



Up and down regulation of a highly automatic process: Implementation intentions can both increase and decrease social projection



Anton Gollwitzer^{a,*}, Bettina Schwörer^b, Chadly Stern^c, Peter M. Gollwitzer^{d,e}, John A. Bargh^a

^a Department of Psychology, Yale University, 2 Hillhouse Ave., New Haven, CT 06511, USA

^b Department of Psychology, University of Hamburg, Von-Melle-Park 5, Hamburg 20146, Germany

^c Department of Psychology, University of Illinois at Urbana-Champaign, 603 East Daniel Street, Champaign, IL 61820, USA

^d Psychology Department, New York University, 6 Washington Place, New York, NY 10003, USA

^e Department of Psychology, University of Konstanz, Konstanz 78457, Germany

HIGHLIGHTS

- Projection, assuming that other people share one's attitudes, is highly automatic.
- Implementation intentions create a link between a cue and a goal-directed response.
- The goal-directed response is automatically activated when encountering the cue.
- Implementation intentions can decrease as well as increase projection.
- Implementation intentions can be used to alter automatic processes.

ARTICLE INFO

Article history:

Received 30 March 2016

Revised 9 December 2016

Accepted 16 December 2016

Available online xxxx

Keywords:

Implementation intentions

Projection

Automaticity

Self-regulation

False consensus

ABSTRACT

Two studies examined whether implementation intentions, self-regulatory “if-then” plans, can alter social projection – people's tendency to automatically assume that other people share their attitudes. In Study 1 ($N = 120$), participants provided their attitudes on twenty items (e.g., “I like mechanics magazines”), and then formed either (1) a goal intention directed at reducing projection: “I will remember that other people are different!”, (2) the same goal intention followed by an implementation intention: “If I'm asked to estimate what percent of other people agree with me, then I will remember that other people are different!”, or (3) did not adopt any strategy (no-treatment control). Participants who formed an implementation intention were less likely to estimate that other people share their attitudes than did participants in the goal intention and control conditions. Study 2 ($N = 268$) replicated these results and additionally demonstrated that if-then plans can also increase projection. Overall, these findings indicate that if-then plans can be used to both decrease and increase social projection. Importantly, the latter finding is the first demonstration that implementation intentions can be used to *intensify* an existing automatic process. Thus, by forming implementation intentions, individuals can exercise dynamic control over nonconscious processes, that is, they can down-regulate as well as up-regulate such processes.

© 2016 Elsevier Inc. All rights reserved.

I like coffee. Does that mean that you like coffee too? As social beings, people are often required to make predictions about the attitudes of others. One source that informs these predictions are our own attitudes: We commonly assume that others share our likes and dislikes (Murstein, 1957; Ross, Greene, & House, 1977). Such projection can manifest itself, for example, in the belief that since I like coffee, others like coffee as well.

1. Social projection

Projection has been found to occur across a variety of different domains and constructs, including in individuals, close relationships, and groups with respect to beliefs, attitudes, emotions, and goals (Clement & Krueger, 2002; Lemay, Clark, & Feeney, 2007; Kawada, Oettingen, Gollwitzer, & Bargh, 2004; Robbins & Krueger, 2005; Van Boven & Loewenstein, 2003; Oettingen, Ahn, Gollwitzer, Kappes, & Kawada, 2014; Ahn, Oettingen, & Gollwitzer, 2015). A meta-analysis conducted 30 years ago, had already recorded 115 different instances in which projection of attitudes occurred (Mullen et al., 1985; $d = 0.496$).

* Corresponding author at: Yale University, Department of Psychology, 2 Hillhouse Ave., New Haven, CT 06511, USA.

E-mail address: anton.gollwitzer@yale.edu (A. Gollwitzer).

In some cases, projecting one's attitudes onto others can have negative consequences. Regarding smoking, for instance, Sherman, Presson, Chassin, Corty, and Olshavsky (1983) found that adolescent smokers believe that more adolescents smoke than non-smokers do, likely discouraging smoking cessation. With respect to behavior change interventions, studies have also demonstrated that projection causes apathy towards statistics and intervention programs that utilize statistical information (Bauman & Geher, 2002). Projection can also have positive consequences however. For example, projection increases predictive accuracy of others' attitudes when people projected their attitudes onto their specific group of friends (Hoch, 1987). Further, participants report higher relationship satisfaction when they assume that their friend or spouse is more similar to them (Morry, 2005; Lemay et al., 2007).

Various studies have investigated whether individuals can alter the effect of projection. For example, Krueger and Clement (1994) illustrated the rigidity of consensus judgments by showing that participants failed to update their consensus estimates even when (1) they were educated about consensus bias and provided with feedback of actual consensus information, and (2) when they were made aware of self-other differences in consensus estimates. That providing such information did not help participants to alter projection suggests that projection is not easily controllable. Indeed, Krueger (2007) has argued that projection occurs automatically as it exhibits features of automaticity, that is, it occurs without awareness, with little effort or intention, and cannot be reduced at will (Bargh, 1994).

Research examining the projection of implicit goals supports the assumption that projection occurs outside of awareness. Kawada et al. (2004) found that participants with the implicit goal to compete perceived others as striving for competitive goals more than control participants. As these participants were nonconsciously primed to be competitive – participants were unaware of their competitive goal – they likely nonconsciously projected their competitive goal onto others. That projection occurs without effort or intention is suggested by experimental studies showing that projection continues to occur even under high cognitive load (Krueger & Stanke, 2001), and projection has actually been found to increase when participants are under time pressure (Epley, Keysar, Van Boven, & Gilovich, 2004).

Krueger (2007) concluded that projection is a highly automatic process: “social projection is a perceptual primitive that emerges with minimal cognitive contribution” (p. 2). However, Krueger also points out that while *highly* automatic, projection may not be *entirely* automatic. Such high automaticity is in line with viewing automaticity as continuous (Bargh, 1994). In other words, processes should not be classified as either automatic or not, instead the *level* of automaticity should be focused on. This can be done by looking at the features of automaticity: controllability, efficiency, and occurring outside of awareness. Projection, for instance, is difficult but not impossible to control, thus indicating that projection is not completely but highly automatic.

