



Psychological reactance as a function of thought versus behavioral control

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ABSTRACT

How can people persuade and influence others? One option is to directly target others' behavior through rules and incentives. Another increasingly popular option, however, is to focus on modifying what others think rather than how they behave, and hoping behaviors will then change as a result. The assumption underlying this latter approach is that targeting thoughts and attitudes might be easier or more effective than targeting behaviors. Drawing from psychological reactance theory (Brehm, 1966), we investigate whether efforts targeted at controlling what people think, rather than how they behave, will indeed be met with differing levels of psychological reactance. Across four studies, we find that people experience greater psychological reactance towards efforts to control their thoughts compared to efforts to control their behaviors. Specifically, thought control, compared to behavioral control, led people to experience greater anger and negativity, and to report lowered motivation to engage in requested behaviors (Study 1). These effects occurred, at least in part, because people perceived that those who try to control their thoughts are likely to try to control their behaviors too, but not vice versa. As a result, thought control elicited greater reactance than behavioral control because the former was perceived as more restrictive than the latter (Studies 2 & 3). We also address other explanations for why thought control may elicit more reactance than behavioral control (Study 4).

1. Introduction

Everything can be taken from a man but one thing, the last of the human freedoms—to choose one's attitude in any given set of circumstances.

Victor E. Frankl (1985)

What happens when others try to take away our freedom to think, value, and believe what we want? One could imagine how this might be taken to extreme conclusions in dystopias, like the one depicted in George Orwell's "Nineteen Eighty-Four," in which the Thought Police monitors for signs of subversive thoughts and beliefs among civilians. While such an extreme control of thoughts is rare, more benign attempts at influencing people's thoughts may be common in today's world. For example, organizations often seek to instill in their workers certain thoughts, values, and beliefs that will ultimately benefit the company (Peters & Waterman, 1982). Similarly, because impure thoughts are sometimes deemed more sinful than immoral behaviors, certain religions like Catholicism and Judaism recommend their adherents to actively control their thoughts and attitudes. For example, a

passage from *Yoma* 29a in the Talmud states that thoughts of sin are more damaging than the sin itself (also see Cotlar, 2019). Similarly, the Bible states that evil thoughts that come from the heart can defile a person (Mark 7:21–23, New International Version).

Past research on people's defensive reactions to influence attempts – that is, research on the processes, mechanisms, and phenomena of reactance (Brehm, 1966) – has largely conceptualized reactance as a response to behavioral freedom threats. In this article, we distinguish between two different types of social control strategies – those focused on thought control – defined as attempts to impose rigid expectations for how people should think – and those focused on behavioral control – defined as efforts to enforce strict standards on how people should behave – and assess whether people may respond more severely to one versus the other. Drawing on several different literatures, we propose and test the idea that thought control will elicit greater state reactance than behavioral control, and this is because people believe that when others try to control their thoughts, their behaviors would be controlled as well.

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1.1. Thought and behavioral control

Given that people are often interested in getting others to do what they want, a great deal of research has been devoted to examining how to persuade and influence others to change their behaviors (e.g., Cialdini & Trost, 1998). Based on theories such as the theory of planned behavior (Ajzen, 1991), one way to get others to change their behaviors may be to target people's thoughts, values, beliefs, and attitudes that underlie behavior. For example, governments can encourage conservation behaviors by either instilling pro-environmental attitudes, or amending people's behaviors directly by asking them to drink tap instead of bottled water to reduce plastic waste. Thought and behavioral influence strategies may differ in terms of what is targeted (behaviors vs. thoughts), but ultimately, they aim to cause the same behavioral outcome (i.e., get people to engage in environmental conservation).

Judging from the prevalence of thought control strategies (e.g., advertisements), it appears that thought control strategies are at least as popular, if not more so, than behavioral control strategies. One potential reason¹ for the popularity of thought control may be that people think it might be easier or more effective to get others to change what they think as opposed to changing their behaviors directly. Since people often exhibit reactance against policies that restrict behavioral freedom (Laurin, Kay, & Fitzsimons, 2012; Laurin, Kay, Proudfoot, & Fitzsimons, 2013; Rhodewalt & Davison, 1983), people may assume that reactance may be attenuated or avoided if they targeted other's thoughts instead. However, we suggest that this intuition may be backwards, in that people actually exhibit more reactance when others try to control their thoughts as opposed to their behaviors. We outline the reasoning for this prediction below.

1.2. Why thought control may elicit more psychological reactance than behavioral control: thought control implies behavioral control

According to Brehm (1966), when people's freedom is threatened, they experience a motivational state directed towards attaining the restricted freedom ("psychological reactance"). A threat to freedom occurs whenever an influence or control attempt causes people to feel pressure to change (Clee & Wicklund, 1980). When psychological reactance is experienced, people are often motivated to reassert their independence by adopting hostile attitudes towards the source of control, and/or increase the appeal of the restricted object or activity. For example, banning consumer goods can increase their attractiveness in consumers' eyes (Mazis, Settle, & Leslie, 1973).

Although existing psychological reactance research has demonstrated antagonistic responses to restricted freedom, it has mostly focused on reactance in response to behavioral control. This may be because Brehm (1966) originally conceptualized reactance as relating to threats to "behavioral freedom" (p. 1). Although scholars have found that reactance can also occur when the freedom to think what people want is restricted (e.g., Baer, Hinkle, Smith, & Fenton, 1980; Clee & Wicklund, 1980; Fitzsimons & Lehmann, 2004; Heller, Pallak, & Picek, 1973; Henriksen, Dauphinee, Wang, & Fortmann, 2006; Miller, Burgoon, Grandpre, & Alvaro, 2006; Snyder & Wicklund, 1976), no research to our knowledge has directly compared whether or why the two types of control may have varying influences on reactance.

We predict that people will react more strongly to thought control, as opposed to behavioral control, because people believe that those who are trying to control thoughts are also likely to try to control their

behaviors. As a result, thought (vs. behavioral) control may be then perceived as more extreme and controlling, and thus elicit greater psychological reactance. Indeed, people appear to hold the general belief that thoughts predict subsequent behavior. For instance, Cohen (1964, pp. 137–138) as cited in Wicker (1969) noted that many academics "make the broad psychological assumption that since attitudes are evaluative predispositions, they have consequences for the way people act toward others, for the programs they actually undertake, and for the manner in which they carry them out. Thus attitudes are always seen as precursors of behavior, as determinants of how a person will actually behave in his daily affairs."² Therefore, it is possible that people in general will perceive those who try to control their thoughts as likely to want to change their subsequent behaviors as well.

To test whether thought control may feel more restrictive than behavioral control because people believe that those who try to control their thoughts are also likely to try to control their behavior, we manipulate the two different types of control and then measure perceived thought control, perceived behavioral control, perceived restrictiveness, and reactance elicited by the two control types. Reactance has been measured in a variety of ways, and currently no established dependent measure exists, perhaps in part due to Brehm's (1966) assertion that state reactance cannot be assessed directly. Classic reactance studies use a combination of behavioral (Brehm & Cole, 1966; Hammock & Brehm, 1966) and attitudinal measures (Brehm, 1966; Brehm & Rozen, 1971), which include but are not limited to: aggression, source derogation, and counter arguing (Brehm, 1966; Brehm & Brehm, 1981; Clee & Wicklund, 1980). One typical way to measure reactance is by assessing the effects of restrictions on people's subsequent behaviors. For example, Fitzsimons and Lehmann (2004) found that people who were high in trait reactance were more likely to do the opposite of what was recommended – they were more likely to choose an option if they received a negative recommendation about this option, and less likely to choose an option if they received a positive recommendation about it.

Other researchers use a combination of negative attitudes, uncooperativeness and anger as indications of state reactance (Heilman & Toffler, 1976). For example, Jonas et al. (2009) induced threats to freedom by asking university students to imagine a scenario in which someone wanted to borrow their car, and then measuring the experience of reactance using evaluations of how reasonable and legitimate the request was, and how bothered and irritated they were at the request (p. 1071). Indeed, communication researchers have conceptualized state reactance as a combination of "anger and negative cognitions" (Dillard & Shen, 2005; Quick & Stephenson, 2007, p. 258; Rains, 2013). Therefore, consistent with these perspectives on state reactance, in our studies, we induce the experience of reactance by asking participants to imagine other people restricting their thoughts (vs. behaviors) and measuring reactance using a combination of anger and negative cognitions. Put formally, we hypothesize that:

Hypothesis 1. People will experience greater state reactance (as measured by anger and negative cognitions) when others try to control their thoughts, as opposed to their behaviors.

