

## When Interrogative Self-talk Improves Task Performance: The Role of Answers to Self-posed Questions

MAŁGORZATA M. PUCHALSKA-WASYL\*

*Institute of Psychology, The John Paul II Catholic University of Lublin, Lublin, Poland*

*Summary:* Nearly all the self-talk cues studied so far have been self-statements. However, the findings of Senay, Albarracín, and Noguchi suggest that interrogative self-talk produces better task performance than declarative one. Two of the experiments reported here were meant to replicate that study, but the expected differences were not confirmed. Experiment 3 showed that if a self-posed question about future behavior was answered positively, task performance was better than in groups exposed either to the self-statement 'I will do it' or to a negative answer following the question. However, these differences occurred only in those who self-reported the awareness of the impact of self-talk on their thought processes. This effect and the possible reasons why between-group differences were not found in Experiments 1 and 2 are discussed. An alternative explanation for the results of Experiment 3 is also proposed beside that stressing the impact of internal answer. Copyright © 2014 John Wiley & Sons, Ltd.

Although talking to oneself seems odd, many studies show its benefits in various domains. The functions served by self-talk include cognitive and self-regulatory functions, the internalization of rules, the rehearsal of information, self-guidance, and executive functioning (Diaz & Berk, 1992; Lee, 2011; MacKay, 1992; Winsler, Fernyhough, & Montero, 2009). Successful therapeutic interventions involving the use of self-talk in several contexts have also been demonstrated (Callicott & Park, 2003; Kamann & Wong, 1993; Sanders, Shepherd, Cleghorn, & Woolford, 1994). The most extensive literature on self-talk, concerning sport and exercise psychology, indicates that self-talk is an effective strategy for the facilitation of learning and the enhancement of performance (Hardy, 2006; Hatzigeorgiadis, Zourbanos, Galanis, & Theodorakis, 2011; Tod, Hardy, & Oliver, 2011). Generally, three characteristics of self-talk have been studied: its content (instructional vs. motivational self-talk cues), selection (assigned vs. self-selected), and overtness (internal/silent vs. external/out loud) (Hatzigeorgiadis et al., 2011). However, the way the form of self-talk influences performance has not been of interest to researchers until recently. On the one hand, it is well known that linguistic categories and structures shape the way people construct mental representations of events (Zwaan & Radvansky, 1998) and that even verb aspect (perfective vs. imperfective) used in previous tasks affects future actions (Hart & Albarracín, 2009). On the other hand, the self-talk cues usually studied were self-statements (e.g. *I'll do it, I can do it, I feel good*). Therefore, the research of Senay, Albarracín, and Noguchi, (2010) concerning the interrogative structure of self-talk and its beneficial influence on task performance was novel, and the results encouraged further explorations.

What grammatical structure of thoughts can affect performance in goal-directed behavior? Senay et al. (2010) assumed that 'self-posed questions about 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' (p. 500). They

conducted four experiments to verify this process of motivating goal-directed behavior through interrogative self-talk. In Experiment 1, participants ( $N=53$ ) were instructed to prepare for an anagram-solving task by taking 1 min to think either *whether* they would work on anagrams or *that* they would work on anagrams. The former group solved significantly more anagrams than the latter group. Experiment 2 examined whether incidental exposure to the interrogative form can produce the same effect. Participants ( $N=50$ ) were told that the research focused on handwriting practices and were asked to write one of the following words or phrases 20 times: *Will I, I will, I or Will*. Then they worked on a series of anagrams. The *Will I* prime produced better performance than any other prime. Experiment 3 tested whether the effect of the interrogative form depends on perceiving the primes as meaningful patterns of words. On the basis of research showing that performing a behavior leads to applying the same behavior in a subsequent context (Gollwitzer, Heckhausen, & Steller, 1990), it was 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. Before priming manipulation, which included only the *Will I* and *I will* primes, participants ( $N=46$ ) wrote down a sequence—either patterned or random—of 24 numbers. After priming, participants reported their intention to take physical exercise. As expected, an interaction between the two study factors (number-sequence prime: patterned vs. random, and word prime: *Will I* vs. *I will*) was revealed. Respondents previously primed with patterned sequences had a stronger intention to exercise in the *Will I* condition compared with the *I will* condition. No such effect occurred in participants who had previously written random sequences of numbers. Experiment 4 examined whether the interrogative form facilitates intrinsic motivation. Participants ( $N=56$ ) wrote either the *Will I* or the *I will* prime. Then, they rated their intention to exercise. Finally, they rated how strongly each of the 12 possible reasons for exercising applied to them. Six reasons reflected intrinsic motivation, which turned out to mediate the effect of the prime on exercise intention.

The findings of Senay et al. (2010) appear to have great cognitive and applicative value. Therefore, they encourage further exploration. However, among other things, the analyzed phenomenon concerns language, which does not have

\*Correspondence to: Małgorzata M. Puchalska-Wasył, Department of Personality Psychology, The John Paul II Catholic University of Lublin, Al. Raclawickie 14, 20-950 Lublin, Poland.  
E-mail: wasyl@kul.pl

a universal character. A question thus arises: Can the results obtained by Senay et al. be generalized to the whole population or do they refer exclusively to native speakers of English, the group that the participants represented?

