The Psychology of Error: How Supervisor Behavior Affects Mental Health

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This is to certify that the thesis prepared

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complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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ABSTRACT

The Psychology of Error: How Supervisor Behavior Affects Mental Health

James Thompson

Supervisors must deal with employee errors on a regular basis and may resolve them by acting according to various behaviors, including error management or error avoidance. However, the relationship between supervisor behaviors when dealing with errors and their effect on employee mental health has been subject to limited study, despite an increasing focus on mental health in the workplace. In this thesis, the data I gathered from 244 survey respondents support a model that links supervisor error treatment behavior to the job stress experienced by employees. I discuss the theoretical and practical applications for mental health, leadership training, organizational productivity, and future research.

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Dedication

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To Harry the cat: meow, buddy. Thanks for being such a great companion.

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"Learn by doing." (John Dewey)
"Learn from the mistakes of others." (Eleanor Roosevelt)
"If at first you don't succeed, try, try again." (Edward Hickson)
"It's better to try and fail than fail to try." (William F. O'Brien)
"You miss one hundred percent of the shots you don't take." (Wayne Gretzky)

Mistakes are an integral part of any undertaking — and countless expressions in the English language convey the sentiment that undertakings that end in failure are, at the very least, more acceptable than no attempt at all. However, these sentiments fail to prepare for the reality that trials more frequently meet with failure than success. Indeed, although making mistakes is a major factor in the learning process, one place the adage "to err is human" has never gained widespread acceptance is in the workplace. (In this thesis, I employ Carmeli and Gittell's (2009) definition of error as "a disruption that prevents the completion of an organizational task or achieving a desired organizational end." (p. 711). Note also that I employ the terms "errors" and "mistakes" interchangeably.)

When employees make mistakes at work (i.e., design flaws, releasing incorrect information to the public, following incorrect procedures, losing contracts, or even endangering lives), the cost to their mental health can be high. When errors are made, for many the outcome is often punishment, which takes the form of ostracism, bullying, shaming, being passed over for promotions, forced leave, or termination. Furthermore, the fallout for the employee from these behaviors can be stress, bouts of anxiety, depression, illness, leaves of absence, and eventual departure.

The above examples describe a traditional approach to management known in the literature as 'error avoidance.' (Guchait et al., 2014; van Dyck et al., 2005). Supervisors who employ error avoidance assume that mistakes are avoidable, and that workers should be capable

of learning procedures properly the first time around. When they do occur, mistakes are thought to be correctable through shaming, finger pointing, and the other aggressive, punitive tactics outlined in the preceding paragraph.

At a fundamental level, if the adage indeed holds true that "to err is human," then supervisors should, as a rule, make allowance for errors for the simple reason that they are to be expected. One type of error, for example, occurs on occasions when employees just have a bad day and miss out on important details in a task. This type can often be remedied without much trouble by pointing it out. However, a second type occurs when mistakes may be at least partially due to faults in processes in place, perhaps due to unforeseen circumstances or nonexistent policies for never-encountered situations. Arguably, in either of these cases, enacting punitive measures when the employee is otherwise blameless simply becomes unjustifiable and, moreover, unfair. In fact, blaming individuals for mistakes that are bound to be repeated because of momentary lapses or flaws in training or procedures, instead of prioritizing the correction of said flaws, might even be considered irresponsible management practices. Regardless of the cause of the problem, though, the outcome for the individual is the same. When workers make a mistake, they experience stress, physiological fallout (i.e., social anxiety, panic, fear, emotional exhaustion, insomnia, psychosomatic illness, and cognitive impairment; Maloney et al., 2014; McGregor & Elliott, 2005; Shirom, 2009; see also Linden and Muschalla, 2007). The shame of realizing that they made a mistake, fearing being found out, and anticipating punishment are sources of anguish for many (McGregor & Elliott, 2005), while at the organizational level, the physiological illnesses employees experience translate to loss of productivity (Ford et al., 2011), deviant behavior (Kouchaki & Desai, 2015), insurance expenses, turnover (Linden & Muschalla, 2007), and rehiring and training expenses, all of which can amount to considerable expense for

the organization. At its extreme, fear of negative consequences even leads to the purposeful concealment and underreporting of errors, which means that in some workplaces (i.e., the healthcare sector) errors may not be discovered until they have caused fatalities (Edmondson & Lei, 2014).

That being said, the cost of errors cannot be understated. In terms of human lives, a 2016 British Medical Journal report on health care in the U.S. listed medical errors as the third-leading cause of death behind heart disease and cancer, or 9.70% of all deaths (Makary & Daniel, 2016). In a survey of over 3 100 physicians in Canada and the U.S., 92% admitted to involvement in "a near-miss, minor error, or serious error" (p. 468) in patient treatment (Waterman et al., 2007). Financially, simple mistakes can cause massive disruptions; in 2012, for example, JPMorgan Chase famously lost more than $6 billion due to a spreadsheet cut-and-paste error (Kopecki & Son, 2013). Supervisors of the error avoidance school of thought are, naturally, intent on rooting out these kinds of mistakes. However, their methods may inadvertently be causing the very errors they seek to eliminate, via, for example, the aforementioned discouragement of error reporting induced by fear of reprisal (Edmondson & Lei, 2014).

Regardless of the stakes, then, the task of error resolution set before supervisors is a difficult one; for by emphasizing either the need for performance of the organization or the health needs of employees (Edmondson, 1999), one is sacrificed in favor of the other. Flawless operation may be possible, but only at great cost to employee mental health. Conversely, a permissive supervisor intent on not causing subordinates undue stress may sacrifice accuracy and performance in the meantime.

Fortunately, an alternative beyond the all-or-nothing approach of error avoidance is available. Research over the last 30 years has highlighted a school of thought that has come to be

known as ‘error management’ (i.e., van Dyck et al., 2005). Integrating principles of ‘psychological safety’ (Edmondson, 1999), error management is an approach that recognizes that people are naturally prone to make mistakes, but that these mistakes can make for effective tools for learning. Instead of sanctioning those responsible, problems are resolved via analysis, discussion, quick remedying, dissemination of information among teams, systemic change where necessary, and above all, zero blame. In short, instead of being causes for distress, errors are framed as opportunities for growth (van Dyck et al., 2005).

But make no mistake: like error avoidance, error management has potential costs, such as time and money, that limit its usefulness as a panacea. The discussion of my results will help to elucidate the costs and benefits of both approaches. Indeed, although exceptions exist (i.e., Gilbreath and Benson (2004) studied the effect of supervisor behavior on employee mental health), more research is needed to firmly grasp how these respective behaviors link to organizational productivity (Guchait et al., 2014) through employee mental health (in this thesis I measure mental health via indicators of job stress). This is a surprising lacuna, especially in light of the contemporary emphasis on healthy workplaces (i.e., Biron et al., 2014), and even more so in the context of the recent COVID-19 pandemic that has caused havoc for mental health while upending traditional notions of work. With the research gap in mind, in this thesis I highlight the mental health state of employees by considering the psychological effect on them of supervisors’ error avoidance and error management approaches. To my knowledge, a focus on these specific behaviors and how they relate to individual health outcomes is novel.

My research questions are therefore twofold: 1) Is there a significant relationship between supervisors’ error avoidance and error management behaviors and employees’ experienced job stress? and 2) Is there a significant mediation effect of psychological safety on the relationship

between supervisors' error management or avoidance behavior and employees' experienced job stress?

Literature Review

Any discussion of job stress in the workplace would be incomplete without connecting it to anxiety. The American Psychological Association (2022) defines anxiety as "apprehension and somatic symptoms of tension" in anticipation of threat cues. When experienced, anxiety is a series of physiological responses that manifest themselves through rapid heartbeat, faster breathing, and muscle contraction. The 'fight or flight syndrome,' for example, describes when the body prepares to either confront or escape danger by shutting down unnecessary physiological processes and flooding the bloodstream with adrenaline (American Psychological Association, 2022).

Although estimates vary, anxiety disorders of all types (i.e., social anxiety, panic disorder, generalized anxiety disorder) have an estimated 31.20% lifetime prevalence in the United States (Harvard Medical School, 2007). In Canada between 2009-2010, approximately 1 in 10 sought professional help for mood or anxiety disorders (McRae et al., 2016). In fiscal terms, mental health illness costs the Canadian economy upwards of $50 billion per year, or 2.80% of gross domestic product (Canadian Mental Health Association, 2013). Mental health is therefore costly both in terms of health care and productivity.

