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Changing automatic behavior through self-monitoring: Does overt change also imply implicit change?

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ABSTRACT

Background and objectives: Self-monitoring of unwanted behavior is a common component of effective cognitive-behavioral therapy. Self-monitoring has often shown to lead to decreases in undesirable behavior. To investigate the underlying mechanisms of these 'reactive effects', we investigated whether behavioral changes as a result of self-monitoring were accompanied by changes in explicit and implicit evaluation. For this purpose, monitoring of snack-eating was compared to monitoring of alcohol-drinking, since reactive effects are found absent in alcohol-drinking.
Methods: Implicit evaluations (Affective Priming Task), estimated frequency and satisfaction of consumption (Snacks and Drinks Questionnaire) were assessed before and after a 15-day self-monitoring period. Consumption was measured using self-monitoring forms. Participants were randomly assigned to a group that either monitored snack-eating behavior (experimental group) or to a group that monitored alcohol-drinking behavior (control group).
Results: After self-monitoring, consumption only decreased in the experimental group, although both groups estimated their snack-eating frequency to be higher after self-monitoring. Explicit satisfaction of the habit remained the same but self-monitoring did result in a slightly more implicit negative evaluation of the monitored substance in both groups. In both groups, participants were less satisfied with their snack-eating behavior than with their alcohol-drinking behavior.
Conclusions: Self-monitoring reduced snack-eating but not alcohol-drinking. In both groups, self-monitoring appeared to be accompanied by small implicit, but not explicit changes in evaluation. Changes in evaluation apparently do not lead to actual behavioral change on their own. Other factors are expected to be involved as well, such as dissatisfaction at the start of monitoring.

1. Introduction

"*First we make our habits, then our habits make us*" – Charles C. Noble

This quote illustrates that it is hard to inhibit behavior once it is formed into a habit. Instead of being in control of the habit, the habit is in control of our behavior. Many people suffer from unwanted habits. Examples are smoking, eating snacks, binging, pathological gambling, nail-biting, hair pulling, and skin-picking. Six serious unwanted habits are included in the section 'impulse-control disorders not elsewhere classified' of the Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV-TR; APA, 2000). The present paper investigates a frequently used component of psychological treatments aimed at gaining control over one's unwanted habits: self-monitoring.

In combination with a standard, Baumeister, Heatherton, and Tice (1994) believe self-monitoring of behavior to be the most effective method to achieve self-control. Self-monitoring is a standard component of behavioral treatments (e.g., Hawton, Salkovskis, Kirk, & Clark, 2000). Its function is to collect information on the patients' symptoms before treatment interventions are selected or during treatment, in order to evaluate the treatment's effects. Self-monitoring in the treatment of habitual behaviors also enhances the patients' awareness of their behavior. Being explicitly confronted with unwanted behavior often leads to immediate decreases of the unwanted behavior. Experimental research has

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indeed shown that self-monitoring is not only helpful to collect information, but that it also has therapeutically beneficial effects. These effects of self-monitoring have been tested for a variety of psychopathological behaviors.

The effects of self-monitoring alone, mostly referred to as 'reactive effects', tend to occur in the therapeutically desired direction, that is, undesirable behaviors decrease in frequency while desirable behaviors increase in frequency. To name a few examples, reactive effects have been demonstrated in weight loss (e.g., Bellack, Rozensky, & Schwartz, 1974), nail biting (e.g., Adesso, Vargas, & Siddal, 1979; Vargas & Adesso, 1976), smoking (e.g., McFall & Hammen, 1971), high anxiety levels (e.g., Hiebert & Fox, 1981), and bulimia nervosa (e.g., Dolhanty, 2005). In contrast to these treatment areas the majority of studies showed that the reactive self-monitoring effects on alcohol consumption are weak (e.g., Korotisch & Nelson-Gray, 1999) or even absent (e.g., Harris & Miller, 1990; Hufford, Shields, Shiffman, Paty, & Balabanis, 2002; Litt, Cooney, & Morse, 1998; Ogborne & Annis, 1988; Simpson, Kivlahan, Bush, & McFall, 2005; Sobell, Bogardis, Schuller, Leo, & Sobell, 1989). The reason why there are no reactive effects for self-monitoring of alcohol consumption is not clear. Reactive effects were investigated in students, in patients, as part of their treatment, and also in experimental research settings. The finding that reactive effects are absent in the self-monitoring of alcohol, however, is quite consistent.