Hypothesis 2. The higher levels of state reactance in the thought (vs. behavioral) control experimental condition will be mediated by increased feelings of restrictiveness, and the increased feelings of restrictiveness in the thought control condition will be due to beliefs that those who engage in thought control want to restrict thoughts and behaviors but those who engage in behavior control are only targeting

¹ It is important to note that there may be numerous other reasons why thought control strategies may be as popular as behavioral control strategies. For example, thought control may be more cost-effective and readily accessible than behavioral control. Changing behaviors may require getting people to attend elaborate and expensive behavioral training programs, whereas it may be possible to change thoughts using commercials or social media.

² Subsequent evidence has shown that people's intrapsychic states do not appear to consistently predict subsequent behaviors (for reviews, see Ajzen & Fishbein, 1977; Wicker, 1969). However, the question of whether thoughts do predict subsequent behaviors is separate from the question of whether people believe that intrapsychic states precede or predict behavioral change, and the present research concerns the latter.

behaviors.

1.3. Other explanations

We also address four other explanations for why we might observe higher reactance in the thought (vs. behavioral) control condition. These other explanations are not necessarily mutually exclusive (and may even operate in tandem) with our proposed account. Our goal was to include these explanations as covariates to ensure that they were not confounded with our variables of interest. These four explanations are: extent to which thoughts and behaviors are perceived to affect others, perceived self-representativeness of thoughts and behaviors, perceived importance of thought and behavioral freedom, and perceived normativeness of thought and behavioral control. To examine these four explanations, we developed items tapping into these beliefs, and sought to show that people are still more reactant when others try to control their thoughts (as opposed to their behaviors) even after controlling for these beliefs.

First, we consider the possibility that thought control elicits more reactance than behavioral control because people perceive that their thoughts (vs. behaviors) are less likely to affect others. To the extent that people generally perceive that it is more reasonable to restrict freedoms that may negatively influence others, they may then believe that it is more acceptable to regulate behaviors (vs. thoughts). For example, smokers may find it acceptable for governments to limit their behavioral freedom to smoke in public spaces because their smoking behaviors negatively affect the health of those around them. Since their freedom to smoke directly interferes with other people's freedom to have fresh air, smokers may then accept these behavioral restrictions. Conversely, people's thoughts are private and, unless verbalized, do not impinge on other people's lives. Therefore, people may find it unnecessary and unreasonable to limit thought freedom.

Second, people may be more reactant when others try to control their thoughts because they believe that their thoughts (vs. behaviors) are more self-representative. For example, people often monitor and tailor their behaviors according to the types of situations they are in (Snyder, 1979). Since people may not always be able to engage in authentic, self-expressive behaviors all the time, it is possible that they may believe that their behaviors (vs. thoughts) are less reflective of who they are. Conversely, because thoughts are private, people may be able to think what they want in most, if not all, situations. Therefore, people may perceive that thoughts (vs. behaviors) are more self-representative. Since individuality is especially valued in America (Weisz, Rothbaum, & Blackburn, 1984), and to the extent that thoughts (vs. behaviors) are viewed as more self-representative, people may feel especially reactant when others try to control their thoughts (vs. behaviors).

Third, and relatedly, it is possible that people may be more reactant when others try to control their thoughts (vs. behaviors) because they believe that thought (vs. behavior) freedom is more important. That is, people might believe that the freedom to think (vs. act) what they want is a liberty that they should always have, and that no one else should have control over regardless of the circumstances. Since people are more reactant when important (vs. unimportant) freedoms are threatened (Brehm & Brehm, 1981), people may then feel more reactant in the thought (vs. behavioral) control condition.

Finally, people may experience greater reactance in the thought (vs. behavioral) control condition because they believe that thought control is less common or normative than behavioral control. Although we believe that examples of thought control are commonplace (e.g., people are pressured to think positively in challenging situations), people may perceive thought control as less common than behavioral control. Since people are less likely to comply when they perceive social influence attempts as inconsistent with prevailing social norms (Cialdini, 2007), they may be more reactant when others try to control their thoughts (as opposed to their behaviors).

2. Overview of the present research

Four studies and a replication study, which focused on various different contexts, ranging from organizational recruitment to employer evaluations, tested whether or not thought control elicited greater reactance than behavioral control. Study 1 was designed to test whether people were more reactant to thought as opposed to behavioral control in job advertisements (*Hypothesis 1*). Study 2 sought to test our presumed mechanism: that thought control would be perceived as more restrictive than behavioral control because people perceive that those who try to control their thoughts would also try to control their behaviors (*Hypothesis 2*). Study 3 aimed to test both *Hypotheses 1* and *2* in a different context. Study 4 sought to examine if thought control elicited greater reactance than behavioral control even after controlling for other explanations. Finally, a replication study (Study S1) provides a direct replication of Study 2 (but without a neutral comparison condition). We include details of this study in the supplementary materials.

Across all studies, we report all participants sampled, all manipulation conditions included in the study, and all independent and dependent measures. For each new study we conducted, we excluded participants who had participated in similar studies before on the Mechanical Turk platform (see Study 2 for more details). We also excluded participants if they experienced a technical problem during the study. That is, they responded "Yes" or left the question blank (as opposed to "No") when asked if they experienced a technical difficulty. Examples of technical difficulties include experiencing lags during the survey, or the images and item scales not displaying properly because some of the participants took the survey on mobile devices (as opposed to computers). For each study, data were collected in a single wave, and sample size was determined before data analysis. No data was collected after analysis. We also report how the sample size was determined. For all studies, we aimed to recruit enough people to detect an effect size of $d = 0.43$ or $r = 0.21$, which is typical of published papers in behavioral science as a whole (Richard, Bond Jr, & Stokes-Zoota, 2003). These targeted effect sizes meant that we had to recruit at least 180 people for correlational studies and 100 participants per condition for experimental studies to achieve at least 80% power. However, because the $d = 0.43$ heuristic is useful for determining how many participants we should recruit at minimum when an effect size is unknown, we treated this as a minimum and generally recruited as many participants as our budget allowed to ensure that we obtained as much statistical power as possible when we were running online studies. All participants were paid seven US dollars per hour to complete our study. We recruited only participants from the United States. Our materials and data are available at: https://osf.io/487v9/?view_only=dd53baba3ed945649cda7314fb10a957

3. Study 1

In Study 1, we sought to provide preliminary experimental evidence that the type of control affected the level of state reactance. We did so via manipulating the contents of the job advertisement (i.e., whether the company will try to control participants thoughts or participant's behaviors) and measuring participant's feelings about and interest in the job advertisement.

3.1. Method

3.1.1. Participants and procedure

We recruited 404 participants using Amazon Mechanical Turk. Twenty-nine (3 unreported) participants reported having technical problems were excluded, leaving a sample of 372 participants (54% females, $M_{age} = 34.80$, $SD = 11.12$). A sensitivity power analysis using G*Power (Faul, Erdfelder, Lang, & Buchner, 2007) suggested that this sample size allowed us to detect a minimum effect size of $d = 0.29$. All participants were asked to imagine that they had been searching high and low for the perfect job. One day, as they were browsing through

jobs that were available on the internet, they saw a job advertisement about LBP Corp., a clothing retailer.

In order to manipulate the type of control, we used two different versions of the job advertisement, so that one group of participants saw an advertisement emphasizing conformity of thoughts, values and beliefs, whereas the other group saw an advertisement emphasizing behavior conformity.³ To enhance the vividness of the vignettes, the job descriptions included a set of images that was held constant across experimental conditions. In order to ensure that participants read the job advertisements carefully, we included a 20-second timer that prevented participants from proceeding to the next page.

The thought control job advertisement read:

We're the industry leader. We love our company. Our love shows in all that we think. Thinking great stuff of our customers. Believing the best of our colleagues. Valuing our boss. And most importantly, we believe you can think that too.

In the behavioral control condition, participants saw an advertisement that stressed the importance of behaving in the same way as other employees:

We're the industry leader. We love our company. Our love shows in all that we do. Smiling at our customers, giving high fives to our colleagues. Hanging out with our boss. And most importantly, we believe you can do that too.

3.1.2. Measures

After viewing the manipulations, all participants completed the following measures. The vignettes that participants had just seen were presented along with these questions.

3.1.3. Thought control

We asked participants the extent to which they thought the company would try to influence how they think, what they believe in, and what they value. This item was measured on a 7-point scale (1 = *not at all*, 7 = *To a very great extent*).