Stifling or reducing projection requires special circumstances: Epley et al. (2004) were able to reduce projection in the form of judging others' attitudes by offering participants monetary incentives. These findings suggest that projection can be decreased when people are given incentives that lead them to effortfully correct their judgments. In contrast, in the present research, we examine whether projection can be altered by a strategy that itself operates automatically, and thus does not require effortful thought: implementation intentions (if-then plans). We chose to examine if-then plans because consciously formed if-then plans have been found to automatically trigger goal-directed responses (Gollwitzer, 1999). Accordingly, if people form if-then plans with the goal intention to alter projection, they could perhaps be effective at modulating the extent to which they engage in projection.

2. Implementation intentions as a self-regulation strategy

People often have good intentions, such as exercising regularly, eating healthier, getting better grades in school, and reducing stereotypical

biases. Unfortunately, such goals have a major downside – people often fail to act on them (Sheeran, 2002). Implementation intentions are a self-regulation strategy introduced by Gollwitzer (1993, 1999) that can be used to help achieve such goals. In other words, if-then plans can be used to close the intention-behavior gap. Specifically, implementation intentions direct people to specify when, where, and how they plan to implement their goals. As a result of deciding how to act in a certain situation using an if-then format – linking a goal-directed response to a specified situational cue – implementation intentions achieve swift and efficient execution of a goal-directed action while protecting goal pursuit from tempting distractions, bad habits, or competing goals (Gollwitzer & Sheeran, 2006).

Gollwitzer (1999, 2014) argued that the strong associative link between the cue (the “if”-part) and goal-directed response (the “then”-part) of if-then plans leads to automatic action initiation once the cue is encountered. The automaticity of such action initiation is expressed in its immediacy, efficiency, and the absence of conscious involvement. Awareness is not required to act in the critical moment (i.e., when encountering the cue); implementation intention effects were observed even when the specified critical cue was presented subliminally (e.g., Bayer, Achtziger, Gollwitzer, & Moskowitz, 2009). Effort is also not required for a cue to activate action initiation; people who form if-then plans are found to act more quickly regardless of cognitive load compared to people who only form goal intentions (Gollwitzer & Brandstätter, 1997; Brandstätter, Lengfelder, & Gollwitzer, 2001). In other words, action control by if-then plans is highly efficient.

Implementation intentions should be differentiated from mere goal intentions. Goal intentions have the structure, “I will perform y!” Implementation intentions, in contrast, have the structure, “If situation x arises, then I will perform response y!” thus linking a stimulus cue with a goal-directed response. Because goal intentions lack an if-then structure and therefore a cue-response link, they do not trigger automatic action initiation and thus should fail to stop highly automatic processes such as projection. Support for this hypothesis comes from an fMRI study reported by Gilbert, Gollwitzer, Cohen, Oettingen, and Burgess (2009) in which participants performed a prospective memory task on the basis of either goal or implementation intention instructions. Acting on the basis of mere goal intentions was associated with lateral rostral prefrontal cortex brain activity, an area that is known to be related to top-down (goal) control of action. Acting on implementation intentions on the other hand was associated with activity in the medial rostral prefrontal cortex, an area related to bottom-up (stimulus) control of action (Burgess, Dumontheil, & Gilbert, 2007).

3. The present research

Past research supports the idea that implementation intentions can be used to effectively regulate social projection, a highly automatic process. If-then plans have been shown to effectively control other automatic judgment processes, such as social-cognitive transference (Przybylinski & Andersen, 2013), stereotyping (Mendoza, Gollwitzer, & Amodio, 2010; Stewart & Payne, 2008), and behavioral mimicry (Wieber, Gollwitzer, & Sheeran, 2014). The applied and theoretical significance of such effects can be illustrated by considering the following metaphor of how the nonconscious and conscious interact. Imagine that a car represents the nonconscious and its driver represents the conscious mind (Baumeister, 2005). Overall, the nonconscious and the conscious work together. Similar to how a driver directs the orientation of a car (using the steering wheel), people's goals direct their nonconscious processes. Further, similar to how a driver can hit the brake to slow down the car, people can aim to stifle their automatic processes. Implementation intentions are an effective tool by which a driver can successfully and without great effort brake the car, that is, directly attenuate their nonconscious processes. In other words, if-then plans allow people to easily down-regulate nonconscious processes from the conscious.

Most, if not all research on the control of automatic processes, however, has focused on the 'braking' aspect of the car – decreasing or stopping automatic processes (i.e., down-regulation). Indeed, the very definition of controllability, a common quality of automatic processes, is people's ability to reduce or hinder the process (Bargh, 1994). Strikingly, research is absent with respect to whether automatic processes can be *easily* 'controlled' in the sense of *increasing* their power and influence – that is, on the use of the car's gas pedal. Despite a large literature on how implementation intentions can be utilized to stop or decrease unwanted automatic or impulsive influences, it has yet to be shown that if-then plans can also increase or intensify existing automatic processes. To sum up, research so far has been solely focused on the brakes of the car – the gas pedal has been ignored entirely.

To fill this research gap the current studies investigated whether forming implementation intentions can successfully lead people to not only decrease but also increase their social projection. Considering the importance of if-then plans for regulating one's nonconscious, these findings would have far reaching implications. If individuals can not only down-regulate but also up-regulate social projection utilizing if-then planning, then this indicates that they could both down-regulate and up-regulate other automatic processes and habits (i.e., healthy eating) without costly interventions or effortful repetition as well (Dickinson, 1985; Rothman et al., 2015; Gollwitzer, 2014).

4. Study 1: implementation intentions can be used to reduce projection

In Study 1, we tested the hypothesis that forming implementation intentions can reduce projection, before examining in Study 2 whether if-then plans can also increase projection. Specifically, implementation intentions compared to mere goal intentions and a no-treatment control group, should enable individuals to reduce the amount they project their attitudes onto others. Finally, we investigated whether an increase in deliberate self-reported motivation (i.e., effortful and intentional motivation) mediated this effect of implementation intentions. Importantly, deliberate motivation is effortful and conscious. In line with past research showing that implementation intentions operate via enhancing automatic action control rather than via deliberate processes (i.e., experiencing increased goal commitment; see meta-analysis by Webb & Sheeran, 2008), we hypothesized that feeling highly motivated to reduce projection should *not* be a mechanism underlying the effects of implementation intentions on projection.

