



Reports

Being flexible or rigid in goal-directed behavior: When positive affect implicitly motivates the pursuit of goals or means[☆]

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ABSTRACT

Building on previous research on the role of positive affect as implicit motivator we investigated both flexibility and rigidity in goal-directed behavior. Given that goal-directed behavior can be represented in terms of goals or means, we suggest that goal-directed behavior is more flexible in switching means when positive affect implicitly motivates a person to reach the goal, but is more rigid in switching means when positive affect implicitly motivates a person to perform a specific means. Three experiments corroborated this idea: the speed of switching from a learned goal-directed means to a new means was facilitated when positive affect was attached to the representation of the goal, whereas this switching was slowed down when positive affect was attached to the representation of the learned means. Together, these findings provide new insights into the occurrence of flexibility and rigidity in implicitly motivated goal-directed behavior.

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Introduction

A substantial part of human behavior is goal-directed. People are motivated to maintain and adapt their course of action in a dynamic world to reach behavioral outcomes, and thus engage in goal-directed behavior in a rigid and flexible way. For instance, the goal to visit the office can be attained in a rigid way by always taking the car or in a flexible way by switching between different transport modes. The present research addresses the question when goal-directed behavior may be more flexible or rigid in switching between means to attain goals.

Both rigid and flexible goal-directed behavior can be the result of people's motivation to engage in goal-directed behavior (Aarts, in press). Increased motivation to engage in goal-directed behavior causes people to maintain or adapt their actions, depending on the situation at hand (e.g., when the dominant instrumental action calls for additional effort or other actions are required to reach the goal). While the motivation and control of goal-directed behavior is traditionally thought to be associated with conscious thought and intent, recent research shows that goal-directed behavior also arises from unconscious processes (Bargh, Gollwitzer, & Oettingen, 2010). Specifically, several studies have demonstrated that people are implicitly motivated to control their goal-directed behavior when the cognitive representation of a behavior or outcome is attached to a positive

affective tag (Aarts, Custers, & Marien, 2008, 2009; Aarts, Custers, & Veltkamp, 2008; Capa, Cleeremans, Bustin, Bouquet, & Hansenne, 2011; Custers & Aarts, 2005, 2007; Ferguson, 2007; Holland, Wennekers, Bijlstra, Jongenelen, & Van Knippenberg, 2009; Van Den Bos & Stapel, 2009; Veltkamp, Aarts, & Custers, 2008; 2011).

Importantly, goal-directed behavior is hierarchically structured and consists of a cognitive representation of the goal or outcome and of the means (e.g., Aarts & Dijksterhuis, 2000; Kruglanski et al., 2002; Vallacher & Wegner, 1987). Therefore, the representation of goals and means can be primed (e.g., by cues in the environment), and a person can represent and control her behavior in terms of the goal or the means serving the goal. Interestingly, the notion that positive affect can implicitly motivate people to control goal-directed behavior opens the possibility that flexibility or rigidity depends on whether positive affect is attached to the goal representation or the means representation. Here we examine this issue by suggesting that the way people represent their behavior determines whether implicit motivation materializes in either flexible or rigid goal-directed behavior. Specifically, we propose that when the cognitive representation of the goal or outcome is attached to positive affect, goal-directed behavior may become more flexible in that it switches between means. However, when the cognitive representation of the means is attached to positive affect goal-directed behavior may become more rigid.

One way to understand how positive affect attached to a goal or means representation can foster a more flexible or rigid mode of switching between means is to consider how positive affect motivates people to control their behavior. First, the level at which people represent their behavior determines the reference point at which perception and lower actions are directed (Powers, 1973; Prinz, 1997).

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For instance, a person who represents the act of commuting as going to the office (goal level) controls her behavior in terms of going to the office. However, if the same act is represented as taking the car (means level) then behavior is more likely to be controlled in terms of taking the car. Thus, in both cases people control perception and action in accordance with the accessible (goal or means) representation, only on different levels of information processing.

