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**DOI**

[10.1002/job.2478](https://doi.org/10.1002/job.2478)

**Publication date**

2020

**Document Version**

Final published version

**Published in**

Journal of Organizational Behavior

**License**

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**Citation for published version (APA):**

Belschak, F. D., Jacobs, G., Giessner, S. R., Horton, K. E., & Bayerl, P. S. (2020). When the Going Gets Tough: Employee Reactions to Large-Scale Organizational Change and the Role of Employee Machiavellianism. *Journal of Organizational Behavior*, 41(9), 830-850. <https://doi.org/10.1002/job.2478>

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**RESEARCH ARTICLE**

# When the going gets tough: Employee reactions to large-scale organizational change and the role of employee Machiavellianism

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**Funding information**

European Commission, FP7-SECURITY, Composite-Comparative Police Studies in the EU, Grant/Award Number: 241918

**Summary**

Large-scale, long-term change initiatives take time to unfold, which can be a source of uncertainty and strain. Investigating the initial 19 months of a large-scale change, we argue that during these stages, employees' change-related beliefs become more negative over time, which negatively affects their work engagement and, ultimately, increases their turnover intentions. Furthermore, we investigate the impact of a trait, Machiavellianism, on change reactions and propose that employees high in Machiavellianism react more negatively during change processes as they are especially susceptible to uncertainty and stress. We test our (cross-level) moderated mediation model in a three-wave longitudinal study among employees undergoing a large-scale change (T1:  $n = 1,602$ ; T2:  $n = 1,113$ ; T3:  $n = 759$ ). We find that employees' beliefs about the impact and value of the change are indeed negatively related to change duration and that decreases in these perceptions come with a decline in engagement and increases in turnover intentions. Moreover, employees high in Machiavellianism react more strongly to a deterioration in change-related beliefs, showing stronger reductions in engagement and stronger increases in turnover intentions than employees low in Machiavellianism. Our study offers explanations for the negative effects of large-scale changes including an explanatory factor for disparate employee reactions to change over time.

**KEYWORDS**

change beliefs, longitudinal study, Machiavellianism, organizational change, turnover intentions, work engagement

**1 | INTRODUCTION**

Research shows that large-scale organizational changes are risky endeavors. Indeed, according to Lovallo and Kahneman (2003), about three quarters of all mergers and acquisitions never pay off. This persistently high failure rate testifies to the demanding and challenging nature of these types of changes (Jacobs, van

Witteloostuijn, & Christe-Zeyse, 2013). Large-scale organizational changes can be defined as those that dramatically alter the structure and/or culture of an organization (i.e., transformative changes; e.g., Bartunek & Moch, 1987; Nutt & Backoff, 1997). They imply significant shifts in basic aspects of an organization and can be seen as a "shock to the system" (Rafferty & Griffin, 2006, p. 1159).

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Processual perspectives on change emphasize its unforeseen and unexpected nature, which often creates ambiguities, uncertainties, and confusion for employees (Dawson & Andriopoulos, 2014; Konlechner, Latzke, Güttel, & Höfferer, 2019). In consequence, change has been labeled a stressor (e.g., Rafferty & Griffin, 2006). Although employees might start large-scale change processes with high expectations and hopes for fundamental improvements, they are often unaware of their complexity and consequences. Moreover, changes are often implemented sequentially leading to growing adaptation demands on employees (Herold, Fedor, & Caldwell, 2007; Jacobs, Christe-Zeyse, Keegan, & Polos, 2008). The risk of losing momentum has thus been identified as a crucial challenge, as initiatives need to keep up their momentum in order to be successful (e.g., Jansen, 2004; Kotter, 1995).

Jansen, Shipp, and Michael (2016) have shown that employees' change perceptions fluctuate during a project and that this has implications for their (perceptions of) change momentum. We build on this observation and extend it by exploring more closely in what way employees' perceptions evolve during a change project and how a loss in change momentum may affect individuals' behavior. This is an important extension, because—although past research has shown that employees' perceptions can vary during the course of a change project, and that these variations may have implications for their behavior (e.g., Meyer, Srinavas, Lal, & Topolnytsky, 2007)—we still have a limited understanding of *how* perceptions of and reactions to large-scale changes unfold over time (Rafferty & Jimmieson, 2017) and how shifting perceptions and related losses in change momentum (Jansen et al., 2016) are linked to employee reactions. Understanding such dynamics is vital in order to better manage long-term change efforts and avoid the frequent negative outcomes of change.

We argue that, due to the inherently uncertain and stressful nature of large-scale organizational change, employees' beliefs about such a change will become more negative over time, resulting in a loss in change momentum (Jansen et al., 2016) and a broader decline in work outcomes (employees' work engagement and turnover intentions) as the change unfolds. More specifically, we posit that a deterioration in employees' change beliefs will lead to declines in their work engagement and, in turn, to increases in their turnover intentions (see Oreg, Vakola, & Armenakis, 2011; Rafferty, Jimmieson, & Armenakis, 2013; Van Dierendonck & Jacobs, 2012).

At the same time, past research has shown that employees differ in their ability to cope with change (e.g., Amiot, Terry, Jimmieson, & Callan, 2006), which suggests that personal characteristics like employee personality might moderate change reactions. One personality variable that has been conceptually linked to the ineffective handling of stress and uncertainty is Machiavellianism. Machiavellians (Machs) are characterized by a cynical, negative, and selfish worldview (e.g., Christie & Geis, 1970; Jones & Paulhus, 2009). High Machs focus on short-term profit maximization and are inclined to defect from social relationships (Wilson, Near, & Miller, 1996), hence increasing the likelihood that they will leave their organization as the costs of organizational change become clear. They also tend to expect the worst from others and often show increased anxiety (Fehr, Samsom, &

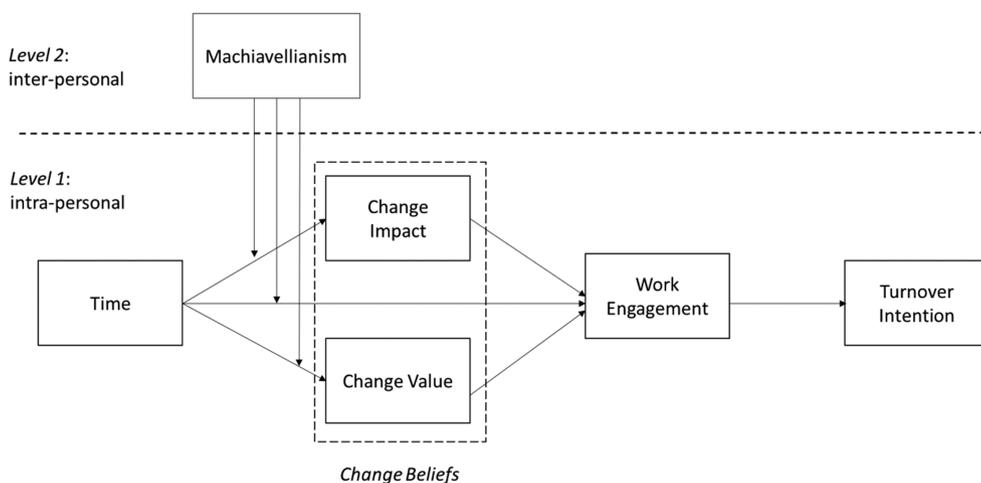
Paulhus, 1992; Wilson et al., 1996), which exacerbates negative reactions to uncertain and stressful situations. Machiavellianism is significantly related to individual differences that trigger negative reactions to uncertainty like general distrust and anxiety (e.g., Fehr et al., 1992), (low) tolerance for ambiguity (e.g., Mudrack, 1993), (low) self-esteem (e.g., Valentine & Fleischman, 2003), pessimism (Jonason, Foster, Csatho, & Gouveia, 2018), and neuroticism (e.g., Jakobwitz & Egan, 2006). Drawing on stress and coping perspectives on change that emphasize the stressful, ambiguous, and uncertain nature of organizational change (e.g., Rafferty & Griffin, 2006; Rafferty & Jimmieson, 2017), we thus predict that Machiavellianism will be a key trait in moderating employees' change-related reactions. We propose that high Machs will develop more negative change beliefs during a change project and will show stronger decreases in work engagement and increases in turnover intentions compared to their low Mach colleagues.

Integrating the above arguments, we hypothesize a longitudinal (cross-level) moderated mediation model (see Figure 1) in which *deteriorations in change beliefs* during a large-scale organizational change lead to a *decline in work engagement* and ultimately to an *increase in turnover intentions*, with Machiavellianism as a moderator. Our model thus explicitly focuses on the *dynamics* in the pathway from change beliefs to turnover intentions.

Our study investigates the hypothesized effects during the first 19 months of a large-scale change process, in a three-wave longitudinal study. By integrating change-specific beliefs and general work attitudes with the moderating role of Machiavellianism as a personality variable, we extend insights into the mechanisms and processes through which the psychological costs of change unfold and manifest over time. The importance of such a longitudinal perspective has been noted by several authors (e.g., Pettigrew, Woodman, & Cameron, 2001). It is further underlined by the results of Chen, Ployhart, Cooper Thomas, Anderson, and Bliese (2011) who found that *variations over time* in job satisfaction explained variance in turnover intentions over and above absolute (average) levels of satisfaction and by the results of Piderit (2000) and Jansen et al. (2016) who noted that a dynamic perspective focusing on *variations over time* in attitudes and perceptions is better able to explain change success or failure than a static perspective. We build on the general idea by Jansen et al. (2016) that variations in change perceptions negatively influence change momentum and extend this model by investigating the broader consequences of this process (for work engagement and turnover intentions) in a longitudinal design. We further extend the model and add to the literature on traits in the context of change by adding Machiavellianism as a stress-related contingency variable that explains variation in change reactions between employee groups over time.