3.1.4. State reactance

Consistent with how Jonas et al. (2009) operationalized reactance, we assessed state reactance in this study (and the subsequent studies) using combination of anger and negative attitudes. Specifically, we measured the extent to which participants would feel "bothered, threatened, inspired, excited, scared" if they had to work at LBP Corp., the extent they found working for LBP Corp. to be "appealing," and "attractive," and the extent they would "fit" and "adapt" into the company (items indicating positivity were reverse coded; $\alpha = 0.95$).⁴ All items were measured on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*).

3.1.5. Behavioral intentions

We measured participants' intentions to apply to the job based on the advertisement that they had seen using two items, "I would like to work at the company," and "I would like to apply for a job at the company" ($r = 0.93$). These two items were measured on a 7-point

³ These job advertisements were adapted from actual job advertisements from companies such as Airbnb. For example, Airbnb's career webpage states that "It takes an entire team united behind something big. Together, we work hard, we laugh a lot, we brainstorm nonstop, we use hundreds of Post-Its a week, and we give the best high-fives in town."

⁴ We conducted exploratory factor analysis for state reactance measures for all the studies presented here. All analyses indicated that state reactance items loaded on one factor across studies (eigenvalue_{Study 1} = 6.42; eigenvalue_{Study 2} = 4.74; eigenvalue_{Study 4}, behavioral control = 5.67; eigenvalue_{Study 4}, thought control = 5.36, eigenvalue_{Study S1} = 4.80). The exception was Study 3 which had two factors of eigenvalues 2.22 and 1.17 respectively. In this study, we found that items that were worded positively loaded on the first factor, and items that were worded negatively loaded on the second factor.

scale (1 = *strongly disagree*, 7 = *strongly agree*).

Finally, participants answered some demographic questions.

3.2. Results

Table 1 presents correlations, reliabilities, means, and standard deviations for all study variables. All the following analyses were conducted using two-tailed independent samples *t*-tests.

3.2.1. Thought control

Participants in the thought control condition ($M = 4.34$, $SD = 1.47$) were more likely to agree that the company would try to influence their thoughts, values and beliefs compared to those in the behavioral control condition ($M = 3.99$, $SD = 1.61$), $t(370) = -2.17$, $p = .031$, $d = 0.23$.

3.2.2. State reactance

Supporting **Hypothesis 1**, participants in the thought control condition ($M = 3.25$, $SD = 1.43$) experienced greater state reactance compared to those in the behavioral control condition ($M = 2.71$, $SD = 1.24$), $t(370) = -3.90$, $p < .001$, $d = 0.40$.

3.2.3. Behavioral intentions

Participants in the thought control condition ($M = 4.52$, $SD = 1.78$) were less likely to want to apply to the job compared to the behavioral control condition participants ($M = 5.18$, $SD = 1.66$), $t(370) = 3.71$, $p < .001$, $d = 0.38$.

3.2.4. Mediation analysis

Next, we examined whether the effect of experimental condition on behavioral intentions were mediated by perceived thought control and psychological reactance. To do so, we conducted a serial mediation model (Fig. 1). We used the PROCESS macro (Model 6, Hayes, 2013) to compute the indirect effect. The experimental condition (*Thought control* = 1, *Behavioral control* = 0) was entered as the independent variable, thought control as first mediator, and state reactance as the second mediator, and behavioral intentions as the dependent variable. Full mediation was observed, as the significant main effect of control type on behavioral intentions became non-significant after adding thought control and state reactance to the model. The bias-corrected confidence interval (5000 bootstraps) of the indirect effect did not include 0, *Coeff* = -0.15, *SE* = 0.07, 95% *C.I.* [-0.305, -0.009], thus supporting **Hypothesis 2**. That is, participants perceived that thought (vs. behavioral) control condition job advertisement controlled their thoughts more, and increased perceptions of thought control was subsequently associated with greater state reactance and lowered motivation to apply to the thought (vs. behavioral) control company.

3.3. Discussion

Consistent with our predictions, Study 1 showed that participants experienced greater state reactance and were less likely to report interest in applying to work for a company when that company wanted to change their thoughts, values, and beliefs as opposed to their behaviors. We also found that those in the thought (vs. behavioral) control condition were significantly more likely to agree that the company would try to control their thoughts, and that perceived thought control mediated the effect of the experimental condition on state reactance and behavioral intentions.

However, one limitation of the present study is that we did not measure perceived behavioral control as a mediator. Therefore, this study does not present a comprehensive test of our proposed account, which is that people perceive thought (vs. behavioral) control as more restrictive (and consequently experience greater reactance) because they presume that others who control their thoughts will also try to control their behaviors (**Hypothesis 2**). To test this, we included a measure of perceived behavioral control in the next study, in which we

Table 1

Study 1: intercorrelations, reliabilities, means and standard deviations among variables.

	Means	SD	1	2	3	4
1. State reactance	2.97	1.36	(0.95)			
2. Behavioral intentions	4.86	1.75	-0.87***	(0.93)		
3. Perceived thought control	4.16	1.55	0.47***	-0.43***	-	
4. Experimental condition ^a	0.49	0.50	0.20***	-0.19***	0.11*	-

* $p < .05$, ** $p < .01$, *** $p < .001$.

^a 1 = thought control, 0 = behavioral control.

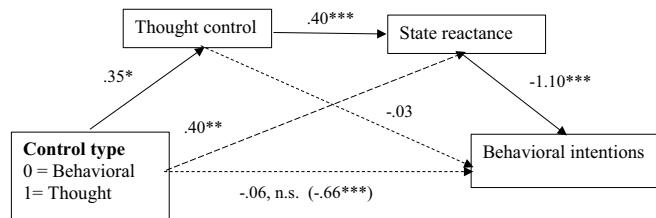


Fig. 1. The effect of experimental condition, thought control, state reactance and behavioral intentions; Study 1. Values not in parentheses represent relationships after including all variables in the model. Unstandardized coefficients. Dashed paths indicate estimated paths that were not included in the computation of indirect effects. * $p < .05$ ** $p < .01$, *** $p < .001$.

also sought to provide a more comprehensive test of our proposed account.

One last limitation of the present study is that the measure of thought control was double barreled and consisted of three components (thoughts, values, and beliefs). We sought to address this limitation in subsequent studies.

4. Study 2

In Study 2, we sought to test the mediating mechanisms (Hypothesis 2). To do so, we developed another vignette in which participants were told that they were new employees seeking advice from their supervisors on how to perform well on the job. We manipulated the type of control by varying the contents of the advice that the supervisor gave. For example, in the thought control condition, the supervisor told participants that they needed to think obsessively about organizational issues, whereas in the behavioral control condition, participants were told that they needed to behave in these ways. In the neutral condition, the supervisor did not attempt to control the participant. We predicted that people would experience greater anger and negative cognitions towards advice that utilizes thought (vs. behavioral) control. In this study, we also included a measure of perceived behavioral control (in addition to the thought control item). Consistent with Study 1, we predicted that perceived thought control will be significantly higher in the thought (vs. behavioral) control condition. Further, if participants presume that those who try to control their thoughts will also control their behaviors, then levels of perceived behavioral control might be equally high in the thought and behavioral control conditions. Consequently, there may be no significant difference in perceived behavioral control between the thought and behavioral control experimental conditions. We also predict that higher levels of state reactance and perceived restrictiveness in the thought (vs. behavior) control condition will be mediated by agreement on the perceived thought and behavioral control items (Hypothesis 2).

4.1. Method

4.1.1. Participants and procedure

We recruited 601 participants using Amazon Mechanical Turk.⁵ A sensitivity power analysis using G*Power (Faul et al., 2007) suggested that this sample size allowed us to detect a minimum effect size of $f = 0.13$. We excluded 18 participants who indicated that they had seen this study before. That is, they answered "yes" instead of "no" to the question "Have you seen this survey before? [Please answer honestly, you will be paid regardless of your answer]."⁶ We included this question because some participants may have multiple accounts with different Mechanical Turk identifications which made it difficult to exclude them, a priori, using platform restrictions, or they may have seen our questions from Mechanical Turk worker community forums. We further excluded 18 (and 1 unreported) participants who experienced technical problems. The final sample included 564 participants (56% females, $M_{age} = 37.06$, $SD = 12.18$).

All participants were given the following instructions:

Imagine that you have just landed a job as a marketing manager at a major clothing company, Dosagen Corp., which you are joining for the first time. You are responsible for the accessories division of the company.

Because you are highly motivated to succeed at your job, you have been talking with multiple people at the company to learn what it takes to excel.

In order to manipulate the type of control, we used three different versions of the advice, so that the first group of participants saw the supervisor employing thought control, the second group saw the supervisor employing behavioral control, and the third group saw the supervisor not attempting to control them at all.

