33 Technology and Social Evaluation: Implications for Individuals and Organizations

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In recent years, an unprecedented proliferation of technological devices has led to marked changes in human behavior. This is especially evident in the modern workplace that leverages advances in numerous areas such as text analytics, natural-language processing, data science, and the Internet of Things (IoT) to create novel technological tools that can influence employee behaviors and organizational outcomes (Cain, 2016). For example, collaboration tools (e.g., Slack, Google Drive) have expanded the limits of teamwork by allowing employees from different parts of the world to work remotely with each other. Similarly, immersive technologies such as virtual reality (VR) and augmented reality (AR) enable employees to virtually interact and work with each other in a digital workplace. In addition to enabling new ways for employees to connect, novel workplace technologies are also transforming how employees are being managed. Managers now have access to a variety of technological tools such as applications on employees' phones and computers, sociometric badges equipped with microphones and sensors, and intelligent software systems that allow them to monitor employees more closely than ever before. From these examples, it is evident that technological advances have the potential to upend and transform traditional workplaces by disrupting key industries, and by altering the ways in which organizational actors engage with each other and with their work.

Although there is considerable discussion in I/O psychology scholarship and practice on the extent to which technology can influence organizational processes and outcomes, far less attention is being paid to the *psychological impact* of novel technologies on employees and managers. Novel technologies such as VR/AR and IoT devices that have the potential to dramatically influence organizations and employees (Future Workplace Study, 2016) have only recently become increasingly prevalent in our society. Thus, it is perhaps not surprising that we have paid little attention to the psychological and behavioral consequences for the individuals using these technologies. However, early findings suggest that the psychological impact of these emerging technologies will be considerable. In this chapter, we develop insights about the psychological and behavioral consequences of new technologies for organizational actors. In particular, we focus on the idea that social situations (contexts in which people interact with or behave in the presence of others) inherently allow for the possibility of evaluation by others and, as a result, may introduce a fear of negative evaluation. Building on this idea, we

explore how novel technologies can influence people's psychological experiences in social settings and consequently, affect their behaviors.

To examine the psychological impact of novel technologies on individuals, we focus on two of the most influential types of new technologies that have become increasingly popular in recent years – behavior-tracking technology, and virtual/augmented reality. These two technologies are among the top ten technological trends that are expected to have a significant strategic impact on organizations in 2018 (Gartner, 2017). Consistent with this expectation, it is also predicted that worldwide spending on behavior-tracking technologies and virtual/augmented reality will together exceed over $200 billion by 2020 (Gartner, 2016; IDC, 2017). In light of the organizational and societal impact that these two technologies are expected to have in the near future, we anticipate that examining the psychological impact of these novel technologies can offer important insights for both research and practice in industrial/organizational psychology.

In this chapter, we position our examination of the psychological impact of novel technologies in the context of monitoring and communication – two key organizational functions that have garnered considerable attention among scholars and practitioners in I/O psychology. Monitoring and communication are among the most common organizational functions that have been constantly transformed through technological advancements. In our discussion, we specifically focus on how behavior-tracking technology has changed the way monitoring occurs in organizations, and explore how virtual/augmented reality has transformed organizational communication.

The rest of the chapter is structured as follows: We begin by describing how social situations engender social evaluation and highlight the psychological consequences of experiencing social evaluation. Following this, we explain why we examine the psychological consequences of novel technologies in the context of monitoring and communication and highlight how social evaluation undergirds these organizational functions. In the subsequent section, we explore how technology influences users' concerns about social evaluation. Next, we offer an in-depth discussion of how novel technologies – behavior-tracking technology and virtual/augmented reality – influence the psychology of organizational actors in the context of monitoring and communication. Finally, we conclude by highlighting how a better understanding of the psychological impact of novel technologies can offer important insights for both researchers and practitioners.