## 2 | EMPLOYEES' BELIEFS DURING LARGE-SCALE CHANGE

Scholars have noted that change recipients' attitudes and behaviors are strongly affected by their subjective beliefs about change



**FIGURE 1** A longitudinal moderated mediation model of employee reactions to organizational change

processes (Armenakis, Bernerth, Pitts, & Walker, 2007; Armenakis, Harris, & Mossholder, 1993; Piderit, 2000). These observations stress the relevance of convincing employees of the need for and value of a change project in order to stimulate a positive reaction (e.g., Armenakis et al., 1993; Kotter, 1995). Change beliefs refer to individuals' knowledge and expectations about an organizational change they are confronted with, which provide a lens to understand, interpret, and give meaning to this change (Armenakis et al., 1993). Individuals may have beliefs about different aspects of a change project (Armenakis et al., 2007; Piderit, 2000), such as the meaningfulness and value of the change, the appropriateness of the change, or the support from management.

Drawing on the extant literature, we focus on two aspects of employees' beliefs: first, the perceived *impact* of a change project (i.e., the degree to which the change is perceived to affect the organization and/or employee) and second, whether or not a specific change project is needed, is of value, and serves an important purpose for the organization (i.e., the perceived *value* of a change project). *Change impact* refers to the quantity or degree of change, that is, whether employees consider the change to have major or minor consequences for their organization (e.g., Rafferty & Griffin, 2006, p. 1155). *Change value* has received different labels in the literature including change appropriateness (the belief that a change is able to solve a discrepancy, e.g., Armenakis et al., 1993; Armenakis et al., 2007) and affective change commitment (the belief in the inherent value of a change, e.g., Herscovitch & Meyer, 2002, p. 475). Whereas perceptions of high *change impact* are closely related to feelings of strain and negative change reactions (Rafferty & Griffin, 2006; Rafferty & Jimmieson, 2017), perceptions of high *change value* have been linked to positive change reactions (see Choi, 2011).

Given that change processes unfold over time (Pettigrew et al., 2001), we agree with Jansen et al. (2016, p. 674) that "it may be unreasonable to expect that change perceptions will remain stable over the course of change." In line with this, Chung and Choi (2018) found that employees' perceptions of innovations at their firm fluctuated over time, with evidence of three different stages of perceptions. We therefore propose that employees' beliefs about the impact and value of a change will evolve throughout the process. Applying

findings from research on coping with traumas (Kubler-Ross, 1969), scholars argue that individuals pass through different phases of bereavement when confronted with a serious threat or loss, and their reactions become more negative over time before, ultimately, adaptation can occur, and reactions can become more positive again (see Elrod & Tippett, 2002).

In the organizational change literature, these phases have been depicted as a 'change curve' of employee reactions over time, which is characterized by increasingly negative reactions in the first part of a change process (Elrod & Tippett, 2002; Schneider & Goldwasser, 1998) before a positive trend occurs in the second part of the change. The logic of the change curve is in line with observations by Isabella (1990), who notes that employees' interpretations of a change project differ depending on the stage of the project (e.g., anticipation versus culmination stage). In the pre-implementation ("anticipation") stage of a change project, employees tend to have only limited and disconnected information about the change, thus leaving space for interpretations of an envisioned distant future and a tendency to underestimate the level of adaptation required (Lovallo & Kahneman, 2003). Conversely, at the implementation ("culmination") stage, employees are "peppered with double exposures" (Isabella, 1990, p. 23) as they are confronted with the realization that old behaviors do not work any longer and need to be replaced with new ones. It is argued that the decline in employee morale at the implementation stage is a reaction to adaptation costs and a mismatch between employees' expectations and their understanding of the change's implications and the organizational reality (Elrod & Tippett, 2002; Konlechner et al., 2019).

Change recipients' sensemaking processes play an important role in shaping their reactions to organizational change (Balogun & Johnson, 2005). Chung and Choi (2018) found in their qualitative study on organizational innovation implementation that, in the initial stages of change, the driving forces are usually stronger than the resisting forces as employees usually receive positively biased information about the innovation. Such positive outlooks are incorporated in employees' sensemaking processes, coloring their efforts to give meaning to and develop beliefs about the change (e.g., Bartunek, Rousseau, Rudolph, & DePalma, 2006). Subsequent experiences

during a change project that are not in line with these expectations—such as unforeseen adaptation costs—lead to ambiguity about the change, which may result in a lowering of expectations and a loss of confidence in the project (Konlechner et al., 2019). In this regard, Weick (1988, p. 305–306) notes that an individual “cannot know what he is facing until he faces it.” We therefore expect that during a large-scale organizational change process, employees’ expectations and beliefs about the change will become more negative over time. This might particularly apply to large-scale organizational change processes, which are complex and difficult to oversee, which are characterized by a constant and high need to adapt to dynamic circumstances (Herold et al., 2007), and which force organizational members to deal with performance hindrances while adopting new routines (Burke, Stagl, Salas, Pierce, & Kendall, 2006). Investigating the dynamic character of change perceptions and beliefs over time is important as a deterioration in these beliefs in the early phases of a change project can negatively influence change momentum (Jansen et al., 2016) and the success of such initiatives (e.g., Konlechner et al., 2019).

As noted above, employees are likely to perceive a change as increasingly impactful the longer it continues and will likely adapt their beliefs about its value and appropriateness downwards as the change project unfolds and takes unexpected turns (Jacobs et al., 2008) and the respective adaptation needs and costs become more salient (Buono, Bowditch, & Lewis, 1985). This does not imply that employees’ beliefs about change will become (increasingly) negative over the whole duration of a change project. Rather, our arguments follow the logic of the “change curve” presented above and specifically apply to the *initial stages of large-scale, long-term change*, when employees tend to become aware of the full extent of a change project and the related losses (Elrod & Tippett, 2002). We argue that in these stages of a change project interdependencies are particularly high and unpredictable for employees (Griffin, Neal, & Parker, 2007). In addition, change recipients’ initial expectations are often too optimistic and are in dissonance with their actual experiences, hence leading to negative sensemaking processes (Konlechner et al., 2019). Thus, although we acknowledge that some employees might have realistic expectations at the beginning of a change initiative or might even start out with negative expectations that improve by learning more details about the initiative (see Chung & Choi, 2018; Jansen et al., 2016), we nevertheless argue that for complex, large-scale change projects, perceptions will usually become more negative in the initial stages as employees are confronted with the reality of a complex/challenging change process as it unfolds (see Konlechner et al., 2019). In sum, we hypothesize:

**Hypothesis 1.** During the initial phases of a large-scale organizational change process, employees will perceive the change as becoming increasingly impactful over time, that is, the perceived change impact will be positively related to change duration.

**Hypothesis 2.** During the initial phases of a large-scale organizational change process, employees will perceive the change as

becoming less valuable over time, that is, the perceived change value will be negatively related to change duration.

### 3 | CHANGE MOMENTUM AND WORK ENGAGEMENT DURING LARGE-SCALE CHANGE

Negative change perceptions have been shown to reduce employees’ perceptions of change momentum (Jansen et al., 2016). Change momentum is defined as the socially perceived energy that is needed to carry organizational change forward (Jansen, 2004) and has been linked to the success of a change initiative and to achieving change goals (e.g., Nutt & Backoff, 1997; see Jansen et al., 2016). Although change momentum refers to the energy and enthusiasm related to a specific change project, it is likely to have broader motivational consequences for employees’ job attitudes, in particular with respect to the related construct of work engagement. Like change momentum, work engagement is defined as a positive motivational, energetic state characterized by high personal investments in one’s work (e.g., Bakker & Demerouti, 2008). Variations in change momentum or in factors that are associated with, or indicative of, change momentum (like employees’ change perceptions and beliefs) are likely to have implications for employees’ work engagement. In particular, a loss of change momentum may be expected to manifest itself in a more general decline in work engagement.

Work engagement is a central work attitude and comes with several positive consequences for the engaged employee as well as the organization, such as better employee health and increased in-role and extra-role performance (e.g., Christian, Garza, & Slaughter, 2011; Schaufeli, Bakker, & Salanova, 2006). Work engagement is conceptually distinct from job attitudes like job satisfaction, job involvement, and organizational commitment and explains unique variance in various outcome variables (e.g., in-role and extra-role performance; see Christian et al., 2011). Meta-analyses show that job demands and job resources that give employees a sense of meaningfulness and knowledge about their work and its results are important predictors of employee work engagement, from day to day as well as over time (Christian et al., 2011; Halbesleben, 2010). Conversely, being forced to extensively and repeatedly adjust work routines and adapt to new work environments as is the case during large-scale change projects imposes high job demands on employees, reducing their time and opportunity for core work tasks and personal development, as well as increasing their levels of uncertainty and stress (Rafferty & Griffin, 2006). Hence, such changes are likely to have negative effects on employees’ work engagement.

More specifically, we argue that increasingly negative subjective change beliefs in the initial phases of a change process will be linked to declines in work engagement. Negative change beliefs can create doubts about the meaningfulness of one’s work resulting in lower dedication, attachment, and engagement (Elstak, Bhatt, Van Riel, Pratt, & Berens, 2015; Van den Heuvel, Demerouti, Bakker, & Schaufeli, 2010). At the same time, job demands are high during large-

scale change projects, due to the novel situations encountered and the related need for adaptation, creating additional change-related doubts and losses in change momentum (Jansen et al., 2016), which are likely to further reduce work engagement (Van den Heuvel et al., 2010). We therefore expect that—to the extent that employees' beliefs about the impact and value of the change become more negative during the initial phases of a large-scale change project—their work engagement will also decrease over time.