Most importantly, the preceding figures suggest that many individuals are also affected by anxiety in the workplace. In certain circumstances, the experience of anxiety comes about when the workplace itself becomes psychologically threatening (Edmondson, 1999). As we shall see, an example of this can be due to perceptions of one's supervisor's actions. However, as I explain in the following section, supervision by itself is not automatically anxiety-inducing.

Anxiety Conditioning

As Pavlovian conditioning is a physiological response to a conditioned stimulus (Pavlov & Anrep, 1928), and anxiety is a conditioned response to fear-inducing stimuli (Shin & Liberzon, 2010), we can postulate that an association between supervisory behavior and anxiety occurs as the result of classic Pavlovian conditioning. Functional magnetic resonance imaging (fMRI) studies support this association by allowing us to see that localized electrical brain stimulation causes physiological fear responses; animal research utilizing fMRI, for example, has permitted researchers to simulate fear responses by applying stimulation to the amygdala, which then produces high blood pressure (Tellioglu et al., 1997) and threat vigilance (Kapp et al., 1994). Indeed, research to identify the neurological mechanism responsible for the fear response has pinpointed the amygdala, hypothalamus, and hippocampus as the brain centers responsible for perceiving threats, associating unconditioned stimuli to conditioned responses, executing responses, and modulating fear responses (Shin & Liberzon, 2010). Neuroimaging performed on human brains has likewise confirmed strong amygdala activation during fear conditioning (Alvarez et al., 2008, among others; for full list, see Shin & Liberzon, 2010). Persons with trait anxiety and generalized anxiety disorder are therefore hypothesized to have a hyper-responsive amygdala that responds as it would to fear-inducing threats (Shin & Liberzon, 2010). Further studies following conditioning have shown that even the mere anticipation of punishment can induce arousal (Grillon et al., 1991; Phelps et al., 2001), while even reading angry facial expressions may trigger social-phobic responses and even post-traumatic stress disorder (Shin & Liberzon, 2010). Elsewhere, Shin and Liberzon (2010) hypothesized that fear can be learned through empathic observation.

As humans, we have learned various ways to protect ourselves from threats. For example, from an early age we learn to use impression management and strategic deception to keep information to ourselves that could get us into trouble if revealed (Wilson et al., 2003). As adults, this may take the form of lying to, or concealing information from, work supervisors; this helps us to avoid experiencing fear arousal-inducing negative reactions. A recent, news-worthy example of this has been in connection with the war in Ukraine; analysis of Russian Federation President Putin's strategy had analysts hypothesizing that his advisors concealed the lackluster progress of the Russian military from him to save face (Sabbagh & Smith, 2022). In addition, the greater the deception, the greater the cognitive strain (Mager, 1931). When at work, this translates to a certain difficulty in focusing on tasks.

In the following section, I discuss the way the workplace environment is shaped by how supervisors respond to (or fail to respond to) employees' needs. We will begin to see how the factors discussed up to this point play a vital role in employees' overall mental health.

The Organizational Environment

Beyond the physical space it occupies, the organizational environment is formed by a mixture of elements that influence how employees interact with their work. For the purposes of my research, two foci hold special importance to this organizational ethos: (1) supervision style and (2) learning organization status. As I will explain, these entities are closely intertwined.

Supervision

Supervisory style sets the tone of the organizational environment. This is important because, as key responsibility holders for their team, supervisors' actions set the example followed by their subordinates (Koch & Binnewies, 2015). The philosophies by which supervisors lead, delegate, make decisions, interact with their team members, and provide

motivation therefore become an integral part of the workplace ethos. How employees feel about their supervisor is key to how they feel about the organization (Stinglhamber et al., 2015). The approach the supervisor takes towards relating to their subordinates can make the latter feel healthier psychologically (Gilbreath & Benson, 2004), while fulfilling their self-determination needs (Deci & Ryan, 2001; Kanat-Maymon et al., 2020), as I will discuss shortly. Likewise, Dughera (2022) argued for the importance of supervisor charisma for employee well-being. Subordinates' trust in their supervisor's ability to lead and faith in their decisions are therefore essential parts of a healthy supervisor-employee relationship. On the other hand, Edmondson (1999) argued that the workplace in which employees fear their supervisor stifles creativity.

Although an expanded discussion of specific leadership styles would lead us away from the objective of this thesis, it suffices to briefly state that among those types of leadership commonly studied, the controlling Authoritarian style has been found to correspond most closely with the error avoidant supervisor (Dughera, 2022), while the Transformational style, with its emphasis on self-efficacy and learning, suits the error managing supervisor (Bass & Avolio, 1994; Zia et al., 2022). The ascribed style of leadership has a bearing on how 'forgivable' errors are; on the spectrum of leadership types, research indicates that those types situated towards the far-right end, including the Transformational type, are more open to learning from mistakes (Bass & Avolio, 1994; Coad & Berry, 1998).

Abusive Supervision

Returning to our main trajectory, I will now explain how, on occasion, supervisor behavior turns the workplace toxic. In the preceding section, we observed how supervisor conduct can have significant impact on the way employees view the organization, their work, and themselves, and that when employees view supervisors as surrogates of their employing

organization, they generalize their behavior to represent the entire organization (Stinglhamber et al., 2015). This may have consequences for employees; for example, when they feel abused and mistreated by their supervisor, they may take it to mean that their organization as a whole is unsupportive, as we will shortly see.

Abusive supervision includes verbal and psychological abuse of subordinates (Tepper, 2000). If a supervisor is abusive, this reflects badly on the organization (Caesens et al., 2019, Tepper, 2000), and in many cases, employees regard the organization as complicit in the abusive treatment (Caesens et al., 2019; Tepper, 2000). Recipients of abuse blame the organization for allowing it to happen, or not doing enough to root out and discipline bad managers and protect employees (Tepper, 2000). Caesens et al. (2019) found that the actions of some supervisors had a 'dehumanizing' effect, by which employees were treated more like company assets and less like people. Levels of perceived organizational support and worker commitment stumble under the weight of such toxic culture (Caesens et al., 2019), while deviant behavior rises (Mitchell & Ambrose, 2007). The fulfillment of basic psychological needs also suffers (Caesens et al., 2019). Dehumanized employees are more likely to be dissatisfied and leave the organization (Bell & Khoury, 2011). Conversely, if employees endure abusive supervision but are able to resist dehumanization, it is because of the moderating effect of coworker support (Caesens et al., 2019). Abusive supervision can therefore be an important source of job stress.

Learning Organizations

Whereas at one time organizations used to be static and unchanging, these days, organizational leaders have recognized that they must continually evolve or face extinction. Forward-thinking leaders have adjusted by actively transforming their organizations into centers for learning and innovation, commonly termed "learning organizations" (Senge, 1990). This

includes making room for knowledge sharing and collaboration among employees, encouraging experimentation, learning lessons, and implementing best practices to create new products and improve existing ones. For example, Google has been at the forefront of the push to foster a learning organization by devoting a portion of the work week to allowing employees to work on their own personal projects (D'Onfro, 2015). Moreover, Google has fostered a culture in which it is not only possible, but encouraged, to make mistakes when developing new projects. In learning organizations, it is of utmost importance that employees know that saying "I don't know" is an acceptable response to questions, because being allowed to not know not only stimulates employee curiosity and the search for answers, but also decreases their fear of failure (Shin et al., 2017).

The transfer of knowledge between tenured and newer employees, otherwise known as 'mentoring,' is often a key component of learning organizations (Bass, 2000). In many cases, organizations have dedicated mentoring programs between older employees and more recent hires. Not only does this ease the transfer of information and minimize institutional memory loss (Swap et al., 2001), but the socialization it entails can ease the anxiety of newer workers (McCarthy et al., 2016).

Finally, a word about the role of psychological safety in learning organizations: although learning organizations are common in the creative industries, studies have shown that learning organizations can also thrive in high-stakes workplaces, such as hospitals, when factors such as psychological safety are present (Edmondson, 2014). At least one study has demonstrated that, counter to expectations, reports of errors in hospitals where psychological safety was actively practiced actually outnumbered those in non-psychologically safe hospitals (Edmondson, 2014). Edmondson (2014) determined that nurses at hospitals where psychological safety was practiced

raised more issues because they felt comfortable knowing their mistakes would not be punished. It seems that a policy of non-retaliation for errors is therefore essential to learning organizations. I will discuss psychological safety at greater length in a following section.

The decision to create an identity as a learning organization is a conscious decision by macro-level organizational leadership to support performance through their employees' development. I will now connect learning organizations and supervision to individual motivation and ability, utilizing two theories important to organizational behavior: self-determination and conservation of resources. This will complete our journey from the macro to the micro level.

