

Preparing and Motivating Behavior Outside of Awareness

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The observation that the mere activation of the idea of a behavioral act moves the human body without the person consciously deciding to take action has long been a topic of scientific interest (1–3). Initially, this ideomotor principle was used to explain extraordinary ac-

tion concept (5). Specifically, we investigated that activating the behavior representation of exertion through subliminal priming prepares the execution of the corresponding behavior and that this priming actually motivates effortful behavior when that representation is co-

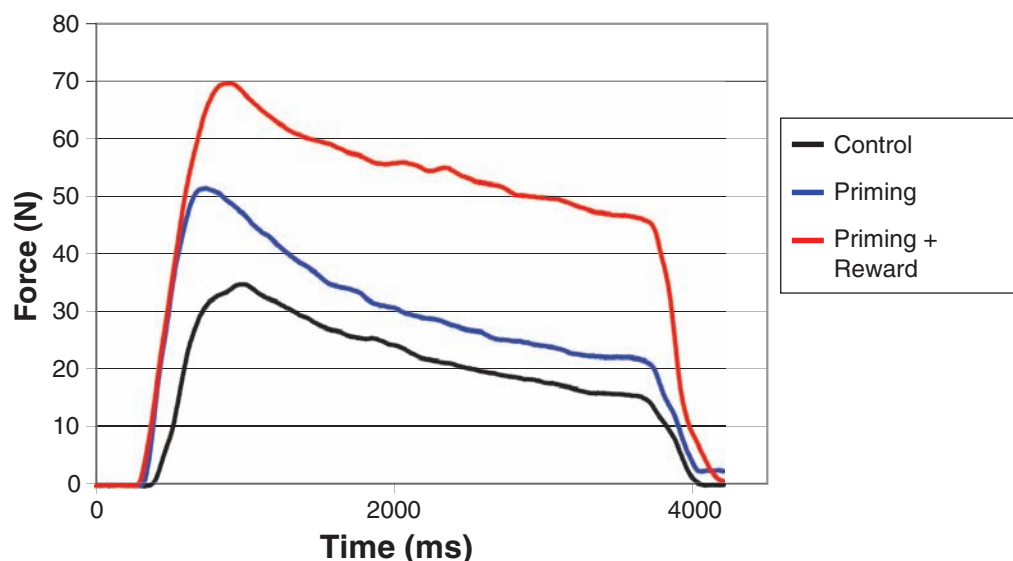


Fig. 1. Mean pattern of force over time as a function of the experimental treatments.

tivities such as compliance under hypnosis, automatic writing, dowsing, and swinging pendulums. Lately, research on social cognition and neuroscience has revealed that seeing or reading about a behavior available in the individual's repertoire increases the tendency to perform it, which has been interpreted as a result of the common code that action concepts share with motor programs. Whereas activating the mental representation of behavior outside of awareness—that is, subliminal priming—indeed prepares people to initiate rapidly the corresponding behavior, an important issue recently addressed is how such subliminal priming effects may acquire an intrinsic motivational property in the sense that people mobilize additional resources and actually spend effort on a task (4). We studied the emergence of such unconscious motivation by examining how subliminal priming of the action concept of physical exertion causes people to spend effort.

Building on research on the basic role of affective value in reward learning and motivation, we propose that the mechanism that turns subliminal priming of action concepts into motivation relies on the tagging of positive affect to the

activated with positively valenced stimuli that act as a reward signal. To test this, we subjected 42 participants to a priming task that enabled us to combine the subliminal priming of words representing exertion with briefly presented, although consciously visible positive words [Supporting Online Material (SOM) text]. Accordingly, three different conditions were created: a (control) condition in which only positive stimuli were presented, a (priming) condition in which exertion was subliminally primed but not directly paired with positive stimuli, and a (priming-plus-reward) condition in which exertion was subliminally primed and immediately linked to positive stimuli.

After the manipulations, we recorded handgrip force, which allowed us to differentiate between action preparation and motivation. Participants were instructed to squeeze a hand grip for 3.5 s when the word “squeeze” appeared on the screen. Results (Fig. 1) showed that participants in the priming and priming-plus-reward conditions started to squeeze earlier and increased their force faster than those in the control condition: The reaction time was shorter, and the initial

slope toward the maximal force (rate of increase in applied force) was steeper in these two priming conditions. This faster initiation of the response to squeeze the hand grip and the faster development of force indicate that acting forcefully was more strongly prepared (2). Crucially, participants in the priming-plus-reward condition displayed more total effort (mean force over time) than those in the other two conditions, showing enhanced motivation (fig. S1 presents the mean scores on the three measures for each cell in the design).

These results confirm that subliminally priming exertion prepares people to display forceful action, but when these subliminal primes are accompanied with a positive stimulus it motivates people to spend extra effort. Previous research on motivation agrees that positive affect acts as a motivator to engage in a task or behavior when it refers to a reward for performing the behavior, even if the reward is subliminally primed (6). We tested a more basic and content-free process by showing that such motivation also emerges when the activation of the behavior representation of exertion is directly accompanied by positive stimuli that do not explicitly pertain to the execution of the behavior itself but nevertheless act as reward signals. These effects occur even though participants were unaware of their contingency with the reward signals. This study thus demonstrates the human capacity to rely on mental processes in preparing and motivating behavior outside of awareness.

References and Notes

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Supporting Online Material

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Materials and Methods

Fig. S1

References and Notes

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