Replication is a valuable mechanism of science development, because it promotes the verification, objectivization, and generalization of scientific theses (Rosenthal, 1991; Yong, 2012). Autoreplication procedure in a series of experiments concerning a given phenomenon is the standard for many researchers. Still, in the case of certain processes (e.g., language related) it is particularly desirable for studies to be replicated in different cultures by different researchers. For this reason, the first two studies presented here are attempts at replicating, on a Polish population, the main result of research by Senay et al. (2010), according to which participants exposed to interrogative self-talk perform better (e.g., at anagram solving) than participants exposed to declarative self-talk. The results of the third of the presented experiments suggest the existence of an additional variable, which may be a moderator in the process of motivating goal-directed behavior through interrogative self-talk, described by Senay et al. In this sense, the third experiment opens the door to further research, likely to be important to researchers in cognitive, social, and developmental psychology as well as to practitioners in educational and work settings.

On the basis of a review of the literature on the subject, in the present study, self-talk has been conceptualized as the use of language to convey content (instructional or motivational) addressed to oneself. The language may be spoken (aloud/externally or silently/in one's mind/internally) or written; it may be used at the level of conscious processes or at the level of automatic processes—with or without conscious intent (cf. Bayer & Gollwitzer, 2007; Hatzigeorgiadis et al., 2011; Senay et al., 2010). Interrogative self-talk is self-talk that has the form of a question.

## EXPERIMENT 1

### Method

#### *Participants and design*

Participants were 56 women and 14 men, 48 part-time graduate physiotherapy students, mostly working, and 22 full-time undergraduate European studies students, with a mean age of 23.71 ( $SD=3.03$ ). The experimental design included two cells (word primes: *Will I do*, and *I will do*). The score in the anagram-solving task and the intensity of involvement in this task were the dependent measures. Five participants were excluded from analysis—two women (from the *I will do* condition) wrote the word primes incorrectly, and three persons (one man from the *Will I do* condition and two women from different conditions) were nonnative speakers, who probably found Polish anagrams significantly more difficult than other participants.

#### *Procedure*

Participants were told that the research concerned graphomotor skills. Under this pretext, each of them was given a sheet of paper to copy one of the word primes as quickly as possible for 2 min. Immediately afterwards, participants were asked to work for 7 min on a series of 14 anagrams.

After solving the anagrams, they rated their involvement in this task on a scale ranging from 1 (*not at all*) to 7 (*very much*). Finally, they were asked about the purpose of the study and then debriefed.

The procedure used resembled that of Experiment 2 by Senay et al. (2010), with three differences. First, the priming manipulation included only two word primes—an interrogative and a declarative phrase (as in Experiments 3 and 4 by Senay et al.). Second, because the experiment was conducted in Poland, the Polish language was used, which required some changes to word primes in comparison with the original ones. The *I will* word sequence used by Senay et al. literally translates into a Polish phrase meaning *I will exist*, which it was therefore necessary to change into a Polish phrase literally equivalent to the English *I will do*. The phrase *Will I* was likewise replaced with *Will I do*. Third, the pretext under which participants wrote down word primes was changed from a handwriting task to a graphomotor task. Thus, the phrase was written for 2 min instead of 20 times. In a pilot study, when hearing about handwriting practices, some participants wrote too carefully, sometimes even decoratively; consequently, in those cases priming manipulation lasted longer. The priming applied here, just like in the studies by Senay et al., combined the characteristics of mindset priming and conceptual supraliminal priming (cf. Bargh & Chartrand, 2000). A given (interrogative or declarative) mindset was activated. However, instead of being made to use the mental procedure intentionally, participants were exposed to a priming stimulus (*Will I do* or *I will do*, respectively) as part of a conscious (graphomotor) task, which is typical of conceptual supraliminal priming. In fact, this type of priming consists not so much in reproducing a stimulus a given number of times as in maintaining it in each participant's consciousness for a comparable time. Therefore, such a change in the procedure seemed permissible.

### Results And Discussion

None of the participants guessed the purpose of the study. Contrary to expectations, there were no differences between the *Will I do* and *I will do* conditions in anagram-solving performance ( $M=5.42$ ,  $SD=3.35$  and  $M=5.22$ ,  $SD=2.74$ , respectively;  $t(63)=0.27$ ,  $p=.788$ ,  $d=0.07$ ) or in the intensity of involvement in the task ( $M=5.88$ ,  $SD=1.14$  and  $M=5.56$ ,  $SD=1.32$ , respectively;  $t(63)=1.04$ ,  $p=.304$ ,  $d=0.26$ ). Analyses were not performed for gender groups separately because of the small number of male participants.

Can these results be an effect of changes to word primes in comparison with the original English-language ones? Polish grammar required adding one word (*do*) to the phrase, which gave it an unambiguous meaning. However, this change should not have diminished the effect because, as Senay et al. (2010) showed in Experiment 3, perceiving the primes as meaningful patterns of words is necessary for the effect to occur.

The fact that word primes were not written 20 times but for 2 min should not have diminished the effect either. Given that the phrase was written, on average, slightly more than 20 times ( $M=25.7$ ), the effect may actually have been strengthened rather than weakened. As Bargh and Chartrand (2000) claim, in general, the more priming stimuli are

presented to the participant, the stronger the obtained priming effects, and the stronger the priming manipulation, the longer the priming effect lasts.

