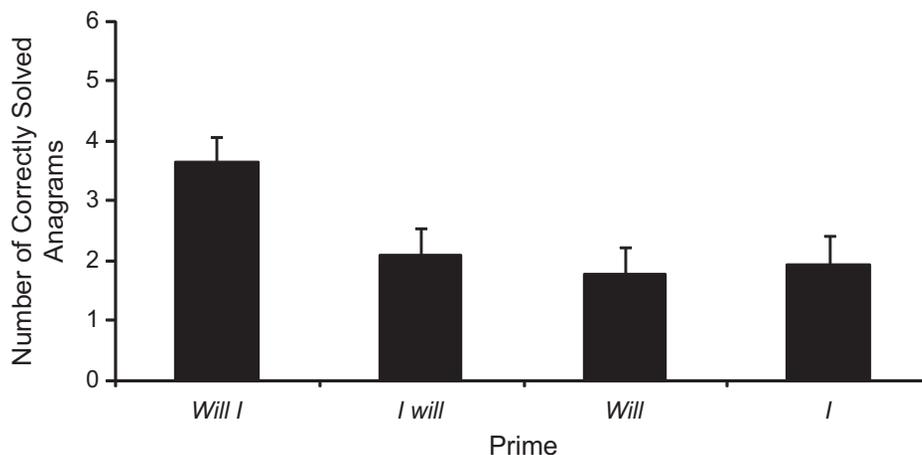


Fig. 2. Mean number of correctly solved anagrams as a function of word prime in Experiment 2. Error bars represent standard errors.

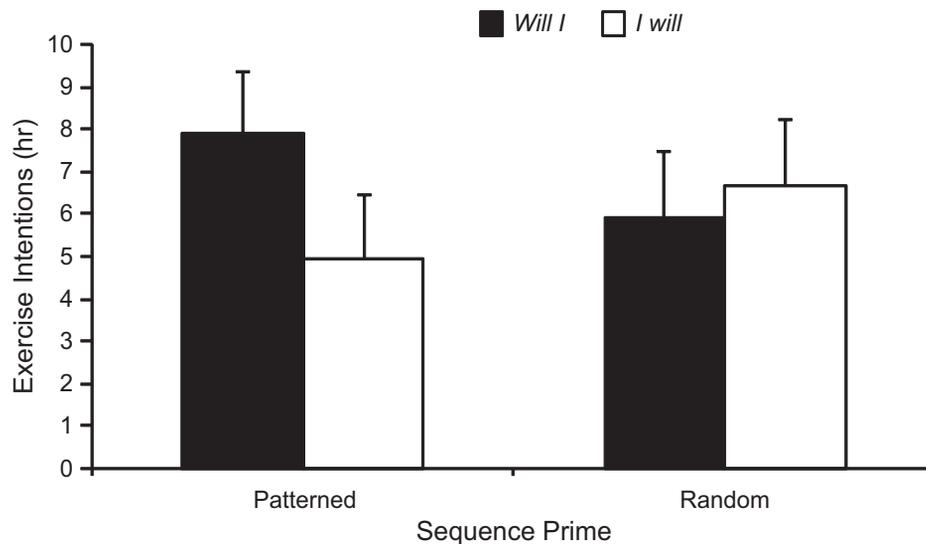


Fig. 3. Mean number of intended hours of physical exercise within the next week, as a function of number-sequence (patterned or random) and word (*Will I* or *I will*) primes in Experiment 3. Error bars represent standard errors.

Experiment 4

Method

Participants were 56 introductory psychology students, who received course credit for their participation. The procedure was the same as in the previous experiment with three exceptions. First, there was no priming of parsing (random vs. patterned). Second, the intention question asked participants to rate how much they intended to either start exercising regularly or continue to do so, on a scale ranging from 1, *not at all*, to 7, *very much*. Third, after reporting their intentions to exercise, participants rated how much each of 12 possible reasons for exercising, which were adapted from a previously validated self-regulation scale (Williams et al., 1996), was true for them. For each reason, participants provided their response on a scale ranging from 1, *not at all*, to 7, *very much*. Six of these reasons reflected intrinsic motivation to exercise (e.g., “Because I feel that I want to take responsibility for my own health”), whereas the other 6 reflected extrinsic motivation to exercise (e.g., “Because I would feel guilty or ashamed of myself if I did not”).