Self-Determination Theory

Built on theories of motivation, Deci and Ryan (2017) defined self-determination as the fulfillment of the innate need for personal growth. Because curiosity and learning are natural drives, discontent occurs when they are not fulfilled. Deci and Ryan (2017) divided this drive into three parts: the needs for autonomy, competence, and relatedness. They argued that there is no self-determination in the absence of these elements, but that the satisfaction of all three leads to intrinsic motivation. In addition, various authors have noted that intrinsic motivation leads to positive outcomes for the organization, but more importantly, for the individual's health (i.e., Baard et al., 2004; Deci et al., 2001; Gagné et al., 2000; Gagné & Deci, 2005). Good supervisors should therefore want their subordinates to be motivated to complete their tasks because they want to do them, not because they are forced to under duress or a sense of obligation. Without needs fulfillment, motivation is rarely more than controlled, or coming from an external locus. Moreover, the threat of punishment is an obstacle to intrinsic motivation and autonomy (Ryan & Deci, 2017) — a feature of significance to this thesis. In other words, if a supervisor says or does

things to workers that cause them to feel anxious, unsafe, or incompetent, they will be unable to fulfill their need for either of these competences and lose their intrinsic motivation.

On the other hand, constructive feedback generally enhances intrinsic motivation and feelings of competence, as long as the perceived locus of causality is internal (Deci et al., 1989). If a supervisor creates an environment supportive of autonomy, then employees will develop their own competence, have more trust towards their supervisor, and experience more satisfaction.

Ryan and Deci (2017) developed subsequent sub-theories of self-determination theory that are also of significance to my hypotheses. 'Cognitive evaluation theory' linked autonomous motivation to feelings of wellness, engagement, perceived competence, and learning. 'Organismic integration' differentiated types of internalized extrinsic motivation into 1) the unstable, introjected kind — or, coming from external values and maintained to feel better about oneself and avoid feelings of guilt; 2) identification — fully recognizing a useful behavior and taking it as one's own, and 3) integration — the internalization of these identifications by connecting them to further aspects of their selves. Of the three, they categorized introjected motivation — influenced by guilt and desire for self-approval — as controlled motivation, whereas the other two, identification and integration, they categorized as autonomous.

Ryan and Deci (2017) went on to connect the previous theories with the 'basic psychological needs' sub-theory of self-determination (Ryan et al., 1996). The evidence for this theory supported a link between the fulfillment of the self-determination needs (i.e., autonomy, competence, and relatedness) and performance, engagement, personal and psychological well-being in the workplace, and learning (e.g., Baard et al., 2004; Grolnick & Ryan, 1987; Ryan & Connell, 1989, Vallerand, 1997). They concluded that greater satisfaction of self-determination

needs — such as one may experience under error management conditions — led to the daily experiencing of greater positive affect (Ryan et al., 2010). The implication here was that doing things merely to alleviate guilt or make oneself feel better — elements of introjected motivation which may occur under error avoidance conditions – correspondingly led to poorer well-being and lower engagement.

Next, I look at conservation of resources theory.

Conservation of Resources Theory

Researchers of conservation of resources – a theory pertaining to organizational behavior first devised by Hobfall (1989) – have postulated that cognitive resources are finite and that competing demands exhaust them (McCarthy et al., 2016). In the case of workplace stress, the arousal produced by anxiety-inducing stimuli produces emotional fatigue, which preoccupies the individual and consumes their cognitive resources (i.e., memory and attention). This leaves insufficient resources to complete work tasks satisfactorily, such as multitasking multiple assignments. The end result is a decrease in an employee's job performance. Moreover, conservation of resources theory is intertwined with psychological safety: feeling safe reduces stress and protects cognitive resources, leaving more resources for work tasks. By feeling safe enough to share issues with others, employees can obtain resources they need (e.g., encouragement, motivation, solutions) to continue their work (Newman et al., 2017).

Although globally the theories of self-determination and conservation of resources have multiple applications, I have restricted myself to extracting the pieces useful to this thesis. I will continue with their integration into my hypotheses below.

In the following section, I present my study variables. Painting in ever-smaller brushstrokes, I connect the concept of 'error culture' to supervisor behavior towards error, all the

while maintaining a firm distinction between the two. As 'culture' and policy can be willfully ignored by the determined supervisor, policy without enforcement is just ineffectual policy. We must therefore look beyond error culture to investigate the behaviors on which it relies. I believe that the behavior of team supervisors, whom employees work with on a daily basis and, as previously stated, commonly consider the organization personified (Stinglhamber et al., 2015), play far more critical roles in affecting employee health from day to day than do culture and policy.

Dependent Variable

Job Stress

Although they lack consensus (Parker & DeCotiis, 1983), the most common understandings of job stress are that it is either a physiological response (perhaps maladaptive) to a work-related stimulus (Ivancevich & Matteson, 1980) or itself the cause of the physiological response (Schuler, 1980), a sort of chicken-egg argument. Arguing for the latter type, Parker and DeCotiis (1983) postulated that (1) an individual must be aware of job stress for it to have consequences, (2) that the consequences usually come about when the stress is ongoing, and (3) the ongoing nature of stress is dependent on (1) the number, duration and intensity of stressors, and (2) coping ability. They defined consequences here as changes in (1) organizational commitment, (2) job satisfaction, (3) avoidance behavior, and (4) job performance. As a subjective response to stimuli, job stress has commonly been found to follow various antecedents such as sentiments of work-family strain, too little free time, workload (either too heavy or too light), a perceived lack of control, and conflicting personal-organizational values (Maslach et al., 2001; Parker & DeCotiis, 1983). Job stress has also been found to precede anxiety disorders (Linden & Muschalla, 2007). Common outcomes of job stress are feelings of anger, guilt, and a

sense of hopelessness (Kahill, 1988). Work performance suffers (Schaufeli et al., 2001), while absenteeism (Bakker et al., 2003) and turnover (Maslach, 2006) rise. Conversely, it has been found to be linked to higher effort and performance (Mughal et al., 1996). Strong work-life boundaries and social support have been found to counter job stress (Parker & DeCotiis, 1983). Ongoing stress can eventually lead to emotional exhaustion, a key component of burnout caused by cognitive resource depletion (Hobfoll, 1989; Maslach et al., 2001). Psychosomatic illness is also caused by stress and anxiety (Costa & McCrae, 1987; Linden & Muschalla, 2007),

Because I expect error avoidance behavior to be ongoing, of overwhelming intensity, and to have negative consequences, all while affected employees feel powerless to stop it, I believe there is a relationship between supervisor error handling and job stress.

Independent Variables

Supervisor Error Avoidance Behavior

For the reader, I underline that the current study distinguishes itself from previous work by going beyond an already well-developed body of research literature on error avoidance culture in organizations to emphasize the effects of supervisors' error avoidance behavior on the mental health of individual employees in their purview – a novel approach, to my knowledge.

Error avoidance is a common, traditional approach to management (van Dyck et al., 2005; Zhao & Olivera, 2006). When working from a position of error avoidance, managers consider no error to be a good error; thus, employees must do their utmost to avoid the commission of any and all errors. In many industries, such as new product development (Akgün et al., 2021), tasks must be completed correctly the first time or negative consequences will follow for the organization, i.e., loss of contracts, lawsuits, and fatalities. Via this philosophy, learning is believed to be accomplished exclusively by moving directly to the right solution.

Engaging in the wrong solution implies negligence on the part of the employee, not the organization. Failure may encourage attempts at correcting the same tried-and-true procedures in the place of innovation (Akgün et al., 2021).

When we talk about supervisors' specific error avoidance behaviors, we look for supervisors who strictly enforce policy and adherence to procedures, are hyper vigilant towards deviations from norms, and punish these deviations through sanctions, shaming, bullying, and fear (van Dyck et al., 2005). The lack of open dialogue encourages social isolation and information silos between employees and teams, while the fear of the consequences of mistakes leads to their cover-up. In fact, in the context of the current thesis, many behavioral aspects falling under error avoidance, including the acceptance of verbal abuse and bullying as legitimate responses to errors, would be considered abusive supervision.

Researchers van Dyck et al. (2005) found no evidence indicating that the error avoidance approach improves worker performance. On the contrary, evidence indicates that fear impedes learning (Edmondson, 2019), a cognitive feature of error avoidance behavior that I will further consider later on.