In this context and in view of the findings of Senay et al. (2010), it was necessary to verify whether the unexpected results obtained are replicable in Polish population. The next experiment was to replicate Experiment 1 in a different group, balanced with regard to gender. Additionally, in order to raise statistical power to the level of .80, it was decided to increase the sample size. Assuming that the anticipated effect size and probability level would reach the values obtained by Senay et al. in their Experiment 1 comparing two groups in an anagram-solving task ( $d=0.48$ ;  $p=.04$ ), the minimum total sample size had to be established at 120 participants (for a one-tailed hypothesis).

## EXPERIMENT 2

### Method

Participants were 120 students, 61 men, and 59 women, with a mean age of 22.16 ( $SD=2.01$ ). Among them were 100 graduate and 20 undergraduate students of various subjects (psychology, mechanical engineering, logistics in transport, information technology, and geology). The experimental design and procedure were the same as in Experiment 1.

### Results And Discussion

None of the participants guessed the purpose of the study. As shown in Table 1, there were no differences between the *Will I do* and *I will do* conditions in anagram-solving performance or in the intensity of involvement in the task—just like in Experiment 1. Analogous analyses performed for gender groups separately revealed no differences, either.

The added value of a replication study that does not confirm the original results lies in the fact that it makes us look for variables that were not taken into account in the original study (Neuliep, 1991). One of such variables, which, as an uncontrolled one, may have prevented the potentially existing differences from being revealed, seems to be the directive character of self-talk. Although the interrogative format, favoring the addressee's greater autonomy, presupposes lower directiveness than the declarative format (cf. Ahluwalia & Burnkrant, 2004; Butler, Potter, Danby, Emmison, &

Hepburn, 2010), different questions (including self-posed ones) may nevertheless have different levels of directiveness. In this context, one may wonder whether the cue *Will I do* used in the Polish study is more directive than the *Will I* used in the American study. If it was, it could function in a manner that no longer inspires autonomously motivated thoughts and, consequently, would not improve performance, either. Because the Polish language does not have good equivalents for *Will I* and *I will*, a replication of the study by Senay et al. (2010) in a language other than Polish, one in which such equivalents could be phrased, would add much the value of the discussed findings.

The contrasting results of my experiments and those of Senay et al. (2010) could also be explained in the light of the dialogical approach in psychology as the impact of internal answers to self-posed questions about future behavior.

## THE ROLE OF ANSWERS TO SELF-POSED QUESTIONS

Dialogism is a general framework for the understanding of human action, cognition, communication, and language, emphasizing relational processes in the individual's interaction with others and with the environment as well as with themselves (Hermans, 2003; Linell, 2007). It is stressed here that a person responds to the prior actions or utterances of others, addresses them, and anticipates their possible future actions (Cooley, 1902; Mead, 1934). Entering into interactions effectively requires the adoption of the perspective of the 'other'. In the course of phylogenesis, the ability to adopt different perspectives alternately (e.g., one's own and someone else's) enabled the emergence of meanings, language as a set of symbols, and the human mind (Mead, 1934). In ontogenesis, external dialogs become internalized, which results in some kind of other-orientedness in solitary thinking (Hermans, 2003; Mead, 1934; Vygotsky, 1978). This is consistent with the recent social cognitive models, according to which a person carries internalized others inside, which considerably influences thinking and behavior (Andersen & Chen, 2002; Baldwin, 1992; Baldwin, Carrell, & Lopez, 1990; Ogilvie & Ashmore, 1991).

In the dialogical self theory (Hermans & Gieser, 2012; Hermans & Kempen, 1993), it is emphasized that dialogical relationships exist not only between the self and others but also within the self. Dialogical self is conceptualized as a

Table 1. Number of correctly solved anagrams and intensity of involvement in anagram-solving task as functions of word primes—comparison in gender groups in Experiment 2

Dependent Measures	Subjects	Word prime				Differences			
		<i>Will I do</i> ( $N=60$ )		<i>I will do</i> ( $N=60$ )		$t$	$df$	$p<$	$d$
		$M$	$SD$	$M$	$SD$				
Anagrams	Females	6.20	2.25	5.24	2.95	1.41	57	.165	0.37
	Males	5.20	3.41	5.94	3.13	0.88	59	.383	0.23
	Total	5.70	2.91	5.60	3.04	0.18	118	.854	0.03
Involvement	Females	5.87	0.94	5.86	0.95	0.02	57	.985	0.01
	Males	5.50	1.64	5.68	1.38	0.46	59	.648	0.12
	Total	5.68	1.33	5.77	1.18	0.36	118	.718	0.07

dynamic multiplicity of relatively autonomous I-positions which represent different points of view available for a person. Each I-position, shaped in a particular social context, is endowed with a voice (the voice of a culture, a community, a significant other, or one's own voice) and intertwined with other I-positions resembling people in social relationships (Hermans, 2003). As a result, not only external (interpersonal) but also internal (intrapersonal) dialogs are possible. Question and answer are basic dialogical forms (Bakhtin, 2003; Hermans & Kempen, 1993), which means that a question always demands an answer—from outside (from another person) or from inside (from oneself). Thus, a question about future behavior addressed to oneself also demands an answer. In cognitive terms, it can be said that when people are in an interrogative mindset, they search for answers.