Whereas the occurrence of different levels of action control is well-studied in research on executive control (Botvinick, 2008; Monsell & Driver, 2000), less is known how control processes render goal-directed behavior flexible or rigid as a function of the motivational significance to execute control. Because research indicates that positive affect attached to the representation of behavior acts as a reward signal that motivates the control of behavior at the level at which the behavior is represented (for a mechanistic account of this process, see Custers & Aarts, 2010), differences in representation levels may have corollaries for how the positive reward signal motivates a flexible or more rigid course of action when a switch to another means is required. Specifically, both flexibility and rigidity are the result of an increased motivation to execute control processes, but they are correlated with different key components within the executive function, namely switching and focusing of attention and action (Dijksterhuis & Aarts, 2010; Smith & Jonides, 1999).

The line of reasoning addressed above suggests that positive affect can implicitly motivate people to control their goal-directed behavior in a more flexible or rigid way. If people represent their behavior in terms of the goal guiding their actions, then positive affect motivates people to control their behavior at the goal level. This enhanced goal motivation should render goal-directed behavior more flexible, as people are keen to switch attention to other means in order to reach the goal if the previous means is no longer valid. However, if people represent behavior in terms of means leading to the goal, then positive affect motivates people to control their behavior at the means level. Enhanced motivation to perform the means renders goal-directed behavior more rigid, as people are keen to focus attention on the means to reach their goal, even though the old means is invalid and a switch to new means is required to reach the goal. Accordingly, flexibility and rigidity in goal-directed behavior can be seen as resulting from the implicit motivation to control behavior at different levels.

Three experiments tested these novel and intriguing ideas. Specifically, we examined the costs associated with switching from one means to another means as part of executing goal-directed behavior. In the first and third experiment we used a modified version of a set-shifting task (Chiu, Yeh, Huang, Wu, & Chiu, 2009; Dreisbach & Goschke, 2004), in which increases and decreases in switch costs concurred with rigid versus flexible control of behavior, respectively (Meiran, 2010). In this task, participants' goal is to categorize letters presented on the computer-screen by means of responding to a pre-specified colored vowel or consonant letter. In a first phase of the task, they repeatedly categorize the two letters (e.g., presented in green and blue) by responding to one of them on the basis of a pre-specified color (e.g., green). In a second phase the target color changes to a new color (e.g., purple) and the previous target color (e.g., green) becomes invalid. Thus, participants have to switch from one means (responding to green) to another means (responding to purple). In general, people's responses slow down when the new color is introduced, which reflects the costs of the switch.

In an important adaptation of the original set-shifting task, we varied the processing instructions during the first phase. Some participants represented their behavior in terms of the task goal (i.e., categorizing letters), while others represented their behavior in terms of the task means (i.e., responding to the target color). They received cues of these two levels of representation at the beginning of each trial of the first phase. Furthermore, participants were exposed to positive or neutral stimuli directly after the presentation of these

cues, thereby implicitly increasing the motivation for the goal or the means (Custers & Aarts, 2005). Thus, we could test whether implicit motivation for the goal facilitates a switch from the old means to a new means, while implicit motivation for the means hampers a switch from the old means to another. Experiment 1 used the modified set-shifting task to provide an initial test of our hypotheses, and Experiment 2 was designed to replicate the results in a different (new) paradigm. Experiment 3 explored a boundary condition for rigidity in implicit motivation of goal-directed behavior.

Experiment 1

Method

Participants and design

Eighty two undergraduates (46 females; mean age 21.7 years) were randomly assigned to the cells of a 2 (first phase valence: positive vs. neutral) \times 2 (representation: goal vs. means) between-subjects design.

Procedure and materials

Participants were told to perform a task in which they had to quickly and accurately categorize letters as vowels or consonants by means of responding to a pre-specified colored letter that was presented together with another colored letter on the screen. Instructions and stimuli were presented on a computer-screen. In addition, a left and a right key were assigned as response keys for vowels and consonants, and the two possible response-key mappings were counterbalanced across participants. Thus, participants learned that the goal was to categorize letters and that they had to do this by means of responding to the letter in a pre-specified color.