4.1. Method

4.1.1. Participants

We conducted a power analysis based on a meta-analysis of close to 100 studies examining the effects of implementation intention on goal attainment (Gollwitzer & Sheeran, 2006; initiating a planned response: $d = 0.61$). This analysis revealed that approximately 112 participants would be needed to achieve 85% power ($1 - \beta$) at a 0.05 alpha level ($\alpha = 0.05$). To account for potential study dropouts, we thus recruited 120 (50 female) adults online using Mechanical Turk in exchange for monetary compensation; participants were given 0.70 cents for 7 min of work (www.mturk.com; see Buhrmester, Kwang, & Gosling, 2011). Of these participants, six were excluded as they failed an attention check at the end of the experiment. Of the excluded participants, two were in the implementation intentions condition, two in the goal condition, and two in the control condition. The mean age of the remaining participants was 36 years ($M = 36.68$, $SD = 11.91$). The study used a 3 self-regulation conditions (implementation intention, goal intention, no-treatment control) between-subjects design with a continuous dependent variable: projection. Participants were randomly assigned to either the implementation intention condition, goal intention condition, or the no-treatment control condition.

4.2. Materials and procedure

4.2.1. Attitude assessment

To collect participants' attitudes (later used to calculate participants' level of projection), participants were, similar to past research on social projection, asked whether they either agreed or disagreed with 20 statements taken from the Minnesota Multiphasic Personality Index (MMPI; Krueger, 2007; Appendix A).

4.2.2. Self-regulation manipulation

After having answered the MMPI questionnaire, participants were randomly assigned to three different conditions: the implementation intention condition ($N = 39$), the goal intention condition ($N = 38$), and the no-treatment control condition ($N = 37$). Participants in the goal intention and implementation intention conditions were prompted to read, memorize, and repeat the following statement three times using inner speech: "I will remember that other people are different!" Participants were also told that they would have to write the above line on the next page from memory, which they then proceeded to do. Participants in the implementation intention condition were additionally asked to do the same thing for the following statement: "If I'm asked to estimate what percent of other people agree with me, then I will remember that other people are different!" These participants were also told that they would have to write the above lines on the next page from memory, which they then proceeded to do. Participants in the control condition skipped both the goal setting and the if-then plan making.

4.2.3. Deliberate motivation assessment and distractor task

Next, all participants reported how motivated they were to remember that other people are different: "I want to remember that other people are different" (Likert scale: 1 = *Not at all* to 7 = *Strongly*). This item, which all participants completed, was followed by a distractor task in the form of a word search. All participants were asked to take 2 min to work on the simple word search task which involved finding color words such as green, blue, etc.

4.2.4. Projection assessment

Participants continued by completing consensus estimates of the identical 20 MMPI items they had been asked to agree or disagree with. Consistent with previous research (e.g., Krueger & Clement, 1994; Simon et al., 1997), participants were prompted: "For each item, please estimate the percentage (0-100%) of OTHER PEOPLE who would AGREE with that item."

4.2.5. Focus check and demographics

Before demographics were collected, participants completed an attention check in the form of a single item: "Note: Your answer on this question will NOT influence your payment on this hit. How focused were you during this survey?" (Likert scale: 1 = *Not at all focused* to 7 = *Very focused*).

4.3. Results and discussion

4.3.1. Projection

We created a single score for each participant assessing their tendency to project their attitudes onto others. To create this score, we calculated within-subject similarity scores, as described in Appendix B (for a detailed discussion, see Krueger & Zeiger, 1993). Positive scores indicate assuming that others' attitudes are *similar* to one's own attitudes (i.e., assumed similarity), and negative scores indicate assuming that others' attitudes are *different* from one's own attitudes (i.e., assumed dissimilarity). Thus, higher positive scores indicate greater projection of a participant's attitudes onto others. Consistent with previous research (e.g., Krueger & Clement, 1994; Stern, West, & Schmitt, 2014), we converted the within-subject similarity scores to Fisher's z-scores

which we used as the dependent variable of projection in our statistical analyses. In this way, a projection z-score representing the degree of projection was calculated for each participant.

To test our hypothesis that implementation intentions can effectively reduce projection, we examined participants' degree of projection across the three conditions using a one-way analysis of variance (ANOVA). A significant effect of condition was observed, $F(2,111) = 3.21$, $p = 0.044$, $\eta^2 = 0.055$. Pairwise comparisons revealed that participants in the implementation intention condition had lower projection scores, $M = 0.49$, $SD = 0.41$, than those in the goal intention condition, $M = 0.67$, $SD = 0.32$, $t(111) = -2.25$, $p = 0.026$, 95% CI: $[-0.341, -0.022]$, $d = 0.427$, and the control condition, $M = 0.66$, $SD = 0.33$, $t(111) = -2.12$, $p = 0.036$, 95% CI: $[-0.333, -0.011]$, $d = 0.402$. The goal intention condition and the control condition did not differ, $t(111) = 0.122$, $p = 0.906$, 95% CI: $[-0.152, 0.171]$, $d = 0.023$ (Fig. 1).

Finally, as we had predicted that participants in the implementation intention condition would exhibit less projection than participants in the other two conditions, and to test the strength of implementation intentions comparatively to the two other conditions, we ran a planned contrast (-1 [control condition], -1 [goal intention condition], 2 [implementation intention condition]) one-way ANOVA with projection score as the dependent variable. This analysis indicated that implementation intention participants were significantly more effective in reducing projection than the other two groups, $t(111) = -2.53$, $p = 0.013$, $d = 0.480$. We also conducted the orthogonal contrast directly comparing the control condition and the mere goal condition (-1 [control condition], 1 [goal intention condition], 0 [implementation intention condition]). No difference between the two conditions was observed; goal intentions of reducing projection were not more effective in reducing projection than a no-treatment control, $t(111) = 0.12$, $p = 0.906$, $d = 0.023$.