On the basis of this thesis, as well as on the results of my two experiments and the findings of Senay et al. (2010), I hypothesized that task performance following a self-posed question about future behavior depends on the answer given to oneself. Senay et al. assume that interrogative self-talk increases intrinsic motivation, leading a person to form the corresponding intention and behave accordingly. I treated interrogative self-talk in this process model as two distinct variables: a self-posed question about future behavior and the answer to that question. I expected that the answer may moderate the process of motivating goal-directed behavior through interrogative self-talk, described by Senay et al. I assumed that this process may proceed as follows: a self-posed question, as opposed to declarative self-talk, does not limit the sense of autonomy (cf. Ahluwalia & Burnkrant, 2004), thanks to which the person can give any answer to the question—either positive or negative. I further assumed that only a self-posed question about future behavior that is followed by a positive answer would lead to an increase in internal motivation. As a result, task performance would also improve. After a negative answer, there would be no increase in internal motivation and no improvement in performance—but no decrease would take place, either, in comparison with declarative self-talk. These assumptions are consistent with the results of meta-analyses, which found no evidence to confirm that negative self-talk is associated with performance decrements (Tod et al., 2011).

In that context, my next experiment was to compare performance following, respectively, a positive answer to the question *Will I do it?*, a negative answer to it, and the statement *I will do it*. I hypothesized that if participants wrote an interrogative phrase with a positive answer their performance would be better in comparison with participants writing a declarative phrase or an interrogative phrase with a negative answer. I also hypothesized that involvement in the task as the general measure of motivation would follow a pattern similar to that exhibited by task performance.

One of the previously considered possible reasons why Experiments 1 and 2 did not replicate the results obtained by Senay et al. (2010) was the higher directiveness of the phrase copied by participants in the Polish research (*Will I do*) compared with the one used in the American research (*Will I*). Therefore, in the planned Experiment 3, participants were additionally supposed rate the degree to which they perceived the copied phrase as imposing on them a particular way

of thinking about themselves. I assumed that the performance-enhancement effect following a positive answer to a self-posed question about future behavior would occur when the copied phrase was treated by the participant only as a nondirective element of a graphomotor task. If, by contrast, the phrase was perceived at the conscious level as directive content addressed to oneself, the expected effect would not occur.

## EXPERIMENT 3

### Method

In order to distinguish groups whose ratings of the directiveness of the copied phrase were extreme, 251 individuals were examined. Participants were part-time physiotherapy students: 237 graduates and 14 undergraduates, with a mean age of 26.27 ( $SD=5.87$ ). About 80% of participants were working people. The procedure was the same as in previous experiments, with two exceptions. First, priming manipulation included three primes: *Will I do it? Yes, I will*; *Will I do it? No, I won't* and *I will do it*. Second, before participants were asked about the purpose of the study and debriefed, they rated the extent to which they perceived the prime as directive—the degree to which it imposed on them a particular way of thinking about themselves. They used a scale ranging from 1 (*It definitely didn't impose on me what I was to think about myself*) through 4 (*I don't know*) to 7 (*It definitely imposed on me what I was to think about myself*).

### Results And Discussion

None of the participants guessed the purpose of the study. Only those who gave extreme ratings to primes (1–2 or 6–7) were included in analyses (i.e., 105 and 43 persons, respectively). In total, together with the outliers, 103 individuals were excluded. The final sizes of analyzed groups are shown in Figures 1 and 2. Anagram-solving task scores were examined in a 2 (directive influence of prime: low vs. high)  $\times$  3 (prime: *Will I do it? Yes, I will* vs. *Will I do it? No, I won't* vs. *I will do it*) analysis of variance. There were non-significant main effects of the prime,  $F(2, 142)=2.20$ ,  $p=.115$ ,  $\eta_p^2=.030$ , as well as of the directive influence of the prime  $F(1, 142)=0.83$ ,  $p=.363$ ,  $\eta_p^2=.006$ . The interaction between the two study factors reached the level of statistical tendency,  $F(2,142)=2.83$ ,  $p=.062$ ,  $\eta_p^2=.04$ ; therefore, pairwise tests were performed. Unexpectedly, Bonferroni *t*-statistics did not yield any significant effects between priming conditions if participants treated the word prime only as an element of the graphomotor task (low ratings of the directive influence of the prime). However, a large reliable effect was noted among those participants who experienced the copied phrase as directive content addressed to them (Figure 1): The participants who copied out the phrase *Will I do it? Yes, I will* solved anagrams significantly better than those who wrote *I will do it* ( $p=.038$ ,  $d=0.99$ ). When the phrase was perceived as directive, an effect also occurred between people writing the interrogative phrase with a positive answer and those writing it with a negative answer ( $d=0.76$ ). However, this effect did not reach the level of significance ( $p=.262$ ),

