Compensatory control and ambiguity intolerance

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ABSTRACT

When do people find ambiguity intolerable, and how might this manifest in the workplace where roles, guidelines and expectations can be made to be more or less ambiguous? Compensatory Control Theory (CCT; Kay, Gaucher, Napier, Callan, & Laurin, 2008) suggests a potential driver: perceived control. Recent CCT theory (Landau, Kay, & Whitson, 2015) has posited that people with chronically lower levels of perceived control may be especially likely to seek coherent and structured environments. Given that ambiguous workplace situations – such as flexible roles and titles, or loose guidelines and expectations – necessarily represent a lack of structure, these types of situations may therefore be especially aversive to those lower in perceived control. Four studies support this prediction. Specifically, we observe that low perceived control (both measured or manipulated) predicts greater ambiguity intolerance as well as greater negative attitudes towards ambiguous situations (Studies 1, 2 and 3), but not other types of problematic workplace situations (Study 1), and that this process can exert important downstream consequences, ranging from behavioral intentions to perceived self-efficacy (Study 4).

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1. Introduction

Autonomy. Freedom. Flexible work schedules. Work-life balance. These are catchphrases that represent what a significant number of people from all over the world claim to value and desire at work, even at the expense of lower salary or promotion delay (PricewaterhouseCoopers, 2013). In order to cater to employees' wishes, an increasing number of organizations are beginning to offer more workplace autonomy. For example, Google designated 20% of employees' paid time for them to work on their personal projects. Best Buy has a Results-Only Work Environment (ROWE), which allows employees to work virtually from anywhere and anytime as long as they are able to deliver results (Dhawan, 2012). Gyms, sleeping pods, and yoga classes (Messieh, 2013) are becoming increasingly common features at modern workplaces. Everywhere in the world, the drive for more freedom and flexibility at the workplace is slowly and significantly changing the corporate landscape.

However, while the push for increased workplace flexibility may lead to many positive outcomes, it also causes work coordination conflicts, a lack of managerial supervision, and even changes in organizational culture (for review see Scandura & Lankau, 1997). These problems may foster greater workplace ambiguity, which some employees may find hard to tolerate. Ambiguity at

the workplace has been shown to decrease perceptions of job autonomy (Beehr, 1976; Jackson & Schuler, 1985), and job satisfaction (Abramis, 1994; Jackson & Schuler, 1985) as well as job performance (Tubre & Collins, 2000). Thus, it is feasible that workplace environments designed to "empower" workers by plying them with freedom and flexibility may sometimes instead foster negative attitudes and, ironically, reduce feelings of self-efficacy. But does this happen and, if so, why?

Drawing on hypotheses put forth by Compensatory Control Theory (CCT; Kay, Shepherd, Blatz, Chua, & Galinsky, 2010; Kay, Whitson, Gaucher, & Galinsky, 2009; Kay, Gaucher, Napier, Callan, & Laurin, 2008), we argue that some workers may find ambiguity intolerable because the associated lack of structure blocks a primary means of maintaining perceptions of an understandable, predictable and ultimately controllable world. Recent research has demonstrated that maintaining perceptions of control – a fundamental psychological need (Presson & Benassi, 1996; Seligman, 1975; Skinner, 1995) – often requires a balancing act between seeing the self in control and also the external world as orderly and structured (Kay et al., 2008; Landau, Kay, & Whitson, 2015). As a result, when personal control is chronically low or temporarily threatened, people often compensate by searching for and craving structure in the world around them (Whitson & Galinsky, 2008). Structure, defined as "simple, clear and coherent interpretations of the social and physical environment" (Landau et al., 2015, p. 694), is a crucial resource for those low in perceived control because it represents a necessary component to building the

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confidence to engage in long-term goal pursuit (i.e. self-efficacy, Kay, Laurin, Fitzsimons, & Landau, 2014). As such, ambiguity in contexts that are important and/or filled with goal strivings – such as the workplace – may be especially intolerable for people with low personal control. Leveraging this research and theory, we sought to test whether workers with low personal control would have a greater need for structure, and consequently be especially intolerant of ambiguities at the workplace.

By positing a novel account for why perceived control should influence the way people respond to ambiguity, we aim to fill theoretical gaps in ambiguity related organizational research. Existing organizational behavior research has examined the extent to which people perceive their jobs to be ambiguous ('role ambiguity', for reviews, see Jackson & Schuler, 1985; Tubre & Collins, 2000), and also their tendency to be threatened by ambiguity ('ambiguity intolerance', Budner, 1962; Schere, 1982). The research generally converges on the notion that sources of ambiguity can be stressful (Keenan & McBain, 1979) and the ability to tolerate ambiguity reduces occupational strain (Frone, 1990). However, it remains unclear why some people should perceive ambiguity to be intolerable in the first place, and when it is perceived to be especially threatening (Frone, 1990; Furnham & Ribchester, 1995). By proposing that people are intolerant of ambiguity because it represents a lack of structure, we aim to improve the field's theoretical understanding of the conceptual relationships between control and ambiguity, while also examining the utility of compensatory control theory for deepening our understanding of organizational and workplace preferences.

1.1. Control-motivated structure seeking

Researchers in clinical, personality and social psychology agree that people are motivated to feel in control of their lives (Presson & Benassi, 1996; Seligman, 1975; Skinner, 1995), and that they often dislike perceived uncertainty and chaos (Pennebaker & Stone, 2004). How do people cope when their personal control is low or threatened? One of the ways they may do so, according to CCT, is to seek external structure, that is, clarity and order in the external world. Personal control is not possible without an orderly and predictable environment, in which one can predict the contingencies of one's own as well as other peoples' actions (Kay et al., 2014). Turning to structure when personal control is low, therefore, can lay the foundation upon which personal control can then be built (or re-built).

Recently, the literature has become filled with examples of this type of control-motivated structure seeking. For example, research has shown that individuals who experience low psychological control prefer scientific theories that have clear stages and boundaries compared to those that are more continuous or fluid (Rutjens, van Harreveld, & van der Pligt, 2010; Rutjens, van Harreveld, van der Pligt, Kreemers, & Noordewier, 2013). People who have low personal control are also more likely to endorse socio-economic ideologies that involve clear rules of merit and deservingness (Goode, Keefer, & Molina, 2014), to prefer organizational structures that are hierarchical and objects with clear physical boundaries in pictures of brand logos (Cutright, 2012; Friesen, Kay, Eibach, & Galinsky, 2014), and even perceive more patterns in fuzzy pictures (Whitson & Galinsky, 2008). A considerable body of emerging research, then, shows that structure seeking can be motivated by low personal control, and is robust to a wide range of social, political, and ideological phenomena (for reviews, see Kay et al., 2009; Landau et al., 2015). Here, we seek to extend this literature by shedding new light on why, despite the intuitive appeal of the movement to "empower" workers through an easing of restriction, rules, and defined roles, employees may construe these initiatives

as sources of ambiguity, and thus find them to be aversive, troublesome, and even intolerable.

1.2. Structure seeking and ambiguity intolerance

Ambiguity is generally understood to involve an absence of guidance, certainty, or expectations (Bochner, 1965; Fox & Tversky, 1995, p. 585; Grant & Ashford, 2008; Knight, 1921; Rizzo, House, & Lirtzman, 1970). Though definitions can vary somewhat from economists, to psychologists and managerial scholars, all tend to converge on the notion that ambiguity necessarily implies a lack of structure. Economists, for example, suggest that an event is ambiguous when knowledge about the probability of an outcome is lacking, that is, when contingencies of actions are unclear (Fox & Tversky, 1995, p. 585; Knight, 1921). Psychologists similarly define ambiguity as a lack of information (McLain, 1993), and also as captured by events that cannot be "structured or categorized by the individual" (Budner, 1962, p. 30). The most common context in which organizational psychology scholars typically consider ambiguity – namely, role ambiguity – also captures this same set of structure violating attributes, ranging from unclear expectations and guidelines to a lack of clear action-outcome contingencies. For example, Van Sell and colleagues specifically defined role ambiguity as the degree to which "clear information is lacking regarding (i) expectations associated with a role, (ii) methods for fulfilling known role expectations and (iii) consequences of role performance" (Van Sell, Brief, & Schuler, 1981, p. 44). Ambiguous situations may be imposed or freely chosen. For example, organizations may introduce mandatory flextime program for all employees, or allow employees to chose whether they want to enroll in such programs. In both situations, such policies may lead to greater workplace ambiguity (e.g., unclear whether it is acceptable to telecommute to work today). However, ambiguous situations will elicit psychological reactance only if they also somehow restrict behavioral freedom (Brehm, 1966).

Ambiguity intolerance is the tendency to perceive ambiguous situations as sources of threat (Budner, 1962, p. 29). Those high on individual difference measures of ambiguity intolerance tend to judge a variety of phenomena in a fixed and rigid way, and prefer clear rules and expectations to social situations (including the workplace; Budner, 1962; Judge, Thoresen, Pucik, & Welbourne, 1999; Schere, 1982). Although ambiguity and lack of structure are conceptually similar, there are noted differences between structure-seeking and ambiguity intolerance. For example, in an empirical investigation of the discriminant validity of the Personal Need for Structure scale (PNS), Neuberg and Newsom (1993) noted that although both PNS and ambiguity intolerance describe a preference for "simplicity and structure... the PNS scale is much better suited for the task of operationalizing... in a reliable, direct manner" a need for epistemic structure (p. 115). This suggests that the ambiguity intolerance construct may be broader than need for structure. For example, Bochner (1965) noted that ambiguity intolerance not only encompasses attributes similar to PNS such as "need for categorization," but also those that may be unrelated to structure seeking (e.g., "anxious," "aggressive," and "authoritarian"). Further, Thompson, Naccarato, Parker, and Moskowitz (2001, p. 20) noted that a "high PNS individual would prefer structure and clarity in most situations, with ambiguity and "grey areas" proving troublesome and annoying." Put simply, whereas ambiguity intolerance is only elicited in ambiguous situations, structure seeking can occur regardless of whether the situation is ambiguous or not. The fact that structure seeking and ambiguity intolerance occur under different situations further suggests that they may be independent and distinct processes. Finally, ambiguity intolerance refers to the tendency to feel threatened and uncomfortable in ambiguous situations. Although seeking structure and certainty

may sometimes lead to discomfort (Webster & Kruglanski, 1994), it is not threatening or uncomfortable per se. Therefore, ambiguity intolerance, and its attendant feelings of threat and discomfort, is likely to be a downstream consequence of structure seeking.