**Hypothesis 3.** During the initial phases of a large-scale organizational change process, (a) change duration will be negatively related to work engagement, and this relationship will be mediated by *changes over time* in beliefs about (b) the perceived change impact (c) the perceived value of the change.

#### 4 | TURNOVER INTENTIONS DURING LARGE-SCALE CHANGE

A stark consequence of declining work engagement among employees is the higher likelihood of employee turnover (intentions; Halbesleben, 2010). That is, if individuals' work engagement suffers during a lengthy change process, we can also expect a growing tendency for them to seek employment elsewhere, the longer the change lasts. Losing valued employees can thus be a costly consequence of long-term, high impact change processes (see Oreg et al., 2011; Van Dierendonck & Jacobs, 2012). Several studies have linked employee turnover intentions to the stress and uncertainty experienced during organizational change (e.g., Rafferty & Griffin, 2006; Rafferty & Restubog, 2010) as well as to the perception of change as a 'shock' event (Morrell, Loan-Clarke, & Wilkinson, 2004). In line with this evidence, the unfolding model of turnover argues that a "shock event" (such as an organizational change) may cause employees to reassess their current job and consider moving on from their position, if their new circumstances no longer match their expectations (Lee & Mitchell, 1994, 1999). We argue that employees are likely to assess their circumstances more negatively during large-scale, long-term organizational change processes as their beliefs about the change decline, and their work engagement suffers.

From an exchange theory perspective (e.g., Blau, 1964), employees who are given engaging work by their organization are more likely to reciprocate by being loyal and are less likely to leave their organization despite potential hardships. From a reinforcement theory perspective, engaged employees are more likely to experience their current work situation as rewarding and are therefore more likely to remain within their organization. By contrast, employees who are dissatisfied and unengaged with their work are likely to assess their work situation as negative and hence to withdraw and look for alternative, more rewarding work elsewhere (Lee & Mitchell, 1994). Moreover, in lengthy change processes, employees may become fatigued and experience increasingly negative emotions and stress due to the continuing unpredictability of their situation. As argued above, this may result in the unfolding of negative assessment

processes in which more negative change beliefs and, related to this, lower work engagement, lead to increases in employee turnover intentions over time (Lee & Mitchell, 1999).

**Hypothesis 4.** During the initial phases of large-scale organizational change, (a) change duration will be positively related to employee turnover intentions, and (b) this relationship will be mediated by *changes over time* in work engagement.

#### 5 | THE MODERATING ROLE OF MACHIAVELLIANISM

Not all employees react to an organizational change in the same way. The literature on organizational change has identified a number of individual characteristics that influence employees' perceptions, attitudes, and behaviors during change projects. These include dispositional components that are directly related to change (such as dispositional change resistance and change self-efficacy; Herold et al., 2007; Oreg, 2003), as well as more general personality traits (such as risk aversion, openness to experience, generalized self-efficacy, self-esteem, and optimism; Judge, Thoresen, Pucik, & Welbourne, 1999; Neves, 2009; Wanberg & Banas, 2000). Most investigations into the impact of personality characteristics on change perceptions and reactions focus on understanding the positive side, such as personality factors that facilitate adjustment and "constructive adaptation" to change (i.e., self-esteem, optimism, and self-control, Wanberg & Banas, 2000; for an exception, see Oreg, 2003, who investigated dispositional change resistance).

We argue that it is equally important to understand what shapes differences in individuals' perceptions and reactions on the "negative" side. In this vein, we investigate Machiavellianism as a critical factor in influencing individuals' change-related attitudes and behavior. Machiavellianism describes a general personality trait that reflects a person's negative, cynical worldview and the related tendency to detach from ethical considerations and engage in all actions needed to attain personal goals and satisfy personal needs (selfishness and "the ends justify the means" attitude; e.g., Christie & Geis, 1970). Machiavellianism has been found to be significantly related to a number of individual differences that trigger negative reactions to uncertain and ambiguous situations, including general distrust in others and anxiety (e.g., Fehr et al., 1992), (low) tolerance for ambiguity (e.g., Mudrack, 1993), (low) self-esteem (e.g., Valentine & Fleischman, 2003), (low) optimism (Jonason et al., 2018), and neuroticism (e.g., Ashton, Lee, & Son, 2000; Jakobwitz & Egan, 2006). We therefore propose that the impact of large-scale organizational changes that are characterized by uncertainty and stress for employees (e.g., Rafferty & Griffin, 2006) and require long-term employee investments in terms of adaptation efforts (see Armenakis & Bedeian, 1999; Jacobs & Keegan, 2018) will be especially detrimental for employees high on Machiavellianism.

Machiavellianism is defined as a quantitative personality trait, implying that individuals might score higher or lower on the continuum of Machiavellianism. It is only moderately correlated with general

personality factors (e.g., Jakobwitz & Egan, 2006) and is also distinct from other “dark personality traits” like narcissism and psychopathy (e.g., Paulhus & Williams, 2002). Even though the link between Machiavellianism and turnover has not been directly investigated to our knowledge, past research has consistently found that Machiavellianism explains unique variance in behaviors like defection from relationships (Gunthorsdottir, McCabe, & Smith, 2002), (a lack of) organizational and team commitment (Zettler, Friedrichs, & Hilbig, 2011), and counterproductive work behaviors (Dahling, Whitaker, & Levy, 2009), over and above broader dimensions of personality.

High Machs (i.e., individuals who exhibit high levels of Machiavellianism) are characterized by a cynical and negative outlook on the world and a tendency to expect the worst (Christie & Geis, 1970; Jones & Paulhus, 2009). Compared to low Machs, high Machs report consistently higher levels of job tension (Gemmill & Heisler, 1972; Heisler & Gemmill, 1977) and thus seem to be prone to experiencing stress. Studies have also found that high Machs tend to feel less easily satisfied with their jobs (see Fehr et al., 1992), which is argued to be linked to their aversion to ambiguity and low levels of control at work (Gemmill & Heisler, 1972; Hollon, 1983). Based on this evidence, we propose that high Machs are likely to develop particularly negative beliefs during large-scale changes, as these are defined by increasing levels of uncertainty, ambiguity and stress, and loss of control (e.g., Elrod & Tippett, 2002; Konlechner et al., 2019). High Machs' negative perspective on and sensitivity to uncertain and ambiguous situations is likely to negatively affect their sensemaking processes during organizational changes resulting in stronger increases in their perceptions of change impact and stronger decreases in their perceptions of change value as the change project unfolds. More specifically, we argue that as high Machs are sensitive to stress (Gemmill & Heisler, 1972), they will tend to experience the initial phases of a large-scale change project as more threatening and impactful than low Machs, as they are confronted with increasing uncertainty and adaptation needs over time. Similarly, high Machs' negativity bias and low tolerance for ambiguity (Mudrack, 1993) may cause them to increasingly question the value and usefulness of an unfolding change process relative to low Mach employees whose expectations are less negatively biased. As a consequence, high Machs are expected to experience stronger decreases in their perceptions of change value over time, compared to their low Mach counterparts.

**Hypothesis 5.** Employee Machiavellianism will moderate (a) the increase over time in beliefs about the change impact and (b) the decrease over time in beliefs about the value of the change for employees undergoing a large-scale change process such that (a) the positive relationship between change duration and change impact beliefs and (b) the negative relationship between change duration and change value beliefs will both be stronger for high Machs than for low Machs.

High Machs are characterized by a strong focus on personal goals and low emotional attachment (see Jones & Paulhus, 2009; Wilson

et al., 1996). The primary focus of high Mach employees is the pursuit of personal rather than organizational goals, with a higher likelihood of self-centered behaviors (Sakalaki, Richardson, & Thépaut, 2007). High Machs feel lower attachment and dedication to other subjects (e.g., to their organization, supervisor, or a change process) than to their own personal goals, and they are less likely to have a stable attachment to their work (Zettler et al., 2011). Results from game theoretical studies also suggest that high Machs prefer short-term oriented behavior over long-term profit-oriented behavior (see Wilson et al., 1996). These findings indicate that high Machs are highly sensitive to the achievement of their personal goals and, relatedly, the cost–benefit balance at their organization. If their perceptions of personal costs/benefits worsen due to (the prospect of) high change-related costs (increasing job demands, the need to adapt to increasing changes; Burke et al., 2006), high Machs may be expected to be more likely to show negative reactions in terms of reducing their work engagement and increasing their desire to leave their organization during periods of large-scale change (Lee & Mitchell, 1994). We thus expect that the work engagement of high Machs will deteriorate more strongly over time than the work engagement of low Machs.

**Hypothesis 6.** Employee Machiavellianism will moderate the decrease over time in work engagement for employees undergoing a large-scale change process such that the negative relationship between change duration and work engagement will be stronger for high Machs than for low Machs.

Summarizing the theoretical ideas above and Hypotheses 1 through 6, we thus propose a longitudinal moderated mediation model of employee reactions to large-scale organizational change (see Figure 1).