The imperative stimuli consisted of two simultaneously presented letters (A, E, O, U, K, M, R, and S) one above the other. The location of the target was determined at random, either above or below. The letters were always presented in two different colors, selected from a pool of three colors: green, blue or purple. Assignment of colors to stimuli (relevant, irrelevant, new) was counterbalanced across participants. Participants were instructed to respond to the letter appearing in a pre-specified color (e.g., relevant = green), which always appeared together with another letter in a constant different color (e.g., irrelevant = blue). After 40 trials participants had to switch to a new pre-specified color that had not appeared before (e.g., new = purple) and had to ignore the previously relevant color (e.g., green). For example, in the first 40 trials the two letters would always be green and blue, and if the target color was green the colors after the switch would be purple and green, where purple would be the new target color.

Participants were told that we were interested in how people perform cognitive tasks in settings of everyday life and to simulate these situations they would be presented with all kinds of everyday images during the task. In the goal representation condition participants were asked to represent their behavior in terms of the goal to categorize letters, and in the means representation condition they represented it in terms of the means of responding the target color. Accordingly, in the goal representation condition a cue appeared on the screen in the form of a gray square with the word 'LETTERS' in white in the middle of it, and in the means representation condition a gray square appeared with the target color word in white in the middle (i.e., 'GREEN', 'BLUE' or 'PURPLE'). Thus, the cue LETTERS supported participants to keep focused on the goal to categorize letters, and the color cue kept them focused on the means to reach the goal (for a similar manipulation of levels of behavior representations, see van der Weiden, Aarts, & Ruys, 2010). The representation-cue was directly followed by a positive or neutral IAPS picture (Lang, Bradley, & Cuthbert, 1998), thereby enabling us to unobtrusively co-activate the goal (vs. means) representation with either neutral or positive affect.

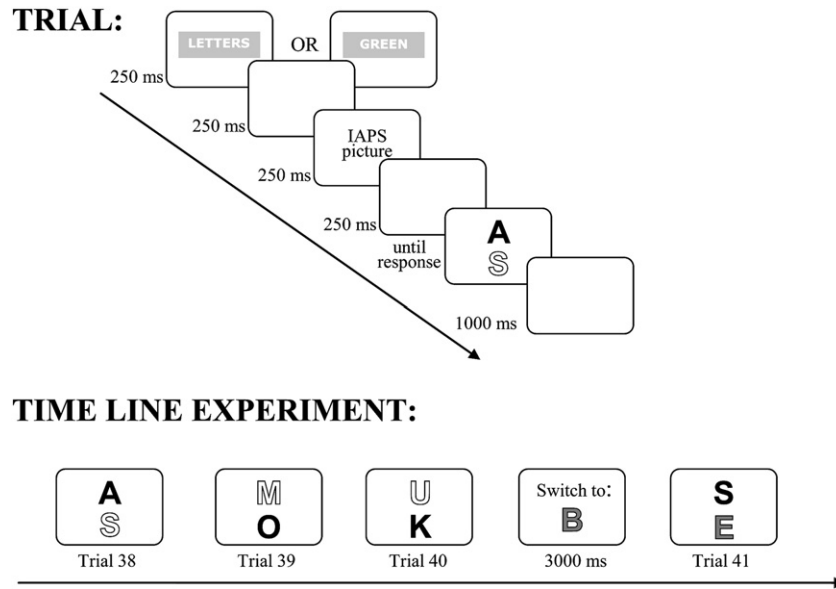


Fig. 1. Example of a trial and the time line of Experiment 1. The colored letters are presented in black, white and gray as substitutes for green, blue and purple, respectively. The course of the trial at the top of the figure represents a correct trial in the first phase (for incorrect trials the final slide contained the word “Incorrect!” and lasted 2000 ms). The IAPS picture had either a neutral or a positive valence. The time line of the experiment is presented at the bottom of the figure and shows four critical trials around the switch (trials 38 to 41). The instructional cue was presented between trials 40 and 41 and lasted for 3000 ms. In this example the target color before the switch is black (i.e., green) and after the switch is gray (i.e., purple).