The thought control condition read⁷:

Your supervisor, Joe Miller, tells you: The key to doing well here is implementing the right marketing strategy for your products. To achieve this, you must be "obsessive" about these issues. For example, you must change how much you value identifying the right customer segment, and finding the correct marketing channels. If you want to succeed, you must believe that these issues are very important to you.

In the behavioral control condition, participants saw:

Your supervisor, Joe Miller, tells you: The key to doing well here is implementing the right marketing strategy for your products. To achieve this, you must approach these issues in an analytical way. For example, you must change the analyses that you do to identify the right customer segment, and find the correct marketing channels. If you want to want to succeed, you must do these things.

In the neutral control condition, participants saw:

⁵ This study was conducted after Study S1. Since this was a replication of Study S1 with a third experimental condition, we decided to aim for twice the original sample size (Simonsohn, 2015), which meant 200 participants per experimental condition.

⁶ Some participants might have seen the study design because Study 2, which employed the same vignette and questions as Study S1, was conducted after Study S1.

⁷ Here, we note the manipulation of thought control might have been worded in a more awkward way than those used in the behavioral control. It is possible that participants were reacting against difficulties trying to understand the scenario (as opposed to control type). Therefore, we pre-tested the thought and behavioral control manipulation using an independent sample of 204 Mechanical Turk workers. We randomly assigned participants to either the thought (or the behavioral) control condition, and asked them to evaluate the scenario using four items, "This scenario feels awkward," "This scenario reflects how people tend to speak," "This scenario feels implausible," and "This scenario feels unclear." We found that there were no significant mean differences ($p > 0.103$) in agreement towards these four items between the thought and behavioral experimental conditions, suggesting that participants did not perceive the thought control scenario to be less clearly worded than those in the behavioral control scenario.

Your supervisor, Joe Miller, also gave you advice about how to do well in the company.

4.1.2. Measures

After viewing the manipulations, all participants completed the following measures. For ease of reference, we included the vignettes that participants saw while completing these measures.

4.1.3. Thought control

We measured the extent to which people believed that their supervisors will control their thoughts using the single item, "To what extent do you agree that your supervisor is trying to control your thoughts?" This item was measured on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*).

4.1.4. Behavioral control

We measured the extent to which people believed that their supervisors will control their behaviors using the single item, "To what extent do you agree that your supervisor is trying to control your behaviors?" This item was measured on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*).

4.1.5. Magnitude of restrictiveness

We measured the extent to which people perceived their supervisors as controlling using these three items, "What my supervisor wants feels controlling," "What my supervisor wants feels restrictive," and "What my supervisor wants feels constraining." These items were measured on a 7-point scale ($\alpha = 0.94$, 1 = *strongly disagree*, 7 = *strongly agree*).

4.1.6. State reactance

We assessed state reactance towards the supervisor by asking participants the extent the supervisor makes them feel "bothered, threatened, inspired, excited, scared," and the extent they found the advice to be feasible, sensible, and helpful (items indicating positivity was reverse coded; $\alpha = 0.91$). All items were measured on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*).

4.2. Results

Table 2 presents correlations, reliabilities, means, and standard deviations for all study variables. Mean levels of perceived thought control, perceived behavioral control, magnitude of restrictiveness and state reactance across experimental conditions are summarized in **Fig. 2**.

4.2.1. Thought control

A one-way ANOVA with experimental condition as the independent variable and thought control as the dependent variable found a significant main effect of experimental condition, $F(2, 561) = 34.29$, $p < .001$, $\eta^2 = 0.11$ or $f = 0.35$. Planned contrasts indicated that participants in the thought control condition ($M = 4.15$) were significantly more likely to think that their supervisor was going to control their thoughts than those in the behavior condition ($M = 3.81$), $F(1, 561) = 4.11$, $p = .043$. Those in the neutral condition ($M = 2.83$) were

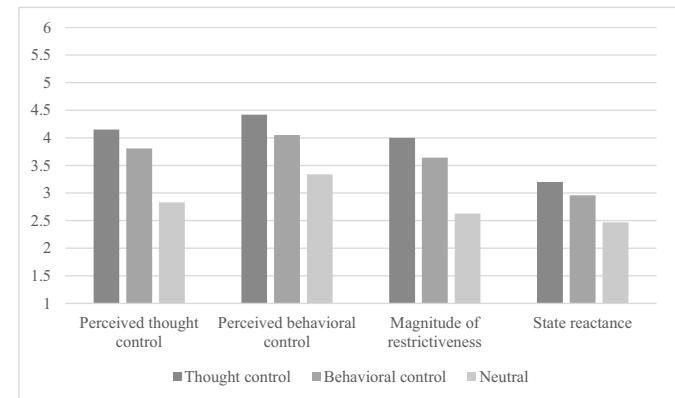


Fig. 2. Mean levels of perceived thought control, perceived behavioral control, magnitude of restrictiveness, and state reactance across the three experimental conditions.

significantly less likely to think that their supervisors were going to control their thoughts compared to both the thought control condition, $F(1, 561) = 63.41$, $p < .001$, as well as the behavioral control condition, $F(1, 561) = 34.49$, $p < .001$.

4.2.2. Behavioral control

A one-way ANOVA with experimental condition as the independent variable and behavioral control as the dependent variable found a significant main effect of experimental condition, $F(2, 561) = 21.48$, $p < .001$, $\eta^2 = 0.07$ or $f = 0.27$. Planned contrasts indicated that participants in the thought control condition ($M = 4.42$) were again significantly more likely to think that their supervisor was going to control their behaviors than those in the behavior condition ($M = 4.05$), $F(1, 561) = 4.65$, $p = .032$. Those in the neutral condition ($M = 3.34$) were significantly less likely to think that their supervisors were going to control their behaviors compared to the thought control condition, $F(1, 561) = 41.42$, $p < .001$, as well as the behavioral control condition, $F(1, 561) = 17.85$, $p < .001$.

4.2.3. Magnitude of restrictiveness

A one-way ANOVA with experimental condition as the independent variable and perceived restrictiveness as the dependent variable found a significant main effect of experimental condition, $F(2, 561) = 44.43$, $p < .001$, $\eta^2 = 0.14$ or $f = 0.40$. Planned contrasts indicated that participants in the thought control condition ($M = 4.00$) perceived their supervisors as significantly more restrictive than those in the behavior condition ($M = 3.64$), $F(1, 561) = 5.34$, $p = .021$. Those in the neutral condition ($M = 2.63$) perceived their supervisors as significantly less restrictive in both the thought control condition, $F(1, 561) = 82.17$, $p < .001$, as well as the behavioral control condition, $F(1, 561) = 44.65$, $p < .001$.

4.2.4. State reactance

Finally, a one-way ANOVA with experimental condition as the independent variable and reactance as the dependent variable found a

Table 2
Study 2: intercorrelations, reliabilities, means and standard deviations among variables.

	Means	SD	1	2	3	4	5
1. Perceived thought control	3.59	1.71	–				
2. Perceived behavioral control	3.93	1.70	0.73***	–			
3. Perceived restrictiveness	3.41	1.59	0.70***	0.69***	(0.94)		
4. State reactance	2.87	1.11	0.54***	0.55***	0.78***	(0.91)	
5. Experimental condition ^a	1.02	0.82	–0.24***	–0.18***	–0.27***	–0.18***	–

* $p < .05$, ** $p < .01$, *** $p < .001$.

^a 1 = thought control, 0 = behavioral control, 2 = neutral.

significant main effect of experimental condition, $F(2, 561) = 23.16$, $p < .001$, $\eta^2 = 0.08$ or $f = 0.29$. Planned contrasts indicated that participants in the thought control condition ($M = 3.20$) were significantly more reactant than those in the behavior condition ($M = 2.96$), $F(1, 561) = 4.62$, $p = .032$. Those in the neutral condition ($M = 2.47$) were significantly less reactant than those in both the thought control condition, $F(1, 561) = 44.40$, $p < .001$, as well as the behavioral control condition, $F(1, 561) = 19.87$, $p < .001$.