33.1 Social Evaluation

When people interact with others or operate in the presence of an audience they feel concerned about being negatively evaluated by others (Schlenker & Leary, 1982). These concerns result from being in an evaluative situation where one's behavior can be scrutinized by others and can possibly be rated as inadequate. In social interactions where people become the focus of others' attention, the prospect of interpersonal evaluation leads them to perceive a lower likelihood of

obtaining satisfactory judgments from others (Schlenker & Leary, 1982). In this way, social situations inherently allow for possible evaluation by others and can make people focus on the possibility of being negatively evaluated by others (Leary, 1983; Van Boven, Lowenstein & Dunning, 2005). Potential negative evaluations can make people feel inadequate in evaluative situations (Muller & Butera, 2007).

The perception that one may possibly be negatively evaluated by others in a social situation is psychologically aversive to people, as it affects how others perceive and treat them (Goffman, 1959; Leary & Kowalski, 1990), and also affects how people view themselves (Leary & Baumeister, 2000). Negative social evaluation is also psychologically aversive as it leads to a range of negative feelings including feelings of embarrassment (Modigliani, 1971), social anxiety (Schlenker & Leary, 1982), and shame (Tangney, 1992). In social situations that entail performing before a competent (versus incompetent) audience where the possibility of negative evaluation is more salient, people report experiencing greater tension and nervousness (Jackson & Latane, 1981) and behave in ways indicative of embarrassment (Brown & Garland, 1971; Garland & Brown, 1972). Similarly, perceived negative evaluation of one's global self by others leads to feelings of shame. Shame, in turn, is often associated with a feeling of being exposed to others such that people think about how their defective self would appear to others (Tangney, 1999). Social situations also result in social anxiety when people are motivated to make a specific impression on others, but expect that others will react unfavorably toward them or negatively evaluate them (Schlenker & Leary, 1982).

In addition to being psychologically aversive, the possibility of being negatively evaluated by others is a physiological stressor for individuals. Cortisol is the hormone that is produced in the body as a response to threat experiences. Increases in cortisol levels in the body have been linked to receiving negative social feedback (Koslov, Mendes, Pajtas, & Pizzagalli, 2011; Jamieson & Mendes, 2016). In a meta-analysis of 208 acute stressor studies (Dickerson & Kemeny, 2004), performance tasks characterized by social evaluative threat (e.g., presence of an evaluative audience) were associated with cortisol responses more than four times larger than tasks without these evaluative elements. Taken together, these results suggest that social-evaluative contexts that may potentially result in negative evaluation by others lead to conditions that can be both psychologically and physiologically aversive.

33.2 Social Evaluation in Monitoring and Communication

Monitoring and communication are key organizational functions that have received substantial attention in the management and I/O psychology literatures. The criticality of monitoring and communication for organizations is evident from their inclusion in various taxonomies of key managerial and organizational functions (e.g., Fayol, 1949; Komaki, Zlotnick, & Jensen, 1986; Mintzberg, 1973; Yukl, 1989). In addition to their importance, monitoring and communication are among

the organizational functions that have been continually influenced by technological advancements. For example, developments in information technology were accompanied by computer-aided monitoring of employees (Chalykoff & Kochan, 1989), electronic performance monitoring (Aiello & Kolb, 1995) and even close monitoring of employees' communications (Smith & Tabak, 2009). Today, a typical manager in a modern workplace can closely monitor various employee's behaviors including the time they spend at their desks, the extent to which they use instant messaging and social networks while at work, when and how they use various productive and non-productive applications, and their emails as they are being written (Bernstein, 2014). Similarly, advances in information technology have significantly transformed organizational communication. Initial technological developments enabled us to communicate with each other through telephones, facsimiles, and pagers. Further developments in information technology allowed for communicating via emails and video conferencing tools. Now, we have access to increasingly sophisticated technologies such as smartphones and virtual/augmented reality (VR/AR) that enable us to interact with others in an immersive manner. Both the importance of monitoring and communication in organizations, and the potential for technology to transform these organizational functions are factors that motivated us to examine the psychological impact of novel technologies in the context of these functions. Next, we describe how social evaluation is a critical psychological factor that influences both monitoring and communication.