1.3. Overview of studies and hypotheses

Across four studies, we empirically test whether ambiguity is in fact unappealing to those struggling to maintain perceptions of personal control. To do so, we employ a range of different measures of ambiguity intolerance, including ratings on established measures of ambiguity intolerance (McLain, 2009) and reactions to ambiguous workplace situations generated by both participants and the experimenter. In our studies, we both measure and manipulate the independent variable, perceived personal control. In the majority of studies presented, however, we opted to measure rather than manipulate this variable. This decision was made deliberately because acute psychological threats (regardless of what psychological system is being acutely threatened) can lead to a host of common compensatory responses associated with structure seeking (Landau et al., 2004; Proulx & Heine, 2006), and control manipulations are often experienced as acute psychological threats. Therefore, in order to rule out interpretations of the data as simply due to a general tendency to seek clarity when under momentary psychological threat, we chose to measure personal control rather than employ a control threat manipulation in all but one of the studies. Our first hypothesis, therefore, is:

Hypothesis 1. Lower (as opposed to higher) levels of perceived control, whether measured or manipulated, will be associated with greater intolerance of ambiguity as well as greater dislike of ambiguous workplace situations.

We are not suggesting, however, that employees with lower levels of personal control will evaluate all potentially threatening or aversive workplace situations more negatively than those with higher levels of personal control. Rather, we are positing that this will be specific to situations that involve ambiguity. Thus, to ensure this is the case, and also to rule out the possibility that lower levels of personal control are simply associated with greater negative attitudes towards problematic workplace situations in general, we also examined whether lower personal control will be associated with undesirable workplace situations that, though bad, are not ambiguous. To this end, in Study 1 we also measure dislike of bad but predictable/non-ambiguous organizational situations. If it is the case that the relationship between lower perceived control and ambiguity intolerance is not due to a specific distaste for ambiguous workplace situations, but just a tendency to dislike all potentially negative workplace situations, then we should expect that lower personal control should also predict dislike of these other workplace situations. If, instead, lower personal control leads to a specific aversion towards ambiguous workplace scenarios, then this relationship should be absent for non-ambiguous scenarios. In fact, it is possible that lower personal control might be associated with increased liking of the bad but predictable workplace scenarios. Past research has demonstrated that compensatory control processes may sometimes lead people to seek structure in outlets that are generally undesirable so long as they are especially high on structure. For example, under low control threat, people prefer to attribute their misfortunes to powerful enemies rather than randomness (Sullivan, Landau, & Rothschild, 2010), and prefer less optimistic but highly structured theories of disease progression to those that allow for some optimism but are unpredictable (Rutjens et al., 2013). Given this past work, we deemed it possible that those who report lower levels of personal control (compared to those who report higher levels)

will not only exhibit increased dislike of ambiguous workplace situations, but also an increased liking for workplace situations that, while clearly negative, contain clear elements of predictability (e.g., a specific employee *consistently* acts poorly, a boss *predictably* favors certain employees, a colleague *habitually* distracts others, etc.).

Hypothesis 2. Lower (as opposed to higher) levels of perceived control will be associated with greater dislike of ambiguous workplace situations but this relation will be weaker (and may even reversed) in the context of clearly undesirable but predictable workplace situations.

Central to our theorizing about why people with lower levels of personal control are more intolerant of ambiguity is the concept of structure seeking. According to CCT, those who experience lower personal control (whether chronically or temporarily) are presumed to be especially attuned to finding structure in their surroundings, and this motivated state can be measured using established scales of need for structure. Thus, to the extent that ambiguous situations lack structure, need for structure should mediate the relationship between personal control and ambiguity intolerance. This idea is formally captured by Hypothesis 3.

Hypothesis 3. The relation between perceived control and ambiguity intolerance will be mediated by need for structure.

Finally, we seek to examine if the effect of lower control on ambiguity intolerance can be observed not only for the attitudes that people hold towards existing ambiguities at their workplaces, but also in another organizationally relevant context: a job search. We aim to show that job environments that emphasize freedom and flexibility, and may therefore be construed as ambiguous, will be especially undesirable to potential applicants low in personal control. Not only would we expect these people to express more dislike of these potential employers, but they should also be less likely to indicate a desire to apply for the relevant position.

One reason why students with lower personal control are less likely to apply to job environments that emphasize freedom and flexibility may be that they feel less confident about being able to navigate these potentially ambiguous contexts. Previous research has shown that exposure to highly structured representations about how the world works leads to greater willingness and confidence to take action, and thus a lack of structure and order might reduce these feelings of self-efficacy (Bandura, 1986; Kay et al., 2014; Shell, Murphy, & Bruning, 1989). Whereas those higher in personal control may feel efficacious even in unstructured environments, those lower in personal control might only feel self-efficacious in environments with high levels of structure (Landau et al., 2015).

Hypothesis 4. People with lower (as opposed to higher) levels of perceived control should feel less efficacious in the context of an ambiguous job (i.e., the one that emphasizes freedom) compared to a structured job.

To test these 4 hypotheses, we present four studies, all of which broadly investigate the relationship between personal control and ambiguity intolerance. Study 1 was designed to test whether lower personal control predicted greater ambiguity intolerance, as well as more negative attitudes towards workplace ambiguities. In addition, Study 1 also addressed the alternative explanation that people with lower personal control may generally exhibit more negative attitudes towards problematic workplace events. Study 2 sought to replicate the link between lower personal control and greater negative attitudes towards workplace ambiguities, and also examined need for structure as a mediator. Study 3 aimed to provide causal evidence for the relationship between perceived

control and ambiguity intolerance by first manipulating low (vs. high) control and then measuring negative attitudes, as well as ambiguity related negative affect. Study 4 was designed to test this model in the context of job search and also examine downstream behavioral effects. To this end, personal control was measured, and then university student participants were presented with internship opportunities that advertised companies with flexible or structured environments.

Across all studies, we report all participants run, all conditions included in the study, and all independent and dependent measures. Each study was run in a single wave of data collection, and data were analyzed only after the required sample size target was met. We also kept the exclusion criteria consistent across all studies, except in cases where the relevant exclusion variable was not measured due to the nature of the sample. All data, syntax, and materials are available at: osf.io/xftxj

2. Study 1

Study 1 was designed to meet two goals. First, we sought to test whether lower perceived control was in fact associated with increased intolerance of ambiguity, both in general and at the workplace. To do so, we included two separate measures of ambiguity intolerance. The first measure was an established scale measuring general ambiguity intolerance (MSTAT-II, McLain, 2009). The second measure was created specifically to assess negative attitudes towards common ambiguous situations at the workplace. We predicted that lower perceived control would be associated with increased ambiguity intolerance, both in general and at the workplace (Hypothesis 1). In addition, we sought to address the alternative explanation for the link between low perceived control and ambiguity intolerance (Hypothesis 2). That is, people with low perceived control may evaluate all types of situations more negatively, not just ambiguous situations. Thus, in this study we asked participants to evaluate situations that possessed structure, but were clearly and predictably bad. If it was indeed the case that lower perceived control leads to greater negative attitudes in general, then lower perceived control should predict negative attitudes towards both ambiguous and predictably bad situations. If, however, lower perceived control specifically begets negative attitudes towards ambiguous workplace situations, then this relationship should not extend to the undesirable but predictable workplace situations. In fact, because predictably bad situations possess structure, those with lower control should evaluate these scenarios more positively compared to those with higher control. Last, to rule out the possibility that the ambiguous workplace situations used in the study led to a loss of choice, as opposed to perceptions of ambiguity, we included an established measure of psychological reactance in the study. Since psychological reactance is often elicited when people experience restrictions to behavioral freedom (Brehm, 1966), reactance should be significantly correlated with attitudes towards the ambiguous situations.

2.1. Method

2.1.1. Pretest

To test our predictions, we developed five ambiguous and five predictably bad workplace scenarios. The five ambiguous situations included: "you are given several tasks at once from different supervisors and it is unclear which ones to prioritize"; "a colleague is going away for a short while, and vaguely tells you to 'take care of the account for Client A' but provides no further information"; "a supervisor asks you to give a presentation to your client or colleagues about a certain topic, but does not tell you exactly what to emphasize"; "employees can dress down on Fridays but it is ambiguous as to what would be considered too casual or inappropriate"; "checking social media websites is not encouraged during work time, but there are no clear rules as to whether you can check them during lunch." The 5 predictably bad situations included: "Senior management blatantly show favoritism to some employees by regularly promoting them"; "your coworker disrupts company morale by regularly bad mouthing the company and its leadership to fellow employees"; "one of your coworkers habitually interrupts other employees during meetings, criticizes other employees' performance, and takes credit for their work"; "your supervisor routinely tells you that sex, race, age and religion are, and should be, factors to consider when evaluating someone's work performance" and "your coworker takes company products home for perceived use even though these products are clearly supposed to be sold to customers." These 5 ambiguous and 5 predictably bad scenarios were pre-tested in an independent sample of 202 Mechanical Turk workers (94 females, 108 males). The average age of the participants was 32.32. We asked participants to rate each of the 10 scenarios using two items, "Not at all ambiguous," and "Very ambiguous." All pre-test items were measured on 7-point scale (1 = strongly disagree, 7 = strongly agree). Paired sampled t-tests for each of the 5 ambiguous scenarios indicated that participants rated each scenario as significantly more ambiguous as opposed to not ambiguous at all ($ps < 0.01$). As expected, the 5 predictably bad scenarios were rated as significantly unambiguous as opposed to ambiguous ($ps < 0.01$). Details of pretest results can be found in Appendix A.