Participants were told that the task started with a first phase in which they had to respond to a specific color, but that at a later point in time they would have to respond to a different color and that a screen would announce this rule change by showing the new target color. They were also informed that after the switch the representation-cue would not be shown anymore.

There were 40 trials in the first phase. In Fig. 1 the course of a trial and the time line of the experiment are shown. Each trial began with a blank screen (500 ms) followed by the representation-cue (250 ms), another blank screen (250 ms) and then a picture from the IAPS (250 ms) and a final blank screen (250 ms) appeared before the imperative stimulus was presented, which remained on the screen until a response was given. In order to present a unique picture in each trial, 40 IAPS pictures were selected at random from a pool of 60 positive (mean valence = 7.67, $SD = 0.32$) or a pool of 60 neutral pictures (mean valence = 4.89, $SD = 0.39$) dependent of the first phase valence condition. After a correct response a blank screen appeared for 1000 ms and then a new trial started. Feedback was given only for errors. After an incorrect response the word ‘Incorrect!’ would appear for 2000 ms instead of the blank screen. Stimulus presentation was completely randomized with one constraint: targets and distracters were always response incompatible (i.e., both mapped to different response keys). After the 40 trials of the first phase an instructional cue (3000 ms) announced the switch to the new color. There were 20 trials in the second phase. The representation-cues were replaced with blank screens and the 20 IAPS pictures were selected at random from the pool of 60 neutral pictures for all participants. Prior to the experimental task participants performed 30 practice trials (which included the representation-cues).

Data preparation

Incorrect responses were excluded from analysis (mean errors = 7.5%). There were no significant differences on error rates between conditions. Responses exceeding 3 standard deviations from the mean reaction time were excluded from further analysis (0.37% of correct responses). There were no significant differences on the overall mean RTs between conditions. The critical comparison of mean reaction times is between the mean of five trials immediately

before the switch and the mean of five trials immediately after the switch.¹ A difference score of these means was calculated and served as the dependent variable: switch cost.

Results and discussion

Switch costs were subjected to a 2 (first phase valence: positive vs. neutral) \times 2 (representation: goal vs. means) ANOVA. The analysis did not yield a main effect of first phase valence ($F < 1$). Whereas the goal representation cue caused a slightly lower switch cost than the means representation cue, this main effect of representation was not reliable, $F(1, 78) = 2.96, p = .09$. More importantly, a significant interaction effect of First phase valence \times Representation was found, $F(1, 78) = 8.56, p < .01, \eta^2 = .10$. The mean switch costs per condition are presented in Fig. 2.

Simple effects analyses revealed that participants in the goal representation condition showed lower switch costs when they were in the positive first phase condition than when they were in the neutral first phase condition, $F(1, 78) = 4.52, p = .04, \eta^2 = .05$. In the means representation condition the effect was also significant but the other way around, indicating that participants in the positive first phase condition had higher switch costs compared to participants in the neutral first phase condition, $F(1, 78) = 4.60, p = .04, \eta^2 = .06$.

These effects on switch costs were not driven by differences by condition before the switch. The mean of five reaction times before the switch was significantly faster in the means representation condition, $F(1, 78) = 6.52, p = .01, \eta^2 = .08$, but this main effect of representation was not qualified by an interaction effect ($F < 1$). Thus, when participants represented their behavior in terms of the goal to categorize letters, positive affect facilitated the switch to use a new

¹ Ideally, the reaction time of the trial before and after the switch would be a good indicator of switching performance. However, in our experiments we have only one switch per participant rendering one observation a poor measure (e.g., an error or extreme reaction time leads to complete omission of participants). Therefore, we took the mean of five trials before or after the switch, which is mostly used in this type of task-switching paradigm (e.g., Dreisbach & Goschke, 2004).