4.2.5. Mediation analysis

Next, we examined whether the effect of experimental condition on state reactance was mediated by perceived thought control, behavioral control, and perceived restrictiveness.⁸ To do so, we conducted a serial mediation model (Fig. 3). Although the neutral condition was included in our statistical analyses, due to the volume of paths estimated, we only present the multi-categorical mediation results for the contrast between thought and behavioral control experimental conditions. Please refer to the supplementary materials for multi-categorical mediation results for the thought control vs. neutral condition, and behavioral control vs. neutral condition. We used the seeming unrelated regression or the *sureg* command in Stata 14 to compute the indirect effects. The categorical experimental condition (*Behavioral control* = 0, *Thought control* = 1, *Neutral* = 2) was entered as the independent variable, perceived thought and behavioral control items as first stage parallel mediators, magnitude of restrictiveness as the second mediator, and state reactance as the dependent variable. Full mediation was observed, as the significant difference in state reactance between the thought and behavioral control conditions became non-significant after adding perceived thought control, perceived behavioral control, and magnitude of restrictiveness mediators to the model. Next, we computed the indirect effects of perceived thought and behavioral control by multiplying the relevant unstandardized path coefficients. The bias-corrected confidence interval (5000 bootstraps) of the indirect effect via thought control did not include 0, $Coeff = 0.06$, $SE = 0.04$, 95% C.I. [0.002, 0.142]. The bias-corrected confidence interval (5000 bootstraps) of the indirect effect via behavioral control also did not include 0, $Coeff = 0.07$, $SE = 0.04$, 95% C.I. [0.008, 0.150]. That is, because participants perceived that the supervisor in thought control condition will be more likely to control both their thoughts and their behaviors than those in the behavioral control condition, the thought (vs. behavioral) control supervisor was then perceived as more restrictive and elicited greater reactance.

4.3. Discussion

Study 2 revealed that participants in the thought (vs. behavioral) control condition experienced greater reactance and perceived their supervisor as more restrictive because they perceived that the thought control supervisor was more likely to control both their thoughts and their behaviors compared to the behavioral control supervisor.

The finding that both perceptions of thought and behavioral control was significantly higher in the thought (vs. behavioral) control condition was surprising. Compared to the neutral condition, we had predicted that the thought control condition would cause an increase in both perceived thought control and behavioral control but behavioral control would only increase perceived behavioral control. What we did not anticipate was that the thought control condition would lead to both higher perceived thought and behavioral control than the

⁸ Here we note that the mediational analyses that we presented in the present paper are compatible with only one of the several models possible (Fiedler, Harris, & Schott, 2018). Other (and potentially equally valid) configurations of the model might exist, and we are only presenting one of the possibilities. That said, for reasons we describe in the introduction, we believe that the path models that we have proposed have good theoretical bases.

behavioral control condition. We will discuss this further in the General Discussion.

5. Study 3

One limitation of the studies that we have presented so far is that higher reactance in the thought (vs. behavioral) control condition could have been driven by the fact that the thought control manipulations were worded in a more extreme and restrictive way than the behavioral control condition (e.g., “have to be obsessive about these issues” vs. “approach these issues in an analytical way”). We aim to address this confound in the present study by holding constant all the other words used in the scenario, and only varying the words thoughts (vs. behaviors) across the experimental conditions.

Another limitation is that participants were asked to imagine themselves in scenarios in the previous studies. We sought to test if our predictions hold in a context where there is a more “real” attempt at control. To achieve this goal, we conducted an experiment in which we told Mechanical Turk workers that we were interested in studying the effects of an intervention that we developed. Because the effectiveness of the intervention depended on their receptiveness towards it, participants had to evaluate the intervention study before completing it. In the thought control condition, we told Mechanical Turk workers that the intervention sought to change their thoughts, and in the behavioral control condition we told workers that the intervention study sought to change their behaviors. Since we were primarily interested in capturing their reactions and attitudes towards the intervention, after evaluating the study, participants were debriefed and told that they did not actually need to complete the study that they evaluated earlier.

5.1. Method

5.1.1. Participants and procedure

We decided to recruit 300 U.S. workers using Amazon Mechanical Turk. We recruited 150 participants per experimental condition because the manipulations of thought and behavioral control were more subtle (i.e., we only varied the words thought and behaviors across conditions) than that in the previous studies. A total of 301 participants completed the survey. Seven participants had technical problems, leaving a sample of 294 (53% female, $M_{age} = 37.70$, $SD = 12.77$). A sensitivity power analysis using G*Power suggested that this sample size allowed us to detect a minimum effect size of $d = 0.32$.

All participants were presented with the following background information:

The purpose of this survey is to examine the effect of an intervention that we have developed. Because the effectiveness of this intervention depends on how receptive participants are towards it, in the next few pages, you will read about this intervention. You will then be asked to indicate your attitudes towards the intervention. Finally, you will participate in the intervention study.

All participants were then randomly assigned to one of two experimental conditions, the thought control condition or the behavioral control condition. Those assigned to the thought control condition read:

Thought study: In this study, we want to study the influence of interventions on your thoughts. To receive credit for participating, you must think in ways that are consistent with the specific instructions that we give you. Throughout the experiment, you must not engage in any thoughts that are unrelated to this study. If we find that you had any thoughts that are unrelated to the study, you will be immediately disqualified from the experiment.⁹

⁹ It is possible that participants in the thought control condition might dismiss the threat of the thought control disqualification. That is, they might believe that we (the experimenters) cannot possibly know what they might be thinking, and thus we cannot disqualify them. However, given that the study was

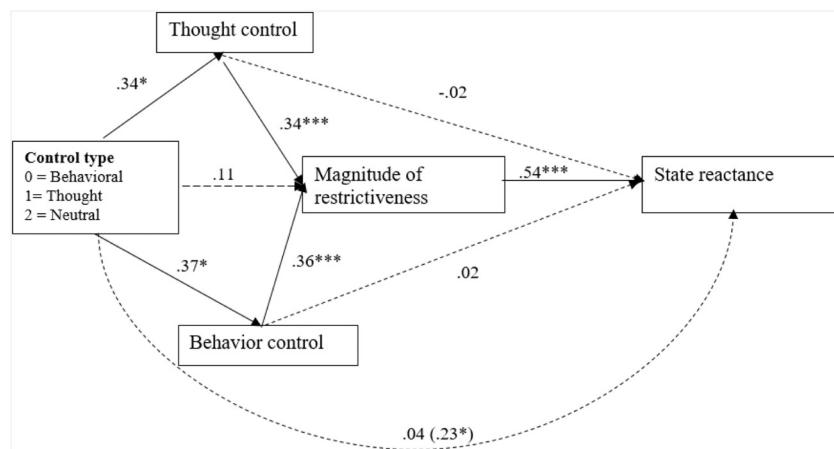


Fig. 3. The effect of experimental condition, thought control, behavioral control, magnitude of restrictiveness, and state reactance; Study 2. Values not in parentheses represent relationships after including all variables in the model. Coefficients represent the contrast between the behavior and thought control experimental conditions. Unstandardized coefficients. Dashed paths indicate estimated paths that were not included in the computation of indirect effects. ${}^*p < .05$, ${}^{**}p < .01$, ${}^{***}p < .001$.

Table 3
Study 3: intercorrelations, reliabilities, means and standard deviations among variables.

	Means	SD	1	2	3	4	5	6
1. Perceived thought control	4.09	2.13						
2. Perceived behavioral control	4.51	2.05	0.65***					
3. State reactance	4.49	1.23	0.12*	0.13*	(0.77)			
4. Perceived restrictiveness	5.24	1.67	0.40***	0.44***	0.62***	(0.96)		
5. Behavioral intentions	5.59	1.35	0.14*	0.05	-0.48***	-0.24***	(0.92)	
6. Experimental condition ^a	0.49	0.50	0.12*	-0.08	0.12*	0.14*	0.05	

* $p < .05$, ** $p < .01$, *** $p < .001$.

^a 1 = thought control, 0 = behavioral control.

Those assigned to the behavioral control condition read:

Behavioral study: In this study, we want to study the influence of interventions on your behaviors. To receive credit for participating, you must behave in ways that are consistent with the specific instructions that we give you. Throughout the experiment, you must not engage in any behaviors that are unrelated to this study. If we find that you engaged in any behaviors that are unrelated to the study, you will be immediately disqualified from the experiment.

5.1.2. Measures

After viewing the manipulations, all participants completed the following measures. For ease of reference, we included the vignettes that participants saw while completing these measures.

5.1.3. Thought control

We measured the extent to which people believed that we will control their thoughts using the single item, "To what extent do you agree that we will control your thoughts?" This item was measured on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*).

5.1.4. Behavioral control

We measured the extent to which people believed that we will control their behaviors using the single item, "To what extent do you agree that we will control your behaviors?" This item was measured on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*).

5.1.5. Magnitude of restrictiveness

We measured the extent to which people perceived the study is restrictive using these three items, "This study feels controlling," "This study feels restrictive," and "This study feels constraining." These items

(footnote continued)

completed online, participants in the behavioral control might also be able to dismiss the threat of the behavioral control disqualification because they believe that we cannot observe their behaviors.

were measured on a 7-point scale ($\alpha = 0.96$, 1 = *strongly disagree*, 7 = *strongly agree*).