Although bearing similarities, certain features of error avoidance differentiate it from management-by-exception, a management technique by which micromanaging supervisors correct deviations from expected norms to restore performance (Dekker & Woods, 1999; Goodridge, 2006). Employees who are managed by exception are viewed as implements towards the achievement of organizational objectives, and only interact with managers when the latter deem it absolutely necessary. Managers' interest in employees' health only goes as far as ensuring that subordinates are able to carry out their work activities. Furthermore, management-by-exception is divided into active and passive styles. Managers who actively manage by

exception monitor performance for deviations from standards, while those who passively manage only act after performance has already fallen, then punish (Bass & Avolio, 1994; Howell & Avolio, 1993). Unsurprisingly given these characteristics, Goodridge (2006) found that active management-by-exception was negatively related to autonomous motivation, and positively related to controlled motivation.

Conversely, the two approaches, error avoidance and management-by-exception, share a punitive aspect. But while the objective of punishment in error avoidance behavior may be to provoke an improvement in performance, in management-by-exception it is to regain status quo. By strict definition, management-by-exception is "nothing personal". Regardless, neither approach aims to aid the employee's development by fostering sustained learning. Regardless, any learning objective would overlap with the aims of error management.

The differences and commonalities between error avoidance and management-by-exception aside, I believe that supervisor error avoidance behaviors affect the work performance of employees by driving down the fulfillment of their self-determination needs for autonomy, competence, and relatedness, taxing their cognitive abilities, and, in the end, causing them stress.

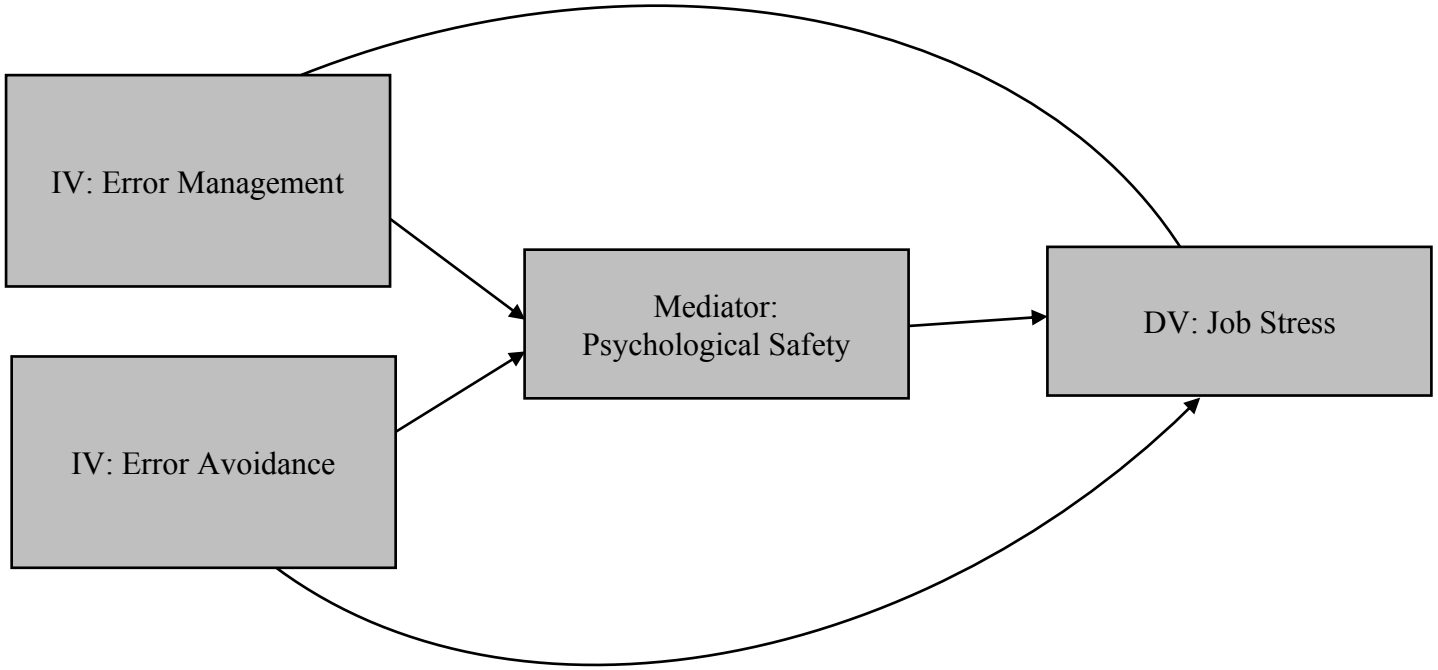
With that in mind, supervisors' error avoidance behavior creates a toxic workplace environment that foments employee stress. My hypothesis is therefore the following (see Figure 1 for my research model):

H_1: Supervisor error avoidance behavior is positively related to employee job stress.

Supervisor Error Management Behavior

As in the previous section, again I pause to emphasize that, although the literature on error management culture forms the starting point of the current research, I am expanding its

Figure 1: Research Model



scope to study the effects of supervisor error management behavior on individuals at the micro level.

Although research on error management in organizations has largely been focused on the management culture present in various industries, including healthcare (i.e., Edmondson, 2014; Moore & Foss, 2003; Sirriyeh et al., 2012) and hospitality (i.e., Guchait, 2014), additional research has investigated areas that include new product development (Akgün et al., 2021), security (Wei et al., 2019), and auditing (Gold et al., 2014). Differentiating itself from error avoidance by both its objective and approach, under error management, the process of identifying an error, signaling, documenting, discussing, learning from it, and changing standard operating procedures as necessary, is considered a far more effective learning strategy overall than the mere correction of one (Cannon & Edmondson, 2005). Indeed, failure at tasks is believed to increase exploration (Frese, 1995; Keith & Frese, 2008; van Dyck et al., 2005), persistence (Carver et al., 1979), and creativity (Akgün et al., 2021). In such circumstances, learners whose failures are not only pardoned but encouraged begin to view even *un*-success as a normal, good, and acceptable part of the learning process, and not cause for alarm.

Under error management, we look for supervisors who realize the potential for learning from errors. When team members make mistakes, these are diagnosed rapidly and analyzed from the perspective of what could have been done differently or what organizational structures are at fault. This process involves open discussion among the entire team. Instead of finger pointing, there is understanding that mistakes happen.

However, various extrinsic factors have been found to influence the success of error management. For example, Gold et al. (2014) found that a concern for impression management still made workers less likely to report errors of the conceptual, but not mechanical, kind, while

in the case of teachers, Tulis (2013) wrote that how teachers modeled error handling directly affected their students' attitudes towards their own mistakes.

Regardless of these exceptions, tolerance for errors has been found to increase creativity (Geng et al., 2022; Liu et al., 2016) and one's sense of being appreciated (Akgün et al., 2021). Instead of terminating in disappointment, problems become challenges surmountable through perseverance and critical thinking. It should come as no surprise, then, that van Dyck et al. (2005) demonstrated the existence of a clear relationship between error management and firm performance. However, although more and more managers are embracing error management behavior, far more are still primarily engaged in avoidance (van Dyck et al., 2005).

As a fairly recent concept, writers have yet to decide a hard-and-fast definition of error management culture. Guchait et al. (2014) hypothesized that error management is a combination of perceived supervisor support, perceived colleague support, and recovery. In a similar vein, Van Dyck et al. (2005) argued that error management culture is determined by factors on the process side, such as 1) giving precedence to the documentation of errors when they occurred; 2) the speedy analysis of their cause(s); 3) open, frank discussion about them among colleagues; and 4) the revision of didactic methods. Akgün et al. (2021) also argued for the inclusion of team reward attitude and error recognition. Both Guchait et al. (2014) and Akgün (2021) supported the inclusion of psychological safety, which I will describe next.

Note that, as I explained in the preceding paragraphs, the characteristics of supervisor error management and error avoidance behaviors are such that the two are not polar opposites. In theory, any supervisor is capable of demonstrating elements of both behaviors, making it possible for error management and error avoidance to appear in the workplace, if not simultaneously, then contemporaneously. For example, during their training phase, a supervisor

of new airline attendants may initially be lenient on mishandling of safety procedures using an error management approach, while swiftly sanctioning these individuals for making the same mistake while performing their duties during the more critical in-flight phase.

With that in mind, error management supervisors deal with mistakes in a constructive, non-judgemental manner that lays no blame, while respecting the needs for autonomy, competence, and relatedness. With minimal stressors and cognitive fatigue, I believe that this approach mitigates employee job stress. My second hypothesis is therefore the following:

H_2: Supervisor error management is negatively related to employee job stress.