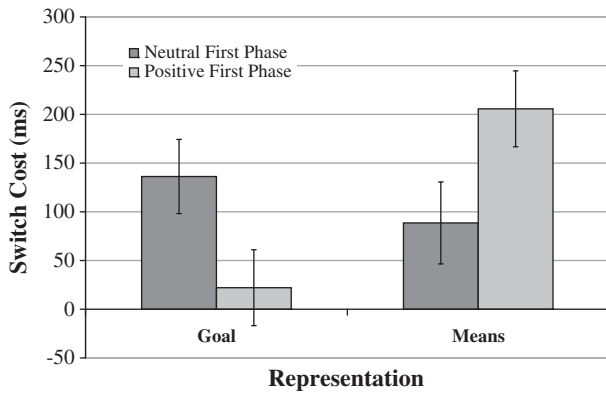


Fig. 2. Main results of Experiment 1 are presented as switch costs in ms as a function of first phase valence (positive vs. neutral) and representation (goal vs. means), with error bars representing one standard error of the mean.

color, but when they represented the behavior in terms of the means to respond to the color pre-specified in the first phase, positive affect hampered the switch to a new color means.

Experiment 2

The first experiment showed that attaching positive affect to the representation of the goal or the means motivates a more flexible or rigid mode of goal-directed behavior, respectively. However, although the modified set-shifting task produced the predicted pattern of results, the distinction between the goal (categorize letters) and the means (by responding to a pre-specified color) might appear somewhat artificial, even though we emphasized to participants that the task consisted of this goal and means. In line with this idea, research on action control suggests that most information processing tasks (including task switching tasks) can be composed of several cognitive representations that differ in their level of control (Hommel & Elsner, 2009). However, to offer more compelling evidence for our ideas we conducted a second experiment to replicate the previous findings in a different task that clearly speaks to the separation of a goal and means in goal-directed behavior. Specifically, instead of using the task of categorizing letters as vowels or consonants, we designed a task in which participants have the goal to turn on a light by means of pressing a specific button.

Method

Participants and design

Seventy undergraduates (42 females; mean age 21.9 years) were randomly assigned to the cells of a 2 (first phase valence: positive vs. neutral) × 2 (representation: goal vs. means) between-subjects design.

Procedure and materials

Participants worked on a computer task and were told that the goal of the task was to turn on a light bulb by means of pressing a pre-specified colored button. This button was presented either on the left side or the right side of the screen, together with another colored button that was presented on the opposite side. A left and a right key were assigned as response keys for the left and right locations.

The buttons were always presented in two different colors, selected from a pool of three colors: green, blue or purple. Assignment of colors to buttons (relevant, irrelevant, new) was counterbalanced across participants. Participants were instructed to press the button appearing in a pre-specified color (e.g., relevant = green), which always appeared together with another button in a constant different

color (e.g., irrelevant = blue). After 40 trials participants had to switch to a new pre-specified color that had not appeared before (e.g., new = purple) and had to ignore the previously relevant color (e.g., green). The location of the target was determined at random, either left or right.

Depending on the condition participants were in, they were either told to represent their behavior in terms of turning on the light (goal representation), or in terms of pressing the target colored button (means representation). A specific cue was presented on the screen at the beginning of each trial to encourage participants to represent the behavior in terms of the goal or the means. In the goal representation condition the cue appeared on the screen in the form of a gray square with the words 'TURN ON LIGHT' in white in the middle of it, and (similar to Experiment 2) in the means representation condition the square appeared in gray with the words 'PRESS GREEN', 'PRESS BLUE' or 'PRESS PURPLE' in white in the middle of it. The cue was directly followed by the presentation of a positive or neutral IAPS picture.