5.1.6. State reactance

We assessed participants' state reactance towards each study by asking them the extent that the study made them feel bothered, threatened, inspired, excited, and annoyed ($\alpha = 0.77$). Items indicating positive attitudes or emotions were reverse coded and averaged to form a composite score. All these items were measured on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*).

5.1.7. Behavioral intentions

We also asked the extent to which participants would want to participate and take part in the study ($r = 0.92$). Both of these items were also assessed on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*).

After completing these measures, participants filled in demographic questions and were debriefed.

5.2. Results

Table 3 presents correlations, reliabilities, means, and standard deviations for all study variables.

5.2.1. Thought control

Participants in the thought control condition ($M = 4.36$, $SD = 2.09$) were more likely to agree that we would try to influence their thoughts compared to those in the behavioral control condition ($M = 3.83$, $SD = 2.14$), $t(292) = -2.12$, $p = .035$, $d = 0.25$.

5.2.2. Behavioral control

Unlike results presented in Study 2, perceptions of behavioral control did not differ across the thought control condition ($M = 4.34$, $SD = 2.02$) and behavioral control condition ($M = 4.68$, $SD = 2.06$), $t(292) = 1.40$, $p = .164$, $d = 0.17$.

5.2.3. Magnitude of restrictiveness

Participants in the thought control condition ($M = 5.48, SD = 1.40$) perceived that the study was more restrictive than those in the behavioral control condition ($M = 5.00, SD = 1.87$), $t(292) = -2.47, p = .014, d = 0.29$.

5.2.4. State reactance

Participants in the thought control condition ($M = 4.64, SD = 1.16$) experienced greater reactance compared to those in the behavioral control condition ($M = 4.35, SD = 1.28$), $t(292) = -2.04, p = .042, d = 0.24$.

5.2.5. Behavioral intentions

We did not find significant differences in behavioral intentions to participate in the study across the thought ($M = 5.66, SD = 1.31$) and the behavioral control condition ($M = 5.52, SD = 1.39$), $t(292) = -0.92, p = .361, d = 0.10$. One reason why we did not find significant differences in behavioral intentions across the experimental conditions could be because participants were told that they had to participate in the experimental study regardless of their attitudes and therefore this measure of behavioral intentions might not have been the most sensitive measure. Despite not finding a main effect of experimental condition on behavioral intentions, we still sought to examine if the effect of the experimental condition on behavioral intentions might be mediated by perceived thought control, behavioral control, perceived restrictiveness, and state reactance.

5.2.6. Mediation analysis

We examined whether the effect of experimental condition on behavioral intentions was mediated by thought control, behavioral control, and perceived restrictiveness. To do so, we conducted a serial mediation model (Fig. 4). Due to the number of paths that were estimated, for parsimony, we only present paths that were included in the computation of the indirect effects. Please refer to Fig. S5 for coefficients for all the paths that were estimated in this model. We again used the *sureg* command in Stata 14 to compute the indirect effect. The experimental condition (*Thought control* = 1, *Behavioral control* = 0) was entered as the independent variable, thought and behavioral control as first stage parallel mediators, perceived restrictiveness as the second mediator, state reactance as the third mediator, and behavioral intentions as the dependent variable. The bias-corrected confidence interval (5000 bootstraps) of the indirect effect via thought control did not include 0, *Coeff* = -0.02, *SE* = 0.01, 95% *C.I.* [-0.062, -0.00005]. The bias-corrected confidence interval (5000 bootstraps) of the indirect effect via behavioral control included 0 and therefore was not significant, *Coeff* = 0.03, *SE* = 0.02, 95% *C.I.* [-0.007, 0.088]. These results suggest that participants agreed that the thought control study will be more likely to control their thoughts than the behavioral control study, and greater perceived control of thoughts in the thought (vs. behavioral) experimental condition was in turn associated with greater perceived restrictiveness and state reactance towards the study, as well

as lowered behavioral intentions to participate.

5.3. Discussion

Study 3 replicated the findings from Study 2 that participants experienced greater psychological reactance in the thought (vs. behavior) control condition. However, this study did not replicate the unexpected finding that perceived behavioral control was significantly higher in the thought (vs. behavioral) control condition. Instead, we found that there were no significant differences in perceived behavioral control across the thought (vs. behavioral) control experimental conditions, suggesting that perceived behavioral control across the two experimental conditions was equally high. Taken together with findings from earlier studies, these results offer broad support for *Hypothesis 2* insofar as we found that perceived thought control in the thought (vs. behavioral) control was higher, whereas perceived behavioral control across conditions did not differ. These findings suggest that people perceive that those who try to control their thoughts would also try to control their behaviors.

6. Study 4

We have argued that people experience greater psychological reactance in the thought control condition because they believe that those who try to control their thoughts will also attempt to control their behaviors. In Study 4, we aimed to address four other explanations that we have described earlier: self- representativeness of thoughts and behaviors, normativeness of thought and behavioral control, extent to which people believe that thoughts and behaviors will affect others, and finally, the extent to which participants believe that thought and behavioral freedom are important. In order to do so, we employed a within-subjects design where participants evaluated two different Italian subcultures (thought vs. behavioral control subculture). We examined if people exhibited greater reactance towards the thought control (vs. behavioral control) subculture even after controlling for these four other explanations.

6.1. Method

6.1.1. Participants and procedure

We decided to recruit 200 full time U.S. employees using Amazon Mechanical Turk. Ten participants had technical problems (one unreported), leaving a sample of 189 (49% female, $M_{age} = 36.03, SD = 11.54$). A sensitivity power analysis using G*Power suggested that this sample size allowed us to detect a minimum effect size of $f = 0.12$ (assuming correlations among repeated measures of $r = 0.30$, 80% power and 0.05 alpha error rate, two-tailed).

6.1.2. Measures

All participants responded to the following four measures. We randomized the order in which the four measures were presented.

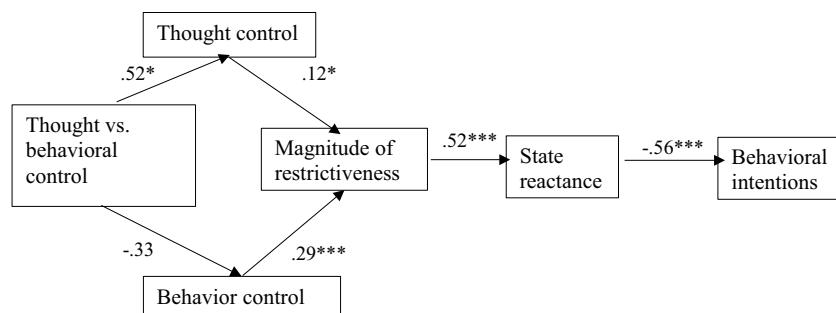


Fig. 4. The effect of experimental condition, thought control, behavioral control, magnitude of restrictiveness, and state reactance; Study 3. Coefficients represent the contrast between the behavior and thought control experimental conditions. Unstandardized coefficients. * $p < .05$ ** $p < .01$, *** $p < .001$.

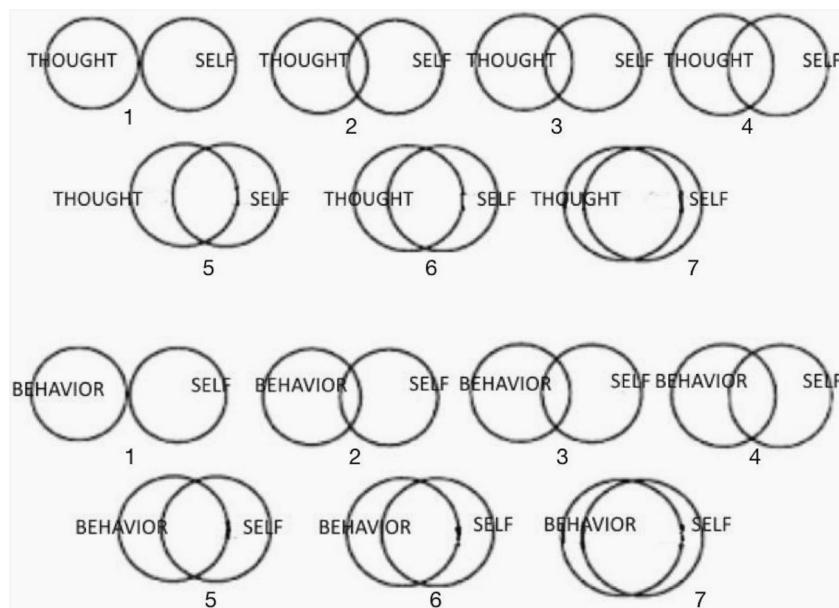


Fig. 5. Self-representativeness of thoughts and behaviors.