4.3.2. Deliberate motivation: how automatically did implementation intentions operate?

To investigate our claim that deliberate self-reported motivation is not a mediator of the effect of condition on projection, we first looked at whether participants' experienced degree of motivation to decrease projection differed across the three conditions. A one-way ANOVA found an effect of condition on such deliberate motivation, $F(2,111) = 6.49$, $p = 0.002$, $\eta^2 = 0.105$. Pairwise comparisons revealed that participants in the implementation intention condition were marginally more motivated to decrease projection, $M = 6.31$, $SD = 1.00$, than participants in the goal condition, $M = 5.74$, $SD = 1.45$, $t(111) = 1.94$, $p = 0.055$, 95% CI: $[-0.011, 1.153]$, $d = 0.369$, and significantly more motivated than those in the control condition, $M = 5.24$, $SD = 1.38$, $t(111) = 3.59$, $p < 0.001$, 95% CI: $[0.478, 1.651]$, $d = 0.682$. However, there was no relationship between deliberate

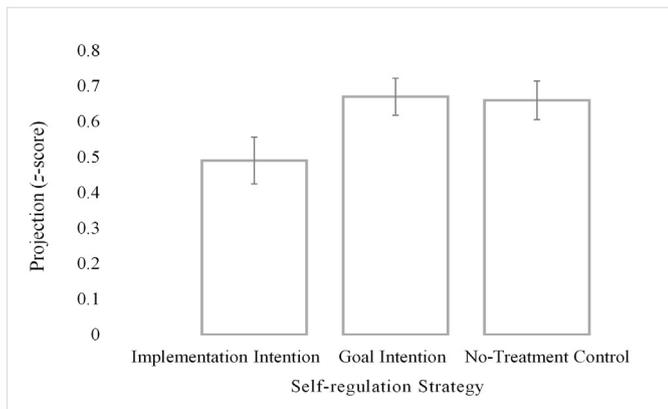


Fig. 1. Study 1: Projection scores as a function of experimental condition. Error bars represent ± 1 SE.

motivation not to project and actual projection scores, $r(112) = 0.053$, $p = 0.578$. Thus, increased deliberate motivation among implementation intention participants cannot account for why implementation intentions reduced projection. These findings support our hypothesis that the observed effects of implementation intentions on the reduction of projection occur in an automatic (versus deliberate) fashion.

5. Study 2: implementation intentions can be used to increase projection

The aims of Study 2 were twofold. First, to replicate the findings of Study 1, and second, to show that implementation intentions can also be used to increase projection. Importantly, if implementation intentions can be used to increase projection, then our findings would be the first example of if-then plans intensifying an automatic process. Given that implementation-intentions allow individuals to easily control their nonconscious, such findings would be of applied and theoretical value.

Social projection aptly illustrates the importance of demonstrating that implementation intentions can dynamically alter (i.e., down-regulate and up-regulate) automatic processes. Social projection has both harmful as well as beneficial outcomes. While projection can, for example, deter addiction cessation (e.g., smoking; Sherman et al., 1983), it can also help people affiliate with their partners, friends, and acquaintances (e.g., Clement & Krueger, 2002; Lemay et al., 2007). In sum, because projection is harmful in some contexts and beneficial in others, it is an exemplar of a highly automatic process that individuals may wish to decrease versus increase depending on the situation. Thus, we examined in Study 2 whether if-then planning cannot only be used to decrease, but also to increase projection.

The design of Study 2 was identical to Study 1, except for the addition of two conditions, an implementation intention condition to increase projection, as well as a goal intention condition to increase projection. To directly replicate the findings of Study 1, we included all the conditions of Study 1 in Study 2. We included these conditions given the recent calls upon researchers in psychology to provide direct replications of their findings (e.g., Asendorpf et al., 2013). Further, direct replications, unlike conceptual replications, do not allow for 'degrees of freedom' of the researcher, and thus can be argued to be the most stringent form of replication (e.g., Pashler & Harris, 2012).

5.1. Method

5.1.1. Participants

We recruited 268 (141 female) adults online using Mechanical Turk. A power analysis revealed that based on the planned contrast (-1 [control condition], -1 [goal condition], 2 [implementation intention condition]) one-way ANOVA from Study 1 ($d = 0.480$) that approximately 260 participants needed to be recruited to achieve 80% power ($1 - \beta$) at a 0.05 alpha level ($\alpha = 0.05$). Sixteen participants were excluded because they failed the focus check item (responded less than six on this item). Seven further participants were excluded as they indicated throughout that 50% of people agree with every item. Reporting 50% for every possible attitude caused the scores of these participants to exhibit zero variance and suggests that they were not seriously engaged in the study. Of the excluded participants, five were in the decrease projection implementation intention condition, three in the decrease projection goal intention condition, four in the increase projection implementation intention condition, five in the increase projection goal intention condition, and six in the control condition. This left us with 43 participants in the decrease projection implementation intention condition, 54 in the decrease projection goal intention condition, 47 in the increase projection implementation intention condition, 49 in the increase projection goal condition, and 52 in the control condition. The mean age was 37 years ($M = 37.31$, $SD = 12.21$). The study used a 2 projection direction (increase projection vs. decrease

projection) \times 2 self-regulation strategy (implementation intention vs. goal intention) between subjects design, with an added no-treatment control condition; the continuous dependent variable was the degree of projection.

5.2. Materials and procedure

The materials and procedure were identical to those of Study 1 except for the two additional conditions: the increase projection implementation intention condition, and the increase projection goal intention condition. Participants in the increase projection implementation intention condition were given the same instructions as participants in the decrease projection implementation intention condition, except instead of a goal to remember that other people are different, participants had the goal to remember that other people are similar: "I will remember that other people are similar!" followed by "If I'm asked to estimate what percent of other people agree with me, then I will remember that other people are similar!" Participants in the increase projection goal intention condition followed the same procedure except that they only completed the goal prompt: "I will remember that other people are similar!" Finally, appropriate changes for the increasing projection conditions were made to the self-reported deliberate motivation item: "I want to remember that other people are similar." Participants in the no-treatment control condition answered both items, motivation to decrease as well as increase projection. All other prompts or questions were identical to Study 1.

5.3. Results and discussion

5.3.1. Projection

We calculated a score indicating the extent to which participants engaged in projection in the same manner as in Study 1. For three participants, the correlation between their attitudes and assessments of others' attitudes was 1, indicating perfect projection. Since there is no corresponding Fisher's z -score for a correlation of 1, these three people were assigned the next highest projection score observed in the sample.

To test our hypothesis that implementation intentions, but not mere goal intentions, can decrease as well as increase projection, we performed a 2 self-regulation direction (decreasing projection vs. increasing projection) by 2 self-regulation strategy (goal intention vs. implementation intention) ANOVA. A main effect of projection direction was observed, $F(1,189) = 8.06, p = 0.005, \eta^2 = 0.040$; participants who intended to increase projection showed higher projection scores, $M = 0.62, SD = 0.60$, than participants who intended to decrease projection, $M = 0.40, SD = 0.49$. The main effect of self-regulation strategy was not significant, $F(1,189) = 0.12, p = 0.731, \eta^2 < 0.001$. Importantly, we observed the predicted interaction effect between projection direction and self-regulation strategy, $F(1,189) = 3.72, p = 0.055, \eta^2 = 0.019$.