There were 40 trials in the first phase. Each trial began with a blank screen (1000 ms) followed by the cue (500 ms), another blank screen (250 ms) and then a picture from the IAPS (250 ms) and a final blank screen (250 ms) appeared before a fixation cross ('X') was presented for 500 ms. Then the two buttons were presented, which remained on the screen until a response was given. A lighted bulb appeared for 1000 ms after a correct response and after an incorrect response an unlighted bulb appeared. A new trial started after an interval of 2500 ms. After the 40 trials of the first phase an instructional cue (3000 ms) announced the switch to the new color. There were 20 trials in the second phase.

Data preparation

Switch costs were calculated the same way as in Experiment 1. Incorrect responses (mean errors = 1.3%) and outliers (0.43% of correct responses) were excluded from analysis. No differences between conditions in error rate were found, nor were there differences on the overall RTs.

Results and discussion

Switch costs were subjected to a 2 (first phase valence: positive vs. neutral) × 2 (representation: goal vs. means) ANOVA. The analysis did not yield a main effect of first phase valence ($F < 1$). Whereas the goal representation cue caused a slightly lower switch cost than the means representation cue, this main effect of representation was not reliable, $F(1, 66) = 1.74, p = .19$. More importantly, the significant interaction effect of First phase valence × Representation was replicated, $F(1, 66) = 9.16, p < .01, \eta^2 = .12$, see Fig. 3.

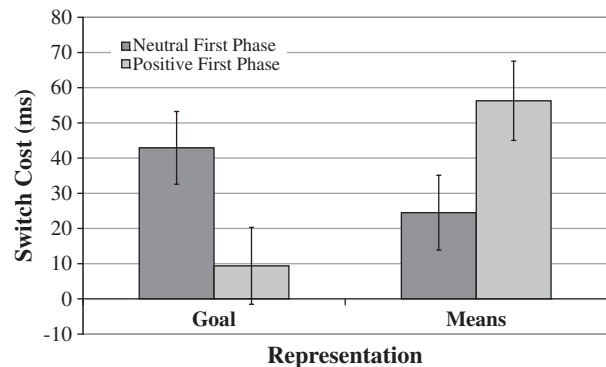


Fig. 3. Main results of Experiment 2 are presented as switch costs in ms as a function of first phase valence (positive vs. neutral) and representation (goal vs. means). Error bars represent one standard error of the mean.

Simple effects analyses revealed that switch costs in the positive goal representation condition were lower when in the neutral goal representation condition, $F(1, 66) = 4.97, p = .03, \eta^2 = .07$. Switch costs in the positive means representation condition were significantly higher than in the neutral means representation condition, $F(1, 66) = 4.22, p = .04, \eta^2 = .06$.

These effects on switch costs were not driven by differences by condition before the switch, because there were no significant effects on the mean of five trials before the switch (all $F_s < 1.10$). Thus, results of Experiment 2 conceptually replicate the findings of Experiment 1 in a task (turning on a light by means of pressing a button) that more clearly speaks to the separation of a goal and a means in goal-directed behavior.

Experiment 3

Thus far, our data provide clear evidence that flexibility and rigidity are a function of the level of representation (goal or means) at which positive affect implicitly motivates people to control their behavior. Flexibility vs. rigidity reflected the ease vs. difficulty to abandon the practiced means (e.g., respond to green) and to switch to new means (e.g., respond to purple). These findings, however, are constrained to situations where the to-be-abandoned means is overtly present after the switch, and therefore is in direct competition with the new means as a result of attracting attention (cf. research on temptations and delay of gratification; Leander, Shah, & Chartrand, 2009; Mischel, Shoda, & Rodriguez, 1989). This raises the question whether the observed flexibility and rigidity are dependent on this direct attentional competition.