6.1.3. Self-representativeness of thoughts and behaviors

We adapted the inclusion of other in the self scale to measure this construct (Aron, Aron, & Smolan, 1992). Participants were asked to respond to two items corresponding to perceived self-representativeness of thoughts and behaviors. Specifically, they were told that:

The following questions concern how much you believe your thoughts (vs. your behaviors) represent your sense of self. For example, some people believe that their thoughts reveal who they are as people, whereas others believe that it is people's behaviors that truly show who they are. Please indicate the extent to which you believe that your thoughts and behaviors represent your sense of self. Please use the pictures below to help you answer these questions. The closer the circles are to each other, the more representative or indicative thoughts and behaviors are reflective of your sense of self.

They were then presented with two pictures that depicted circles that overlapped to varying degrees (Fig. 5). Participants were asked two questions, "To what extent do your THOUGHTS reflect who you are as a person?" and "To what extent do your BEHAVIORS reflect who you are as a person?" Both items were administered on a 7-point scale (1 = *not at all reflective*, 7 = *very reflective*).

6.1.4. Normativeness of thought and behavioral control

Participants were told to consider "how common it is for people and institutions to try to change other's thoughts and behaviors. For example, when schools try to instill the belief that certain qualities (e.g., honesty) are virtuous, they are trying to change their student's thoughts. When governments forbid smoking in certain places, they are trying to change people's behaviors." They then responded to two items pertaining to the normativeness of thought and behavioral control. These items were: "It is common for people to try to change other's THOUGHTS" and "It is common for people to try to change other's BEHAVIORS." These items were administered on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*).

6.1.5. Importance of thought and behavior freedom

Participants were asked to consider the extent to which it was important for them to think or act however they like. These items were: "I need the freedom to DO what I want at all times," and "I need the freedom to THINK however what I want at all times." The measure was administered on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*).

6.1.6. Extent thought and behavior affects others

All participants also responded to two items about the extent to which their thoughts and behaviors might impact or affect other people. These items were: "My THOUGHTS have the potential to strongly affect other people," and "My BEHAVIORS have the potential to strongly affect other people." These two items were administered on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*).

Next, all participants were presented with the following background information:

Imagine that you are to relocate to Italy for about 1 year for work. Your company tells you have two different options, North Italy and South Italy. In order to find out more about the different subcultures and the likelihood of you enjoying and adapting to each one of the two different subcultures, you conduct some research on how North Italy and South Italy are like.

Then all participants were presented with a description of Northern and Southern Italy which corresponded with thought and behavioral conditions. We counterbalanced the region and experimental condition so that one group of participants saw that Northern Italy corresponded to the thought control condition (and Southern Italy to the behavioral control condition), and another group of participants saw that Southern Italy correspond to the thought control condition (and Northern Italy to the behavioral control condition).

Northern Italy: Northern Italians tend to value the collective before their individual selves. Northern Italians, such as the Milanese, believe that it's important for people to have the same thoughts and values. People who find it difficult to accept and subscribe to the same thoughts and values as those around them typically have a hard time adjusting to life in Northern Italy.

Southern Italy: Southern Italians are also collectivistic because they believe that communal interests are sometimes more important than individual needs. Southern Italians, such as the Sicilians, want everyone in the society to adhere to the same codes of conduct. People who have a hard time behaving in accordance with these rules might find Southern Italy difficult to adapt to.

Finally, all participants evaluated both North and South Italy, and the order in which they evaluated the regions were counterbalanced. For ease of reference, we included these vignettes when participants evaluated each subculture.

Table 4

Study 4: intercorrelations, reliabilities, means and standard deviations among variables.

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11
1. Self-representativeness of thoughts	5.46	1.35											
2. Self-representativeness of behaviors	5.45	1.27	0.10										
3. Normativeness of thought control	5.50	1.15	0.22**	0.003									
4. Normativeness of behavioral control	5.86	1.02	0.12	0.03	0.42***								
5. Importance of behavioral freedom	4.74	1.64	-0.05	0.10	0.03	-0.13							
6. Importance of thought freedom	6.13	1.05	0.29***	0.04	0.03	0.26***	0.23**						
7. Thoughts will affect others	4.31	1.67	0.14	-0.07	0.19**	-0.03	0.26***	-0.05					
8. Behaviors will affect others	5.94	1.17	0.09	0.18*	0.11	0.22**	-0.18*	0.21**	0.17*				
9. State reactance (Behavior)	3.39	1.30	0.09	-0.14	0.17*	0.03	0.05	0.007	-0.13	-0.12	(0.93)		
10. State reactance (Thought)	3.72	1.21	-0.02	-0.14	0.02	0.10	0.14	0.15*	-0.02	-0.03	0.34***	(0.92)	
11. Bipolar choice	6.75	2.95	-0.09	-0.02	-0.11	0.04	0.04	0.08	0.10	0.01	-0.54***	0.34***	

Note. Numbers in diagonals represent reliabilities.

*** $p < .001$.* $p < .05$.** $p < .01$.

6.1.7. State reactance

We assessed participants' state reactance towards each subculture by asking them the extent that they would fit in, acclimatize, feel bothered, feel threatened, inspired, excited, scared, and find the culture appealing and attractive ($\alpha_{thought} = 0.92$, $\alpha_{behavior} = 0.93$). Items indicating positive attitudes or emotions were reverse coded and averaged to form a composite score. All these items were measured on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*).

6.2. Bipolar choice

Finally, all participants were asked, "If you had to choose between North Italy and South Italy, which would you choose?" on an 11-point bipolar scale. This scale was coded such as higher numbers represented greater preference for the behavioral control subculture.

6.3. Results

Variable intercorrelations, means, and standard deviations are presented in Table 4. We conducted a multilevel linear regression with restricted maximum likelihood estimation. Subculture type was included as a categorical within-subjects factor (0 = *behavioral control*, 1 = *thought control*). State reactance was the dependent variable. All variables were included as fixed effects (γ) effects. The following analyses were done using the command procedure *xtmixed* in Stata 14. In our analyses, we also added order in which each subculture was evaluated as a covariate, and our results remain the same after controlling for order ($p = .938$), and order did not moderate the effect of subculture type on state reactance ($p = .756$). Thus the results we report below do not contain order as a covariate or moderator. We also examined whether the people were more reactant when North Italy was assigned to the thought control condition and South Italy was assigned to the behavioral control condition (and vice versa). Region-condition type was coded as 0 = *South Italy/Thought Control*, *North Italy/Behavioral control*, 1 = *North Italy/Thought Control*, *South Italy/Behavioral control*. We found that this variable did not have a significant influence on our analyses when included as a covariate ($p = .628$), and also did not moderate the effect of subculture type on state reactance ($p = .882$).

6.3.1. State reactance

As predicted, state reactance in the thought control condition ($M_{thought} = 3.72$, $SD = 1.21$) was significantly higher than that in the behavioral control condition ($M_{behavioral} = 3.39$, $SD = 1.30$), $\gamma = 0.33$, $SE = 0.11$, $z = 3.09$, $p = .002$. Next, we examined the relation between subculture type and state reactance after controlling for other explanations, including self-representativeness of thoughts and behaviors,

how important thought and behavioral freedoms were, extent to which people believed thoughts and behaviors will affect others, and finally the extent to which thought and behavioral control was common or normative. After including these as between-level covariates, we found that reactance in the thought control condition was still significantly higher than that in the behavioral control condition, $\gamma = 0.33$, $SE = 0.11$, $z = 3.09$, $p = .002$ (Table 5).

Finally, we tested each of the eight covariate items (i.e., self-representativeness of thought and behaviors, importance of thought and behavioral freedom, normativeness of thought and behavioral control, and extent that thoughts and behaviors will affect others) as moderating variables. Subculture type was included as a categorical within-subjects factor (0 = *behavioral control*, 1 = *thought control*). Each of the eight items were included as a continuous between-subjects moderating factor in eight separate multilevel moderated regressions. State reactance was the dependent variable in each of these eight multilevel moderated regressions. We found a marginally significant interaction with normativeness of thought control as the moderating variable, $\gamma = -0.18$, $SE = 0.09$, $z = -1.94$, $p = .052$. We present this result in the Supplementary Materials. The other seven interactions were non-significant ($ps = 0.098$ to 0.925).

6.3.2. Bipolar choice between thought and behavioral control subculture

Finally, we conducted a two-tailed *t*-test to examine if people's choices differed significantly from the midpoint (6), which represented the point at which they were indifferent about going to either subculture. We observed that, on average, participants had a stronger preference for the behavioral (vs. thought) control subculture ($M = 6.75$, $SD = 2.95$), $t(188) = 3.50$, $p < .001$.