Mediator

Psychological Safety

The presence (or absence) of psychological safety forms the mediating keystone element of my study. At its heart, psychological safety is the perception that the advantages of speaking up outweigh the drawbacks (Edmondson, 2004). This perception arises when supervisors provide a safe space for innovation and risk taking without judgement, where all ideas are accepted as valuable, and none are rejected as erroneous or ridiculous. And, just as Maslow (1943) placed safety among the most fundamental of human requirements in the hierarchy of needs, the need to experience psychological safety has been identified as essential to many processes in the workplace.

Speaking up is a characteristic psychological safety shares with supervisor error management behavior. For either of them to function, employees must perceive that they will not face negative consequences — that they are, in fact, 'safe' from punishment. But while psychological safety includes safety for any and all situations by reducing the fear of consequences, in error management, this is more specifically constrained to creating a safe

environment for reporting errors. This makes psychological safety a likely outcome of error management. This difference also underlines the glaring lack of psychological safety under error avoidance behavior; in the latter, as mistakes are likely to garner censure, employees have greater incentive to conceal them.

Edmondson (1999; 2019; see also Geng et al., 2022) furthermore argued for other benefits of psychological safety: employees who experience psychological safety are more creative, feel comfortable taking risks, share more knowledge, ask more questions, seek more feedback, are unashamed to discuss their errors, argue constructively, and are at ease being themselves. I expect to observe more evidence of these behaviors under error management behavior, and less under error avoidance.

Newman et al. (2017) likened psychological safety to 'group trust', because it must be a shared sentiment among teams. Regarding this sense of trust, a lack of psychological safety in teams has been at the heart of numerous disasters involving the tragic loss of human life. For example, in the aftermath of the 2003 Columbia space shuttle disaster, NASA was criticized for a closed culture that made managers reluctant to take threats seriously and discouraged discussion. Post-mortem analysis concluded that, had managers been convinced of their ability to contribute, critical flaws would have been fixed, potentially saving the lives of the astronauts (Edmondson, 2011). Edmondson (2019) also blamed a culture of fear for a psychologically unsafe workplace that led to the Volkswagen emissions scandal of 2013, in which engineers assigned the impossible task of lowering engine emissions by their CEO created software to fool electronic testers. The aforementioned JP Morgan loss of $6 billion at first went unnoticed because stock traders tried to hide it (Kopecki & Son, 2013). One can only imagine the countless

additional times that an existent underlying foundation of psychological safety would have saved lives and reputations.

Because psychological safety is acknowledged to be a shared team sentiment, a growing number of researchers have looked to the role of supervisors in fostering it (Newman et al., 2017). Newman et al. (2017) argued that psychologically safe supervisors are supportive (May et al., 2004), inclusive (Carmeli et al., 2010), and model behavioral integrity (Palanski & Vogelsang, 2011).

Newman et al. (2017) argued that the lack of necessary shared experiences underlying it made generalizability of psychological safety at the organizational level difficult. For her part, Edmondson (2019) hypothesized that even if organization-wide policies existed, it remained a more meaningful feature at the team level. This supports my belief that error treatment is, at its heart, a phenomenon mainly observable at the meso level, and neither owing its existence to organizational culture nor policy. Based on the previously established connection between stress and mental health, I postulate that in teams where psychological safety is lacking, the likelihood of stress-causing behaviors is higher. I therefore expect to see indications of an increase in employee job stress. Conversely, when psychological safety is present, the risk of punishment for errors is low. I therefore expect to see indications of a decrease in employee job stress.

For this thesis, then, I look for the main element of psychological safety: the reduction of consequences for risk taking. I believe that this risk reduction feature makes psychological safety the mediating element between supervisor error avoidance or management behavior and employee job stress.

I believe that supervisor error avoidance behavior increases employee job stress because it creates a workplace atmosphere in which employees feel psychologically unsafe, experience

higher risk of consequences for mistakes, and fail to receive social support. My third hypothesis is therefore:

H_3: Psychological safety mediates the relationship between supervisor error avoidance behavior and employee job stress.

I also believe that supervisor error management behavior reduces employee job stress because it creates a workplace atmosphere in which employees feel psychologically safe, experience lower risk of consequences for mistakes, and receive social support. My fourth hypothesis is therefore:

H_4: Psychological safety mediates the relationship between supervisor error management behavior and employee job stress.

Method

Participants

I employed Prolific, an online recruiting service, to gather a convenience sample of participants. The subjects were screened using the parameters that they be 1) residents of Canada, the United States, or the United Kingdom; 2) between 18-65 years old; 3) had either English as their first language or fluency in English; 4) worked ≥ 31 hours per week under a supervisor; and 5) held no supervisory role themselves. The survey was posted online for 24 hours. After screening out profiles that did not meet requirements, were incomplete, flatlined, or were completed too quickly (less than one-half of the median completion time, or < 380.00 seconds), I was left with a total $N = 244$ responses.

Among those participants, 36.89% self-identified as male, 61.89% as female, and 0.41% non-binary or third gender, with a further 0.82% preferring not to say. Ages ranged from 19-64 years old. The vast majority of respondents resided in the U.K., while a further six respondents

lived in Canada and five in the U.S. I also asked respondents for their workplace tenure (*M* = 6.53 years, *SD* = 6.78 years), job tenure (*M* = 4.06 years, *SD* = 4.43 years), hours worked per week (*M* =37.75 hours, *SD* = 4.62 hours), industry sector (see Table 1), and education (see Table 2).

Procedure

This study was approved by the University Human Research Ethics Committee (see Appendix A for the ethics certificate). I uploaded and posted my survey to Qualtrics web-based polling software. Via the consent protocol (see Appendix B), the participants read that some items may cause them psychological distress. As responses were made anonymously, participants were informed that their identities would not be stored or linked to their responses, and they would not be able to withdraw their responses after submission. After reading through the consent protocol, participants ticked a forced response box indicating their consent to testing. Two more forced response items then asked participants to confirm that they were 18 years old or over and working full time. Entering any other response prevented them from continuing. Subsequently, they were directed to respond to the first survey item, continuing through subsequent items until all items were complete (see Appendix C; the following section contains a summary of all scales used). With a few exceptions, all items allowed participants to skip over without responding, at their discretion. The final page of the survey thanked them for their participation and offered the phone numbers of national mental health crisis hotlines.

Measures

Error Avoidance and Error Management

Van Dyck et al.'s (2005) scale measures employees' perceptions of error management and error avoidance culture at work. I changed wording referencing 'the organization' to 'your

Table 1

Participant Industry Sector of Employment

	n	Percent
Agriculture, forestry, fishing and hunting	1	0.41
Mining, quarrying, and oil and gas extraction	3	1.23
Utilities	6	2.46
Construction	9	3.69
Manufacturing	12	4.92
Wholesale trade	1	0.41
Retail trade	8	3.28
Transportation and warehousing	12	4.92
Information and cultural industries	8	3.28
Finance and insurance	25	10.25
Real estate and rental and leasing	3	1.23
Professional, scientific and technical services	27	11.07
Educational services	30	12.30
Health care and social assistance	36	14.75
Arts, entertainment and recreation	5	2.05
Accommodation and food services	5	2.05
Other services (except public administration)	20	8.20
Public administration	30	12.30
Subtotal	241	98.77
Missing	3	1.23
Total	244	100.00

Table 2

Participant Education

	n	Percent
Elementary school	1	0.41
High school	58	23.77
Community college/CEGEP (Quebec)	23	9.43
Some university	14	5.74
Undergraduate degree	105	43.03
Graduate degree	19	7.79
Postgraduate degree	24	9.84
Total	244	100.00

supervisor', because my interest was in perceptions of supervisor behavior, not of the organization. Sixteen items measured error management perceptions, while 11 items measured error avoidance. An example item for each was, "For my supervisor, errors are very useful for improving the work process," and, "Working under my supervisor, people feel stressed when making mistakes." Respondents answered on a scale from 0 to 4, "Does not apply at all," "Applies a little," "Applies somewhat," "Applies a lot," or "Applies completely". Higher scores on the avoidance scale indicated a greater perception that their supervisor emphasized an error avoidance approach, while higher scores on the management scale indicated a greater perception that their supervisor emphasized an error management approach. When running statistical analyses, I analysed both simultaneously because, at least in theory, management and avoidance are not exclusive constructs, and elements of both behaviors may be present at the same time. Cronbach's alphas for both subscales were .93, or highly reliable.

Psychological Safety

For psychological safety, I employed the seven-item team psychological safety subscale of Edmondson's (1999) Team Psychological Safety survey. Edmondson (1999) is currently one of the foremost researchers of psychological safety. An example item is, "If you make a mistake on my team, it is often held against you." Respondents answered based on a seven-point Likert scale from 1 to 7: "Very inaccurate," "Moderately inaccurate," "Somewhat inaccurate," "Neither accurate nor inaccurate," "Somewhat accurate," "Moderately accurate," or "Very accurate". Higher scores indicated higher perceived psychological safety. Cronbach's alpha was .83, or highly reliable.