To explore this issue, in Experiment 3 we removed this direct overt attention competition, by presenting participants with two novel colors in phase 2 of the letter categorization task. Because task switching seems to be more strongly hampered by an attention process that relies on specific stimuli–response processing (Mayr & Bryck, 2007; Monsell, 2003), it is likely that implicitly motivating people on the means level in the absence of the overt attentional competition may lead to less switch costs. In this case, attention is no longer attracted to the means one is motivated to engage in, and hence the rigidity effect might (partly) disappear. However, our findings indicate that implicitly motivating people on the goal level renders a switch to other means less difficult, and this motivation to attain a goal is likely to promote and shield goal-directed processing in the absence of overt attentional competition (Custers & Aarts, 2010; Shah, Friedman, & Kruglanski, 2002). Therefore, attaching positive affect to the goal representation may leave flexibility of the switch unaffected when the old means is no longer overtly present.

Method

Participants and design

Eighty-three undergraduates (45 females; mean age 21.5 years) were randomly assigned to a 2 (first phase valence: positive vs. neutral) \times 2 (representation: goal vs. means) between-subjects design.

Procedure and materials

The procedure and materials were similar as in Experiment 1, with one major adjustment. After the switch participants were presented with two completely new colors (red and yellow). Assignment of these colors to new target and new irrelevant was counterbalanced across participants.

Data preparation

Switch costs were calculated the same way as in the previous experiments. Incorrect responses (mean errors = 5.4%) and outliers (0.36% of correct responses) were excluded from analysis. No

differences between conditions in error rate were found, nor were there differences on the overall RTs.

Results and discussion

Switch costs were subjected to a 2 (first phase valence: positive vs. neutral) \times 2 (representation: goal vs. means) ANOVA. The analysis did not yield a main effect of first phase valence, $F(1, 79) = 1.24, p = .27$. Whereas the goal representation cue caused a slightly lower switch cost than the means representation cue, this main effect of representation was not reliable, $F(1, 79) = 2.20, p = .14$. More importantly, there was a significant interaction effect of First phase valence \times Representation, $F(1, 79) = 5.21, p < .03, \eta^2 = .06$, see Fig. 4.

Simple effects analyses revealed that switch costs in the positive goal representation condition were lower than in the neutral goal representation condition, $F(1, 79) = 5.97, p = .02, \eta^2 = .07$. However, switch costs in the positive means representation condition were not significantly different from switch costs in the neutral means representation condition, $F < 1$. Furthermore, there were no significant differences between conditions on the mean of five trials before the switch (all $F_s < 1$).

These findings again show that when goal-directed behavior is implicitly motivated at the goal level flexibility is enhanced. However, when goal-directed behavior was implicitly motivated at the means level and the means did no longer overtly attract attention we did not find increased rigidity. This suggests that control over behavior by the old means does not run in an offline fashion, but rather in an online fashion such that it occurs when there is a direct opportunity to execute the goal-directed action.

General discussion

Based on the idea that positive affect can implicitly motivate the control of goal-directed behavior at different levels (Custers & Aarts, 2010), in three experiments we showed that positive affect facilitates flexibility (faster switch to new means) when attached to the goal representation, but fosters rigidity (slower switch to new means) when attached to the means. These effects rely on different functions of executive control within a specified goal–means structure, namely switching and focusing of attention and action (Dijksterhuis & Aarts, 2010). If positive affect is attached to the goal representation people are motivated to control their course of action to reach the goal, and become more flexible in switching to other means if such a switch is required to reach the goal. However, if people represent their

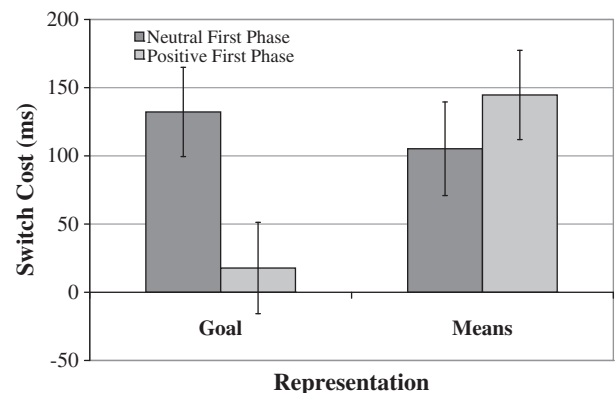


Fig. 4. Main results of Experiment 3 are presented as switch costs in ms as a function of first phase valence (positive vs. neutral) and representation (goal vs. means). Error bars represent one standard error of the mean.