## 6 | METHODS

### 6.1 | Organizational context

This study was conducted within the context of a restructure of the Dutch police. At the time of the study, this change constituted the largest organizational change in the public sector conducted in the Netherlands in the past 50 years. The objective of the change was to centralize the Dutch police from 26 regional forces into one national force. This meant a complete transformation in the structural makeup of the organization, including overhauling team structures, redefining and reallocating thousands of functional profiles, merging and relocating service functions (and their personnel) into centralized centers, and replacing regional leaders with a single leader at the top (Commissie Evaluatie Politiewet 2012., 2017). This reform thus implied far-reaching changes on all levels of the organization, a reorientation of its strategy, and dramatic modifications of existing procedures and responsibilities. Hence, although employees could not be dismissed or their salaries reduced, the change nevertheless represented severe adaptation needs for most employees in terms of changes

to status, work location, work scope, and tasks. The change process was expected to take 4 years to complete.

The sample seems appropriate for a study of turnover intentions as experienced police officers have ample job opportunities in the private sector (e.g., airports and railway system) as well as the public sector (e.g., fire agencies or drug and alcohol compliance units in municipalities) in the Netherlands. Police administrators are also unlikely to experience problems in finding other positions in either the public sector (e.g., municipalities) or the private sector (big or small corporations), as their expertise is clearly applicable to other settings. In this sense, employees' opportunities to switch jobs and find alternative work outside the police force can be seen to be comparable to the opportunities of people working in other professions.

## 6.2 | Procedure

We collected data at three different time points from two police forces, which merged into a single unit during the course of the change. Large-scale strategic change aims at long-term effects and, as outlined above, these changes were of a fundamental nature. In view of the lengthy nature of these changes, we chose to have relatively long time periods between our measurement points. At the same time, we felt that very long time intervals would run the risk that a considerable number of employees would have moved from one police unit to another, and we would suffer from a high attrition rate. The literature on longitudinal research does not provide clear guidelines on the optimal length of the time lags between measurement points (e.g., Ployhart & Vandenberg, 2010), although clearly intervals between the measurement points in longitudinal research should be appropriate for the theoretical model at hand. Because we were interested in the long-term effects of an ongoing large-scale change, we chose time points that avoided emotionally intense phases immediately after change milestones (e.g., developing a shared service center or installing new unit leaders) and instead reflected relatively quiet periods of the change process to avoid measuring transient peaks in employee reactions.

The first measurement took place 1 month before the kick-off of the change process. It is worth noting that employees were aware of the change well before that as the change process was the result of a lengthy public debate on police reform, and some anxiety may have already built up in anticipation of the changes to come. The second survey occurred 9 months after the start of the implementation process, and the third survey was undertaken another 9 months later. Overall, we thus captured a period of 19 months between the first and the last measurement point (according to the blueprint, the change project was expected to take 48 months in total). The survey was distributed via the internal police mailing system to all employees in the two forces. A police administrator matched the surveys over time using respondents' personnel numbers. Full anonymity was contractually guaranteed by the police and our universities, monitored by the police union, and reasserted by the head of the police unit and the

research project coordinator in an invitation note attached to the survey.

## 6.3 | Sample

Personnel from all areas and functions within the two police forces were invited to take part in the study. The three waves of data collection included personnel from all ranks from trainee to chief of police. The time 1 sample consisted of 1,602 police personnel, representing a 77% response rate. Sixty seven percent of respondents were male. Age ranged from 18 to 66 years, with a mean age of 44 years. The total sample at time 2 was 1,113. Sixty nine percent of respondents were male. Age ranged from 21 to 67 years, with an average age of 45. Finally, the Time 3 sample consisted of 759 police personnel. Seventy two percent of the sample were male. Age ranged from 20 to 68 years with an average age of 47. We provide tests for attrition bias in the results section below.

## 6.4 | Measures

We measured beliefs about the change impact and change value, work engagement, and turnover intentions at all three time points, hence meeting the requirements of longitudinal research studying change (Ployhart & Vandenberg, 2010). We were interested in testing the moderating effects of Machiavellianism for the relationships between change duration and change beliefs as well as change duration and work engagement. Machiavellianism was considered to be a stable personality trait (Christie & Geis, 1970) and was therefore measured at only one time point (Time 3). All scales were measured on a 5-point Likert scale (1 = "strongly disagree", 5 = "strongly agree"). The reliabilities of all measures can be found on the diagonal in Table 1 (see below).

### 6.4.1 | Change impact

Employees' beliefs about the impact of the ongoing change project was measured with the three-item transformational change scale by Rafferty and Griffin (2006). Sample items are "These changes will affect my force's structure" and "These changes will significantly change my force's goals."

### 6.4.2 | Change value

To measure beliefs about the value of the change, we used three items from the affective change commitment measure by Herscovitch and Meyer (2002), which refers to change recipients' "belief in its inherent benefits" (Herscovitch & Meyer, 2002, p. 475). The items capture employees' beliefs regarding the value, purpose, and meaningfulness of a change project, hence the appropriateness dimension of

**TABLE 1** Descriptives, reliabilities, and intercorrelations of study variables

	n	M	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	
(1) Gender	2,802	.63	.48																	
(2) Age (T1)	2,802	42.50	11.32	.13**																
(3) Force	2091	1.15	.35	.04	.07**															
(4) Mach	767	2.08	.64	.11**	-.07	-.08*	(.79)													
(5) CI (T1)	1827	3.41	.78	-.03	.05*	.15**	-.01	(.69)												
(6) CI (T2)	1,384	3.48	.88	-.002	.04	.08*	.09*	.36***	(.72)											
(7) CI (T3)	913	3.49	.85	-.05	-.05	.08*	.09**	.37***	.47***	(.70)										
(8) CV (T1)	1795	3.46	.92	.04	-.05	-.08**	-.13**	-.12***	-.09**	-.10**	(.92)									
(9) CV (T2)	1,286	3.38	.97	.04	-.06*	-.08*	-.14**	-.08*	-.17***	-.16**	.64**	(.93)								
(10) CV (T3)	853	3.39	.91	.07*	-.07	-.04	-.16***	-.04	-.10*	-.21***	.59***	.66***	(.93)							
(11) WE (T1)	1,605	3.85	.70	.01	-.04	.01	-.21***	.05*	.03	-.08*	.23***	.18***	.20***	(.93)						
(12) WE (T2)	1,127	3.76	.76	-.01	-.06*	-.02	-.16***	.04	-.02	-.09*	.18***	.20***	.19***	.68**	(.94)					
(13) WE (T3)	770	3.67	.77	.000	-.07	-.03	-.28***	-.03	-.13**	-.19***	.23***	.27***	.31***	.54***	.69***	(.94)				
(14) TI (T1)	1,603	1.65	.92	.01	-.01	-.01	.10*	-.01	-.002	.05	-.06*	-.07	-.07	-.31***	-.26***	-.24***	(.78)			
(15) TI (T2)	1,112	1.73	.97	.04	-.02	-.004	.17**	.01	-.02	.08	-.05	-.10**	-.04	-.19***	-.31***	-.24***	.56***	(.81)		
(16) TI (T3)	759	1.75	.98	.02	.02	-.004	.21**	.02	.07	.10**	-.07	-.13**	-.12**	-.16***	-.20***	-.30***	.44***	.59***	(.81)	

Note. Reliabilities are depicted in parentheses on the diagonal.

Abbreviations: CI, change impact; CV, change value; WE, work engagement; TI, turnover intentions.

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .

employees' change beliefs (Armenakis et al., 2007). Sample items include "This change serves an important purpose" and "I believe in the value of this change." In a second sample of Dutch police force members different from the ones participating in the primary study presented here ( $n = 1961$ ), the three-item version and the full six-item version of the affective change commitment scale were correlated at  $r = .93$  ( $p < .001$ ) providing support for the validity of the shortened three-item measure.

### 6.4.3 | Work engagement

We measured work engagement with the nine-item scale of Schaufeli et al. (2006). This scale includes the three subdimensions of vigor, dedication, and absorption. Example items include "At my work I feel bursting with energy" (vigor), "I am enthusiastic about my job" (dedication), and "I feel happy when I am working intensely" (absorption).

### 6.4.4 | Turnover intentions

We used the two-item measure of Tekleab, Takeuchi, and Tylor (2005) to capture turnover intentions. Items are "It is likely that I will leave my employment with the police this year" and "I intend to keep working at the police for at least the next three years."

### 6.4.5 | Machiavellianism

Our eight-item measure of Machiavellianism is a subset of the 20 items of the Mach-IV scale developed by Christie and Geis (1970). This short measure includes both the "interpersonal tactics" dimension (the tendency to manipulate and engage in unethical behavior; four items, e.g., "The best way to handle people is to tell them what they want to hear") and the "views of human nature" dimension (a negative, cynical worldview; four items, e.g., "It is safest to assume that all people have a vicious streak and it will come out when they are given a chance") by Christie and Geis (1970, p. 14). The eight items also overlap with the trimmed five-item Mach\* measure (Rauthmann, 2013) but yield the advantage of also including the defining Mach characteristics of "manipulating others" (two items) and "using all means to achieve one's ends" (one item). This short eight-item Machiavellianism measure has been used successfully in several past studies in the Netherlands (e.g., Belschak, Den Hartog, & Kalshoven, 2015; Belschak, Muhammad, & Den Hartog, 2018; Den Hartog & Belschak, 2012).

## 7 | RESULTS

Table 1 presents descriptive statistics, scale reliabilities, and correlations among all variables. The descriptive data indicate that although

change value and work engagement decreased, change impact and turnover intentions increased over time.