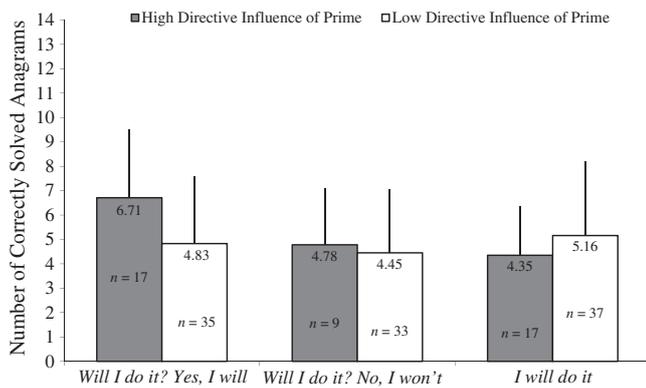


Figure 1. Mean number of correctly solved anagrams as a function of word primes (*Will I do it? Yes, I will*; *Will I do it? No, I won't*, and *I will do it*) and the directive influence of prime in Experiment 3. Error bars represent standard deviations

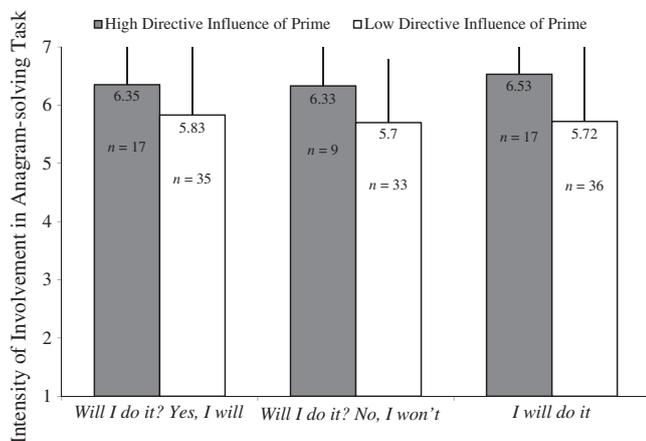


Figure 2. Mean intensity of involvement in anagram-solving task as a function of word primes (*Will I do it? Yes, I will*; *Will I do it? No, I won't*, and *I will do it*) and the directive influence of prime in Experiment 3. Error bars represent standard deviations

probably because of the small number of cases in the latter group ( $n=9$ ) (cf. Rosenthal, 1991). Additionally, the participants who perceived the question with a positive answer as directive performed better than those who treated this phrase only as an element of the graphomotor task ( $p=.021$ ,  $d=0.68$ ). All the remaining differences were statistically non-significant, and effect sizes ( $d$ ) did not exceed 0.30.

The intensity of involvement in the anagram-solving task was also analyzed in the same design. Analysis of variance yielded only a significant main effect of the directive influence of the prime,  $F(1,141)=9.55$ ,  $p=.002$ ,  $\eta_p^2=.06$ . There was nonsignificant main effect of the prime,  $F(2, 141)=0.084$ ,  $p=.919$ ,  $\eta_p^2=.001$ , and there was no interaction between the two study factors,  $F(2,141)=0.181$ ,  $p=.835$ ,  $\eta_p^2=.003$ .

Generally, involvement in working on anagrams was higher when participants perceived the copied phrase as directive, regardless of its content (Figure 2). It is possible that the measurement of involvement in the task in this case reflects the occurrence of conscious (effortful) reaction to the copied phrase—intensive effort to adjust to the standards present in it.

Summing up, the results of Experiment 3 showed that a positive answer to a self-posed question about future behavior

improved performance compared with the *I will do it* statement and to a negative answer to that question. This effect occurred when the copied questions together with answers and the statement were perceived at the conscious level as directive content addressed to oneself. Such an effect was not observed when the copied phrase was treated by participants as merely a non-directive element of the graphomotor task.

## GENERAL DISCUSSION

Replication promotes the verification, objectivization, and generalization of scientific theses (Rosenthal, 1991; Yong, 2012), and in the case of certain processes (e.g., language related), replication studies carried out in different cultures are particularly desirable. Therefore, the first two studies presented here were attempts at replicating, on a Polish population, the main result of research by Senay et al. (2010), according to which participants exposed to interrogative self-talk perform better than participants exposed to declarative self-talk. In neither of these experiments were the expected differences found, however. These results argued for trying to identify the variables that, as uncontrolled ones, may have prevented the potentially existing differences from being revealed. The first interpretive hypothesis concerned the directive influence of self-talk. Even though the interrogative format, which favors the addressee's greater autonomy, presupposes lower directive influence than the declarative format (cf. Ahluwalia & Burnkrant, 2004; Butler et al., 2010), different questions may nevertheless have different levels of directive influence. Polish grammar required adding one word (*do*) to the phrases *Will I* and *I will* used in the American study. If the cue *Will I do* was perceived as more directive than *Will I*, it may have limited autonomy to a greater degree. In consequence, used as a word prime for triggering automatic processes, it would not have reinforced internal motivation or improved performance.

Because the Polish language has no good equivalents of the phrases *Will I* and *I will* used by Senay et al. (2010), replicating their research in a language other than Polish, one in which such equivalents could be phrased, would add considerably to the value of the discussed findings. It would also be advisable then to control the degree to which the copied phrase is perceived as directive, in order to assess unambiguously whether indeed this has influence on task performance following a self-posed question or self-statement about future behavior.

