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

Joyce Maas, Lars Hietbrink, Mike Rinck, Ger P.J. Keijser

Department of Clinical Psychology, Radboud University Nijmegen, P.O. Box 9104, 6500 HE Nijmegen, The Netherlands

Behavioural Science Institute, Radboud University Nijmegen, P.O. Box 9104, 6500 HE Nijmegen, The Netherlands

Hendriks & Roosenboom, Eusebiusviertingel 2a, 6828 HS Arnhem, The Netherlands

Article info

Article history:
Received 13 December 2011
Received in revised form 8 November 2012
Accepted 17 December 2012

Keywords:
Habits
Self-monitoring
Implicit evaluation
Automaticity

Abstract

Background and objectives: Self-monitoring of unwanted behavior is a common component of effective cognitive-behavioral therapy. Self-monitoring has often been 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.

© 2013 Elsevier Ltd. All rights reserved.

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, bingeing, 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
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 & Litt, Cooney, & Morse, 1998; Ogborne & Annis, 1988; Simpson, Kwilahan, 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 (Keijzers 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
developed by the researchers for the purpose of the present study. The SDQ contains one question about the estimated frequency of eating snacks (‘when comparing myself to other people, the amount of snacks I consumed during the previous week was…)’ that people had to answer on a 10-point Likert-scale (0 = very small, 10 = very large), one question about the estimated frequency of consuming alcoholic drinks (‘when comparing myself to other people, the amount of alcoholic beverages I consumed during the previous week was…’), six questions about the satisfaction with the consumption of snacks (e.g., ‘I am satisfied with my snack-eating behavior’, and ‘I don’t want to change anything about my snack-eating behavior’), and six questions about the satisfaction with the consumption of alcoholic drinks (e.g., ‘I am satisfied with my alcohol-drinking behavior’, and ‘I don’t want to change anything about my alcohol-drinking behavior’). The questions were selected based on their high face validity.

The implicit stimulus evaluation was measured using an Affective Priming Task (APT; Bargh, Chaiken, Govender, & Pratto, 1992; Fazio, Sanbonmatsu, Powell, & Kardes, 1986; Hermans, de Houwer, & Eelen, 1994). Lamote, Hermans, Baeyens, and Eelen (2004) showed that the APT is a sensitive instrument to determine a person’s attitude/evaluation toward food primes. Picture primes and word targets were used. Participants had to respond to the valence of the targets. In the APT, the affective relation between primes and targets is manipulated in such a way that their combination is either congruent (both positive or both negative) or incongruent (one positive and one negative). In general, people are faster in processing the target in the congruent condition. This means that when the response of a participant is faster on a positive target than on a negative target that is preceded by the same kind of prime, this participant has a positive association with this prime. Picture primes were chosen over word primes, since they appear to have a stronger effect (Spruyt, Hermans, de Houwer, & Eelen, 2002). Ten picture primes for snack-eating behavior (e.g., chips, chocolate, cookies, candy), ten picture primes for alcohol-drinking behavior (e.g., beer, wine), and ten control primes were used. The control primes were pictures of doors. Only the pictures with regard to the snacks and alcohol primes were used for analyses. The target stimuli were ten Dutch words of which half were positively related to consumption (e.g., ‘nice’, ‘tasteful’) and half were negatively related to consumption (e.g., ‘bad’, ‘fat’). The words were chosen based on their low ambiguity and their association with consumption.

The APT was performed on a Macintosh computer. Connected to the computer was a button box of which the left and right button were used to either give the response ‘pleasant’ or the response ‘unpleasant’. The attachment of ‘pleasant’ or ‘unpleasant’ to the left or right button was randomly determined for each subject.

2.3. Procedure and design

A mixed design was used with two groups and an assessment before and after the experimental manipulation. After enlistment, participants were randomly assigned to either the experimental group (N = 32) or the control group (N = 33). After randomization, participants were approached by e-mail for appointments for the first (before the self-monitoring task) and the second (after the self-monitoring task) assessment. Exclusion criteria were checked with a short written questionnaire when the participants were enlisted.

The research room was a dimly lit space with a table, a chair, and a computer. Participants were informed that they were about to participate in an experiment concerning health behavior in students. Written instructions were offered. Participants were asked to fill out a biographical questionnaire and the SDQ. By pressing a button on the keyboard, the APT started with 15 practice trials.