33.2.1 Monitoring and Social Evaluation

Monitoring is a critical aspect of management that allows managers to obtain information about the performance of subordinates (Komaki, Zlotnick, & Jensen, 1986), use this information to differentiate between high and low performers, and appropriately administer contingent rewards (Komaki, 1986). Monitoring also allows subordinates to secure information about the importance of various tasks (Larson & Callahan, 1990). However, beyond having an informational role, monitoring influences the relationship between those who engage in monitoring and those who are monitored. Strickland (1958) found that monitoring can reduce trust between the two parties. Along these lines, Adams (1976) noted that frequent monitoring could lead to distrust and negative evaluations. Consider the example of an employee having to copy his boss on emails that he sends to other team members. Although there is no formal observation occurring in this context, the very act of copying the boss on emails falls under the purview of monitoring. In fact, studies show that copying the boss on emails makes employees feel evaluated and less trusted (De Cremer, 2017). In addition to influencing the cognitions and behaviors of employees who are being monitored, the act of *engaging* in monitoring can, itself, lead to psychological discomfort for managers. Knowing that monitoring might signal distrust, managers may feel negatively evaluated by subordinates (Raveendhran, Fast, & Carnevale, 2018). Such negative social evaluation, or even the fear of being negatively evaluated by others, can lead to

psychologically aversive feelings (e.g., Schlenker & Leary, 1982) Thus, social evaluation is a critical psychological factor that underlies both the experience of monitoring and the experience of being monitored.

33.2.2 Communication and Social Evaluation

Given the importance of communication in organizations, we now turn our attention to understanding how social evaluation influences people's communication behaviors. From interpersonal communication to interacting with a group or with much larger audiences, communication inherently involves evaluation apprehension due to a fear of being negatively evaluated by one's audience. In fact, communication scholars have extensively examined the effects of evaluation (or anticipated evaluation) and the fear or anxiety associated with communication under numerous labels – stage fright (e.g., Clevenger, 1959), reticence (e.g., Phillips, 1968), and audience sensitivity (e.g., Paivo, 1964). Communication apprehension (e.g., McCroskey, 1977) pertains to an individual's level of fear/anxiety associated with communication and is rooted in the likelihood of being evaluated by others. In fact, communication apprehension is highly correlated with social anxiety, which is defined as anxiety resulting from the prospect or presence of personal evaluation in real or imagined settings (Leary, 1983; Schlenker & Leary, 1982). Thus, social evaluation plays a critical role in people's psychological experiences associated with organizational communication.

33.3 Technology and Social Evaluation

Social evaluation plays an important role in organizational contexts for a number of reasons. First, being evaluated by others (or even the likelihood of evaluation) is related to performance. An extensive body of work in social psychology including research on social loafing, creativity, goal setting and social facilitation has examined the link between social evaluation and performance (e.g., Amabile, 1983; Karau & Williams, 1993; Locke & Latham, 2002; Zajonc, 1965). A comprehensive examination of *how* social evaluation affects performance in these contexts suggests that the potential for evaluation leads people to either expend greater effort on tasks or quit trying, depending on individuals' experience of difficulty with the tasks (Harkins, 2006). Second, social evaluation (or the potential for evaluation) influences individuals' behaviors towards others in a social setting. When people are in situations that have the potential for evaluation, they may be less likely to engage in negative behaviors toward others such as physical or verbal harassment, abusive behaviors, counter-productive behaviors, stealing, or slacking. Third, social evaluation may negatively influence the probability of learning in organizations. In fact, research on social facilitation suggests that evaluation apprehension elicits the arousal of dominant responses in people and inhibits learning (Martens & Landers, 1972). Fourth, social evaluation likely reduces people's intrinsic motivation at work and enhances their attentiveness towards

external factors such as rewards and punishments (Deci, Koestner & Ryan, 1999). Fifth, social evaluation affects creativity. In fact, fear of evaluation is negatively related to originality and ideation fluency, two common measures of creativity (Amabile, 1979).