This interaction effect was unpacked by comparing the projection scores of participants intending to decrease versus increase projection, separately for participants who formed goal intention versus implementation intentions. For participants who formed mere goal intentions, no simple effect of projection direction was found, $F(1,189) = 0.44, p = 0.506, \eta^2 = 0.002$; participants' scores did not differ depending on whether they intended to decrease, $M = 0.46, SD = 0.55$, or increase projection, $M = 0.53, SD = 0.47$. The simple effect of projection direction for participants who formed implementation intentions was significant, $F(1,189) = 10.64, p = 0.001, \eta^2 = 0.056$; as expected, participants' scores differed depending on whether they intended to decrease, $M = 0.33, SD = 0.38$, or increase projection, $M = 0.71, SD = 0.71$. These findings suggest that implementation intentions can effectively alter projection in both directions, while mere goal intentions cannot; even when comparing goal intentions of opposite direction (decrease vs. increase projection) no difference in projection scores was found.

5.3.1.1. Decreasing projection. The same planned contrast (-1 [control condition], -1 [decrease projection goal intention condition], 2 [decrease projection implementation intention condition]) one-way ANOVA conducted in Study 1 replicated our findings that implementation intentions were significantly more effective in reducing projection, $M = 0.33, SD = 0.38$, than mere goal intentions, $M = 0.46, SD = 0.55$, and a no-treatment control group, $M = 0.54, SD = 0.33, t(146) = -2.07, p = 0.040, d = 0.343$ (Fig. 2). We also conducted the orthogonal contrast directly comparing the control condition to the goal intention condition (-1 [control condition], 1 [goal intention condition], 0 [implementation intention condition]). No difference between the two conditions was observed; again, goal intentions do not qualify as an effective self-regulation strategy for reducing projection, $t(146) = -0.92, p = 0.360, d = 0.152$.

5.3.1.2. Increasing projection. In order to investigate whether implementation intentions are similarly effective at increasing projection, we conducted the same planned contrast one-way ANOVA on projection scores as for decreasing projection, except with the increasing projection conditions (-1 [control condition], -1 [increase projection goal intention condition], 2 [increase projection implementation intention condition]). Implementation intentions were marginally more effective in increasing projection, $M = 0.71, SD = 0.71$, than goal intentions, $M = 0.53, SD = 0.47$, and no-treatment control, $M = 0.54, SD = 0.33, t(145) = 1.91, p = 0.058, d = 0.317$ (Fig. 2). We also conducted the orthogonal contrast directly comparing the control condition to the goal intention condition, (-1 [control condition], 1 [increase projection goal intention condition], 0 [increase projection implementation intention condition]). No difference between the two conditions was observed; goal intentions are not an effective goal strategy for increasing projection, $t(145) = -0.06, p = 0.950, d < 0.001$.

5.3.2. Deliberate motivation

5.3.2.1. Decreasing projection. Replicating Study 1, we again found that condition influenced self-reported deliberate motivation to decrease projection. A one-way ANOVA found an effect of condition on explicit motivation, $F(2,146) = 15.83, p < 0.001, \eta^2 = 0.178$. Pairwise comparisons revealed that participants in the implementation intention condition were not more explicitly motivated to decrease projection, $M = 6.14, SD = 1.04$, than participants in the goal intention condition, $M = 6.17, SD = 1.21, t(146) = -0.10, p = 0.922, 95\% \text{ CI: } [-0.574, 0.520], d = 0.017$. In line with Study 1, implementation intention participants were more motivated than participants in the control condition, $M = 4.85, SD = 1.69, t(146) = 4.63, p < 0.001, 95\% \text{ CI: } [0.742, 1.845], d = 0.766$. As in Study 1, there was no relationship between deliberate motivation and decreasing projection however, $r(147) = -0.082, p = 0.322$, thus eliminating deliberate motivation as a potential mediator of the effect of condition on projection score. In line with Study 1, these findings support our claim that deliberate motivation (i.e., effortful and intentional motivation) does not qualify as a mechanism behind the effectiveness of implementation intentions on behavior change.

5.3.2.2. Increasing projection. Similar to decreasing projection, we found that condition influenced reported deliberate motivation to increase projection, $F(2,145) = 11.62, p < 0.001, \eta^2 = 0.138$. Pairwise comparisons revealed that participants in the implementation intention condition were not more motivated to increase projection, $M = 5.87, SD = 1.65$, than participants in the goal condition, $M = 5.80, SD = 1.46, t(145) = 0.23, p = 0.814, 95\% \text{ CI: } [-0.563, 0.716], d = 0.038$, but were more motivated than participants in the control condition, $M = 4.52, SD = 1.64, t(145) = 4.24, p < 0.001, 95\% \text{ CI: } [0.723, 1.984], d = 0.704$. Similarly to decreasing projection however, there was no relationship between deliberate motivation and increasing projection, $r(146) = 0.118, p = 0.152$, thus eliminating effortful and intentional motivation as a potential mediator of the effect of condition on

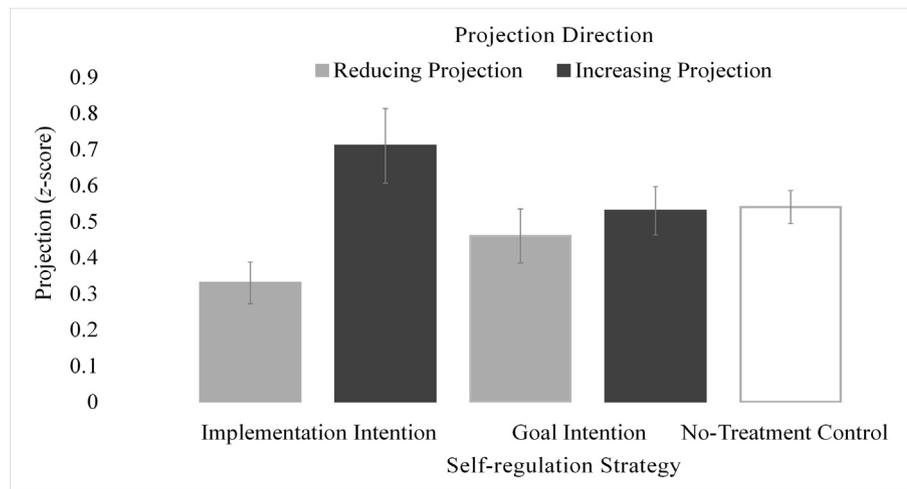


Fig. 2. Study 2: Projection as a function of experimental condition. Error bars represent ± 1 SE.

projection. Accordingly, deliberate motivation does not qualify as a mechanism behind the effectiveness of implementation intentions on increasing projection either.