During the APT, all ten snacks pictures, all ten alcohol pictures, and all ten door pictures were presented in a random order, each randomly followed by the negative and positive words. The task consisted of 240 trials, divided between two blocks. The prime picture appeared on the screen for 400 ms and was immediately followed by a target word (Hermans, de Houwer, & Eelen, 2001). The target remained on the screen until the subject gave a response by pushing the left or right button on the button box to evaluate the target as positive or negative, or until 2000 ms had elapsed after appearance of the target. The subject was asked to respond as quickly as possible to evaluate the target as either pleasant or unpleasant. The reaction times (RTs) were monitored.

After completion of the APT, oral instructions for a self-monitoring task followed. Participants in the experimental group were asked to monitor snack-eating behavior. Participants in the control group were asked to monitor alcohol-drinking behavior. The participants were asked to complete a self-monitoring form as completely as possible once everyday before going to bed. The participants were advised to keep the forms on their pillow, in order to minimize the possibility that the self-monitoring task would be forgotten. In order to further clarify the task, participants were helped to complete a self-monitoring form concerning the previous day. The participants received self-monitoring forms and were instructed to monitor their behavior for 15 consecutive days, starting the next day.

The second assessment was administered on the 16th day for all participants. Again the SDQ and APT were administered, and the participants were asked to complete the evaluation questionnaire. After completion of the study, participants were debriefed by email about the goal of the experiment.

3. Results

3.1. Group characteristics

Sixty-five participants presented themselves at the first assessment of the experiment, two of them failed to show up at the second assessment. Their data were excluded from the analyses. Two participants did not complete the entire priming task and were therefore excluded from the statistical analyses with regard to the APT. Overall, 61 participants were thus included for the implicit measures (29 participants in the experimental group and 32 participants in the control group) and 63 participants were included for the overt measures (30 participants in the experimental group and 33 participants in the control group). The experimental group did not differ from the control group with respect to gender, age, weight, length. Furthermore, there were no significant group differences for snack-eating or alcohol-drinking frequency and satisfaction on the SDQ. Nor were there significant group differences on the APT task (Table 1).

3.2. Snacks and Drinks Questionnaire (SDQ)

Before testing whether frequency and satisfaction changed in both groups as a result of self-monitoring, we checked how ‘unwanted’ both behaviors were. For this purpose, we compared snack-eating and alcohol-drinking frequency and satisfaction before self-monitoring. For this purpose, a 2 (Group: experimental, control) × 2 (Substance: snacks, alcohol) repeated-measures ANOVA was first conducted for estimated snack-eating frequency and alcohol-drinking frequency of assessment 1. The main effect of Group, F(1, 63) = .76, p = .39, $\eta^2 = .01$, and the Group × Substance interaction, F(1, 63) = .16, p = .69, $\eta^2 = .002$ were not significant. The main effect of Substance was significant, F (1, 63) = 26.50, p < .001, $\eta^2 = .30$: both groups estimated their snack-eating...
frequency ($M = 4.9, SD = 1.7$) to be significantly higher than their alcohol-drinking frequency ($M = 3.2, SD = 2.1$).

The 2 (Group: experimental, control) × 2 (Substance: snacks, alcohol) repeated-measures ANOVA was used for snack-eating and alcohol-drinking satisfaction of assessment 1. The main effect of Group, $F(1, 63) = 21, p = .05, eta^2 = .03$, and the Group × Substance interaction, $F(1, 63) = .185, p = .18, eta^2 = .03$ were not significant. The main effect of Substance was significant, $F(1, 63) = 78.52, p < .001, eta^2 = .55$; both groups were significantly more satisfied with their alcohol-drinking frequency ($M = 33.2, SD = 6.0$) than with their snack-eating frequency ($M = 24.5, SD = 6.9$).

### 3.3. Self-monitoring data

Since either snack-eating behavior or drinking behavior was monitored depending on the group the participants were assigned to, a direct comparison between the data of both groups was impossible. Therefore, both groups are discussed separately.

#### 3.3.1. Experimental group

In the evaluation questionnaire participants reported to have carried out the self-monitoring task on a daily basis for 93.4% of the self-monitoring period. Furthermore, they reported to have carried out the self-monitoring task mostly according to instructions ($M = 8.71$ on a 10-point scale). The data collected from the self-monitoring forms (see Fig. 1) were analyzed using a repeated-measures ANOVA. Since sphericity was violated, the Huyn–Feldt correction was applied. The repeated-measures ANOVA resulted in a significant decline, $F(11.9, 16) = 2.22, p < .05, eta^2 = .07$, in the average amount of calories per day as recorded by the participants in the experimental group, $R^2 = .54$.