The second hypothesis explaining the lack of differences between groups in Experiments 1 and 2 was advanced in accordance with the dialogical approach. According to this hypothesis, task performance following a self-posed question about future behavior depends on the answer given to oneself (Hermans, 2003; Hermans & Kempen, 1993). I hypothesized that participants exposed to an interrogative phrase with a positive answer (*Will I do it? Yes, I will*) would be more involved in the task, and their performance would be better in comparison with participants exposed to a declarative phrase (*I will do it*) or to an interrogative phrase with a negative answer (*Will I do it? No, I won't*)—with the reservation that the effect would occur only when the phrase was treated as nondirective.

The results of Experiment 3 showed that 43 out of 251 participants rated the copied phrase as highly directive and 105 rated it as nondirective. Indeed, interrogative self-talk with affirmative answer produced better performance in the anagram-solving task, than declarative self-talk or interrogative self-talk with a negative answer. However, contrary to what was hypothesized, these differences occurred only in those individuals who consciously treated the copied phrase as a directive addressed to themselves. Moreover, individuals who self-reported a directive influence of the phrase, regardless of its content, showed higher involvement in the task compared to participants from the second group.

These results provoke a few questions. First, was the applied priming procedure efficient if as many as 43 out of 251 participants rated the word primes as imposing on them a particular way of thinking about themselves? If we assume that a good priming procedure guarantees that people are not aware of being led to think in a certain way as a result of undergoing this procedure, then we should also conclude that the priming procedure in Experiment 3 did not work for those who self-reported to have felt the impact of the priming. What, then, about the efficiency of priming in the remaining participants who did not self-report its impact?

It is difficult to answer this question unambiguously. As mentioned earlier, the priming used by Senay et al. (2010) and in my experiments combined the features of mindset priming and conceptual supraliminal priming (cf. Bargh & Chartrand, 2000). A given (interrogative or declarative) mindset was activated. However, instead of being made to use the mental procedure intentionally, participants were exposed to the word prime as part of a conscious (graphomotor) task, which is typical of conceptual supraliminal priming. In this type of priming, the participant is fully aware of priming stimuli themselves, but 'he or she is not cognizant of the relation between the priming manipulation and the subsequent experimental task' (Bargh & Chartrand, 2000, pp. 7–8). Recognizing this as the effectiveness criterion for the priming procedure, we should assume that priming worked properly, because the participants, when asked about the purpose of the study after it was completed, did not notice a possible connection between the content of the copied phrase and the effectiveness in anagram solving. If we consider the priming procedure effective, we should also conclude that the postulated performance improvement following a positive answer to a self-posed question about future behavior does not take place at the level of automatic processes. It seems, however, that adopting such a criterion may be an oversimplification, all the more so as the criterion was also met by those who self-reported the awareness of the influence of the phrase on their thinking. As Bargh and Chartrand (2000) emphasize: 'There is no easy rule to achieve the "right" level of subtlety' (p. 7). In their opinion, for instance, repeating a given word increases the chances that the participant may clue in to the purpose of the task or at least become consciously aware that the experiment seems to be focusing on the particular concept. It is possible, then, that the phrase copied many times, which had a much more unambiguous message in my Experiment 3 than in the experiments of Senay et al. may have favored overstepping the line that leads to the participants' awareness and, as a result, erase the expected effect. Assuming that

precisely this kind of situation was the case in Experiment 3, the issue that still remains open (and requires further study) is the question of performance improvement following a positive answer to interrogative self-talk proceeding at the automatic level.

If the awareness of the prime's influence erases the expected effect (Bargh & Chartrand, 2000), the question arises why the effect was found in 43 participants who reported that the cue imposed on them a certain way of thinking about themselves. It is possible that these participants were characterized by a higher level of self-awareness. According to Baldwin (1994), self-awareness plays a considerable role in the way of perceiving supraliminal primes. Its high level promotes a focus on the self rather than a focus on the prime itself. Moreover, self-awareness favors perceiving oneself in terms of accessible standards, which, in Experiment 3, were present in the copied phrase.

The juxtaposition of the results of Experiment 3, presented here, with those of Experiment 3 by Senay et al. (2010) argues for an interpretation that remains consistent with this way of thinking. Although detailed comparisons between the two experiments are impossible because the American researchers do not provide all the results of pairwise tests, the results of these experiments nevertheless appear to coincide, in some sense, at the general level. In the American experiment, it was demonstrated that the effect of interrogative self-talk depends on perceiving the written phrase as a meaningful pattern of words. In my experiment, the effect was found only among those for whom the phrase determined the goal and the way of thinking about themselves. Their significantly higher level of involvement in the task may be treated as an indicator of their conscious (effortful) reaction, an effort to act in accordance with the directions present in the phrase. It can, therefore, be concluded that the copied phrase constituted a standard that was personally meaningful for these people.

Without resolving whether a similar effect may occur at the level of automatic processes, it can be concluded that giving a conscious positive answer to a self-posed question about future behavior improves task performance. The results of Experiment 3, however, may be interpreted differently than as resulting from the influence of the internal answer.