Job Stress

Parker and DeCotiis (1983)'s scale consisting of 13 items is intended to test relationships between job stressors and job stress. They developed five subscales: 1) job aspects; 2) structure; 3) career development; 4) relationships; and 5) role aspects. Further analysis determined that all items loaded onto two factors: 'time stress' and 'anxiety', although both Jamal (2007) and Wu and Shih (2010) collapsed both factors into one for their respective studies. For my purposes, I collapsed all 13 items into one job stress scale. A sample item is, "I have too much work and too little time to do it in." Respondents answer on a Likert scale from 1 to 7: "Strongly disagree," "Moderately disagree," "Somewhat disagree," "Neither agree nor disagree," "Somewhat agree," "Moderately agree," or "Strongly agree". Higher scores indicate higher experience of job stress. Cronbach's alpha was .93, highly reliable.

Results

Table 3 presents descriptive statistics and correlations. Supervisor error management behavior was positively related to psychological safety (r = .55, p = < .01), and supervisor error avoidance behavior was negatively related to psychological safety (r = -.62, p < .01). Supervisor error management behavior was negatively related to job stress (r = -.33, p < .01), while supervisor error avoidance behavior was positively related to job stress (r = .55, p < .01). Psychological safety was negatively related to job stress (r = -.49, p < .01).

Tests of Multiple Regression Mediated Model

Running a simultaneous multiple mediated regression via Model 4 in the PROCESS macro, version 4.1, developed for IBM SPSS version 28 by Andrew Hayes (2022), I investigated relationships between supervisor error management behavior, error avoidance behavior,

Table 3

Descriptive Statistics and Correlations

	Mean	SD	N	1.	2.	3.	4.	5.	6.	7.
1. Error Management	2.49	0.79	244	--						
2. Error Avoidance	0.70	0.78	244	-.33**	--					
3. Psychological Safety	5.48	1.07	244	.55**	-.62**	--				
4. Job Stress	2.86	1.35	244	-.33**	.55**	-.49**	--			
5. Workplace Tenure (Years)	6.53	6.78	244	.08	.03	.09	.00	--		
6. Position Tenure (Years)	4.06	4.43	243	.07	.00	.05	-.01	.66**	--	
7. Hours per Week	37.75	4.62	243	-.03	-.07	.11	-.03	-.07	-.05	--

Note. $N = 244$ participants.

**$p < .01$, two-tailed.

psychological safety, and job stress. The model was set to "4," the bootstrap samples to 5000, and the confidence intervals to 95.

Test of Hypotheses 1 and 3

I ran a PROCESS analysis to predict job stress based on error avoidance behavior and psychological safety. To account for the possible intervention of error management behavior, I made error avoidance behavior the independent variable, error management behavior the covariate, and psychological safety the mediator. In line with my hypothesis, the total effect of error avoidance behavior on job stress was 0.86, C.I. = [0.67, 1.05]. Hypothesis 1 was therefore supported.

Table 4 shows this result, and also that the indirect effect of error avoidance on job stress via psychological safety was significant (B = 0.16, C.I. = [0.04, 0.31]), in support of hypothesis 3. However, because the direct effect was also significant (B = 0.70, C.I. = [0.47, 0.92]), this suggests a partial mediation of error avoidance's effect on job stress by psychological safety.

Test of Hypotheses 2 and 4

I ran a PROCESS analysis to predict job stress based on error management behavior and psychological safety. To account for the possible intervention of error avoidance behavior, I made error management behavior the independent variable, error avoidance behavior the covariate, and psychological safety the mediator. In line with my hypothesis, the total effect of error management behavior on job stress was -0.29, C.I. = [-0.48, -0.10]. Hypothesis 2 was therefore supported.

Table 5 shows this result, and also that the indirect effect of error avoidance on job stress via psychological safety is significant (B = -0.12, C.I. = [-0.23, -0.03]), in support of hypothesis

Table 4

Hypotheses 1 and 3: Error Avoidance and Job Stress

	Psychological Safety						Job Stress					
Antecedents	*B*	SE	*t*	L.L. C.I.	U.L. C.I.	R^2 .52	*B*	SE	*t*	L.L. C.I.	U.L. C.I.	R^2 .35
Constant	4.68	0.19	24.93	4.31	5.04		4.07	0.52	7.78	3.04	5.10	
Error Avoidance	-0.68	0.06	-10.52	-0.81	-0.56		0.70	0.12	6.02	0.47	0.92	
Error Management	0.52	0.06	8.00	0.39	0.64		-0.17	0.11	-1.54	-0.38	0.05	
Psychological Safety	--	--	--	--	--		-0.24	0.10	-2.48	-0.42	-0.05	

	Effect	SE	L.L.C.I.	U.L. C.I.	p
Indirect	0.16	0.07	0.04	0.31	--
Direct	0.70	0.12	0.47	0.92	.00
Total	0.86	0.10	0.67	1.05	.00

Table 5

Hypotheses 2 and 4: Error Management and Job Stress

	Psychological Safety						Job Stress					
Antecedents	*B*	SE	*t*	L.L. C.I.	U.L. C.I.	R^2 .52	*B*	SE	*t*	L.L. C.I.	U.L. C.I.	R^2 .35
Constant	4.68	0.19	24.93	4.31	5.04		4.07	0.52	7.78	3.04	5.10	
Error Management	0.52	0.06	8.00	0.39	0.64		-0.17	0.11	-1.54	-0.38	0.05	
Error Avoidance	-0.68	0.06	-10.52	-0.81	-0.56		0.70	0.12	6.02	0.47	0.92	
Psychological Safety	--	--	--	--	--		-0.24	0.10	-2.48	-0.42	-0.05	

	Effect	SE	L.L.C.I.	U.L. C.I.	p
Indirect	-0.12	0.05	-0.23	-0.03	--
Direct	-0.17	0.11	-0.38	0.05	.12
Total	-0.29	0.10	-0.48	-0.10	.00

4. As well, because the direct effect was not significant (B = -0.17, C.I. = [-0.38, 0.05]), this suggests a full mediation of error management's effect on job stress by psychological safety.

Discussion

For my thesis, I chose to study the effects of supervisor error management, error avoidance, and psychological safety on employee job stress. While previous researchers have considered the outcomes of error handling approaches at the organizational level, to my knowledge this is the first study to specifically examine the role of supervisors' behaviors towards errors as contributors to mental health at the individual level. The PROCESS analyses showed that psychological safety acted as a partial mediator of the relationship between error avoidance behavior and job stress, and as a full mediator of the relationship between error management behavior and job stress.

Errors are unavoidable and cause stress. Nevertheless, some supervisors continue to treat them as shameful taboo through error avoidance behavior, when an alternate approach, error management, is potentially much less detrimental to the mental state of their employees. In fact, the present research indicates that the relationship between supervisor error avoidance behavior and the job stress that employees experience as a result takes a large, positive order of magnitude. This implies that as supervisors increase their error avoidance behavior, employee job stress grows. Interestingly, error avoidance behavior had a much larger effect on job stress than did error management behavior, albeit in the opposite direction. Combined with the fact that psychological safety was a partial mediator of the relationship in the case of error avoidance behavior and a full mediator in the case of error management behavior, this suggests that the two error behaviors are not polar opposites. Otherwise, the statistical support I gathered points to the

potential for psychological safety as an integral, if not essential, part of maintaining employee mental health.

I believe that at least part of the reason behind why error management, when in tandem with psychological safety, works to reduce stress is that employees may need the self-determination fulfillment that it provides. Employees need autonomy, relatedness, and competence. I believe that the reason why error avoidance raises stress is because it does not fulfill these needs. As for why psychological safety has such a drastic negative effect on error avoidance when it runs counter to its principles, I hypothesize the following: if employees view supervisors as surrogates for the organization, as stated by Stinglhamber et al. (2005), it is the organization that is behind the rise in stress. If those same supervisors were to introduce some element of psychological safety that reduced the risk to their employees, such as open discussion, it would be regarded instead as a personal initiative of the supervisor, not the organization, increasing feelings of self-determination and lowering stress.