The first aim of the present study was therefore to further investigate these reactive effects by comparing self-monitoring in two groups: an experimental group monitoring snack-eating behavior, and a control group monitoring alcohol-drinking behavior. By comparing self-monitoring with reactive effects to self-monitoring without reactive effects, the underlying working mechanisms of these reactive effects in unwanted habits can be investigated. This is important since high relapse rates are common after successful behavioral treatments for unwanted habits (Keijsers et al., 2006). In this study implicit processes were studied as one important underlying mechanism, since implicit processes are shown to play an important role in habit formation. Cognitive theories, such as the auto-motive theory of Bargh (1990, 1997), assume that cognitive processes, such as goal formation, mediate the relationship between the stimulus and the response: environmental stimuli activate goals that, without the need for conscious awareness, lead to certain goal-directed behavior (Aarts & Dijksterhuis, 2000; Bargh, 1990, 1997; Bargh & Ferguson, 2000). This can be very convenient. For example, we do not have to think about every brush stroke when brushing our teeth and when we are in a hurry, we do not have to constantly remind ourselves to move fast. Although convenient most of the time, environmental stimuli can also activate goals that lead to unhealthy behavior; a stressful situation can elicit nail biting or snack-eating, since these behaviors might originally have been paired with sensations of relaxation or elevated mood.

Auto-motive theory thus emphasizes the role of mediating automatic cognitive processes between the environmental stimuli and the response in habitual behavior. The second aim of the present study, therefore, is to investigate these automatic processes. Especially in the case of unwanted habits, these implicit processes may be of great relevance to better understand what makes habits so persistent and in what ways self-control procedures may be applied to achieve long-term beneficial changes. We tested whether a reduction of (overt) habitual behavior due to a self-monitoring task is accompanied by cognitive changes measured at an implicit level. The specific implicit processes investigated in this study are implicit evaluations. In addition to these implicit evaluations, explicit evaluations of the monitored behavior were investigated. As already briefly mentioned, self-monitoring is often used to make patients more aware of their unwanted habitual behavior. It is likely, therefore, that self-monitoring leads to a more negative evaluation of the unwanted behavior. Given the fact that self-monitoring has repeatedly been shown to be ineffective in alcohol-drinking behavior, both implicit and explicit evaluative processes might be resistant to change in this group.

2. Method

2.1. Participants

A total of 65 students, 6 men and 59 women, participated in the experiment. All participants were psychology students at the Radboud University of Nijmegen. The mean age of the sample was 20.3 years ($SD = 1.4$, range 19–25). Participants received a partial fulfillment of the experimental credits required for the completion of their bachelor course. Students had to indicate on a screening questionnaire whether they had presently been formally diagnosed with an eating disorder or with alcohol abuse according to the criteria of the DSM-IV-TR (APA, 2000) or were receiving psychological or pharmacological treatment for these disorders. Students who were diagnosed with an eating disorder or alcohol abuse disorder or were receiving treatment were excluded for participation. All participants were native Dutch speakers and had normal or corrected-to-normal eyesight.

2.2. Materials

Three dependent variables were measured twice during the experiment, namely 'Estimated snack-eating frequency' or 'Estimated alcohol-drinking frequency' (participants' estimated snack-eating or alcohol-drinking frequency when comparing themselves to others), 'Snack-eating satisfaction' or 'Alcohol-drinking satisfaction' (participant's satisfaction with their snack-eating or alcohol-drinking behavior), and 'Implicit stimulus evaluation' (the implicit evaluation of snacks-related and alcohol-related stimuli). All variables were measured prior to the experimental manipulation (Assessment 1) and after the experimental manipulation (Assessment 2).

The experimental manipulation consisted of a self-monitoring homework assignment during 15 consecutive days. Participants were given a package of standardized self-monitoring forms to record their behavior at home. This package contained 15 (A5-sized) pre-printed self-monitoring forms, one form for each self-monitoring day, and an example-form to clarify the task. Two slightly different types of self-monitoring forms were used, one for the experimental group and the other for the control group. The experimental group monitored snack-eating behavior, whereas the control group monitored alcohol-drinking behavior. Both types required the recording of the following: point in time (e.g., 13.00 h), the nature of the product (e.g., 'bag of chips' or 'beer'), the amount (e.g., 'two pieces' or 'one glass'). In the experimental group, the recorded amount of calories was calculated after completion of the experiment and was used as an objective measurement for the amount of snacks eaten. In the control group, the amount of alcohol in the drinks consumed by the participants was calculated. Standardized lists were used to compute the total amount of calories or standard units of alcohol (according to Dutch guidelines) participants consumed. After the self-monitoring period, an evaluation questionnaire with a 10-point scale assessed whether participants had monitored according to instructions. The higher the score, the better participants monitored according to instructions.

Estimated snack-eating and alcohol-drinking frequency and snack-eating and alcohol-drinking satisfaction were measured in both the experimental group and the control group, using the Snacks & Drinks Questionnaire (SDQ). This instrument was