2.1.2. Participants

Surveys seeking full time employees were posted on Prolific Academic, an online research panel based in United Kingdom, which offers "high-quality, diverse, and naive subjects" (Peer, Brandimarte, Samat, & Acquisti, 2017). Two hundred and one participants were recruited. Of these, we excluded 19 participants who self-reported that they were distracted during the experiment. That is, we presented all participants with the question, "Were you distracted during the study?" and gave them two options "Yes," and "No." We excluded participants who indicated "Yes." We then asked distracted participants to describe the nature of the distractor. Examples included people talking to them in the background, drinking and eating, or listening to music. Unless specified otherwise, the same exclusion criterion was used for all the studies presented below. The final sample included 84 females and 97 males (1 unreported), and the mean age of the participants were 33.94. Most of the participants were from United Kingdom, Europe (e.g., Sweden, Germany, Austria, Croatia), and the United States. Participants worked in a wide range of industries, including food and beverage, security, customer service, administrative work, sales, marketing and health. Formal work job titles included, "Community Psychiatric Nurse," Airline Representative," "Clinical Trainee," and "Auditor." A full list of formal job titles is available upon request. Participants had an average tenure of 5.16 years, and possessed 11.35 years of working experience. The average commuting time was 36.71 min. Participants were also provided with 11 salary range options, "$0–$10,000," "$10,000–$20,000," "$20,000–$30,000," "$30,000–$40,000," "$40,000–$50,000," "$50,000–$60,000," "$60,000–$70,000," "$70,000–$80,000," "$80,000–$90,000," "$90,000–$100,000," and "above $100,000". On average, participants earned $20,000–$30,000.

2.1.3. Procedure

Participants completed the following measures (demographics were measured at the end).

Table 1
Descriptive statistics and correlations for Study 1.

Variable	M	SD	Correlation with				
			1	2	3	4	5
1. Perceived control	4.80	0.87	(0.85)				
2. Ambiguity intolerance	3.82	0.93	−0.54**	(0.88)			
3. Negative attitudes towards ambiguous events	4.20	0.68	−0.25**	0.25**	(0.85)		
4. Negative attitudes towards predictable/unambiguous events	5.63	0.93	0.15*	−0.06	0.43**	(0.95)	
5. Psychological reactance	4.63	1.05	−0.17*	0.17*	0.06	−0.25**	(0.81)

Note. Reliabilities are reported in parentheses on the diagonal; $N = 182$.
* $p < 0.05$.
** $p < 0.01$.

2.1.3.1. Perceived control. To measure perceived control, we used two different measures. The first measure of perceived control was from Greenaway, Haslam, et al. (2015). These items were: "I am in control of my own life," "I am able to live my life how I wish," and "My life is determined by my own actions" ($\alpha = 0.78$). In addition, we used Pearlin and Schooler's Self Mastery Scale (SMS). Self-mastery reflects one's perceived mastery or control over life outcomes, and it has been defined as the "extent to which one regards one's life-chances as being under one's own control in contrast to being fatalistically ruled" (Pearlin & Schooler, 1978, p. 5, $\alpha = 0.79$). These two measures were highly correlated ($r = 0.65$, $p < 0.001$), and therefore they were averaged to form a single composite score of perceived control ($\alpha = 0.85$).[1] All the items were measured on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*). We include all the scales that we use in Appendix B.

2.1.3.2. General ambiguity intolerance. In order to assess people's general attitudes towards ambiguity, we used the MSTAT-II scale (McLain, 2009). Sample items include, "I would rather avoid solving a problem that must be viewed from several different perspectives" and "I avoid situations that are too complicated for me to easily understand" ($\alpha = 0.88$). All the items were measured on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*).

2.1.3.3. Negative attitudes towards ambiguous workplace situations. Participants were presented with the five pre-tested ambiguous workplace situations, and then asked to judge the degree to which they found each situation threatening, problematic, serious, favorable, helpful, and beneficial. All the rating items were measured on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*). The positive attitude items were reverse coded, and all the ratings were averaged to form a grand composite score of negative attitudes towards the 5 ambiguous scenarios ($\alpha = 0.85$).

2.1.3.4. Negative attitudes towards undesirable but predictable and unambiguous workplace situations. Participants were also presented with the five pre-tested scenarios that were clearly bad or undesirable, but still predictable and unambiguous. Participants were asked to consider these situations, and rate them on the same set of adjectives as those used to evaluate ambiguous workplace situations. All the positive attitude items were reverse coded and all the ratings were averaged to form a grand composite score of negative attitudes ($\alpha = 0.95$). The items were measured on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*).

2.1.3.5. Psychological reactance. To assess if people were reacting against a potential loss of free choice in the scenarios, we measured psychological reactance using an established scale (Hong & Page, 1989). Sample items include, "Regulations trigger a sense of resistance in me," and "When something is prohibited, I usually think, 'That's exactly what I am going to do'" ($\alpha = 0.81$). The items were measured on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*).

2.2. Results and discussion

Table 1 presents the means, standard deviations, and correlations among the study variables.

In order to examine if lower perceived control was associated with greater ambiguity intolerance, we conducted a series of regression analyses. As predicted, we found that people with lower perceived control were more intolerant of ambiguity in general, $B = -0.54$, $SE = 0.07$, $t(180) = -8.60$, $p < 0.001$, $d = 1.28$. Next, we examined the relationship between perceived control and negative attitudes towards the ambiguous workplace scenarios. As hypothesized, we found that people with lower perceived control tended to hold greater negative attitudes towards ambiguous workplace scenarios, $B = -0.25$, $SE = 0.06$, $t(180) = -3.48$, $p = 0.001$, $d = 0.52$. Last, we examined the relationship between perceived control and attitudes towards the undesirable but predictable/unambiguous workplace scenarios. In this case, the relation reversed. Though these scenarios were also undesirable, lower perceived control was associated with less (not more) dislike of them, $B = 0.15$, $SE = 0.08$, $t(180) = 2.05$, $p = 0.042$, $d = 0.30$.

The psychological reactance measure was not significantly correlated with negative attitudes towards ambiguous scenarios, $B = 0.06$, $SE = 0.11$, $t(180) = 0.83$, $p = 0.406$, $d = 0.12$, suggesting that the scenarios did not elicit reactance. We also conducted a mediation analyses with 5000 bootstrap samples using the PROCESS macro in SPSS (Model 4, Hayes, 2013). We specified psychological reactance as the mediator, perceived control as the independent variable, and attitudes towards ambiguous scenarios as the dependent variable. The 95% bias-corrected confidence interval of the indirect effect was not significant, [−0.0288, 0.0163], suggesting that psychological reactance did not mediate the effect of control on attitudes towards ambiguous scenarios. These findings suggest that not only did the scenarios not elicit reactance, reactance also could not explain why those with lower (vs. higher) perceived control held more negative attitudes towards the ambiguous scenarios.

3. Study 2

Study 2 was designed to replicate the relationship between perceived control, ambiguity intolerance, and negative attitudes toward workplace ambiguities (Hypothesis 1). In addition, we

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[1] We conducted an Exploratory Factor Analysis (EFA) for the three studies in which we measured perceived control (Study 1, 2, and 4). Across the studies, the results indicate that all items load on one factor (Eigenvalue$_{Study\ 1}$ = 3.98, Eigenvalue$_{Study\ 2}$ = 5.11, Eigenvalue$_{Study\ 4}$ = 3.12). All other factors were < 1. According to the Kaiser criterion (retain factors with eigenvalues > 1), the EFA results suggest an underlying uni-dimensional factor structure.

aimed to provide evidence for the presumed role of need for structure (Hypothesis 3). Thus, we again employed the measure of perceived control, the general ambiguity intolerance scale and the negative attitudes towards workplace ambiguity items. To assess the potential mediating role of structure seeking, we added an established measure of need for structure.

3.1. Method

3.1.1. Participants

Surveys seeking full time employees in the US were posted on Amazon Mechanical Turk. Two hundred and one participants were recruited. Of these, we excluded 13 participants who self-reported that they were distracted during the study. This was the same exclusion question used in Study 1. The final sample included 91 females and 96 males (1 unreported), and the mean age of the participants was 33.51. The sample comprised of 78% Anglo-Americans, 12% African Americans, and 5% Latino American, 6% Asian Americans, and the rest of the participants were of other ethnic and racial origin. Some participants indicated that they were of multiple races.[2]

3.1.2. Procedure

Participants completed the following four measures, all of which were counterbalanced.

3.1.2.1. Perceived control. These were the same items as those in Study 1 ($\alpha = 0.91$) and they were measured on a 7- point scale (1 = *strongly disagree*, 7 = *strongly agree*).

3.1.2.2. Need for structure. To measure need for structure, we used items from Neuberg and Newsom (1993). Sample items are: "I become uncomfortable when the rules in a situation are not clear," "I enjoy being spontaneous," and "I find that a consistent routine enables me to enjoy life more" ($\alpha = 0.88$). All the items were measured on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*).

3.1.2.3. General ambiguity intolerance. We used the same measure of ambiguity intolerance as we did in Study 1 ($\alpha = 0.88$). All the items were measured on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*).