### 7.1 | Confirmatory factor analysis and longitudinal measurement invariance

In Table 2, we provide the results of various CFA tests run in R with the lavaan package (Rosseel, 2012). We first tested confirmatory factor analyses within each time point (including the measures of change impact, change value, work engagement, and turnover intentions, and Machiavellianism at Time 3). Afterwards, we tested for longitudinal measurement invariance. This can be evaluated using (1) a multigroup approach or (2) a single sample longitudinal approach taking into account the lagged relationships among indicators (Brown, 2015; Vandenberg & Lance, 2000). The former approach only takes into account the within-time covariances whereas the latter additionally includes the between-time correlations between the repeated items. We tested longitudinal invariance using both methods as recommended by Brown (2015).<sup>1</sup>

The results provided a reasonable fit for the measurement model at each time point, which was also significantly better than the fit of alternative models (e.g., a model in which change impact and change value remained unspecified). SRMR values were below .08, RMSEA values were close to or below .06, and CFI values were close to or above .95 (cf. Hu & Bentler, 1999).

We assessed longitudinal measurement invariance using three important metrics: (1) configural invariance, that is, the equivalence of factor structures; (2) metric invariance, that is, the equivalence of factor loadings; and (3) scalar invariance, that is, the equivalence of item intercepts. The multigroup analysis provided a well-fitting configural model (i.e., pattern invariance—the baseline model). The metric model showed a change of CFI smaller than the cut-off of .002 suggested by Meade, Johnson, and Braddy (2008). Further, the changes in RMSEA and SRMR, together with the changes in CFI, fulfilled the criteria set by Chen (2007). Thus, this analysis supported the metric invariance of our model. Even the scalar invariance provided a good fit, and the deviation from the configural model was below the suggested cut-off values to establish invariance (cf. Meade et al., 2008). The results for the single sample longitudinal approach are also provided in Table 2. Overall, given the complexity of our model and the available cut-off scores for multigroup models, both approaches provided good support for metric invariance and even some support for scalar invariance.

### 7.2 | Test for attrition bias

To determine whether attrition biased our analyses, we followed Goodman and Blum's (1996) recommendations for testing for

<sup>1</sup>As our data have missing values, we followed the advice of Schaefer and Graham (2002) who recommended using the full-information maximum likelihood method to deal with missing data in structural equation models, because Monte Carlo studies have shown that these seem to be best at dealing with missing data.

**TABLE 2** Results of tests for longitudinal measurement invariance of scales

Model	$\chi^2$	df	CFI	RMSEA (90% CI)	SRMR	$\Delta\chi^2$	$\Delta$ CFI	$\Delta$ RMSEA	$\Delta$ SRMR
Time 1	927.67	110	.952	.064 (.060, .067)	.042				
Time 2	611.90	110	.962	.057 (.053, .062)	.038				
Time 3	473.61	110	.960	.060 (.055, .066)	.042				
Time 3 with Mach	774.04	262	.952	.046 (.042, .050)	.042				
<i>Multigroup CFA</i>									
Configural	2,013.74	330	.957	.061 (.058, .063)	.041				
Metric	2,051.36	356	.957	.059 (.056, .061)	.042	37.62	.000	.002	-.001
Scalar	2,122.64	376	.956	.058 (.056, .060)	.043	71.28***	-.001	.001	-.001
<i>Single sample longitudinal CFA</i>									
Configural	3,111.26	1,098	.954	.028 (.027, .029)	.042				
Metric	3,544.42	1,124	.945	.030 (.029, .053)	.057	433.16***	-.009	-.002	-.015
Scalar	3,678.86	1,152	.942	.031 (.029, .032)	.059	134.44***	-.003	-.001	-.002

Note. For engagement, we modeled the constructs with three sub-components and one higher order latent variable (see Yalabik, Popaitoon, Chowne, & Rayton, 2013). For the other constructs, all items loaded on one latent factor. Multigroup CFAs only consider within-time covariances; single sample longitudinal CFAs account for the between-times correlations of items.

Abbreviations:  $\chi^2$ , chi-square; df, degrees of freedom; CFI, comparative fit index; RMSEA, root mean square error of approximation; CI, 90% confidence interval around RMSEA;  $\Delta\chi^2$ , change in  $\chi^2$  relative to preceding model;  $\Delta$ CFI, change in CFI;  $\Delta$ RMSEA, change in RMSEA;  $\Delta$ SRMR, change in SRMR; +/–, signs denote better/worse fitting models, respectively.

\*\*\* $p < .001$ .

nonrandom sampling using multiple logistic regressions. We conducted two multiple logistic regressions, using a dichotomous dependent variable which defined participants as either stayers (i.e., respondents who answered at both measurement point T1 and T2 [analysis 1] or at measurement point T2 and T3 [analysis 2]) or leavers (respondents who answered at only T1 [analysis 1] or T2 [analysis 2]). The independent variables were the T1 measures of our main variables in the first analysis and the T2 measures of our main variables in the second analysis.

The results of the first multiple logistic regression yielded nonsignificant effects for work engagement,  $b = -.02$ ,  $SE = .08$ ,  $p = .81$ , turnover intentions,  $b = .04$ ,  $SE = .06$ ,  $p = .49$ , change impact,  $b = .06$ ,  $SE = .06$ ,  $p = .81$ , and change value,  $b = -.06$ ,  $SE = .08$ ,  $p = .23$ . Similarly, the results of the second analysis indicated an absence of nonrandom effects for work engagement,  $b = .03$ ,  $SE = .09$ ,  $p = .77$ , turnover intentions,  $b = .08$ ,  $SE = .07$ ,  $p = .21$ , change impact,  $b = -.08$ ,  $SE = .06$ ,  $p = .18$ , and change value,  $b = -.04$ ,  $SE = .06$ ,  $p = .49$ . These analyses indicated that attrition was random for the key variables of our model.

### 7.3 | Main analysis

The current data are multilevel with repeated measures on Level 1 nested within individuals at Level 2. Consequently, we analyzed the data using hierarchical linear modeling. We used grand-mean centering for the moderator variable Machiavellianism at Level 2 and coded time as 0, 1, and 2 (see Raudenbush & Bryk, 2002). We made use of the nonlinear and linear mixed effects package (“nlme”) in the statistical software package R and followed the model building steps as

described by Bliese and Ployhart (2002), thus using a random coefficient modeling (RCM) framework for growth modeling. Note that, in this framework, time is the independent variable. Thus, results should be interpreted here as *changes in the mean levels* of the dependent variable over time.

We first specified the Level 1 model at the intrapersonal level using time increases as predictors of our dependent variables (see Bliese & Ployhart, 2002, for a detailed description of the procedure). Bliese and Ployhart advise to first model Level 1 to best fit the data before modeling Level 2 (in our case, the cross-level moderation effect of Machiavellianism). This is important as “correctly analyzing the data can lead to more accurate substantive interpretations” (p. 375). In Hypotheses 1 to 4, we expect a relationship between time and the respective dependent variable. Further, we expect to find random slopes as these indicate variation between individuals which afterwards can be explained by the Level 2 moderation (see Hypotheses 5 and 6). First, we tested Hypotheses 1 to 4 which are all on Level 1 of our model (see Figure 1).

To compare the different models, we used restricted maximum likelihood estimation and ran the analysis in R with the NLME library written by Pinheiro and Bates (2000). In the next step, we calculated mediations and moderated mediations for which we specified the Level 2 model including the cross-level interaction effects between Machiavellianism (grand-mean centered) and time. For the Level 2 cross-level interaction calculation, we followed the procedure of Bliese and Ployhart (2002). For the calculation of mediation (Hypotheses 3 and 4) as well as moderated mediation (i.e., additional analyses), we additionally made use of the MLmed macro—a computational SPSS macro enabling us to test the mediating as well as the moderated mediation effects (Rockwood &

Hayes, 2017).<sup>2</sup> Monte Carlo confidence intervals around the respective indirect and moderated mediation effects are reported in our analysis.<sup>3</sup> The current statistical tools provided for RCM do not allow for testing the overall model as presented in Figure 1. We therefore tested the model stepwise as reflected in Hypotheses 1 through 6. RCM yields the advantage of including more participants (i.e., participants who answered only two out of the three surveys) when estimating effects, hence leading to more accurate results (Bliese & Ployhart, 2002). MLmed allows us to test the predicted mediations (Hypotheses 3b, 3c, and 4b) as well as the moderated mediations in our overall model as additional analyses.

We ran all analyses twice, once with and once without control variables. The control variables included *gender*, *age*, and (former) police force membership (former police force 1 versus force 2). The results did not differ substantially in terms of size and significance levels of coefficients for the analyses including versus not including the control variables. We report the results with control variables here.

## 7.4 | Level 1 modeling<sup>4</sup>

All statistical results of the Level 1 analysis testing our hypotheses with RCM are reported in Table 3.<sup>5</sup>

### 7.4.1 | Change impact

In the Level 1 model, we used linear time increase as a predictor of change impact beliefs and covariates. This analysis indicated that compared to a baseline model with fixed intercepts and slopes, a model with random intercepts provided a better fit,  $\Delta -2 \log\text{-likelihood} = 282.25$ ,  $p < .001$ . Allowing random slopes further improved the fit,  $\Delta -2 \log\text{-likelihood} = 20.11$ ,  $p < .001$ . In Hypothesis 1, we predicted a positive significant effect of time on change impact. This is indeed what we found. Specifically, average levels of change impact beliefs increased over time, providing support for Hypothesis 1.