#### 3.3.2. Control group

The control group monitoring alcohol-drinking behavior reported to have carried out the self-monitoring task on a daily basis for the entire (100%) self-monitoring period. They also reported to have carried out the self-monitoring task mostly according to instructions ($M = 9.3$ on a 10-point scale). Using the Huyn–Feldt correction, the repeated-measures ANOVA did not result in a significant decline, $F(10.7, 16) = 1.45, p = .15, eta^2 = .04$, in the amount of alcohol per day as recorded by the participants in the control group, $R^2 = .04$ (Fig. 2).

### 3.4. APT

Extreme reaction times (below 300 ms and above 1500 ms) were considered as outliers (14% at assessment 1; 8% at assessment 2) and eliminated from the analyses. Furthermore, all incorrect responses (e.g., a “pleasant” response to an unpleasant target) were eliminated (17% of all responses at assessment 1 and 19% at assessment 2). Median RTs were analyzed to minimize the impact of extreme values.

### APT

![Fig. 1. Amount of calories consumed during 15-day self-monitoring period: mean amount of calories monitored and fitted regression line.](image-url)
successful, but not unsuccessful self-monitoring, resulted in a more negative implicit evaluation of the monitored substance. However, the Group × Time × Valence × Self-monitoring status interaction was not significant, $F(1, 59) = .50, p = .82, \eta^2 = .001$. The Time × Valence × Self-monitoring status interaction was borderline significant, $F(1, 59) = 2.92, p = .052, \eta^2 = .06$, meaning that in both groups during assessment 1 the monitored substance primed positive targets faster ($M = 615, SD = 104$) than negative targets ($M = 619, SD = 83$), whereas in both groups during assessment 2 the monitored substance primed negative targets faster ($M = 584, SD = 57$) than positive ($M = 591, SD = 82$) targets. The implicit evaluation of substances that were not monitored did not change over time; substances that were not monitored primed negative targets faster (assessment 1: $M = 614, SD = 80$; assessment 2: $M = 586, SD = 61$) than positive targets (assessment 1: $M = 622, SD = 99$; assessment 2: $M = 587, SD = 71$) in both assessments and both groups. Follow-up analyses were performed for monitored and not monitored substances separately, but both for monitored, $F(1, 59) = 2.16, p = .15, \eta^2 = .04$, as well as for not monitored substances, $F(1, 59) = .17, p = .68, \eta^2 = .01$, the Time × Valence interaction was not significant.

**4. Discussion**

The first aim of the present experiment was to investigate the reactive effects of a 15-day self-monitoring task by comparing two groups: an experimental group that monitored snack-eating behavior, and a control group that monitored alcohol-drinking behavior. Next to this more objective measure of consumption, participants’ estimated snack-eating and alcohol-drinking frequencies, estimated as compared to others, were also assessed. In line with the literature, reactive effects of self-monitoring were expected to be found in the experimental group, but not in the control group.

When comparing the estimated snack-eating frequency with the observed amount of calories consumed, an interesting contradiction emerged: estimated snack-eating frequency increased in both groups from assessment 1 to assessment 2, but the total amount of calories as registered on the self-monitoring forms by the experimental group showed a strong decrease. The finding that the amount of calories consumed by the participants in the experimental group showed a strong decrease, irrespective of the fact that participants in no way were instructed to make an effort to reduce their consumption of snacks, supports previous research concerning the reactive effects of self-monitoring in several disorders and unwanted behaviors (e.g., Adesso et al., 1979; Bellack et al., 1974; Dollhanty, 2005; Hiebert & Fox, 1981; McFall & Hammern, 1971; Vargas & Adesso, 1976). The fact that the observed amount of calories decreased, whereas the estimated amount increased appears to be in line with Wansink and Sobal’s (2007) notions that 90% of all food-related decisions are made without clear conscious choice, thus strengthening the assumption that snack-eating behavior is automatic. It is likely that the participants failed to notice the change at all. An alternative explanation is that participants are aware of the change in consumption, but unaware of their sweet-eating before self-monitoring: participants might have thought that they ate about the same as other people before starting self-monitoring. But because they are made aware of their behavior by self-monitoring and by the question regarding consumption in the questionnaire, they might have looked more closely at their behavior and adjusted their estimated snack-eating frequency accordingly.

Confirming our hypothesis, and in line with the literature (e.g., Harris & Miller, 1990; Hufford et al., 2002; Korotisch & Nelson-Gray, 1999; Litt et al., 1998; Ogborne & Anis, 1988; Simpson et al., 2005; Sobell et al., 1989), self-monitoring was not successful in the control group; both objective alcohol consumption, as registered on the self-monitoring forms, as well as estimated alcohol-drinking frequency did not change over time. Overall, both groups estimated their snack-eating frequency to be higher than their alcohol-drinking frequency at baseline.