6. General discussion

In two studies, participants who formed the implementation intention “If I’m asked to estimate what percent of other people agree with me, then I will remember that other people are different!” were more successful at reducing projection than participants who merely formed the goal intention “I will remember that other people are different!” and participants in a no-treatment control condition. Our results are in line with research showing that implementation intentions can reduce social phenomena that are based on automatic processes, such as transference (Przybylinski & Andersen, 2013), stereotype bias (Stewart & Payne, 2008; Mendoza et al., 2010), and mimicry (Wieber et al., 2014).

Our findings also provide the first demonstration of if-then plans intensifying an automatic social process. In Study 2, we found that the implementation intention, “If I’m asked to estimate what percent of other people agree with me, then I will remember that other people are similar!” successfully increased projection. Additionally, we are the first to address a question raised by Krueger (2007): Are mere goal intentions sufficient to increase projection? We observed that mere goal intentions to increase projection do *not* alter projection. The level of projection of participants in the goal intention condition, “I will remember that other people are similar!” did not differ from participants in the no-treatment control condition. This observation suggests that simple goal intentions cannot be used to intensify highly automatic processes.

We differentiate between influencing reflexive, automatic processes (such as habits) in an effortful versus non-effortful way. Research on habit formation indicates that reward and repetition, both arguably effortful and costly, can lead to the formation and strengthening of habits (Neal, Wood, & Quinn, 2006). At the same time, people can down-regulate their habits by avoiding behavior inducing cues (e.g., hiding your cigarettes; Verplanken & Wood, 2006) or changing the environment (e.g., smoking bans; Orbell & Verplanken, 2010), among other effortful methods (Dickinson, 1985; Rothman et al., 2015). One benefit of implementation intentions is that if-then planning can, in many cases, create as well as down-regulate habits without necessitating effortful action (Gollwitzer, 2014; Rothman et al., 2015). The current findings suggest that if-then plans can also be used to *intensify* habits without necessitating effortful action. Considering the car and driver metaphor of the non-conscious and conscious again, but with respect to habits, past research has indicated that if-then plans can both successfully start and brake the car with little effort. The current findings indicate that if-then plans can successfully intensify habits, that is, speed up the car as well.

The dynamic down and up-regulation of implementation intentions exhibited in the current findings gives autonomy to the individual. Such autonomous intervention techniques, unlike ‘nudge’ interventions (Thaler & Sunstein, 2008), do not fall prey to moral questioning, and further do not require costly changes to the environment to encourage behavior change. Instead, if-then plans use the existing environment to come up with mental cues that trigger behaviors. Ultimately, the current findings indicate that if-then plans can be utilized as an easy and low-cost self-regulation tool to down-regulate as well as up-regulate one’s nonconscious processes without changing the environment.

6.1. Implications for projection

The current research demonstrated that if-then planning can both down-regulate and up-regulate a highly automatic process. These results are particularly important for social projection as social projection is associated with both negative and positive outcomes. For one, if-then plans can be used to reduce projection, in turn potentially reducing unhealthy habits, such as smoking (Sherman et al., 1983), and improving the efficacy of information-based interventions by increasing attention to statistical information (Bauman & Geher, 2002). In other contexts however, if-then plans can be used to *increase* projection, in turn leading to increased cooperation within groups, feelings of belonging (because of the illusion of like-minded attitudes among peers), increased affiliation (Robbins & Krueger, 2005), and increased self-esteem (for a comprehensive overview of the behavioral effects of social projection, see Krueger, 2007).

Our findings, combined with past evidence that if-then plans can *activate* automatic processes (Gollwitzer, 1999, 2014), indicate that if-then plans could be used to *activate* and thereafter *intensify* social projection. Such use of implementation intentions could be particularly beneficial for a special situation in which social projection does not occur: when interacting with outgroup members (Robbins & Krueger, 2005). The creation and thereafter amplification of projection should lead to increased liking of and affiliation towards outgroup members, in turn reducing negative affect and prejudice.

6.2. Process automaticity

Our findings also contribute theoretically to our understanding of process automaticity. Bargh (1994) noted that one quality traditionally associated with the automaticity of a process is low controllability. Controllability is defined as “one’s ability to stifle or stop a process once started, or at least to override its influence if so desired (p. 16).” For example, it is exceedingly difficult to stop oneself from automatically reading presented text in one’s native language (e.g., Stroop, 1935). This

definition of controllability, however, only includes the down-regulation of an automatic process. Past research has missed the possibility that an automatic process might also be difficult to up-regulate, that is, to increase or intensify. In the current paper, we observed that aside from being resistant to voluntary down-regulation, a highly automatic process was also resistant to voluntary up-regulation: Mere goal intentions were unable to increase social projection. Thus, perhaps the inability to easily intensify a process (once started) is an additional feature of automaticity. Research should investigate this possibility.

6.3. Horse-race model

We can better understand how implementation intentions influence automated systems and their outcomes by considering the horse-race model of action control by implementation intentions (Adriaanse, Gollwitzer, De Ridder, De Wit, & Kroese, 2011). In this model, nonconscious processes are represented as horses which race against each other to determine an elicited response. For example, when a situation that elicits projection is encountered, the projection horse wins the race against all other nonconscious processes, therefore causing projection to occur. It has been proposed that forming implementation intentions creates an additional race horse that both outruns as well as hinders other nonconscious processes. This proposition suggests that participants in our studies who formed if-then plans with the goal of reducing projection created a race horse that ran faster than and hindered the speed of the projection horse.

How do we interpret our finding that if-then plans can intensify automatic processes in the context of the horse-race model? This model and if-then plans on the whole, have previously been thought of as stifling highly automatic processes by 'beating out' or 'winning' against them. Two possibilities come to mind with respect to our finding: (1) After completing the appropriate implementation intention, an increase projection horse is entered into the fray. This horse overtakes the other horses, including the inbuilt or original projection horse. Were this the case, then strikingly, two projection horses would be running at the same time. Alternatively, (2) the original projection horse is not let out of the gate, and is instead replaced by the newly created if-then increase projection horse. Were this the case, then were the implementation intentions horse to fail for some reason, then projection would perhaps entirely fail to occur. Future response-time experiments could be conducted to examine these two possibilities.