3.1.2.4. Negative attitudes towards ambiguous workplace situations. These were the same scenarios and items that we used in Study 1. All the items were measured on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*). Like in Study 1, the positive attitudes items were reverse coded, and all the ratings were averaged to form a grand composite score of negative attitudes towards the 5 ambiguous scenarios ($\alpha = 0.88$).

3.2. Results and discussion

Table 2 presents the means, standard deviations, and correlations amongst the study variables.

In order to examine if lower perceived control was associated with greater ambiguity intolerance, we once again employed regression analysis. As predicted, people with lower perceived control were more intolerant of ambiguity, $B = -0.35$, $SE = 0.08$, $t(186) = -5.13$, $p < 0.001$, $d = 0.75$. Likewise, replicating our effects in Study 1, lower perceived control was associated with greater negative attitudes towards ambiguous workplace situations, $B = -0.20$,

$SE = 0.10$, $t(186) = -2.76$, $p = 0.006$, $d = 0.41$. All of these results remained substantively unchanged when order of presentation was included as a covariate.

Given that ambiguity intolerance and need for structure were highly correlated ($r = 0.71$), we conducted a series of confirmatory factor analyses to examine the discriminant validity of the two constructs.[3] Results indicated that both two constructs possessed discriminant validity. Next, we tested whether need for structure mediated the link between perceived control and ambiguity intolerance, as well as the link between perceived control and negative attitudes towards ambiguous workplace situations. For each of the two dependent variables, we used Hayes's 2013 PROCESS macro (Model 4) with 5000 bootstrap samples to test for mediation via structure seeking. As predicted, we found a significant indirect effect of perceived control on ambiguity intolerance via need for structure, that is, the bias corrected confidence interval did not include zero: [−0.2306, −0.0498] (see Fig. 1). Similarly, need for structure mediated the link between perceived control and negative attitudes towards ambiguous situations, [−0.1305, −0.0235] (see Fig. 2).

4. Study 3

Study three had two main objectives. The first was to provide causal evidence for the relationship between perceived control and ambiguity intolerance (Hypothesis 1). To do so, we manipulated perceived control through a recall manipulation. Specifically, we randomly assigned participants to one of two recall tasks. Participants in the no control condition were asked to recall a positive event that they had no control over, whereas those in the high control recall condition were asked to recall a positive event that they had control over. The memory was specifically asked to be positive in both conditions to ensure that the relationship between control threat and ambiguity aversion was driven by perceived uncontrollability and not the experience of negativity due to the control threat. Past research has demonstrated this recall task to be effective at manipulating feelings of perceived control (Cutright, Bettman, & Fitzsimons, 2013; Kay et al., 2008). Our second goal was to examine if the effect of control on ambiguity intolerance would generalize to a variety of ambiguous situations that people experience at their own workplaces. Thus, instead of asking participants to evaluate the common ambiguous workplace scenarios we used in Studies 1 and 2, we asked them to write about ambiguous situations that they faced at their own workplaces, and then evaluate these situations using the same measure of negative attitudes that we used in Study 1 and 2. Last, given that negative emotions can often accompany the experience of ambiguity (Budner, 1962; Grenier, Barrette, & Ladouceur, 2005), we were interested in exam-

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[2] Our race measure allows participants to tick multiple races, because some of the participants may have been multiracial. Therefore, the percentages of the different races in our studies may not add to 100%.

[3] Following procedures described by Bagozzi and Phillips (1982), we establish the discriminant validity of ambiguity intolerance and need for structure using confirmatory factor analysis (CFA). First, we specified a model (Model 1) with the intolerance of ambiguity items loading on a latent Ambiguity Intolerance construct, and the need for structure items loading on a latent Need for Structure construct. In Model 1, we allowed the two latent variables to correlate freely. The fit of this model was, $\chi^2(274) = 807.54$, $p < 0.001$, $CFI = 0.754$, $TLI = 0.731$, $RMSEA = 0.105$. In the second model, we fixed the correlation between the latent variable Ambiguity Intolerance and Need for Structure to 1 (perfectly correlated). If Ambiguity Intolerance and Need for Structure are indeed the same construct, then allowing the latent variables to freely correlate (Model 1) should not significantly improve the model fit relative to Model 2. The fit of Model 2 was $\chi^2(275) = 932.15$, $p < 0.001$, $CFI = 0.697$, $TLI = 0.670$, $RMSEA = 0.116$. Since the two models are nested, we used a chi-square difference test and found that Model 1 had significantly better fit than Model 2, $\chi^2(1) = 132.15$, $p < 0.001$. That is, allowing the latent factors to freely correlate in Model 1 caused the fit indices to significantly improve relative to Model 2. Last, the confidence interval (±two standard errors) around latent factor correlation of Ambiguity Intolerance and Need for Structure did not include 1, providing further evidence that they possess discriminant validity, [0.7384063, 0.874115] (Anderson & Gerbing, 1988, p. 416).

Table 2
Descriptive statistics and correlations for Study 2.

Variable	M	SD	Correlation with			
			1	2	3	4
1. Perceived control	4.89	1.07	(0.91)			
2. Perceived structure	4.57	0.98	−0.25**	(0.88)		
3. Ambiguity intolerance	3.94	0.92	−0.35**	0.71**	(0.88)	
4. Negative attitudes towards ambiguous workplace events	4.33	0.78	−0.20**	0.41**	0.46**	(0.88)

Note. Reliabilities are reported in parentheses on the diagonal.
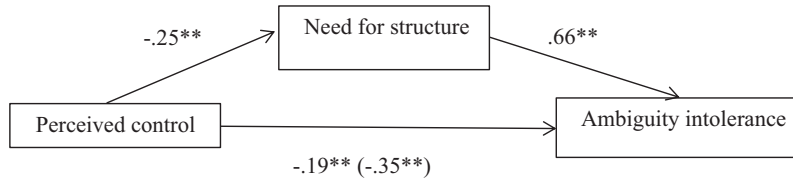$N = 188$.
* $p < 0.05$.
** $p < 0.01$.

Fig. 1. Need for structure mediates the relationship between perceived control and ambiguity intolerance. $^*p < 0.05$, $^{**}p < 0.01$. Standardized coefficients.
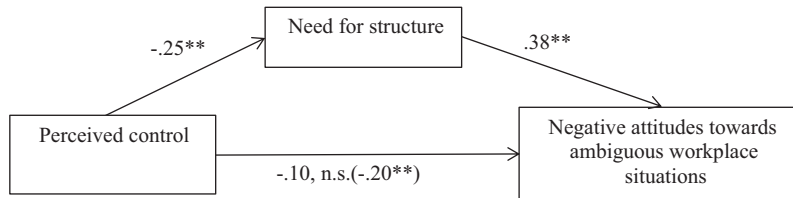

Fig. 2. Need for structure mediates the relationship between perceived control and negative attitudes towards ambiguous workplace situations. $^*p < 0.05$, $^{**}p < 0.01$. Standardized coefficients.

ining whether those with lower perceived control would also experience greater ambiguity-related negative affect towards these ambiguous situations. Previous research has shown that the experience of ambiguity can be disconcerting (Budner, 1962), and can also arouse "uneasiness, discomfort, dislike, anger and anxiety" (Grenier et al., 2005, p. 594). Thus we included a measure of ambiguity-related negative affect (e.g. distress) as a dependent variable. Furthermore, in order to assess the specificity of our effects, we also included more general negative emotions, such as "disgust," that are theoretically unrelated to the experience of ambiguity. To reduce suspicion that we were specifically interested in the negative consequences of experiencing ambiguity, we also included some positive emotions items.

4.1. Method

4.1.1. Participants

Surveys seeking full time employees in the US were posted on Clearvoice, a marketing research panel owned by a company that works with both public and private research institutions. We recruited a total of two hundred and one participants. Of these, we excluded 22 participants who self-reported that they were distracted during the study. The final sample included 86 females and 93 males, and the mean age of the participants was 42.05. The sample comprised of 69.3% Anglo Americans, 14% African Americans, 5.6% Latino American, 8.9% Asian Americans, and the rest were of other ethnic and racial origin[2].

4.1.2. Procedure

Participants were asked to list 3 common ambiguous situations they face at their workplaces. Specifically, the instructions read:

In this project, we are interested in ambiguous situations at the workplace.

An ambiguous situation is a situation in which guidelines are not clear and structured, but are blurry and undefined. In these situations, it might seem like many different interpretations or alternatives would be acceptable.

For example, an ambiguous situation at the workplace may be when your supervisor asks you to "Write a report about topic XYZ", and it is ambiguous as to how the written report should look like.

Some examples of ambiguous situations participants wrote about included, "when I am asked to give a report on the number of products we sold in a month, but not given any direction as to how the report should look like or what information it should include," "We don't have fixed lunch times at office. So during lunch time I am confused if I should first finish my work or go for lunch," and "My boss asked me to prepare a check to an employee for an advance but didn't let me know when he would need it by."

Next, participants were randomly assigned to one of two recall tasks (a time when control was lacking vs. a time when control was present). In the control deprivation condition, participants completed the following writing task:

In the next 3 min, please try and think of something positive that happened to you in the past few months that you had absolutely no control over.

In the control affirmation condition, participants completed the following writing task:

In the next 3 min, please try and think of something positive that happened to you in the past few months that you had control over.

Some examples of positive no-control incidents included, "I got a raise of 5000$ in the past few months. I had no control over this, although I wish it was a bigger raise. I currently have 40 employees underneath me and I am about to increase my payroll budget by 200,000$, so I will be making a lot of money," "I won some money. Other than making the decision to buy a ticket, I had no control over the outcome," and "unexpected rebate that someone tipped me off to so got a totally free movie." Some of the positive high-control incidents included, "My team has been very successful in hitting the collection numbers set by the company. We have achieved this by have work and a never give up attitude," "I was approved for a promotion. I have worked very hard for the past 4 years, and I made a detailed file that showed all of my activities and accomplishments. I had a list of criteria, and I met all of them (thanks to careful planning)," and "I was able to completely repaint my screened porch using saved vacation."