behavior in terms of the means leading to the goal, positive affect motivates performance of that means, and therefore causes executive control to maintain focused on the means. In other words, motivating instrumental actions by positive affect makes it more difficult to refrain from the actions, and thus to switch to new ones. Importantly, this rigidity mainly occurred when practiced means produced direct competition for attention with new means. Thus, whereas positive affect motivates people to be more flexible on the goal level, it motivates a rigid mode of responding on the means level when the means is overtly present. Together, our findings extend and integrate previous research on the role of positive affect in implicit motivation of goal-directed behavior (Custers & Aarts, 2005) with research on behavioral regulation and task switching as a function of the human capacity to represent behavior in terms of goals and means (Aarts, Custers, & Veltkamp, 2008; Meiran, 2010; Vallacher & Wegner, 1987).

The present findings are confined to a specified goal–means relation in a task at hand. It is important to note, though, that such relation is often part of a hierarchically ordered knowledge structure (Aarts & Dijksterhuis, 2000; Gallistel, 1985; Kruglanski et al., 2002; Vallacher & Wegner, 1987). This hierarchical nature renders people's tendency to represent their goal-directed behavior conditional on cognition and attention. Previous research shows that levels of behavior representation vary as a function of both context and individual differences and play a role in understanding own and others' behavior (Aarts, Gollwitzer, & Hassin, 2004; Kozak, Marsh, & Wegner, 2006; Trope & Liberman, 2010; Vallacher & Wegner, 1989; van der Weiden et al., 2010; Wegner, Vallacher, Macomber, Wood, & Arps, 1984). Therefore, a means in one context might be considered a goal in another. For example, the act of commuting consists of the means of taking the car that leads to the goal of going to work. However, there are even lower means, such as turning left at the McDonald's, and this lower means turns the previous means representation into a goal. Moreover, going to the office can also be considered a means for an even higher level goal, such as preparing a lecture. The way people represent their behavior (in terms of goals or means) thus seems to rely on the context at hand. Accordingly, whereas our findings indicate that flexibility and rigidity in goal-directed behavior can result from the implicit motivation to control behavior at different levels, it may be essential to take this context into account to understand and predict when positive affect motivates a more flexible or rigid control of behavior.

Furthermore, we wish to stress that the interpretation of our findings is derived from specific paradigms where switching between means is an obligatory aspect of the task. Although this might render generalization to other situations difficult, there is some recent work that seems to be in line with the current results (Bayuk, Janiszewski, & Leboeuf, 2010). Specifically, participants who are in an abstract mind-set and have formed an intention to reach a certain goal show an increased willingness to pursue an alternate means to reach the goal. However, a concrete mind-set decreases willingness to pursue an alternate means. From the perspective of action identification theory these findings are in line with our results, because abstract high-level identities are characterized by action flexibility and concrete low-level identities are characterized by action rigidity (Vallacher & Wegner, 1987). The account we put forth here thus seems to be complementary to other accounts in the literature, such as those of concrete versus abstract mind-sets, on condition that these mind-sets also produce effects by their motivational value for the person (Clare & Huntsinger, 2007).

To conclude, we observed that positive affect motivates people to be rigid or flexible in goal-directed behavior, but this depended on how people represented their behavior—in terms of higher level goals or lower level means. We therefore believe that taking into account whether people represent their behavior in terms of goals or means promotes a better understanding of how behavior is implicitly motivated and regulated toward goal attainment.

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