Some of the participants in the *Will I do it? Yes, I will* or the *Will I do it? No, I won't* condition may have become conscious of how they were 'supposed to' answer questions, that is, with a 'yes' or 'no', as opposed to how they felt like answering them at a particular moment. The prime *Will I do it? Yes, I will* may have been perceived by the participants as an explicit instruction to say '*I will do it*' whenever a question came to their mind. However, the *I will do it* condition (control condition) only specified what the participants should say in general rather than when exactly they should say it. Thus, it is likely that those in the *Will I do it? Yes, I will* condition self-produced the statement '*I will do it*' both more appropriately and more often during the anagram-solving task (i.e., whenever they were in doubt) as compared with those in the *I will do it* condition. As a result, performance improvement would have been due to how often and how appropriately '*I will do it*' was stated rather than due to spontaneously answering 'yes' to a performance question. A similar

case is reported by Bayer and Gollwitzer (2007). In their study, a mathematics test was performed under two conditions. In the first condition, participants were instructed to tell themselves: 'I will correctly solve as many problems as possible!' In the second one, they also added: 'And if I start a new problem, then I will tell myself: I can solve it!' It turned out that the latter group achieved better results. The researchers explain that in the second group the motivating content was recalled more often because the second instruction pointed to a specific situation (starting every new task) in which the participants were supposed to say 'I can solve it', whereas the first instruction specified no such situation. However, Bayer and Gollwitzer also emphasize an issue that seems to be at variance with the results of Experiment 3. Namely, they stress that linking a particular goal-directed response ('I can solve it') to a situational cue (starting a new task) delegates the control of this response to the respective situational cue. 'Once this cue is encountered, response initiation proceeds swiftly and effortlessly, and it does not require the person's conscious intent' (Bayer & Gollwitzer, 2007, p. 3). How can this be reconciled with the fact that in Experiment 3, the effect was only obtained among those who self-reported to be aware of the impact of the priming procedure on their thought processes? In Experiment 3, participants were purposefully led to answer with either a 'yes' or a 'no' to a performance question. In order to resolve whether performance improvement indeed depends on a positive answer, it would be advisable to plan an experiment in which the 'yes' or 'no' answer would be left to the participants' own choice.

Another issue worth considering is whether any conclusion concerning the influence of self-talk on behavior can be drawn from the experiment in which participants were assigned particular cues that they were supposed to address to themselves. A meta-analytic review of the effects of self-talk interventions on task performance in sport shows the efficacy of self-talk cues imposed by researchers (Hatzigeorgiadis et al., 2011). A total of 32 analyzed studies yielded 62 effect sizes, among which 46 were noted when self-talk cues were assigned by researchers. Moreover, similar effects were revealed when cues were assigned ( $d=0.49$ ) and self-selected (chosen from a designated list or self-formulated) by participants ( $d=0.44$ ). These findings indirectly indicate that the practical value of the results obtained in the present study may be considerable. Nevertheless, it is conceivable that spontaneous self-formulated answers may have a somewhat different influence on behavior than self-talk cues that are assigned. Therefore, this question requires further exploration.

Another reason why further research on the role of internal answer in enhancing performance is necessary is the fact that the conclusions presented here are based on analyses of groups of small size. Although in Experiment 3 as many as 251 individuals were examined, the subgroups distinguished within the extreme groups eventually turned out to be small, which argues for the need to verify the obtained results on different samples with the use of different procedures.

Future research should also cover the performance of tasks other than intellectual ones in order to determine the possibilities of generalizing the conclusions presented here to other domains of human functioning. It seems that it is worth

searching for a cheap and simple way that a person could use to enhance the effectiveness of his or her activity in various domains. This is consistent with Bandura's (1997) idea that psychological treatment should focus on self-enablement by providing people with the knowledge and competencies necessary to acquire instruments of control over the quality and direction of their lives. If further studies confirm that a positive answer to a self-posed question about future behavior leads to better performance than a self-statement declaring that performance, we will be closer to fulfilling Bandura's postulate. This may be of interest to researchers in cognitive, social, and developmental psychology as well as to practitioners in educational and work settings.

## ACKNOWLEDGEMENT

Writing this paper was partially supported by grant DEC-2012/07/B/HS6/02348 from the National Science Centre, Poland.