4.1.2.1. Negative attitudes towards ambiguous situations. After the control manipulation, we asked each participant to rate the extent to which each of the ambiguous situations they previously wrote about was threatening, a serious issue, problematic, beneficial, favorable, and helpful ($\alpha = 0.93$). These were the same items as those we used in Study 1 and Study 2. The positive attitude items, "beneficial," "favorable," and "helpful," were reverse coded for each situation, and all the ratings items were averaged to form a grand composite. All the items were measured on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*).

4.1.2.2. Ambiguity-related negative affect. We also asked each participant to rate the extent they experienced these emotions towards the scenarios that they had written about: inspired, distressed, anxious, helpless, worried, fearful, sad, happy, excited, and disgusted. We created a composite of negative affect that has been commonly associated with ambiguity intolerance in previous research (Budner, 1962; Grenier et al., 2005), which included "distressed," "anxious," "helpless," "worried," and "fearful" ($\alpha = 0.96$). All items were measured on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*).

4.2. Results and discussion

Table 3 presents the means, standard deviations, and correlations among the study variables.

4.2.1. Negative attitudes towards ambiguous workplace events
We predicted that participants in the low control condition would display greater negative attitudes towards the ambiguous workplace situations that they had previously written about. To test this prediction, we conducted a two-tailed independent samples *t*-test to examine if mean differences in negative attitudes towards ambiguous workplace events differed significantly across the two conditions. As expected, we found that people in the control deprivation condition ($M = 4.11$, $SD = 1.24$) judged their self-generated ambiguous workplace events significantly more negatively than those in the control affirmation condition ($M = 3.73$, $SD = 1.20$), $t(177) = -2.09$, $p = 0.038$, $d = 0.31$.

4.2.2. Ambiguity-related negative affect
We also examined if participants in the low perceived control condition were more likely to feel greater ambiguity related negative affect towards the ambiguous workplace situations that they listed. To test this prediction, we conducted a two-tailed independent samples *t*-test to examine if mean differences in negative affect experienced towards these ambiguous workplace events dif-

fered significantly across the two conditions. However, we did not find evidence that ambiguity related negative affect was significantly higher in the low control condition ($M = 3.72$, $SD = 1.59$), compared to the high control condition ($M = 3.63$, $SD = 1.82$), $t(177) = -0.35$, $p = 0.725$, $d = 0.05$.

Our results demonstrated that although control deprivation caused people to evaluate ambiguous situations more negatively, they did not necessarily experience more ambiguity-related negative affect. Although ambiguity intolerance has been theorized to lead to distinct cognitive, emotional, and behavioral reactions (Grenier et al., 2005, p. 594), our research suggests that these different types of reactions do not occur concurrently. More specifically, control-motivated structure seeking influenced peoples' cognitive, but not affective, reactions to ambiguous situations. One reason for why control-motivated structure seeking is unrelated to affective reactions towards ambiguous situations could be that structure seeking does not serve basic emotional desires, and thus lacks "hot" emotional components (Thompson et al., 2001, p. 22). Put simply, consistent with how structure seeking has been conceptualized, control-motivated structure seeking appears to drive "cool" and evaluative preferences for ambiguous workplace situations, and not "hot" and affective reactions towards them.

5. Study 4

Study 4 aimed to replicate the relationship between perceived control and ambiguity intolerance (Hypothesis 1) in a different subject population (university students) and a different organizational context (evaluations of job advertisements). Another goal was to show that job environments that emphasize freedom and flexibility (as opposed to structure) may be perceived as ambiguous and thus be undesirable to potential applicants with lower (vs. higher) personal control. In this within-subjects study, we measured students' perceived control and then assessed their attitudes, intentions to apply and feelings of self-efficacy towards a summer internship job advertisement that emphasized clear rules, roles and guidelines (more structure) and an internship advertisement that had more relaxed rules, roles and guidelines (more ambiguity). We hypothesized that, in the context of the ambiguous organization, lower perceived control would be associated with more negative attitudes towards the job, reduced intentions to apply for the position and lowered anticipated self-efficacy (Hypothesis 4). Conversely, in the context of the more structured organization, lower perceived control would be associated with lower negative attitudes, greater intentions to apply, and greater self-efficacy.

5.1. Method

5.1.1. Participants
We recruited 140 students from a Southeastern University at a public venue on campus. Three of the students signed the consent form but turned in blank surveys. Twenty-one turned out not to be undergraduates, making our materials that were about undergraduate internship opportunities irrelevant to them. The final sample included 60 males and 48 females (8 unreported), and the mean age of the students was 18.90. The sample comprised of 42.6% Anglo Americans, 6.5% African Americans, 5.56% Latino American, 30.56% Asian Americans, and the rest were either of other ethnic and racial origins or did not report race.

5.1.2. Procedure
Participants were presented with the following two measures:

Table 3
Descriptive statistics and correlations for Study 3.

Variable	M	SD	Correlation with		
			1	2	3
1. Manipulated control[a]	–	–	–		
2. Negative attitudes	3.90	1.23	0.16[*]	(0.93)	
3. Negative affect	3.67	1.71	0.03	0.39[**]	(0.96)

Note. Reliabilities are reported in parentheses on the diagonal.
N = 179.
  [a] *0 = High control, 1 = Low control.*
  [*] *p < 0.05.*
  [**] *p < 0.01.*

Table 4
Descriptive statistics and correlations for Study 4.

Variable	M	SD	Correlation with								
			1	2	3	4	5	6	7	8	9
1. Perceived control	5.49	0.88	(0.80)								
2. Ambiguity intolerance	3.69	0.93	−0.45[**]	(0.84)							
3. Negative attitudes (Ambiguous program)	3.61	1.38	−0.13	0.27[**]	(0.91)						
4. Negative attitudes (Structured program)	3.57	1.37	0.16	−0.07	0.30[**]	(0.92)					
5. Self-efficacy (Ambiguous program)	4.57	1.37	0.21[*]	−0.41[**]	−0.65[**]	−0.02	(0.96)				
6. Self-efficacy (Structured program)	4.84	1.33	−0.11	−0.05	−0.09	−0.58[**]	0.17	(0.94)			
7. Behavioral intentions (Ambiguous program)	4.23	1.72	0.01	−0.14	−0.63[**]	−0.01	0.69[**]	0.08	(0.95)		
8. Behavioral intentions (Structured program)	4.00	1.68	−0.24[*]	0.07	−0.03	−0.52[**]	0.08	0.66[**]	0.26[**]	(0.94)	
9. Bipolar choice scale	5.99	2.83	−0.20[*]	0.16	0.45[**]	−0.36[**]	−0.46[**]	0.40[**]	−0.51[**]	0.42[**]	–

Study 4: Multilevel moderated regression analysis results

Independent variable	Negative attitudes		Behavioral intentions		Self-efficacy	
	γ	SE	γ	SE	γ	SE
Prior interest in finance	−0.21[**]	0.07	0.33[**]	0.08	0.15[*]	0.07
Prior interest in technology	−0.04	0.08	0.32[**]	0.08	0.16[*]	0.07
Internship type (A)[a]	2.60[**]	0.99	−2.37	1.26	−3.02[**]	1.05
Perceived control (B)	0.27	0.15	−0.49[**]	0.17	−0.18	0.15
A X B	−0.47[**]	0.18	0.47[*]	0.23	0.50[**]	0.19
R^2_1[b]	0.05	0.19	0.08			
R^2_2[c]	0.05	0.28	0.08			

Note. Reliabilities are reported in parentheses on the diagonal.
N = 104.
  [*] *p < 0.05.*
  [**] *p < 0.01.*
  [a] *Coded 1 = Ambiguous internship, 0 = Structured internship.*
  [b] Within-individual variance explained (Level 1, Snijders & Bosker, 1994, 1999).
  [c] Between-individual variance explained (Level 2, Snijders and Bosker, 1994, 1999).

5.1.2.1. Perceived control. To measure perceived control, we used items from Greenaway, Haslam (2015) as well as those from Pearlin and Schooler's Self Mastery Scale (SMS) to form a 10 item composite of perceived control ($\alpha = 0.80$). All the items were measured on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*).

5.1.2.2. Ambiguity intolerance. In order to assess ambiguity intolerance, we used the MSTAT-II scale (McLain, 2009), which is the same scale we used in Studies 1 and 2 ($\alpha = 0.84$). All the items were measured on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*).

5.1.2.3. Prior interest in technology and finance. The summer internship advertisements we created were in the context of technology and finance, and we did not want participants' prior interest in internships related to technology and finance to bias their responses towards the internship advertisements. Therefore, we assessed the amount of interest students had towards careers in four different industries: finance, technology, nonprofit and government prior to viewing the internship advertisements. All the items were measured on a 5-point scale (1 = *strongly disinterested*, 5 = *strongly interested*).