6.4. Alternative process explanations

Another mechanism that could potentially drive the effects of implementation intentions is deliberate motivation (i.e., effortful and intentional motivation). In line with the automatic nature of action control by implementation intentions (e.g., Webb & Sheeran, 2008) however, we found no mediation of deliberate motivation in Study 1 nor in Study 2. Despite this finding, a limitation of the current studies is that the postulated automaticity of implementation intention effects was solely investigated indirectly; only the potential mediating role of deliberate motivation was examined. However, numerous experiments investigating if-then planning effects have found that these effects are based on automatic processes, and thus, it is unlikely that a deliberate process was responsible for the observed results (Gollwitzer, 2014). Furthermore, as we found that mere goal intentions did not affect projection (relative to a no-treatment control group), we can conclude that implementation intentions, which are known to produce automaticity, were most likely directing our effects.

7. Conclusion

The current research adds to our knowledge of implementation intentions in two ways. First, we show that implementation intentions can be used to alter social projection, a ubiquitous, heavily influential,

and highly automatic process. Indeed, social projection has been characterized as “among the simplest, oldest, and arguably most central concepts of the field (of psychology)” (Krueger, 2007). In the present research, participants who internalized and wrote out a single if-then sentence – an implementation intention – were able to alter projection. Accordingly, forming implementation intentions qualifies as both a cost and time effective self-regulation tool to modulate projection. Second, our results are the first to demonstrate that if-then plans can be used to intensify a highly automatic process. Our observation that implementation intentions can be used not only to decrease but also to increase projection contributes to the applied potential of if-then plans, and importantly suggests that individuals can acquire dynamic up and down regulatory control over nonconscious processes.

Appendix A

For each item, please indicate whether YOU agree or disagree with that item.

	Agree	Disagree
I like mechanics magazines		
I have a good appetite		
I wake up rested most mornings		
I think I would like the work of a librarian		
I am easily awakened by noise		
I like to read newspaper articles on crime		
My hands and feet are usually warm enough		
My daily life is full of things that keep me interested		
I am afraid of being alone in a wide-open space		
Once in a while I think of things too bad to talk about		
I think I would like the kind of work that a forest ranger does		
I do not always tell the truth		
I would like to be a nurse		
I enjoy the excitement of a crowd		
I can remember “playing sick” to get out of something		
I used to keep a diary		
I hardly ever feel pain in the back of my neck		
I like repairing a door latch		
I would like to be a singer		
I would like to hunt lions in Africa		

Appendix B

To illustrate the calculation of within-subject assumed similarity scores, we will use data for five items from a hypothetical participant, as shown in the table below. A participant's opinion on an issue was coded as 1 if they agreed with the item and as –1 if they disagreed with the item. To calculate the within-subject assumed similarity score, we then correlated the participant's opinions (Column A) with their estimates of the percentage of other people who agreed with each item (Column B). This method results in a single assumed similarity score for each participant (see also Krueger & Zeiger, 1993, for further discussion of this analytic strategy).

Item	Opinion (A)	Perceived agreement (B)
1	1	64
2	–1	37
3	1	25
4	–1	89
5	–1	40

References

- Adriaanse, M. A., Gollwitzer, P. M., De Ridder, D. T. D., De Wit, J. B. F., & Kroese, F. M. (2011). Breaking habits with implementation intentions: A test of underlying processes. *Personality and Social Psychology Bulletin, 37*, 502–513.
- Ahn, J. N., Oettingen, G., & Gollwitzer, P. M. (2015). Goal projection in public places. *European Journal of Social Psychology, 45*, 575–586.