## REFERENCES

- Ahluwalia, R., & Burnkrant, R. E. (2004). Answering questions about questions: A persuasion knowledge perspective for understanding the effects of rhetorical questions. *Journal of Consumer Research*, 31(1), 26–42. DOI: 10.1086/383421
- Andersen, S. M., & Chen, S. (2002). The relational self: An interpersonal social-cognitive theory. *Psychological Review*, 109(4), 619–645.
- Bakhtin, M. (2003). *Problems of Dostoevsky's poetics*. Minneapolis and London: University of Minnesota Press.
- Baldwin, M. W. (1992). Relational schemas and the processing of social information. *Psychological Bulletin*, 112(3), 461–484. DOI: 10.1037/0033-2909.112.3.461
- Baldwin, M. W. (1994). Primed relational schemas as a source of self-evaluative reactions. *Journal of Social and Clinical Psychology*, 13(4), 380–403.
- Baldwin, M. W., Carrell, S. E., & Lopez, D. F. (1990). Priming relationship schemas: My advisor and the Pope are watching me from the back of my mind. *Journal of Experimental Social Psychology*, 26(5), 435–454. DOI: 10.1016/0022-1031(90)90068-w
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- Bargh, J. A., & Chartrand, T. L. (2000). The mind in the middle: A practical guide to priming and automaticity research. In H. T. Reis & C. M. Judd (Eds.), *Handbook of research methods in social and personality psychology* (pp. 253–285). New York, NY US: Cambridge University Press.
- Bayer, U. C., & Gollwitzer, P. M. (2007). Boosting scholastic test scores by willpower: The role implementation intentions. *Self and Identity*, 6(1), 1–19. DOI: 10.1080/15298860600662056
- Butler, C. W., Potter, J., Danby, S., Emmison, M., & Hepburn, A. (2010). Advice-implicative interrogatives: Building 'client-centered' support in a children's helpline. *Social Psychology Quarterly*, 73(3), 265–287. DOI: 10.1177/0190272510379838
- Callicott, K. J., & Park, H. (2003). Effects of self-talk on academic engagement and academic responding. *Behavioral Disorders*, 29(1), 48–64.
- Cooley, C. H. (1902). *Human nature and the social order*. New York: Schocken Books.
- Diaz, R. M., & Berk, L. E. (Eds.), (1992). *Private speech: From social interaction to self-regulation*. Hillsdale, NJ England: Lawrence Erlbaum Associates, Inc.
- Gollwitzer, P. M., Heckhausen, H., & Steller, B. (1990). Deliberative and implemental mind-sets: Cognitive tuning toward congruous thoughts and information. *Journal of Personality and Social Psychology*, 59(6), 1119–1127. DOI: 10.1037//0022-3514.59.6.1119
- Hardy, J. (2006). Speaking clearly: A critical review of the self-talk literature. *Psychology of Sport and Exercise*, 7(1), 81–97. DOI: 10.1016/j.psychsport.2005.04.002

- Hart, W., & Albarracín, D. (2009). What I was doing versus what I did: Verb aspect influences memory and future actions. *Psychological Science*, 20(2), 238–244. DOI: 10.1111/j.1467-9280.2009.02277.x
- Hatzigeorgiadis, A., Zourbanos, N., Galanis, E., & Theodorakis, Y. (2011). Self-talk and sports performance: A meta-analysis. *Perspectives on Psychological Science*, 6(4), 348–356. DOI: 10.1177/1745691611413136
- Hermans, H. J. M. (2003). The construction and reconstruction of a dialogical self. *Journal of Constructivist Psychology*, 16, 89–130.
- Hermans, H. J. M., & Gieser, T. (Eds.), (2012). *Handbook of dialogical self theory*. Cambridge: Cambridge University Press.
- Hermans, H. J. M., & Kempen, H. J. G. (1993). *The dialogical self: Meaning as movement*. San Diego: Academic Press.
- Kamann, M. P., & Wong, B. Y. L. (1993). Inducing adaptive coping self-statements in children with learning-disabilities through self-instruction training. *Journal of Learning Disabilities*, 26(9), 630–638.
- Lee, S. W. F. (2011). Exploring seven- to eight-year-olds' use of self-talk strategies. *Early Child Development and Care*, 181(6), 847–856. DOI: 10.1080/03004430.2010.494253.
- Linell, P. (2007). Dialogicality in languages, minds and brains: Is there a convergence between dialogism and neuro-biology? *Language Sciences*, 29, 605–620.
- MacKay, D. G. (1992). Constraints on theories of inner speech. In D. Reisberg (Ed.), *Auditory imagery* (pp. 121–149). Hillsdale, NJ England: Lawrence Erlbaum Associates, Inc.
- Mead, G. H. (1934). *Mind, self and society: From the standpoint of a social behaviorist*. Chicago: University of Chicago Press.
- Neuliep, J. W. (Ed.), (1991). *Replication research in the social sciences*. Newbury Park, CA: Sage.
- Ogilvie, D. M., & Ashmore, R. D. (1991). Self-with-other representation as a unit of analysis in self-concept research. In R. C. Curtis (Ed.), *The relational self* (pp. 282–314). New York: Guilford Press.
- Rosenthal, R. (1991). Replication in behavioral research. In J. W. Neuliep (Ed.), *Replication research in behavioral sciences* (pp. 1–30). Newbury Park, CA: Sage.
- Sanders, M. R., Shepherd, R. W., Cleghorn, G., & Woolford, H. (1994). The treatment of recurrent abdominal pain in children: A controlled comparison of cognitive-behavioral family intervention and standard pediatric care. *Journal of Consulting and Clinical Psychology*, 62(2), 306–314. DOI: 10.1037//0022-006x.62.2.306
- Senay, I., Albarracín, D., & Noguchi, K. (2010). Motivating goal-directed behavior through introspective self-talk: The role of the interrogative form of simple future tense. *Psychological Science*, 21(4), 499–504. DOI: 10.1177/0956797610364751
- Tod, D., Hardy, J., & Oliver, E. (2011). Effects of self-talk: A systematic review. *Journal of Sport & Exercise Psychology*, 33(5), 666–687.
- Vygotsky, L. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.
- Winsler, A., Fernyhough, C., & Montero, I. (Eds.), (2009). *Private speech, executive functioning, and the development of verbal self-regulation*. New York: Cambridge University Press.
- Yong, E. (2012). In the wake of high-profile controversies, psychologists are facing up to problems with replication. *Nature*, 485, 298–300.
- Zwaan, R. A., & Radvansky, G. A. (1998). Situation models in language comprehension and memory. *Psychological Bulletin*, 123(2), 162–185. DOI: 10.1037//0033-2909.123.2.162