5.1.2.4. Summer internship advertisements. After responding to all these measures, participants were told that their peers often apply for internship programs while they are undergraduates and that our objectives were to understand how students perceive and evaluate different internship programs. We invited students to view two internship advertisements. One internship advertisement emphasized that roles and expectations were clearly defined and the other was written in a way that emphasized flexibility and freedom from defined roles. For example, the description of the more structured internship advertisement read as follows:

> *We have a highly structured internship program for students, and so everyone gets the same enriching experience. Students are often able to thrive in our environment as what they are required to do is defined, and thus they are frequently able to go the extra mile.*

In contrast, the description of the ambiguous internship advertisement read as follows:

> *Our internship program is highly flexible. Everyone benefits in a different way because each student shapes and defines his or her own enriching experience. Students are often able to succeed in our flexible environment because what they are required to do is less defined, and thus they are often able to go above and beyond.*

The specific industry paired with each condition was counterbalanced, so that for half the participants the ambiguous description was paired with the technology firm and the structured description was paired with the finance firm, whereas for the other half of the participants the pairings were reversed. The order of the internship advertisements was also counterbalanced, so that for half of the participants the ambiguous internship advertisement came first and for the other half of the participants the structured internship advertisement came first.

5.1.2.5. Negative attitudes towards internship advertisements. To assess students' attitudes towards the internship advertisements, we asked students to rate how appealing and attractive each internship was, and whether the internship was a good prospect for them ($\alpha_{ambiguous} = 0.91$, $\alpha_{structured} = 0.92$). All the items were measured on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*). The positive attitudes items were reverse coded and averaged to form a composite score of negative attitudes.

5.1.2.6. Behavioral intentions. Two items assessed intentions to apply to the internships advertised. Participants were asked if they "would like to be contacted about opportunities in this company," and if they would be "interested in applying to the program" ($\alpha_{ambiguous} = 0.95$, $\alpha_{structured} = 0.94$). All the items were measured on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*).

5.1.2.7. Perceived self-efficacy. We also measured students' perceived self-efficacy if they were to work in each of these two companies. These items were: "I think I would be able to thrive in this company," "I think I would be able to do well in this company," and "I think I would be able to succeed in this company" ($\alpha_{ambiguous} = 0.96$, $\alpha_{structured} = 0.94$). All the items were measured on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*).

5.1.2.8. Choosing between companies. Students were also asked to make a choice between the company that was presented first and the company that was presented second on a continuous bipolar scale measured on an 11-point scale (1 = *first company*, 11 = *second company*). This item was coded so that greater numbers indicated more preference for the more structured internship.

Finally, students responded to a demographic measure.

5.2. Results and discussion

Table 4 presents the means, standard deviations, and correlations among the study variables.

5.2.1. Perceived control and ambiguity intolerance

In order to examine if lower perceived control was associated with greater ambiguity intolerance, we first ran a regression to examine if we could replicate the link between perceived control and ambiguity intolerance amongst our student sample. As expected, we again observed that lower perceived control was associated with greater ambiguity intolerance, $B = -0.45$, $SE = 0.09$, $t(106) = -5.20$, $p < 0.001$, $d = 1.01$.

5.2.2. Preference for companies

Next we examined whether lower perceived control was associated with preference for the more structured or the more ambiguous program using the bipolar choice item. We regressed the single bipolar choice item on perceived control and found that students with lower perceived control were more likely to prefer the more structured program over the ambiguous program, $B = -0.20$, $SE = 0.31$, $t(103) = -2.03$, $p = 0.044$, $d = 0.41$.

We then analyzed whether preference for the ambiguous and the structured internships varied as a function of perceived control. As

expected of a within-subjects research design, a preliminary analysis of the dependent variable (negative attitudes) revealed a significant between-individual variance, ICC 95% CIs [0.159, 0.501]. Thus for each of our dependent variables (negative attitudes, behavioral intentions and self-efficacy), we conducted a series of multilevel linear regressions with restricted maximum likelihood estimation which produces unbiased standard errors and parameter estimates with nested data (Hox, 2010). We included type of company as the within-subjects factor, and perceived control as the between-subjects factor. Prior interest in technology and finance were included as covariates. The pattern of our results held with and without the inclusion of the prior interest covariates, but since we measured them with the intention of adding them into the analyses, the results that we report below are our findings after controlling for these covariates. All variables were included as fixed effects (γ) effects. Multilevel-modelling analyses were conducted using *xtmixed* command in STATA 14 statistical program. Simple slopes were estimated using the *margins* command in the same statistical program. Spotlight analyses[4] were conducted in accordance with procedures described in Fitzsimons (2008), and more recently in Krishna (2016).

5.2.3. Negative attitudes

For the negative attitudes measure, the main effect of control was not significant, $\gamma = 0.03$, $SE = 0.12$, $z = 0.26$, $p = 0.792$, such that control was not associated with having more negative attitudes towards internships in general. The main effect of company type was also not significant, $\gamma = 0.04$, $SE = 0.16$, $z = 0.23$, $p = 0.816$, such that one advertisement was not evaluated more or less negatively compared to the other. More importantly, however, these two main effects were qualified by a Company Type × Perceived Control interaction term, $\gamma = -0.47$, $SE = 0.18$, $z = -2.62$, $p = 0.009$. Simple slope analyses (Bauer & Curran, 2005) indicated that students

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[4] Here we describe the details of the spotlight analyses that were conducted for each of dependent variables (negative attitudes, behavioral intentions, and self-efficacy). Since similar spotlight analyses were conducted for each of the three dependent variables, we will use negative attitudes as an illustrative example. We focus on the details of what we performed as opposed to explaining the rationale behind the procedures because the empirical reasoning for spotlight analyses has been covered extensively elsewhere (e.g., Fitzsimons, 2008; Krishna, 2016; Spiller, Fitzsimons, Lynch, & McClelland, 2013). As noted by Spiller et al. (2013, p. 278), the principles of spotlight testing can be readily applied to within-subject designs because they "involve nothing more than basic regression techniques." Therefore, although our models were tested in a multi-level framework, we will simplify the equation notations to make it easier to understand what we did. This was the moderated regression model we ran:

$$\text{Negative attitudes} = a + b \text{ AdvertisementType} + c \text{ PerceivedControl}$$
$$+ d \text{ AdvertisementType} * \text{PerceivedControl}$$

To examine the effect of the categorical moderator Advertisement Type when control is high (one standard deviation above the mean), we created a new Perceived-Control variable (High-Control), where m = mean value of Perceived-Control, and s = standard deviation of Perceived-Control:

$$\text{HighControl} = \text{PerceivedControl} - m - s$$

To examine the effect of Advertisement Type when control is low, we created a new perceived control variable (Low control):

$$\text{LowControl} = \text{PerceivedControl} - m + s$$

These following two equations were then estimated using two separate multilevel linear regressions with restricted maximum likelihood estimation:

$$\text{Negative attitudes} = a + b \text{ AdvertisementType} + c \text{ HighControl}$$
$$+ d \text{ AdvertisementType} * \text{HighControl} \quad (1)$$

$$\text{Negative attitudes} = a + b \text{ AdvertisementType} + c \text{ LowControl}$$
$$+ d \text{ AdvertisementType} * \text{LowControl} \quad (2)$$

The effect of Advertisement Type on negative attitudes at high and low levels of perceived control is represented by coefficient b.
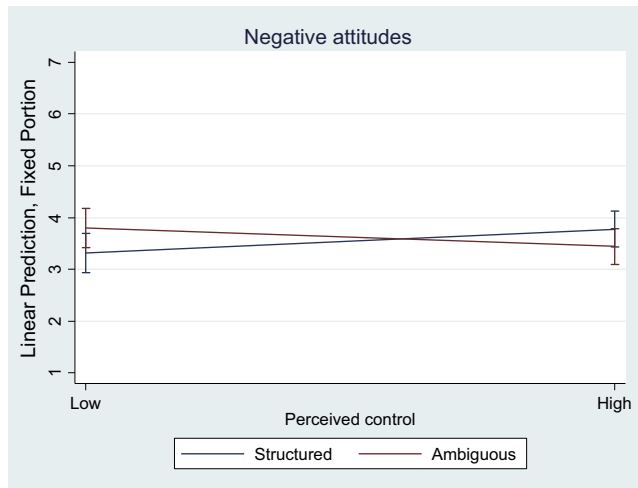
Fig. 3. Interaction plot of negative attitudes towards the internship program as a function of perceived control in Study 4.

Fig. 4. Interaction plot of behavioral intentions as a function of personal control in Study 4.

with lower perceived control evaluated the structured program less negatively, $\gamma = 0.27$, $SE = 0.15$, $z = 1.76$, $p = 0.078$, and the ambiguous program more negatively, $\gamma = -0.20$, $SE = 0.15$, $z = -1.33$, $p = 0.182$ (Fig. 3). Conversely, students with higher perceived control evaluated the structured program more negatively, and the ambiguous program less negatively. Furthermore, a spotlight analysis was employed to compare the relative preferences of the two job ads for students lower (one standard deviation below the mean) versus higher (one standard deviation above the mean) in perceived control. As predicted, this demonstrated that among students with lower perceived control, the ambiguous job advertisement was evaluated more negatively than the structured internship advertisement, $\gamma = 0.48$, $SE = 0.23$, $z = 2.10$, $p = 0.036$. Importantly, and also as predicted, this differences was absent, and nearly reversed, among students with higher perceived control, $\gamma = -0.33$, $SE = 0.21$, $z = -1.58$, $p = 0.114$.