Table 5

The effect of thought control on state reactance (Study 4).

	State reactance			
	γ	SE	z	p
1. Thought vs. behavioral control (1 = thought, 0 = behavioral)	0.33	0.11	3.09	0.002
2. Self-representativeness of thoughts	0.05	0.06	0.82	0.414
3. Self-representativeness of behaviors	-0.16	0.06	-2.74	0.006
4. Importance of behavioral freedom	0.11	0.05	2.06	0.039
5. Importance of thought freedom	0.02	0.08	0.28	0.777
6. Thoughts will affect others	-0.11	0.05	-2.18	0.030
7. Behaviors will affect others	-0.02	0.07	-0.32	0.752
8. Normativeness of thought control	0.11	0.07	1.45	0.148
9. Normativeness of behavioral control	0.04	0.09	0.48	0.635

N = 189.

6.4. Discussion

Consistent with previous studies, we observed that people were more reactant towards thought control (vs. behavioral control) subculture, and the effect held even after controlling for alternative explanations, such as perceived self-representativeness of thoughts and behaviors, perceived importance of thought and behavior freedom, extent to which people believed thoughts and behaviors will affect others, and finally the extent to which thought and behavioral control was perceived as common or normal.

7. General discussion

Four studies and one replication study provided converging evidence for the idea that people are more reactant when others attempt to change their thoughts as opposed to their behaviors. Supporting [Hypothesis 1](#), people were more reactant when others try to influence their thoughts as opposed to their behaviors in a job search scenario (Study 1). We also showed that the effect of thought (vs. behavior) control on state reactance and perceived restrictiveness was mediated by the fact that people believe that those try to control their thoughts will also try to control their behaviors (Studies 2, 3 and Study S1, supporting [Hypothesis 2](#)). We replicated the effect of thought (vs. behavioral) control on state reactance in a less hypothetical context, and found that Mechanical Turk workers were significantly more reactant towards a study in which their thoughts (vs. behaviors) will be controlled (Study 3). We also found that increased reactance in the thought (vs. behavioral) control condition held after controlling for perceived self-representativeness of thoughts and behaviors, perceived normativeness of thought and behavioral control, extent to which people believe that thoughts and behaviors will affect others, and the extent to which participants believe that thought and behavioral freedom are important (Study 4). Finally, a supplementary study (Study S1) replicated the effects of Study 2.

7.1. Theoretical and practical implications

Drawing from psychological reactance theory, our work examines how people perceive and react towards different types of control. Taken together, our findings suggest that people are more resistant towards thought as opposed to behavioral control, and this is because they perceive that others who try to control their thoughts will also try to control their behaviors. Our work contributes psychological reactance theory. Although past research has shown that people may exhibit reactance when others try to change their attitudes and behaviors ([Wicklund & Brehm, 1968](#)), to our knowledge, no research has directly examined how the type of control (e.g., whether it targets attitudes or behavior) influences the amount of reactance that people subsequently feel. Given that people can persuade others by either targeting their thoughts or behaviors, we believe that it is important to understand how these social influence attempts are ultimately perceived by the receiver, and their subsequent behavioral intentions.

7.2. Limitations and future research

One interesting question that is not examined by the present research is – are there circumstances in which people accept or rationalize thought control? We propose three potential theoretically derived factors that may moderate the relationship between thought control and reactance. First, future research can consider awareness of control as a boundary condition for the present effects. Indeed, one limitation of the present research is that our manipulations of thought and behavioral control were both highly noticeable and blatant – this is confirmed by the fact that the thought and behavioral control items in all our experiments indicate that people are aware of both the source as well as nature of the control. Therefore, one possibility is that people are only

highly reactant to the extent that they are aware that others are trying to influence their thoughts, values, and beliefs, an idea consistent with past research showing that people are reactant only if they consciously pay attention to the controlling nature of restrictive policies ([Laurin et al., 2013](#)). To the extent that the controlling nature of thought control policies in complex, real-life environments tend to be more subtle and positively valenced (e.g., “love your work,” “all ideas are good ideas”), an interesting possibility is that reactance is exhibited only to the extent that people are aware that others are trying to modify their thoughts, values, and beliefs. Thus, a fruitful direction for future research will be to examine how attention and valence moderate the relationship between thought control and reactance.

The second factor may be whether controlling events are perceived as supporting (vs. changing) the existing system ([Proudfoot & Kay, 2014](#)). Since people generally perceive what currently exists as good ([Eidelman, Pattershall, & Crandall, 2010](#)), they may be less likely to react against thought control policies that bolster the current state of affairs as opposed to those that aim to change the status quo.

Last, the probability that the controlling event will occur is likely to influence the extent to which thought control attempts will be met with reactance or rationalization ([Proudfoot & Kay, 2014](#)). Past research has shown that people are more likely to rationalize and accept external control when these control attempts are presented as unchangeable, inescapable, and certain (as opposed to changeable, escapable, and uncertain). For example, people who were told that a certain restrictive policy will definitely be implemented exhibited less reactance compared to those who were told that it was unclear if the policy will be implemented ([Laurin et al., 2012](#)). Thus, one possibility is that people may exhibit less reactance when they perceive that certain thought control policies are inevitably (vs. only probably) going to be implemented.

Relatedly, although the probability of the controlling event may moderate the relationship between thought control and reactance, it can also serve as an alternative explanation for the effects we find here. That is, it is possible that behavioral control is perceived as more certain than thought control. Consequently, behavioral control induces more rationalization and less reactance compared to thought control. Since people's thoughts, values, and beliefs are often privately held and less observable compared to how they act, from the target's perspective, thought control attempts may be viewed as relatively more escapable and uncertain compared to behavioral control. For example, governments can ensure that no more cars are made with gas engines by instituting strict laws about the availability of such engines (i.e., behavioral control), or via changing people's attitudes (i.e., thought control). Consumers may be forced to buy gas engine cars under behavioral control. However, whether consumer's true attitudes towards gas engine cars have changed due to thought control is something that others cannot be fully certain of. Therefore, examining perceived certainty of control as a mediator may a fruitful area for future research.

Further, Study 2 (and Study S1) found that people perceived that the supervisor in the thought control condition was significantly more likely to control both their thoughts and their behaviors than that in the behavioral control condition (although this was not replicated in Study 3). We believe that perceived behavioral control was higher in the thought (vs. behavioral) control condition in these two studies because the behavioral restrictions that are implied by thought control in these studies might have been more wide-ranging than those suggested in the behavioral control condition. For example, when people are told that they needed to be “obsessive” about finding the right marketing strategy, they might believe that they then have to engage in many different types of behaviors. These behaviors may include those recommended in the behavioral control experimental condition (e.g., approaching issues in analytical way, changing analyses), as well as behaviors that were not mentioned in the behavioral control condition, such as calling potential customers constantly, and working closely with research departments. Future research should test more explicitly

if this is the case.

Next, psychological reactance has been found to lead to less helping (Berkowitz, 1973), greater insubordination (Graybar, Antonuccio, Boutilier, & Varble, 1989), aggression (Bushman, Bonacci, Van Dijk, & Baumeister, 2003), and motivation to do the opposite (Fitzsimons & Lehmann, 2004). As such, one possible avenue for future research could be to examine how these downstream outcomes vary as a function of control type.

Finally, future research could also strive to connect the present findings to real world phenomena. One notable limitation of the present research is that, apart from Study 3, we used scenarios to test our ideas. Therefore, a possible avenue for future research could be a larger scale lab study within the context of political correctness, in which researchers can examine differences in reactance and behavioral intentions when interventions to promote tolerance are framed in terms of instilling politically correct thoughts or promoting tolerant behaviors (e.g., microaggressions). Similarly, it would also be interesting to examine if our model generalizes to group brainstorming or teamwork contexts. For instance, reactance or objective quality of ideas might differ across two experimental conditions in which managers induce employee participation by promoting the belief that “all ideas are good ideas,” as opposed to explicitly telling them to adopt certain behaviors that might facilitate idea sharing (e.g., “do not criticize other’s ideas”).

8. Conclusion

The present research advances our current understanding of psychological reactance and responses towards different types of control. By demonstrating how and why we react vehemently when others try to restrict our freedom of thoughts, values and beliefs, we suggest that Frankel might be right in his assertion that our freedom to think what we want, value and believe might be the “last of freedoms.”

8.1. Chronology of studies

Studies are numbered 1–4 for narrative style. Chronologically, studies were run in the following order: 1, S1, 2, 4, 3.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jesp.2019.103825>.

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