Results and discussion

None of the participants guessed the purpose of the study. Intrinsic motivation, extrinsic motivation, and exercise intention were analyzed in a multivariate analysis of variance with prime (*Will I* vs. *I will*) as the independent variable. The overall effect of the prime was significant, $F(3, 49) = 2.82, p = .048$. The prime had significant effects on both intrinsic motivation, $F(1, 51) = 5.71, p = .021, \eta^2 = .05$ (*I will*: $M = 5.1, SD = 1.4$; *Will I*: $M = 5.8, SD = 0.9$), and intention, $F(1, 51) = 4.06, p = .049, \eta^2 = .04$ (*I will*: $M = 5.1, SD = 1.7$; *Will I*: $M = 5.8,$

$SD = 1.5$). The effect of the prime on extrinsic motivation was not significant, $F(1, 51) = 0.36, n.s.$ (*Will I*: $M = 3.1, SD = 1.1$; *I will*: $M = 3.4, SD = 1.6$).

We then conducted a mediation analysis to determine if the effect of the prime on the intention was mediated by intrinsic motivation. As shown in Figure 4, intrinsic motivation alone and the *Will I* prime (as opposed to the *I will* prime) alone predicted the intention to exercise, and the prime alone predicted the level of intrinsic motivation. However, when both the prime and intrinsic motivation were introduced in the model, only the effect of intrinsic motivation on intention remained significant. These results, along with a significant Sobel test ($z = 2.03, p = .043, R^2 = .06$), confirmed the role of intrinsic motivation as a mediator of the effect of the prime on exercise intentions.

General Discussion

Our findings identified interrogative self-talk as an important motivator of goal-directed behavior. We confirmed that the interrogative form used in self-talk can lead to goal-directed

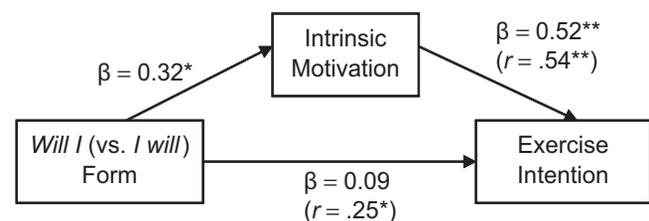


Fig. 4. Intrinsic motivation as a mediator of the effect of the interrogative form on exercise intention in Experiment 4. Parenthetical coefficients represent the direct effect of the interrogative form and intrinsic motivation. Asterisks indicate significant relationships (* $p < .05$, ** $p < .001$).

behavior, similarly to the way that the interrogative form used in behavior-change counseling, persuasive messages, and behavioral requests can lead to changes in behaviors, attitudes, and perceptions, respectively (Ahluwalia & Burnkrant, 2004; Burnkrant & Howard, 1984; Hotgraves & Yang, 1990; Sheldon et al., 2003).

Moreover, although people can engage in self-talk voluntarily, our results show that the grammatical structure of self-talk can also be activated implicitly. This finding of subtle effects implies that merely seeing another person use interrogative self-talk may be enough to produce the same effect. For example, in psychotherapy, clients may be encouraged to engage in interrogative self-talk about adaptive and healthy behaviors, to complement questions posed by the therapist.

Although there is a strong connection between intention and behavior (Albarracín, Johnson, Fishbein, & Muellerleile, 2001; Glasman & Albarracín, 2006), our studies did not specifically show that the performance of a goal-directed behavior was determined by intentions to perform this behavior, which could have been partially under the control of processes beside intention. Despite this limitation, the present results are clear in showing that the general forms of thought implicitly elicited through the grammatical structure of self-talk are capable of motivating and altering behavior. Previous studies have documented the role of linguistic forms in influencing the interpretation of linguistic meaning that will ultimately influence the way people think about a situation (i.e., situation model) and in making certain past intentions available in mind (Hart & Albarracín, 2009; Madden & Zwaan, 2003). The present study shows that the effect of grammatical categories can go beyond those prior findings and directly motivate behavior and intentions. Future research may investigate whether the interrogative forms of other verbs (e.g., *can*, *should*, or *would*) and other grammatical structures (e.g., passive vs. active voice) can produce similar effects on behavior. Given the identified effects of even very subtle introspective talk on behavior, further work is warranted to explore the important but long-overlooked effects of the shape of introspection on behavior.

Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

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