<sup>2</sup>Here, a stepwise approach is used, in which the effects on the mediator as well as on the dependent variable are first tested, and then moderated mediation as well as indirect effects are calculated. In the case of multilevel data, this procedure uses within-group centering of the level 1 predictor variables (i.e., including mediators) and stacks the data to test for mediating and moderated mediation effects (see Bauer, Preacher, & Gil, 2006).

<sup>3</sup>Typically, the indirect effects and/or index of moderated mediation do not have a normally distributed sampling distribution, so  $p$  values constructed under the assumption that these are normally distributed are generally underpowered. Therefore, we report bootstrap confidence intervals or Monte Carlo confidence intervals in this analysis.

<sup>4</sup>All models showed homoscedasticity. Only the model on turnover intentions showed potential autocorrelation. As the analysis with and without modeling autocorrelation for turnover intentions showed no significant difference for the effects tested, we report all analyses here without modeling heteroscedasticity and autocorrelation.

<sup>5</sup>We also ran all analyses testing for curvilinear effects. Only the analysis on change values showed a significant additional curvilinear effect,  $\gamma = -.02$ ,  $SE = .01$ ,  $t(1566) = -2.01$ ,  $p = .04$ , indicating that the increases over time were flattening. All other analyses did not show curvilinear effects on the level 1 model.

### 7.4.2 | Change value

We followed the same statistical procedure as described above. Modeling data with random intercepts provided a better fit to the data as compared to the baseline model,  $\Delta -2 \log\text{-likelihood} = 834.50$ ,  $p < .001$ . However, modeling random slopes did not further improve the model fit,  $\Delta -2 \log\text{-likelihood} = .92$ ,  $p = .66$ .<sup>6</sup> The Level 1 analysis yielded a negative and significant linear effect of time on change value. The average levels of change value beliefs thus decreased over time, supporting Hypothesis 2.

### 7.4.3 | Work engagement

This analysis indicated that compared to the baseline model, a model allowing random intercepts was a better fit,  $\Delta -2 \log\text{-likelihood} = 744.67$ ,  $p < .001$ . Further, allowing random slopes fitted the data better,  $\Delta -2 \log\text{-likelihood} = 42.50$ ,  $p < .001$ . The Level 1 analysis yielded a negative and significant linear effect of time on work engagement. Thus, average levels of work engagement decreased over time during the change process in support of Hypothesis 3a.

### 7.4.4 | Turnover intentions

A random intercept model fitted the data better than the baseline model,  $\Delta -2 \log\text{-likelihood} = 470.36$ ,  $p < .001$ . Further, modeling random slopes improved the model fit,  $\Delta -2 \log\text{-likelihood} = 28.17$ ,  $p < .001$ . The Level 1 analysis yielded a significant positive linear effect of time on turnover intentions. Thus, levels of turnover intentions increased over time throughout the change process—supporting Hypothesis 4a.

### 7.4.5 | Mediation on work engagement

Next, we calculated mediation effects as predicted in Hypothesis 3b. Thus, we specified time as the independent variable, change impact as the mediating variable, and work engagement as the dependent variable, including covariates. This analysis tests the extent to which the decrease of work engagement over time is (partially) explained by *changes over time* in change impact beliefs. Predicting work engagement from both time and change impact yielded a significant effect of time,<sup>7</sup>  $\gamma = -.09$ ,  $SE = .01$ ,  $t(1074.03) = -7.96$ ,  $p < .001$ , but a nonsignificant effect of change impact,  $\gamma = -.03$ ,  $SE = .02$ ,  $t(477.67) = -1.70$ ,  $p = .09$ .<sup>8</sup> The overall mediation effect was also not

<sup>6</sup>This indicates that there was no significant variation between employees in terms of *changes* in their change value beliefs over time. Consequently, cross-level effects as predicted in Hypothesis 5b are also unlikely to be found.

<sup>7</sup>Note that when using MLmed within SPSS (with REML estimation), there is an automated correction to the degrees of freedom in more complex models like ours. Substantial differences in terms of results do not usually arise from this (Rockwood & Hayes, 2017).

<sup>8</sup>There was also a significant effect of force,  $\gamma = .26$ ,  $SE = .04$ ,  $t(1951.38) = -1.27$ ,  $p < .001$ .

**TABLE 3** Results of the random coefficient modeling analyses—Level 1

	Change impact			Change value			Work engagement			Turnover intentions			
	Estimate	SE	df	Estimate	SE	df	Estimate	SE	df	Estimate	SE	df	t
Intercept	3.42 <sup>****</sup>	.02	1,992	3.46 <sup>****</sup>	.02	1,950	163.01	.02	1,771	223.20	.02	1,765	73.19
Gender	-.06 <sup>*</sup>	.03	1,992	.12 <sup>***</sup>	.04	1,950	2.87	.03	1,771	.47	.04	1,765	1.08
Age	.002	.001	1,992	-.004 <sup>**</sup>	.002	1,950	-2.40	.002	1,771	-1.66	.002	1,765	-.24
Force	.28 <sup>****</sup>	.04	1,992	-.19 <sup>****</sup>	.05	1,950	-3.42	.05	1,771	.24	.06	1,765	-.57
Time	.04 <sup>***</sup>	.01	1,673	-.06 <sup>****</sup>	.01	1,567	-4.72	.01	1,367	-8.22	.02	1,350	4.19
R <sup>2</sup> (conditional)	.39			.37			.72			.62			

Note. R<sup>2</sup> (S&B) represents an estimate of the total effect procedure. R<sup>2</sup> conditional reports the proportion of total variance explained by fixed and random effects (see Nakagawa & Schielzeth, 2013).

\* p < .10.  
 \*\* p < .05.  
 \*\*\* p < .01.  
 \*\*\*\* p < .001.

significant,  $estimate = -.002$ ,  $SE = .001$ ,  $CI\ 95\% [LL = -.004, UL = .00]$ . Thus, Hypothesis 3b was not supported.

For the mediation analysis of change value beliefs and time on work engagement (Hypothesis 3c), we regressed work engagement on time, change value, and the covariates. This analysis yielded a significant effect of time,  $\gamma = -.09$ ,  $SE = .01$ ,  $t(982.53) = -7.79$ ,  $p < .001$ , and a significant effect of change value,  $\gamma = .11$ ,  $SE = .02$ ,  $t(473.47) = 4.78$ ,  $p < .001$ . The overall mediation effect was significant too,  $estimate = -.007$ ,  $SE = .002$ ,  $CI\ 95\% [LL = -.01, UL = -.003]$ . Thus, supporting Hypothesis 3c, the decrease in work engagement over time was mediated by *changes over time* in beliefs about the value of the change.

## 7.4.6 | Mediation on turnover intentions

To test Hypothesis 4b, we regressed turnover intentions on time, work engagement, and the covariates. This analysis yielded a significant effect of time,  $\gamma = .05$ ,  $SE = .02$ ,  $t(1093.54) = 2.83$ ,  $p = .005$ , and, more importantly, a significant effect of work engagement,  $\gamma = -.32$ ,  $SE = .04$ ,  $t(275.26) = -7.24$ ,  $p < .001$ . The estimated mediation effect of time on turnover intentions via work engagement was  $.03$ ,  $SE = .006$ , with 95% CI (i.e., based on Monte Carlo estimation) of  $[LL = .02, UL = .04]$ . Thus, increases in employee turnover intentions were mediated by *changes over time* in work engagement, providing support for Hypothesis 4b.

## 7.5 | Level 2 modeling: Cross-level moderations

### 7.5.1 | Change impact

The Level 2 model included Machiavellianism as the Level 2 individual difference variable. To test Hypothesis 5a, we ran a cross level moderated analysis. As can be seen in Table 4, this analysis yielded a significant interaction effect (see Figure 2). Employees with higher levels of Machiavellianism (+1 SD) showed stronger increases in change impact beliefs,  $\gamma = .09$ ,  $SE = .03$ ,  $t(1058) = 3.44$ ,  $p < .001$ , than employees lower in Machiavellianism,  $\gamma = -.001$ ,  $SE = .03$ ,  $t(1058) = -.02$ ,  $p = .98$ , in support of Hypothesis 5a.

### 7.5.2 | Change value

Although the Level 1 analysis on change value beliefs indicated that the slopes were not random and, thus, there was no significant variation in slopes between employees to explain, we still ran a cross level moderation analysis to test Hypothesis 5b. In this analysis, we treated slopes as random. The results of the cross-level interaction on change value yielded no support for Hypothesis 5b (i.e., the negative relationship between change duration and change value beliefs was not significantly stronger for high Machs than for low Machs).

### 7.5.3 | Work engagement

The interaction between time and Machiavellianism (i.e., Hypothesis 6) was significant. In line with our hypothesis, employees high in Machiavellianism showed stronger decreases in work engagement,  $\gamma = -.14$ ,  $SE = .02$ ,  $t(1000) = -7.60$ ,  $p < .001$ , compared to employees low in Machiavellianism,  $\gamma = -.05$ ,  $SE = .02$ ,  $t(1000) = -2.41$ ,  $p = .02$  (see Figure 2).

### 7.5.4 | Turnover intentions

For completeness, we also tested the cross-level interaction effect on turnover intentions (see Table 4). Employees high in Machiavellianism showed a stronger increase in turnover intentions over time,  $\gamma = .16$ ,  $SE = .03$ ,  $t(990) = 5.82$ ,  $p < .001$ , than employees low in Machiavellianism,  $\gamma = .04$ ,  $SE = .03$ ,  $t(990) = 1.31$ ,  $p = .19$ .

## 7.6 | Additional Level 2 analyses: Cross-level moderated mediation analyses

Our overall model (depicted in Figure 1) also includes assumptions about moderated mediation. We next tested for these moderated mediations.