- Asendorpf, J. B., Conner, M., De Fruyt, F., De Houwer, J., Denissen, J. J., Fiedler, K., ... Perugini, M. (2013). Recommendations for increasing replicability in psychology. *European Journal of Personality*, 27, 108–119.
- Bargh, J. A. (1994). The four horsemen of automaticity: Awareness, intention, efficiency, and control in social cognition. In R. S. Wyer, & T. K. Srull (Eds.), *Handbook of social cognition* (2nd ed.) 1. (pp. 1–40). Hillsdale, NJ: Lawrence Erlbaum Associates Inc.
- Bauman, K. P., & Geher, G. (2002). We think you agree: The detrimental impact of the false consensus effect on behavior. *Current Psychology*, 21, 293–318.
- Baumeister, R. F. (2005). *The cultural animal: Human nature, meaning, and social life*. New York: Oxford University Press.
- Bayer, U. C., Achtziger, A., Gollwitzer, P. M., & Moskowitz, G. B. (2009). Responding to subliminal cues: Do if-then plans facilitate action preparation and initiation without conscious intent? *Social Cognition*, 27, 183–201.
- Brandstätter, V., Lengfelder, A., & Gollwitzer, P. M. (2001). Implementation intentions and efficient action initiation. *Journal of Personality and Social Psychology*, 81, 946–960.
- Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Amazon's Mechanical Turk a new source of inexpensive, yet high-quality, data? *Perspectives on Psychological Science*, 6, 3–5.
- Burgess, P. W., Dumontheil, I., & Gilbert, S. J. (2007). The gateway hypothesis of rostral prefrontal cortex (area 10) function. *Trends in Cognitive Sciences*, 11, 290–298.
- Clement, R. W., & Krueger, J. (2002). Social categorization moderates social projection. *Journal of Experimental Social Psychology*, 38, 219–231.
- Dickinson, A. (1985). Actions and habits: The development of behavioural autonomy. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 308, 67–78.
- Epley, N., Keysar, B., Van Boven, L., & Gilovich, T. (2004). Perspective taking as egocentric anchoring and adjustment. *Journal of Personality and Social Psychology*, 87, 327–339.
- Gilbert, S. J., Gollwitzer, P. M., Cohen, A. L., Oettingen, G., & Burgess, P. W. (2009). Separable brain systems supporting cued versus self-initiated realization of delayed intentions. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 35, 905–915.
- Gollwitzer, P. M. (1993). Goal achievement: The role of intentions. *European Review of Social Psychology*, 4, 141.
- Gollwitzer, P. M. (1999). Implementation intentions: Strong effects of simple plans. *American Psychologist*, 5, 493–503.
- Gollwitzer, P. M. (2014). Weakness of the will: Is a quick fix possible? *Motivation and Emotion*, 38, 305.
- Gollwitzer, P. M., & Brandstätter, V. (1997). Implementation intentions and effective goal pursuit. *Journal of Personality and Social Psychology*, 73, 186–199.
- Gollwitzer, P. M., & Sheeran, P. (2006). Implementation intentions and goal achievement: A meta-analysis of effects and processes. *Advances in Experimental Social Psychology*, 38, 69–119.
- Hoch, S. J. (1987). Perceived consensus and predictive accuracy: The pros and cons of projection. *Journal of Personality and Social Psychology*, 53, 221–234.
- Kawada, C. L., Oettingen, G., Gollwitzer, P. M., & Bargh, J. A. (2004). The projection of implicit and explicit goals. *Journal of Personality and Social Psychology*, 86, 545–559.
- Krueger, J. I. (2007). From social projection to social behaviour. *European Review of Social Psychology*, 18, 1–35.
- Krueger, J. I., & Clement, R. W. (1994). The truly false consensus effect: An ineradicable and egocentric bias in social perception. *Journal of Personality and Social Psychology*, 67, 596–610.
- Krueger, J. I., & Stanke, D. (2001). The role of self-referent and other-referent knowledge in perceptions of group characteristics. *Personality and Social Psychology Bulletin*, 27, 878–888.
- Krueger, J. I., & Zeiger, J. S. (1993). Social categorization and the truly false consensus effect. *Journal of Personality and Social Psychology*, 65, 670–680.
- Lemay, E. P., Jr., Clark, M. S., & Feeney, B. C. (2007). Projection of responsiveness to needs and the construction of satisfying communal relationships. *Journal of Personality and Social Psychology*, 92, 834–853.
- Mendoza, S. A., Gollwitzer, P. M., & Amodio, D. M. (2010). Reducing the expression of implicit stereotypes: Reflexive control through implementation intentions. *Personality and Social Psychology Bulletin*, 36, 512–523.
- Morry, M. M. (2005). Relationship satisfaction as a predictor of similarity ratings: A test of the attraction-similarity hypothesis. *Journal of Social and Personal Relationships*, 22, 561–584.
- Mullen, B., Atkins, J. L., Champion, D. S., Edwards, C., Hardy, D., Story, J. E., & Vanderklok, M. (1985). The false consensus effect: A meta-analysis of 115 hypothesis tests. *Journal of Experimental Social Psychology*, 21, 262–283.
- Murstein, B. I. (1957). Studies in Projection: A Critique. *Journal of Projective Techniques*, 21, 129–136.
- Neal, D. T., Wood, W., & Quinn, J. M. (2006). Habits: A repeat performance. *Current Directions in Psychological Science*, 15, 198–202.
- Oettingen, G., Ahn, J. N., Gollwitzer, P. M., Kappes, A., & Kawada, C. L. (2014). Goal projection and giving help. *Journal of Experimental Social Psychology*, 54, 204–214.
- Orbell, S., & Verplanken, B. (2010). The automatic component of habit in health behavior: habit as cue-contingent automaticity. *Health Psychology*, 29, 374–383.
- Pashler, H., & Harris, C. R. (2012). Is the replicability crisis overblown? Three arguments examined. *Perspectives on Psychological Science*, 7, 531–536.
- Przybylski, E., & Andersen, S. M. (2013). Short-circuiting transference using implementation intentions. *Journal of Experimental Social Psychology*, 49, 566–572.
- Robbins, J. M., & Krueger, J. I. (2005). Social projection to ingroups and outgroups: A review and meta-analysis. *Personality and Social Psychology Review*, 9, 32–47.
- Ross, L., Greene, D., & House, P. (1977). The “false consensus effect”: An egocentric bias in social perception and attribution processes. *Journal of Experimental Social Psychology*, 13, 279–301.
- Rothman, A. J., Gollwitzer, P. M., Grant, A. M., Neal, D. T., Sheeran, P., & Wood, W. (2015). Hale and hearty policies how psychological science can create and maintain healthy habits. *Perspectives on Psychological Science*, 10, 701–705.
- Sheeran, P. (2002). Intention – Behavior relations: A conceptual and empirical review. *European Review of Social Psychology*, 12, 1.
- Sherman, S. J., Presson, C. C., Chassin, L., Corty, E., & Olshavsky, R. (1983). The false consensus effect in estimates of smoking prevalence: Underlying mechanisms. *Personality and Social Psychology Bulletin*, 9, 197–207.
- Simon, L., Greenberg, J., Arndt, J., Pyszczynski, T., Clement, R., & Solomon, S. (1997). Perceived consensus, uniqueness, and terror management: Compensatory responses to threats to inclusion and distinctiveness following mortality salience. *Personality and Social Psychology Bulletin*, 23, 1055–1065.
- Stern, C., West, T. V., & Schmitt, P. G. (2014). The liberal illusion of uniqueness. *Psychological Science*, 25, 137–144.
- Stewart, B. D., & Payne, B. K. (2008). Bringing automatic stereotyping under control: Implementation intentions as efficient means of thought control. *Personality and Social Psychology Bulletin*, 34, 1332–1345.
- Stroop, J. R. (1935). Studies of interference in serial verbal reactions. *Journal of Experimental Psychology*, 18, 643.
- Thaler, R. H., & Sunstein, C. R. (2008). *Nudge: Improving decisions about health, wealth, and happiness*. New Haven, CT: Yale University Press.
- Van Boven, L., & Loewenstein, G. (2003). Social projection of transient drive states. *Personality and Social Psychology Bulletin*, 29, 1159–1168.
- Verplanken, B., & Wood, W. (2006). Interventions to break and create consumer habits. *Journal of Public Policy & Marketing*, 25, 90–103.
- Webb, T. L., & Sheeran, P. (2008). Mechanisms of implementation intention effects: The role of goal intentions, self-efficacy, and accessibility of plan components. *British Journal of Social Psychology*, 47, 373–395.
- Wieber, F., Gollwitzer, P. M., & Sheeran, P. (2014). Strategic regulation of mimicry effects by implementation intentions. *Journal of Experimental Social Psychology*, 53, 31–39.