Workplace Implications

The implications for the workplace are suggestive: that as supervisors become stricter towards mistakes, perceived psychological safety shrinks and job stress increases. As this happens, inter-team communication around errors may dry up, emotional exhaustion increase, employee anxiety grow, psychosomatic illness take hold, and people think more about changing jobs. Conversely, a different work environment takes shape in organizations dedicated to learning: as supervisors become more open towards errors, the upshot is that mistakes turn into learning opportunities, employees freely discuss successful and unsuccessful techniques, experience more freedom to innovate, and finally, see their mental health improve. For supervisors who want to increase productivity, making employee mental health a priority,

namely through taking on error management, is among the options that they should seriously consider.

This study supports my conclusion that there are few, if any, mentally healthy elements to be found in error avoidance behavior. This may come as no surprise, as we could expect supervisors' punitive emphasis on error-free performance to contribute to a high-pressure work environment that raises anxiety and creates stress. However, the partial nature of the mediation indicates that other factors contribute to this relationship besides psychological safety (or the lack of it). Identifying these factors is a question for further research.

Managers who argue that error management is too slow, too expensive or requires too many resources would do well to consider that the trade-off of strict adherence to error avoidance may be declining employee health, morale, unreported errors, and turnover. And over the long run, the savings in time and resources by insisting on perfection may be derailed by the high costs of health insurance, burnout leave, hiring replacements, and training when employees have decided they have had enough of unforgiving supervisors.

A final point for consideration is the implication that these results may hold for the training of supervisors. Many supervisors are promoted to that position because they are good at their job, not because they possess leadership skills. This in itself may be a fundamental reason why many supervisors fall into error avoidance behavior – because, by default, they simply do not know any better. Luckily, like many skills of leadership, error management behavior is teachable. Supervisors can be taught the fundamentals of error management in a straightforward manner — and in a psychologically safe environment in which they themselves are free to discuss their mistakes with others without fear of reprisal. A trainer who observes learners in

action can make assessments and coach them how to improve. As well, supervisors who model the very behavior they seek from subordinates stand better chances of obtaining it.

Today's youth are not satisfied merely filling hours at work and receiving a pay cheque. In the near future, as baby boomers retire and leave gaps in the workforce, younger generations of talented individuals will be called on to fill those gaps. However, it will be organizations that know how to court them that will succeed in hiring and retaining them, securing their loyalty, and harnessing their productivity. The way organizations will do this will be by showing that they take their employees' health and well-being seriously. Ensuring that supervisors treat them well by supporting their mental health is only one part of this, but a very significant part. On a larger scale, organizations themselves stand to benefit immensely from instituting error management cultures, as this has the potential to lower their health care and hiring costs. My thesis supports the notion that organizations carry some responsibility for their employees' health, and it is not up to these latter to simply 'suck it up' when their supervisors carry out toxic behavior or are even merely unsupportive. And of course, organizations who are committed to the pursuit of innovation will need to foster an environment of psychological safety as much as possible.

Limitations

Despite my careful attention to internal validity in this thesis, there may still be a few remaining issues. I tried to assure construct validity, for example, by choosing established scales, and believe face validity to be robust through consultation with my supervisor and committee members. But because error management and avoidance behavior are still fairly new topics, other facets may remain to be explored and documented, which would alter the study's construct validity. For example, personality traits were not taken into consideration in any of the

measurement scales that I employed but could potentially have a bearing on resilience towards a toxic work environment.

In addition, as all researchers know, the existence of a correlation does not imply causality. As such, I was unable to determine direct causality between supervisor error management, avoidance, and job stress. For example, employee stress may, in fact, cause employee behaviors that are behind the very errors that elicit supervisor error avoidance behaviors. Although determining the correct sequence of workplace behaviors is a problem that a longitudinal study would help to resolve, causality would remain in question. However, given sufficient time and resources, I believe a case study would grant the opportunity to observe supervisor management or avoidance behavior up close to assess fully how individual health is helped or hindered by the supervisor's actions. Indeed, taking charge of a particularly healthy, high-performing group with less need of supervision may lead a supervisor to grant more autonomy and enact more nurturing behaviors. But, as stated earlier, as a general first look, this study uncovered relationships that I believe are worth further study.

With a few exceptions, the vast majority of my participants were located in the U.K. This may be of note for a few reasons: first, the survey parameters called for participants from not just the U.K., but also Canada and the U.S. The preponderance of Britons may have skewed my results by creating an over-representation of British culture. For example, Britons are known for their cordiality and reserved nature, whereas North Americans have a reputation for being more direct. U.K. responders may have therefore been less than straightforward when responding to subjective items about work and supervisors from a desire for impression management.

Subjective responses are also subject to personal biases. An employee who does not like their supervisor may lash out via an unfavorable rating, for example by raising their error

avoidance score to make them seem more disagreeable. Such responses are difficult to weed out. Because dispositions change daily, or even moment to moment depending on the circumstances, the measurement of perceptions can never be purely objective. Among a team of 10 employees, every measurement of the supervisor's behavior may be different from the next, despite the subject remaining the same. The supervisor's behavior over two days may be consistent, while the employee rates it differently, or the employee's perception may remain unchanged while the supervisor's behavior changes radically. Despite their usefulness, such characteristics make surveys imprecise tools of measurement.

As experienced online survey takers know how to foil the system, I did my best to weed out careless responders that clearly had not taken enough time to respond by verifying times and inserting various attention items. However, due to the length of the survey, some survey takers may have gotten away with throwaway responses, which would reduce the accuracy of reporting and affect variable means. There is no way to verify this without interviewing respondents individually to confirm their answers. This said, it is important to mention that we had included several directed questions in order to ensure that inattentive test takers would be identified and removed from the final sample.

Another limitation was that I used participants from a broad range of industries, which had the effect of limiting the number of individuals employed in each sector. Focusing on results in a more limited set of industries, or groups of industries, could have changed the results, but would simultaneously limit external validity in terms of applicability to other industries. For example, by focusing exclusively on non-high stakes environments such as the creative industries, I may have observed less error avoidance behavior in favour of more error management approaches, but at the expense of understanding behaviors in high-stakes

environments. A more detailed look at supervisors' predominant approach in each industry is a question for further study.

Finally, the drawbacks of using non-random samples in studies are well known. For example, convenience samples tested via survey tend to consist of individuals with a propensity for filling out surveys. A truly random sample would obtain results more representative of the general population.

Future Directions

As I believe the objective of this study — to provide justification for future research — was achieved, the implications provide multiple avenues worth pursuing in future research.

A point I raised earlier on – that error management is not the opposite of error avoidance – brings up an interesting avenue for further study: namely, to determine if, and what kind of, other approaches to error handling may exist, and their effect on employee mental health. For example, for this study, I expressly carried out the assumption that supervisors always react to mistakes, but this is surely not always the case. Therefore, a quasi-experimental or case study design may involve three test conditions: an error avoidance group, an error management group, and a control group whose supervisor has no reaction to errors and pursues no method for their treatment. A neutral test group may come closer to experiencing the opposite effect of error avoidance than management, and therefore the results may capture very different views. Because the job stress scale asked respondents to answer mostly negative items about their work, another option would be to include a scale with anti-job stress items, i.e., ask participants about why they enjoy their job, and correlate these with the other variables. The results may provide an interesting counterpoint to scales that were largely negatively oriented towards work experiences.

Since I did not inquire about participants' individual states of mind, investigating disposition as a moderator is one of these possible avenues. Individual ability to manage stress may mitigate the anxiety caused by supervisor behavior. As individual anxiety levels fluctuate from day to day, and even moment to moment (Cheng & McCarthy, 2018), some employees may find that mitigation activities, such as prayer or the practice of mindfulness, undertaken before or during work are an effective way to destress, focus, and prepare mentally for the day. Mindfulness and breathing techniques, for example, are both research-supported methods of alleviating anxiety (Wharton & Kanas, 2019). Future research could therefore ask participants about their stress-reduction habits. A step further would be to include a test group who regularly participates in mindfulness exercises as a moderating variable.

Alluding to a point I made early on, research into which leadership types fit best with each error behavior would also be useful information. Intuitively, for example, one could understand if a compassionate management style was found to fit with error management behavior, but only with more evidence will the connection be made solid.

Not to be overlooked is cognitive ability and its limitations, as understood by the conservation of resources theory. Investigating if and how to build cognitive resilience to error avoidance behaviors is therefore a possible objective for future directions, but also if, and how, any behaviors or actions by supervisors or others can even bolster cognitive ability and reduce the job stress effects of error avoidance behavior.

In line with high-stakes environments in which mistakes have potential costs in human lives, a further avenue of interest would be exploring which, if any, error management behaviors are compatible with avoidance — or at the very least, not incompatible. For example, is non-

blame possible for mistakes in moments when perfection is expected, and what would that outcome look like?