5.2.4. Behavioral intentions

Next, we examined effects of perceived control on the likelihood that students would apply to either internship (i.e., the collapsed measure of intentions to apply and interest in being contacted). The main effect of control was significant, $\gamma = -0.26$, $SE = 0.13$, $z = -2.02$, $p = 0.044$, such that students with lower (vs. higher) control were more likely to apply to both internships. The company type variable was not significant, so that students were not more or less likely to apply to either internship program, $\gamma = 0.23$, $SE = 0.20$, $z = 1.13$, $p = 0.258$. More importantly, however, these two main effects were qualified by a Company type × Perceived control interaction term, $\gamma = 0.47$, $SE = 0.23$, $z = 2.09$, $p = 0.036$. Simple slopes analyses indicated that students with lower perceived control were more likely to apply to the structured program, $\gamma = -0.49$, $SE = 0.17$, $z = -2.90$, $p = 0.004$, compared to the ambiguous program, $\gamma = -0.02$, $SE = 0.17$, $z = -0.13$, $p = 0.899$ (Fig. 4). Conversely, students with higher perceived control were more likely to apply to the ambiguous program compared to the structured program. A spotlight analysis (at one standard deviation below and above the mean level of perceived control) revealed that students with higher control (one standard deviation above the mean) were significantly more likely to show an interest in applying to the internship that was ambiguous, $\gamma = 0.59$, $SE = 0.26$, $z = 2.24$, $p = 0.025$, whereas students with lower control (one standard deviation below the mean) showed no relative preference, $\gamma = -0.23$, $SE = 0.29$, $z = -0.78$, $p = 0.433$.
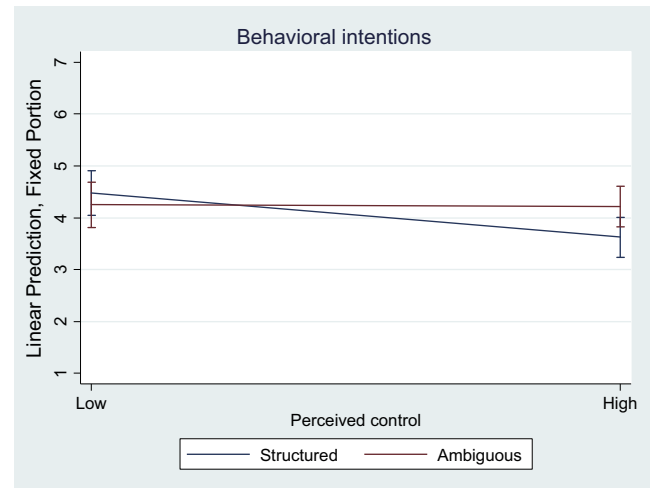
5.2.5. Self-efficacy

Last, we also examined how students' anticipated self-efficacy at either the ambiguous or the structured company varied as a function of their perceived control. Control was not associated with feelings of self-efficacy towards internships in general, $\gamma = 0.06$, $SE = 0.11$, $z = 0.59$, $p = 0.557$. The main effect of company type was also not significant, such that students did not feel more or less efficacious in either internship environment, $\gamma = -0.27$, $SE = 0.17$, $z = -1.60$, $p = 0.110$. More importantly, however, these main effects were qualified by a significant Company Type × Perceived control interaction, $\gamma = 0.50$, $SE = 0.19$, $z = 2.65$, $p = 0.008$. We again probed the interaction using simple slopes analyses and found that students with lower perceived control felt more efficacious in the structured program, $\gamma = -0.18$, $SE = 0.14$, $z = -1.27$, $p = 0.203$, and less efficacious in the ambiguous program, $\gamma = 0.31$, $SE = 0.15$, $z = 2.17$, $p = 0.030$. Conversely, students with higher perceived control felt more efficacious in the ambiguous program and less efficacious in the structured program (Fig. 5). Finally, a spotlight analysis (at one standard deviation below and above the mean level of perceived control) revealed that students with lower perceived control (one standard deviation below the
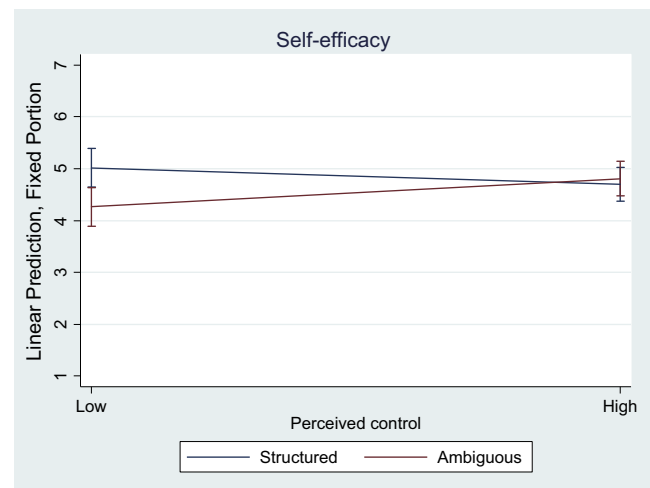

Fig. 5. Interaction plot of perceptions of self-efficacy towards internship program as a function of personal control in Study 4.

mean) anticipated feeling significantly more self-efficacious in the structured program compared to the ambiguous program, $\gamma = -0.75$, $SE = 0.25$, $z = -3.07$, $p = 0.002$, whereas students with higher perceived control (one standard deviation above the mean) anticipated feeling equally efficacious in either program, $\gamma = 0.11$, $SE = 0.22$, $z = 0.51$, $p = 0.607$.

In support for Hypothesis 4, results from Study 4 revealed that students with lower (vs. higher) control held more negative attitudes, felt less self-efficacious and were less likely to apply to an internship that emphasized greater flexibility and freedom (as opposed to one which emphasized more rigid roles, clear expectations, and structure) due to the associated ambiguity.

6. General discussion

Four studies provide converging evidence that personal control is negatively associated with ambiguity intolerance, and that this can manifest in workplace evaluations. Study 1 showed that lower perceived control was associated with increased generalized ambiguity intolerance and increased negative attitudes towards ambiguous workplace situations, but not increased negative attitudes towards undesirable but predictable/unambiguous workplace situations. Study 2 demonstrated the mediating role of need for structure. Study 3 presented causal evidence for the effect of control deprivation on dislike of ambiguous workplace situations. Last, in Study 4 we examined whether this effect can also manifest in job search, and observed that, among university students, lower personal control was associated with decreased liking of and intention to apply to an internship that offered a more ambiguous environment (that is, one that described a job that had loose guidelines and high freedom) compared to a more structured environment. In addition, consistent with a relatively untested prediction offered by recent iterations of CCT (Landau et al., 2015), for participants low in feelings of personal control, their anticipated self-efficacy at the organization advertised was influenced by the structure manipulation – such that these participants reported higher self-efficacy at the structured, compared to the more looser and ambiguous, organization – whereas the anticipated self-efficacy of those higher in personal control was unmoved by the structure manipulation.

6.1. Theoretical and practical implications

Drawing on compensatory control theory, we propose a novel account for why and when people are intolerant of ambiguity. In doing so, we contribute to the field's existing understanding of the underlying mechanism for ambiguity intolerance. When people are deprived of the fundamental psychological need for control, they become especially averse to situations in which structure is lacking because external structure can serve as a key means for those low in control to feel efficacious.

Our work also has theoretical implications for CCT. Although previous CCT research has shown that control deprivation appears to drive structure-seeking tendencies in a variety of different contexts, such as the preference for orderly theories (Rutjens et al., 2010, 2013), endorsement of meritocracy (Goode et al., 2014), and greater illusory object perception (Whitson & Galinsky, 2008), this relationship has never been explicitly articulated until recent theoretical work by Landau et al. (2015). Landau et al. (2015, p. 6) predicted that control deprivation leads people to "desire structure over complexity, ambiguity, and randomness." Although the link between control deprivation and structure-seeking appears quite robust, no research has shown that control

deprivation also leads to more disdain for environments that lack structure. Our work thus contributes to CCT by showing that control deprivation leads to greater dislike of ambiguous situations, crucially because of a greater desire for structure (as measured by the Personal Need for Structure scale; a mediating variable which also has not received adequate empirical attention). Further, past CCT research has focused largely on how control deprivation leads to a greater appreciation of structure, and not the active seeking out of structured environments (which we show). For example, control deprivation leads to greater preference for brands with structured logos (Cutright, 2012), stage theories (Rutjens et al., 2013), and order providing ideologies such as meritocracy (Goode et al., 2014). In these examples, participants were presented with instances of structure in their social and physical environments and they simply indicated whether they believed or liked it or not. However, control-motivated structure *seeking* should not only entail a greater appreciation of structure, but also, and more importantly, the active seeking out of structured environments (e.g., applying to a structured as opposed to ambiguous internships). By showing that people actively seek out structured environments, our research provides more robust evidence for control-motivated structure seeking. Last, by situating CCT within the current managerial zeitgeist of promoting worker empowerment and workplace autonomy, we demonstrate that CCT has important implications in applied contexts. Our research shows that increased flexibility and freedom at work may be appealing to only some employees but not others, and investigates why this may be the case.

Our work on how personal control influences the way people experience and react to ambiguity is important partly also because of the extensive downstream consequences that ambiguity intolerance has within and beyond the workplace. Although we mainly focus on the question of why people with lower personal control are more intolerant of ambiguity, one tacit finding in our research is also that those with higher personal control are more tolerant of ambiguity. Given that perceived ambiguity tolerance has been shown to buffer the negative effects of role ambiguity (e.g., lower tension and higher job satisfaction, Keenan & McBain, 1979), it is also possible that higher personal control could inoculate employees from the negativity and stress emanating from workplace ambiguities, and potentially promote greater job satisfaction and better workplace performance. Therefore, an interesting line of future inquiry would be to examine whether directly bolstering people's sense of control could help them cope with stress and negativity induced by ambiguous events. This may be especially useful given the importance many workplaces now put on offering their employees tools of "empowerment": autonomy, loose guidelines, and flexible roles.

The popular push for more choice freedom at work also assumes that having more choices will always enhance worker autonomy and control. However, we suggest that choice freedom will not increase control if there is no structure. For example, people can choose to do whatever they like at their workplaces, but they may not necessarily perceive greater control if their workplace environment is not meritocratic (i.e., no clear relationship between effort and reward, Goode et al., 2014), or if they are uncertain about the consequences of their choices. In fact, our position on how choice freedom may not always bolster control is consistent with previous perspectives on choice and control. For example, having too many choices may be demotivating or frustrating (Iyengar & Lepper, 2000).