The second aim of the study was to take a closer look at the underlying working mechanisms of the reactive effects of self-monitoring. We investigated whether self-monitoring is also accompanied by cognitive changes measured at an implicit level. For that purpose, participants completed an APT to assess possible changes in implicit evaluations toward snack-eating behavior. In addition to these implicit evaluations, explicit satisfaction with the monitored behavior and, as already described before, frequency estimations of the behavior were investigated. Since being explicitly confronted with unwanted behavior is not a pleasant experience, we expected changes in evaluation of the unwanted behavior to be an important underlying working mechanism. Since self-monitoring did not have reactive effects in the control group, we expected that both implicit and explicit processes might be resistant to change in this group.

We found that explicit snack-eating satisfaction as well as explicit alcohol-drinking satisfaction did not change over time. However, we found that self-monitoring resulted in a slightly more (borderline significant) negative implicit evaluation of the monitored substance in both groups. Although reactive effects were only found in the experimental group, implicit evaluations seemed to become more negative in both groups. This suggests that self-monitoring is accompanied by implicit cognitive changes, but that these negative implicit evaluations do not lead to successful behavioral changes on their own. Changes in evaluations (implicit and explicit) therefore do not seem to explain why self-monitoring was effective in the experimental group, but not in the control group.

We also found that at baseline both groups not only estimated their alcohol-drinking behavior to occur less frequently but also evaluated it to be less bothersome than their snack-eating behavior. Therefore, all participants might have been more motivated to change their snack-eating behavior than their alcohol-drinking behavior. Indeed, increased reactive effects have been found in persons motivated to change their behavior (Korotisch & Nelson-Gray, 1999).

As already mentioned in the introduction of this paper, self-monitoring is often used to make patients more aware of habitual behavior. It can be argued that alcohol-drinking is less habitual than snack-eating. Whereas alcohol-drinking occurs in limited
social situations, during limited times of the day — at least, for non-alcoholics — snack-eating happens all day long in various circumstances; food is always available, but alcohol is not. Self-monitoring might be less effective in behavior that is not automatic or habitual. A few limitations should be addressed. One can argue that the calorie decrease found on the self-monitoring task may have been caused by other factors, such as a decreasing motivation of the participants to monitor accurately. However, participants in the experimental group reported to have monitored their behavior on a daily basis in 93.4% of the cases and according to instructions. Participants in the control group monitored on a daily basis during the entire monitoring period, but their behavior did not change. Therefore, it is likely that the effects we found are valid.

All participants were students (mostly female), who likely have a somewhat different lifestyle than the general population. Our sample, for example, drank relatively large amounts of alcohol. The lack of effects in this group can therefore not be explained by a floor effect. Although our sample drank a lot of alcohol, they estimated their alcohol-drinking frequency not to be very high as compared to others. This again suggests that our participants viewed their behavior as normal (as compared to other students), and were not motivated to change it.

The automatic behaviors that were investigated in this study were not necessarily pathological behaviors, since students were randomly assigned to treatment groups. Previous studies on the reactive effects of self-monitoring mostly concerned psychopathological behavior. The explicit and implicit effects found in the present study might have been different when pathological snack-eaters and pathological drinkers had been included, but, overall, our findings do not divert from the reactive effects previously reported. Furthermore, a strength of the present study lies in the fact that the present findings emerged in an experimental study where participants were randomly assigned to groups.

4.1. Conclusion

In conclusion and line with reports from other studies, participants appear to have difficulties in giving accurate estimates of the frequency of snack-eating (e.g., Wansink & Sobal, 2007). Due to self-monitoring, participants tend to reduce their snack-eating behavior, but not their alcohol-drinking behavior. The fact that both groups were relatively satisfied with their alcohol-drinking behavior most likely negatively affected the reactive effects of self-monitoring in the alcohol group. Although only marginally significant, the results concerning implicit evaluation suggest that self-monitoring is accompanied by implicit cognitive changes. More specifically, monitoring of a substance was associated with a more negative implicit evaluation of the monitored substance, but in both groups. Explicit satisfaction did not change in both groups. Changes in evaluation therefore do not seem to necessarily lead or contribute to actual behavioral change. Other factors are expected to be involved as well. Our data suggest that dissatisfaction with the behavior at the start of self-monitoring is one important factor. Future research should investigate the long-term effects of self-monitoring. So far and to our knowledge, the long-term effects of self-monitoring have never been investigated. Although the effects on the long-term are unclear, self-monitoring has proven to be an effective and efficient treatment for many unwanted behaviors.

Acknowledgments

We would like to thank Jason Sharbanees for his helpful comments. We furthermore would like to thank Stefanie Kampmann for her help with designing and conducting the experiment.

References