I suggest a few methodological improvements to obtain a more robust sample: increase the sample size, use a truly random sample, use large convenience samples taken from each and any industry, and limit the participants from each country to a maximum number. Also, as in many studies, causality is an issue here. For example, employee stress may, in fact, be behind the very errors that elicit supervisor error avoidance behaviors. As previously mentioned, a longitudinal study would help to draw causal conclusions. A case study would take a very fine-grained look at supervisor management and avoidance behaviors and assess their consequences.

Finally, the generalizability of error behavior itself may be dependent on national culture. For example, Liu et al. (2022) found in China that supervisors who intentionally mistreated subordinates obtained higher performance from them. In Turkey, Göktürk et al. (2017) ascribed a dearth of error reporting in universities to a national culture of suppression. Similarly, Cusin and Goujon-Belghit (2019) recognized a conflict between error management and a national custom of finger-pointing in their qualitative study of a French insurance company's transition from an error avoidance culture to one of management. Leaders wanting to effect change may therefore have to fight often deeply ingrained cultural biases. In the case of the insurance company, these researchers underlined that change is only possible given time, maturity, trust, and an organizational philosophy that is robust enough to counter a strong cultural bias (Cusin & Goujon-Belghit, 2019).

One question that remains to be answered is: how easily can supervisors of the error avoidance school make the transition to error management? At the macro level, Cusin and Goujon-Belghit (2019) also wrote about the difficulties of reframing error as a learning

opportunity. The insurance company created a 'right to error' policy and — the lynchpin — promised employees that they would get more autonomy. Supervisors should take note. The underlying message Cusin and Goujon-Belghit (2019) relay is that supervisors who have the support of the organization and clearly communicate intentions to employees are better equipped for change.

Conclusion

Mental health is not the taboo subject it once was. This thesis began with a search for a better way to preserve mental health at work, and the evidence that I found supports that when supervisors use a management approach to mistakes — with the basic understanding that they are unavoidable — the outcome is better employee health. The significance of this finding in the post-COVID-19 world, as people struggle to return to 'normal' work situations, should be obvious: as the faces of the organization they work for, supervisors can demonstrate their dedication to their employees — and to the organization — by using a blame-free learning approach when the inevitable happens and errors occur.

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Appendix A

CERTIFICATION OF ETHICAL ACCEPTABILITY
FOR RESEARCH INVOLVING HUMAN SUBJECTS

Name of Applicant:	James Thompson
Department:	John Molson School of Business\Management
Agency:	N/A
Title of Project:	Evaluating the Impact of Error Management on Mental Health
Certification Number:	30016451

Valid From: April 05, 2022 To: April 04, 2023

The members of the University Human Research Ethics Committee have examined the application for a grant to support the above-named project, and consider the experimental procedures, as outlined by the applicant, to be acceptable on ethical grounds for research involving human subjects.

Richard DeMont

_____

Dr. Richard DeMont, Chair, University Human Research Ethics Committee

Appendix B

Please carefully read through the following. You must indicate your consent before being allowed to continue to the survey.

INFORMATION AND CONSENT FORM

Study Title: Health and Error Management in the Workplace

Researcher: James Thompson, Master's student in Management, JMSB

Researcher's Contact Information: james.thompson@concordia.ca

Faculty Supervisor: Dr. Kathleen Boies, Professor, Department of Management, JMSB

Faculty Supervisor's Contact Information: kathleen.boies@concordia.ca 514-848-2424 x2902;

1455 De Maisonneuve Blvd. W., Montreal, QC, H3G 1M8

Source of Funding: Concordia Research Grant

You are being invited to participate in the research study mentioned above. This form provides information about what participating would mean. Please read it carefully before deciding if you want to participate or not. If there is anything you do not understand, or if you want more information, please ask the researcher.

A. PURPOSE

The purpose of this research is to study your supervisor behaviors as well as your feelings about your work.

B. PROCEDURES

If you participate, you will be asked to complete an online questionnaire by selecting a response to a statement that best corresponds to how you feel.

In total, participating in this study will take 20 minutes.

C. RISKS AND BENEFITS

This research is not intended to benefit you personally. The survey requires participants to recall experiences, which may be stressful for some. Due to the sensitive subject matter, it may evoke minor emotional discomfort. At the end of the survey we provide national crisis hotline telephone numbers in Canada, the U.S., and the U.K. for participants to call if they experience distress.

D. CONFIDENTIALITY

We will gather the following information as part of this research: your age, gender and job tenure.

We will not allow anyone to access the information, except people directly involved in conducting the research. We will only use the information for the purposes of the research described in this form.

The information gathered will be anonymous. That means that it will not be possible to make a link between you and the information you provide.

We will protect the information online by electronic password.

We intend to publish the results of this research. However, it will not be possible to identify you in the published results.

Because data need to be retained for sharing upon request (after publication) and for meta-analyses requests, there is no plan for the deletion of the database.

E. CONDITIONS OF PARTICIPATION

You do not have to participate in this research. It is purely your decision. If you do participate, you can stop at any time.

As a compensatory indemnity for participating in this research, you will be paid according to your agreement with the Prolific platform. If you withdraw before the end of the research, you will not be eligible to receive anything.

There are no negative consequences for not participating or stopping in the middle. However, due to the anonymous nature of your responses, we will be unable to withdraw your survey from the database once you have submitted it.

F. PARTICIPANT'S DECLARATION

I have read and understood this form. I have had the chance to ask questions and any questions have been answered. I agree to participate in this research under the conditions described.

Appendix C

(1) Error management behavior. (Van Dyck et al., 2005).

1. For my supervisor, errors are very useful for improving the work process.
2. After an error, my supervisor thinks through how to correct it.
3. After an error has occurred, my supervisor analyzes it thoroughly.
4. If something goes wrong, my supervisor takes the time to think it through.
5. After colleagues make a mistake, my supervisor tries to analyze what caused it.
6. My supervisor thinks a lot about how an error could have been avoided.
7. Our errors provide my supervisor important information for the continuation of the work.
8. Our errors point my supervisor at what we can improve.
9. When mastering a task in my organization, my supervisor finds that people can learn a lot from their mistakes.
10. When an error has occurred, my supervisor usually knows how to rectify it.
11. When we make an error, my supervisor makes sure it gets corrected right away.
12. With my supervisor, although we may make mistakes, s/he doesn't let go of the final goal.
13. When colleagues are unable to correct an error by themselves, they turn to our supervisor.
14. If colleagues are unable to continue their work after an error, they can rely on our supervisor.
15. When colleagues make an error, they can ask our supervisor for advice on how to continue.

16. When colleagues make an error, my supervisor shares it with others so that they don't make the same mistake.

(2) Error avoidance behavior. (Van Dyck et al., 2005).

1. Working under my supervisor, people feel stressed when making mistakes.
2. In general, under my supervisor, colleagues feel embarrassed after making a mistake.
3. Colleagues under my supervisor are often afraid of making errors.
4. My supervisor gets upset and irritated if an error occurs.
5. Under my supervisor, colleagues are often concerned that errors might occur.
6. With my supervisor, our motto is, "Why admit an error when no one will find out?"
7. Working with my supervisor, there is no point in discussing errors with others.
8. Under my supervisor, there are advantages in covering up one's errors.
9. With my supervisor, people prefer to keep errors to themselves.
10. Under my supervisor, employees who admit their errors are asking for trouble.
11. Working with my supervisor, it can be harmful to make your errors known to others.

(3) Team psychological safety. (Edmondson, 1999).

1. If you make a mistake on this team, it is often held against you.
2. Members of this team are able to bring up problems and tough issues.
3. People on this team sometimes reject others for being different.
4. It is safe to take a risk on this team.
5. It is difficult to ask other members of this team for help.
6. No one on this team would deliberately act in a way that undermines my efforts.

7. Working with members of this team, my unique skills and talents are valued and utilized.

(4) Job stress. (Parker & DeCotiis, 1983).

1. Working here makes it hard to spend enough time with my family.
2. I spend so much time at work, I can't see the forest for the trees.
3. Working here leaves little time for other activities.
4. I frequently get the feeling I am married to the company.
5. I have too much work and too little time to do it in.
6. I sometimes dread the phone ringing at home because the call might be job-related.
7. I feel like I never have a day off.
8. Too many people at my level in the company get burned out by job demands.
9. I have felt fidgety or nervous as a result of my job.
10. My job gets to me more than it should.
11. There are lots of times when my job drives me right up the wall.
12. Sometimes when I think about my job I get a tight feeling in my chest.
13. I feel guilty when I take time off from my job.