Finally, our work bears practical implications. We suggest that managers should perhaps temper their enthusiasm when seeking to "empower" workers by giving them more freedom and flexibil-

ity at work, or at the very least be aware of the ways in which this might be experienced differently by employees with different profiles. While it may seem intuitive that more freedom and autonomy will beget more initiative, self-direction and happiness at the workplace, it is important to remember that external structure is often sought out and required for confident self-regulation. By keeping this in mind, managers may be able to better tailor work environments to match what some employees need (i.e., those lower in personal control) or what some situations call for (i.e., contexts that threaten personal control, such as times of economic threat and organizational change)

6.2. Relation to other theories of ambiguity at work

At first blush, our work may appear similar to existing research on role ambiguity and theories such as the Job Demand Control Model (JDCM). These literatures state that higher (vs. lower) job control may buffer the effects of job demands (e.g., role ambiguity) on negative outcomes (e.g., strain, tension). However, while our work bears some relevance to those models, it is by no means redundant with them. For instance, role ambiguity research concerns perceptions of ambiguity, while ours regards perceiving ambiguous situations as sources of threat. Employees may perceive a great deal of ambiguity, but they need not be threatened by it. Our interest here is in why some may be threatened by ambiguity and others not. Second, role ambiguity research typically uses locus of control as a predictor (for reviews, see Abramis, 1994; Jackson & Schuler, 1985). Locus of control is a multidimensional construct comprising of constructs (e.g., interpersonal control, political control, luck and chance) that may be unrelated to perceived personal control (Gurin, Gurin, & Morrison, 1978; Levenson, 1974; Paulhus, 1983). Last, previous research has noted a lack of conceptual justification for why locus of control should be related to role ambiguity, and limited empirical support for the "buffering hypothesis" described earlier (for review, see Jackson & Schuler, 1985, p. 35). By using a more precise measure of control (i.e., perceived personal control), and proposing a psychological account for why ambiguity intolerance and associated negative outcomes (e.g., dissatisfaction, lack of self-efficacy) should be higher for those with lower (vs. higher) perceived personal control in environments with high role ambiguity, our research contributes to role ambiguity literature.

Further, our finding that higher (vs. lower) control buffers the negative effects (e.g., strain, dissatisfaction) of ambiguous and demanding job situations appears similar to predictions by Karasek's Job Demand Control Model (JDCM). Although the "buffering hypothesis" has received limited empirical support in the JDCM literature (Häusser, Mojzisch, Niesel, & Schulz-Hardt, 2010; Van der Doef & Maes, 1999), the hypothesis focuses on how *higher* control may buffer the effects of job demands. Our research, however, concerns why *lower* control may be associated with greater intolerance for demanding job situations. Therefore, the theoretical focus of our research is different from that of JDCM. However, we note that across our studies, we do find that higher (vs. lower) control is not only associated with less negative attitudes towards ambiguous situations, but also the active seeking out of more ambiguous environments (Study 4). Our empirical findings thus contribute to JCDM by offering novel evidence for its predictions.

6.3. Limitations and directions for future research

We note several limitations in the current work, some of which might constitute promising directions for future research. First, all

research participants were drawn from countries (e.g., United States, Great Britain, and other European countries) where people greatly value personal control, or the ability to influence their social and physical environments (Lefcourt, 1976, 1980). Given substantial cross cultural differences in the importance that people ascribe to personal control and the myriad coping strategies that people employ in response to changes or threats to personal control (Morling & Fiske, 1999), it is possible that these effects would be different in other cultures. Some CCT research has observed consistent patterns of motivated structure seeking across cultures (Kay et al., 2008, 2010; Wang, Whitson, & Menon, 2012) but there is no doubt that further research is needed to clarify how cultural factors might moderate the relationship between perceived control and ambiguity intolerance, especially in organizational contexts.

Two interesting findings from Study 4 deserve further mention. Study 4 revealed that students with lower (vs. higher) control are equally likely to pursue both internships even though they expect to feel less self-efficacious in the ambiguous as opposed to the structured internship. This indiscriminate pursuit of internship opportunities may partly be because loss of control stimulates approach motivation (Greenaway, Haslam, et al., 2015; Greenaway, Storrs, et al., 2015). That is, students with lower (vs. higher) personal control may be motivated to apply internship opportunities in general, regardless of how self-efficacious they expect to be. Further, organizations are sources of structure (Friesen et al., 2014). Although work environments differ in the amount of structure they have (e.g., ambiguous vs. structured), they are bound to have at least some rules and regulations. Therefore, although those with lower (vs. higher) control may find structured work environments more appealing than ambiguous work environments, they may still prefer ambiguous work environments as opposed to not being in an organization at all. To test these predictions, future research may add, to Study 4, a third experimental condition describing an environment that lacks structure (e.g., staying at home).

Study 4 also revealed that students with higher (vs. lower) control prefer and seek out ambiguous internships, even though they anticipate feeling equally self-efficacious in both internship environments. While the theorizing up to this point concerns why those with lower control seek out structured environments, future research should investigate why those with higher control seek out ambiguous environments. It is possible that those with higher control expect that they would be able to exert more control and influence in ambiguous situations. For example, research on flexible workplace policies suggests that workplace flexibility can lead to blurred boundaries between work and leisure, and thus may only be beneficial for people who have better self-regulation abilities (Allen, Johnson, Kiburz, & Shockley, 2013).

Last, our research is also limited in its exclusive focus on how lowered perceptions of perceived control leads to greater ambiguity intolerance. Consistent with learned helplessness theory (Abramson, Seligman, & Teasdale, 1978), it is possible that exposure to threatening ambiguous situations decreases perceptions of control. Lowered perceptions of low control may in turn foster greater ambiguity intolerance, thus leading to a feedback loop between greater ambiguity intolerance and lower perceptions of control. Therefore, testing the existence of a bi-directional relationship between perceived control and ambiguity intolerance will be a fruitful avenue for future research.

Appendix A

Study 1: Pre-test results

Scenario	Very ambiguous		Not ambiguous at all		Test statistic
	M	SD	M	SD	
Ambiguous situations					
When you are given several tasks at once from different supervisors and it is unclear which ones to prioritize.	5.48	1.40	2.72	1.63	$t(196) = 13.45$, $p < 0.001$
Your colleague is going away for a short time, and vaguely tells you to "take care of account for Client A" but provides no further information	5.35	1.51	2.74	1.56	$t(196) = 12.43$, $p < 0.001$
When your supervisor asks you to give a presentation to your client or colleagues about a certain topic, but does not tell you exactly what to emphasize	5.22	1.36	2.97	1.46	$t(197) = 12.06$, $p < 0.001$
Employees can dress down on Fridays but it is ambiguous as to what would be considered too casual or inappropriate	5.07	1.48	3.08	1.55	$t(199) = 9.62$, $p < 0.001$
Checking social media websites is not encouraged during work time, but there are no clear rules as to whether you can check them during lunch	4.67	1.69	3.46	1.71	$t(197) = 5.34$, $p < 0.001$
Predictably bad/Unambiguous situations					
Your supervisor routinely tells you that sex, race, age or religion is, and should be, a factor in work performance	3.48	2.23	4.65	2.19	$t(197) = -3.83$, $p = 0.0002$
One of your coworker habitually talks over other employees at meetings, criticize other employees' performance, and take credit for their work	2.91	1.87	5.23	1.77	$t(198) = -9.35$, $p < 0.0001$
Your coworker regularly bad mouths the company and its leadership to fellow employees, thus disrupting company morale	2.73	1.92	5.24	1.81	$t(197) = -9.83$, $p < 0.0001$
Senior management blatantly show favoritism to some employees by regularly promoting certain people	3.28	1.87	4.79	1.82	$t(197) = -5.98$, $p < 0.0001$
Your coworkers take company products home for personal use even though they were clearly supposed to be sold to customers	2.59	1.87	5.45	1.79	$t(199) = -11.45$, $p < 0.0001$

$N = 202$.

Appendix B

Need for structure scale:

1. I become uncomfortable when the rules in a situation are not clear
2. I don't like situations that are uncertain
3. I enjoy being spontaneous
4. I enjoy having a clear and structured mode of life
5. I enjoy the exhilaration of being in unpredictable situations
6. I find that a consistent routine enables me to enjoy life more
7. I find that a well-ordered life with regular hours makes my life tedious
8. I hate to be with people who are unpredictable
9. I hate to change my plans at the last minute
10. I like to have a place for everything and everything in its place
11. I'm not bothered by things that interrupt my daily routine
12. It upsets me to go into a situation without knowing what I can expect from it

Pearlin self-mastery scale:

1. There is really no way I can solve some of the problems I have.
2. I have little control over the things that happen to me.
3. I can do just about anything I really set my mind to.
4. I often feel helpless in dealing with the problems of life.
5. What happens to me in the future mostly depends on me.

6. There is little I can do to change many of the important things in my life.
7. Sometimes I feel that I'm being pushed around in life.

Ambiguity intolerance scale:

1. I don't tolerate ambiguous situations well.
2. I would rather avoid solving a problem that must be viewed from several different perspectives.
3. I try to avoid situations that are ambiguous.
4. I prefer familiar situations to new ones.
5. Problems that cannot be considered from just one point of view are a little threatening.
6. I avoid situations that are too complicated for me to easily understand
7. I am tolerant of ambiguous situations.
8. I enjoy tackling problems that are complex enough to be ambiguous.
9. I try to avoid problems that don't seem to have only one "best" solution.
10. I generally prefer novelty over familiarity
11. I dislike ambiguous situations.
12. I find it hard to make a choice when the outcome is uncertain.
13. I prefer a situation in which there is some ambiguity.

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