### 7.6.1 | Change impact and work engagement

Specifically, we tested whether time predicted work engagement via change impact and whether this mediation was moderated by Machiavellianism. This analysis indicated a significant moderated mediation index,  $estimate = -.003$ ,  $CI\ 95\% [LL = -.007, UL = -.0002]$  with a mediating effect for employees high in Machiavellianism,  $estimate = -.004$ ,  $SE = .002$ ,  $CI\ 95\% [LL = -.009, UL = -.0007]$ , but not for employees low in Machiavellianism,  $estimate < .0001$ ,  $SE = .001$ ,  $CI\ 95\% [LL = -.003, UL = .003]$ .

### 7.6.2 | Change value and work engagement

Given that there was no cross-level interaction between time and Machiavellianism on change value, it is perhaps unsurprising that the moderated mediation effect on work engagement via change value was also not significant,  $estimate = -.002$ ,  $CI\ 95\% [LL = -.008, UL = .004]$ .

### 7.6.3 | Work engagement and turnover intentions

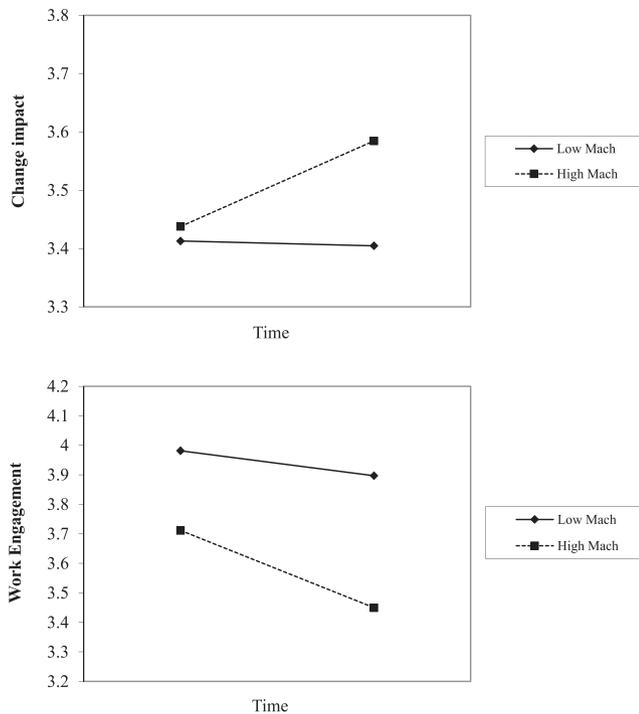
Finally, we tested whether the effect of time on turnover intentions via work engagement was moderated by Machiavellianism. This analysis indicated a significant moderated mediation index,  $estimate = .02$ ,

**TABLE 4** Results of the random coefficient modeling analyses—Level 2

	Change impact			Change value			Work engagement			Turnover intentions				
	Estimate	SE	df	Estimate	SE	df	Estimate	SE	df	Estimate	SE	df	t	
Intercept	3.42 <sup>****</sup>	.03	1,058	108.04	.04	1,043	95.59	.03	1,000	139.77	.03	990	45.07	
Gender	-.04	.06	657	-.75	.19 <sup>***</sup>	657	2.70	.05	657	1.55	.07	656	-.05	
Age	.0003	.003	657	.10	-.006	657	-1.92	.002	657	-.88	.003	656	-1.51	
Force	.26 <sup>****</sup>	.07	657	3.59	-.21 <sup>**</sup>	657	-2.38	.07	657	-1.03	.04	656	.48	
Time	.04 <sup>**</sup>	.02	1,058	2.37	-.06 <sup>****</sup>	1,043	-3.75	.01	1,000	-6.99	.10 <sup>****</sup>	990	4.98	
Mach	.01	.05	657	.19	-.17 <sup>***</sup>	657	-3.17	.04	657	-4.78	.13 <sup>**</sup>	656	2.46	
Time x Mach	.07 <sup>**</sup>	.03	1,058	2.44	-.02	1,043	-.80	.02	1,000	-3.64	.10 <sup>***</sup>	990	3.17	
R <sup>2</sup> (conditional)				.44				.65				.73		

Note. R<sup>2</sup> (S&B) represents an estimate of the total effect procedure. Note that time is a within-participant effect, the covariates and Machiavellianism are between participant effects. R<sup>2</sup> conditional reports the proportion of total variance explained by fixed and random effects (see Nakagawa & Schielzeth, 2013).

\* p < .10.  
 \*\* p < .05.  
 \*\*\* p < .01.  
 \*\*\*\* p < .001.



**FIGURE 2** Changes in employee reactions over time as moderated by employee Machiavellianism

CI 95% [LL = .01, UL = .04], with a significant mediating effect for employees high in Machiavellianism,  $effect = .04$ ,  $SE = .008$ , CI 95% [LL = .03, UL = .06], and a significant but weaker effect for employees low in Machiavellianism,  $effect = .01$ ,  $SE = .006$ , CI 95% [LL = .003, UL = .03].

## 8 | DISCUSSION

The first aim of our study was to investigate the effect of time on variations in employees' beliefs during the initial stages of a large-scale organizational change. As Pettigrew et al. (2001) note, researchers and practitioners of organizational change need to account for the role of time and shifts in individuals' attitudes and behaviors to better understand the dynamics and adequately manage such processes. In line with our expectations, time (as duration of the change process) had a detrimental effect on employees' change beliefs, both in terms of perceived change impact and perceived change value. These results are in line with the proposed "change curve" (Elrod & Tippett, 2002; Schneider & Goldwasser, 1998) and previous empirical findings which show that during the initial phases of large-scale change, employees may experience an increase in uncertainty (Elrod & Tippett, 2002; Schweiger & DeNisi, 1991) and negative affect (Kiefer, 2005) as well as a deterioration in expectations (Konlechner et al., 2019). Our study provides a theoretical explanation of the link between change duration and negative outcomes as well as an explicit empirical test of this relationship, allowing us to better understand the processes facilitating and inhibiting employees' change attitudes and outcomes, when confronted with large-scale change. The findings add to the

sensemaking literature by supporting the view that sensemaking processes during such change projects often lead to negative outcomes as employees are confronted with experiences that are divergent from their expectations (Konlechner et al., 2019).

Next, we found that a decline in employees' beliefs about the impact and value of the change indicative of a loss in change momentum came with a more general decline in employees' work engagement and increases in their turnover intentions. In line with our expectations, change value beliefs mediated the effect of time on work engagement, and work engagement mediated the effect of time on turnover intentions. Although the general mediating effect of change impact on work engagement did not reach conventional levels of significance, we found evidence for a significant mediating effect that was moderated by employee Machiavellianism (moderated mediation). These results add to our knowledge of the psychological mechanisms that explain why turnover intentions may increase during large-scale organizational change and why some employees may react in stronger ways than others. They confirm the importance of subjective beliefs regarding the impact and value of a change for change consequences, including for general work attitudes and behaviors (Oreg et al., 2011; Piderit, 2000). Our findings also provide empirical support for the proposition in the popular change management model by Kotter (1995) that it is important to establish a sense of urgency in employees in an early phase of a change project, which can be achieved by demonstrating the purpose and value of the change (Armenakis et al., 2007).

Research on organizational change distinguishes different phases or stages that might require different activities to facilitate and advance the change process (e.g., Chung & Choi, 2018; Isabella, 1990; Kotter, 1995). Our findings suggest that activities aimed at the early prevention of a deterioration in change beliefs and work engagement during the implementation process may be of particular importance in shaping change outcomes. Communication and information efforts might help to create realistic employee expectations about the change process and the required adaptation, thus reducing the risk of a deterioration in change beliefs when the reality of a change is less positive than the (prechange) expectations (Konlechner et al., 2019). This implication of our results is in line with the oft-mentioned recommendation in the change literature that organizations should use change-supportive communication to keep employees informed about the implementation process (see Oreg et al., 2011). Our results further show that these communication activities are of particular importance in the prolonged initial phases of a change as change momentum needs to be continuously bolstered by ensuring that employees receive change-supportive information throughout all stages of a change when adaptation efforts are especially high.

Employees seem to experience change processes as "shocks," which stimulate them to reflect on the meaning and implications of the changes for their organization and work and which can trigger the desire to leave their job (Lee & Mitchell, 1994). Previous studies have identified organizational (e.g., frequency of change, transformational change, Rafferty & Griffin, 2006) and attitudinal (e.g., affective commitment, change anxiety, Rafferty & Restubog, 2010) variables as

antecedents of turnover (intentions) during organizational change. Our study integrated these variables into one model and added work engagement as a mediator to the picture. More specifically, we identified declines in work engagement as an antecedent of increases in turnover intentions within people, allowing for more detailed insights into the triggers of intraindividual processes and variations during change trajectories.

We further contribute to the literature on organizational change by investigating the initial stages of a specific type of change, that is, large-scale organizational change. We found that the duration of large-scale change had a substantial (negative) effect on employees' reactions. Oreg, Bartunek, Lee, and Do (2018) propose that in order to accept and embrace a change, employees need to believe that the change is positive in relation to their own or their organization's goals and that they are personally able to cope with it. Our findings suggest that such an appraisal might be difficult to achieve in the early stages of a change when rewards and goals of the change might be less apparent (Isabella, 1990; Weick, 1988). More generally though, it may be expected that negative employee reactions will only increase during the initial phases of a change when employees realize the adaptation costs required for the change implementation are not in line with their initial expectations (Konlechner et al., 2019). Once the concrete impact and consequences of a change finally become clear and the benefits become salient, employees' reactions might become more positive (Elrod & Tippett, 2002; see also Schneider & Goldwasser's, 1998, proposition of positive employee reactions towards the end of a change project: "light at the end of the tunnel," and Jansen et al., 2016, who found that some—though only a few—employees developed more positive perceptions of a change process over time).

Finally, we found that employee Machiavellianism acted as a moderator that influenced longitudinal variations in beliefs about the change, work engagement, and turnover intentions. Organizational change processes often come with resource constraints (by "diverting resources from operating to reorganizing," e.g., Haveman, 1992). Our study shows that under change conditions, with few opportunities for self-interested employees to capitalize on, high Machs tend to reduce their work engagement and eventually seek to leave their organization. In this sense, organizational change seems to act as a condition that activates high Machs' innate tendencies for opportunistic and unfavorable organizational behavior. This extends current discussions on trait activation theory (Tett & Burnett, 2003) to change contexts, thus providing evidence for the most recent proposition that Machiavellianism can be activated by trait-relevant situational cues (Greenbaum, Hill, Mawritz, & Quade, 2017).

We theorized that the uncertainty, stress, and hardship associated with large-scale change processes would trigger high Machs' inclination to defect, thus leading to disengagement and turnover intentions. However, it would also be interesting to explore the social interactions of high Machs versus low Machs as people tend to turn to their peers for information on how to interpret and evaluate uncertain and difficult situations. People are more attracted to others who are similar to them (similarity-attraction paradigm, Byrne, 1971). It

may thus be possible that high Machs are more attracted to employees with negative attitudes towards change, and the social confirmation of their negative attitudes may further strengthen those employees in their negative beliefs and sensemaking about the change over time. Despite such open questions about (potential) concrete mechanisms, our findings add to the organizational change literature by showing that personality traits can influence employees' reactions to organizational change (see Rafferty et al., 2013). We thus introduce Machiavellianism as a trait that affects employees' perceptions of and reactions to organizational change in crucial ways. Our findings encourage further investigations of the role of "dark traits" in organizational change. For example, narcissists are self-absorbed, prioritize own goals over organizational goals, and (due to their inflated self-view) might be more inclined to feel that better alternative job options are easily available to them (e.g., Mathieu, 2013). These characteristics are likely to negatively affect their attitudes and reactions to organizational change.

## 9 | LIMITATIONS AND FUTURE RESEARCH

Like most research, this study also has a number of limitations. First, although our empirical study is longitudinal in nature, as Ployhart and Vandenberg (2010, p. 103) note, "the critical issue is to have enough measurements to appropriately model the hypothesized form of change." Our longitudinal analysis was restricted to three time points, meaning that we could have missed certain trends in our data over time. Although we were interested in general trends, which made us consciously avoid times of turmoil for data collection, future longitudinal research should include more measurement points and investigate potential linear and nonlinear patterns over the change period.

In addition, as this study covered only the first one and a half years of a planned 4-year change trajectory, we were not able to determine a tipping point of these increases in negative reactions. In this regard, a study by Petrou, Demerouti, and Schaufeli (2018) provides some interesting insights. These authors measured employee engagement in the second half of a change project and 1 year after the implementation of the change and found nearly identical results at the two time points. Integrating our findings with those of Petrou et al. (2018), it may be suggested that negative employee reactions might indeed first increase (in line with the "change curve" and our results), before stabilizing towards the end of a change process, when the full impact of the change is clear for employees and times are less uncertain. Although our study indicates that the early stages are crucial in shaping employees' beliefs about a change, future research should aim to investigate whether, when, and why negative employee beliefs and reactions plateau or improve again over time. Such a test could provide valuable additional insights into the longitudinal dynamics of change from initial to final stages.

Next, due to the political sensitivity of the focal change process, we were only able to measure turnover intentions rather than actual turnover behavior. Although turnover intentions and actual turnover are distinct concepts (Cohen, Blake, & Goodman, 2016), several

studies have established a significant link between turnover intentions and turnover behavior, indicating that intentions are a strong predictor of actual turnover (see Griffeth, Hom, & Gaertner, 2000; Tett & Meyer, 1993). Still, it would be desirable to replicate our findings in future studies using actual turnover rather than turnover intentions.

Further, we used shortened scales to measure some of our variables in order to keep the survey as short as possible, which was a requirement of the organization where we collected the data. Even though the psychometric properties of our measures were satisfactory, and we were able to provide some evidence of the validity of the shortened measures (e.g., change value, Machiavellianism) these scales cannot rely on the validation information available for the full scales. We also measured Machiavellianism in the final survey, at T3, so it is possible that a systematic dropout of high Machs happened during the course of our longitudinal study, and the range of Machiavellianism in our data was restricted as a consequence. Future research should therefore replicate our results with the full, pre-validated versions of our measures and measure Machiavellianism at the first time point, T1.

Finally, we measured and modeled only a limited number of specific change variables (time/duration of the change process, beliefs about change impact and change value). However, research has shown that change content issues (e.g., incentive systems) may also affect change recipients' reactions (see e.g., Armenakis & Bedeian, 1999) and that unexpected interruptions or delays in the change process are likely to exacerbate negative sensemaking and beliefs over time. We also used a case study design and hence investigated reactions to one specific type of change (large-scale, long-term), within the context of one specific organization (national police) and culture (the Netherlands). Future research should explicitly include and measure additional change content aspects and replicate the study in other contexts (e.g., different national cultures).

## 10 | PRACTICAL IMPLICATIONS

Our study offers important practical implications. First, as declines in work engagement are linked to increases in turnover intentions, our study suggests that employees' work engagement should be repeatedly monitored and managed throughout change processes. Indications of decreasing work engagement can be used as early warning signs of potential employee turnover (intentions) in the future. One way to increase employee engagement is by developing and improving transformational leadership skills in supervisors through education, training, and coaching interventions (Dvir, Eden, Avolio, & Shamir, 2002; Schmitt, Den Hartog, & Belschak, 2016). In addition, employee engagement is found to increase when employees are given greater control over their work (e.g., Mauno, Kinnunen, & Ruokolainen, 2007). Our findings suggest that steps aimed at addressing dwindling engagement should be initiated early on in a change process, in order to prevent negative attitudes from escalating into a desire to leave the organization.

Organizations should also be aware that employees' beliefs about ongoing change play an important role in shaping their work engagement and turnover intentions. Carefully monitoring and managing individuals' beliefs about a change during the full implementation phase—for instance, through employee participation and careful and timely communication (Choi, 2011; Konlechner et al., 2019; Kotter, 1995)—may therefore help to avoid a loss in change momentum, hence facilitating the change process and reducing the social and organizational costs of change.

Finally, organizations should be aware that contextual factors play an important role in the activation of trait-relevant behaviors (Tett & Burnett, 2003). In particular, times of hardship, such as long-lasting, high-impact organizational change processes, seem to activate Machiavellian trait behaviors. In such contexts, high Machs' change beliefs become more negative, their work engagement suffers, and they are likely to defect and leave the organization, whereas low Mach employees react less negatively. Some may argue that these are desirable self-selection processes that help organizations to lose a group of employees who is detrimental to the welfare of the organization. Yet scholars who focus on Machiavellianism have repeatedly noted that high Machs do not always engage in undesirable behaviors (see Wilson et al., 1996) and can be effectively managed to behave in pro-organizational ways (e.g., Bagozzi et al., 2013; Belschak et al., 2015). Also, organizations are already vulnerable during change processes (e.g., facing decreases in employee motivation, an increased risk of high-performing employees leaving, and difficulties in replacing and attracting new personnel), and increased turnover of employees is likely to exacerbate this situation. Organizations should therefore be careful to consider these “side effects” of organizational change projects for high Machs as additional costs of change. Creating short-term wins during change projects, as suggested by Kotter (1995), might be a way to address the skepticism and negative beliefs about change that are typical for high Mach employees.

Overall, our study provides important insights into both the intrapersonal dynamics of employees' reactions to large-scale change and the inter-personal differences in such reactions between different groups of employees. It illustrates that change processes require intensive adaptation efforts from organizational members, which need to be incorporated in the planning and implementation of change trajectories. Our study contributes to a more realistic perspective on the costs of change and the potential for their management over time.

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**How to cite this article:** Belschak FD, Jacobs G, Giessner SR, Horton KE, Bayerl PS. When the going gets tough: Employee reactions to large-scale organizational change and the role of employee Machiavellianism. *J Organ Behav.* 2020;41:830–850. <https://doi.org/10.1002/job.2478>

## APPENDIX A: FULL ITEMS OF MODIFIED ORIGINAL SCALES

**Change impact** (three items adapted from Rafferty & Griffin, 2006):

These changes will affect my force's structure.

These changes will significantly change my force's goals.

These changes will alter the values of my force.

**Change value** (three items taken from Herscovitch & Meyer, 2002):

This change serves an important purpose.

I believe in the value of this change.

This change is a good strategy for this organization.

**Machiavellianism** (eight items taken from Belschak et al., 2015):

Never tell anyone the real reason you did something unless it is useful to do so.

The best way to handle people is to tell them what they want to hear.

It is safest to assume that all people have a vicious streak and it will come out when they are given a chance.

Generally speaking, people will not work hard unless they are forced to do so.

Anyone who completely trusts anyone else is asking for trouble.

The biggest difference between most criminals and other people is that the criminals are stupid enough to get caught.

It is wise to flatter important people.

It is hard to get ahead without cutting corners here and there.