Given the increasing prevalence of novel technologies in modern organizations, it is important to consider how using technology for monitoring and communication influences people's experiences of social evaluation in the workplace. Social situations allow for likely negative social evaluation by others. Therefore, in those situations, individuals focus on the possibility of negative evaluation (Leary, 1983; Van Boven, Lowenstein & Dunning, 2005). This awareness of the potential for negative evaluation in social situations imposes external pressures on people to behave in certain ways. When we know that other people may evaluate us negatively, we are constrained by the need to avoid making a negative impression on others (Nicholls, 1984; Ryan & Connell, 1989). However, technology may be able to mitigate the evaluative pressures of social situations. In our earlier work, we show that technology attenuates undesirable social cues that may otherwise be present in social interactions and mitigates social risks associated with evaluation (Raveendhran & Fast, 2018; Raveendhran, Fast & Carnevale, 2018). Thus, our work offers evidence supporting the idea that technology reduces people's experiences of social evaluation. Reduced social evaluation associated with technology is related to an increased likelihood of adopting technological products for monitoring (Raveendhran & Fast, 2018) and communication (Raveendhran, Fast & Carnevale, 2018).

In summary, social evaluation is a critical psychological factor that influences employees' behaviors and underlies key organizational functions such as monitoring and communication. When individuals are in social situations where they may likely be negatively evaluated by others, they anticipate negative social evaluation and, as a result, experience psychological aversion in the form of embarrassment and social anxiety. Technology, by attenuating social cues, reduces individuals' concerns about social evaluation in social situations. In the following sections, we examine how novel technologies such as behavior-tracking and virtual/augmented reality have transformed monitoring and communication respectively, and highlight how these technologies influence organizational actors' experiences of social evaluation in those contexts.

33.4 Behavior-Tracking Products: A Novel Technology for Monitoring and Implications for Social Evaluation

Research suggests that by the year 2020, people will be using more than 40 billion devices that are connected to the Internet, allowing them to transmit data wirelessly (ABI Research, 2014). This phenomenon, characterized by a network of physical objects that contain embedded technology to interact with their environments, is referred to as the 'Internet of Things (IoT)' (Gartner, 2018a). Some of the most commonly seen manifestations of the IoT are smart technologies in cars,

home appliances and other home systems (e.g., temperature control), voice-acti-
vated assistants in our phones, technological personal assistants in our homes (e.g.,
Google home, Alexa), physician-recommended health monitoring devices, road
sensors, and public safety and security devices. A recent survey indicated that
experts anticipate the rapid spread of IoT devices between now and 2026, until
humans and machines are seamlessly connected in a ubiquitous and unavoidable
manner (Pew Research Center, 2017). This heightened connectivity through the
IoT is expected to enable the collection of vast amounts of data about people,
ultimately allowing organizations to devise effective ways to influence people's
preferences and behaviors (Silva, 2017).

One of the most popular manifestations of the IoT is that of behavior-tracking
products. Behavior-tracking products continuously track information about users
and have the potential to offer real-time feedback based on that information.
Common examples include devices such as smart watches, personal fitness and
health trackers, smart glasses, and various computer/mobile applications that track
users' personal information including their movements, physical location, personal
health- and sleep-related behaviors, and work habits. The increasing popularity of
these devices is evident in the rapid rate at which these products are being adopted.
Recent reports suggest that sales from wearable devices generated $28.7 billion in
revenue in 2016 and that this expected to grow to $61.7 billion by 2020 (Gartner,
2016). Importantly, organizations are beginning to integrate behavior-tracking
technologies into the workplace to leverage them for motivating employees,
enhancing productivity, improving health, and to monitor employees. In fact,
organizations handed out over 12 million wearable behavior-tracking devices in
2016 and this number is expected to reach around 83 million by 2021 (ABI
Research, 2016).

Behavior-tracking devices may benefit organizations in a number of ways.
Behavior-tracking products are associated with improved employee health and
wellness. Wearable devices such as smart watches and Fitbit measure the quantity
and intensity of physical activity and use visual and motivational tools to track
progress and keep users engaged. In 2015, Emory university expanded their health
challenge that encouraged employees to become active. Over 6,300 Emory
employees participated in the challenge that spanned eight weeks and 82 percent
of these participants remained active throughout the 8-week period (Miller, 2017).
In addition to health benefits, organizations may also expect to gain financial
benefits through reduced healthcare costs when having employees who are heal-
thier and more engaged. For example, Carewise (a wellness program provider
whose members use Fitbit), found that healthcare costs increased by only 0.7
percent annually for their users who were more engaged in using behavior-tracking
fitness devices compared to 24 percent for less engaged users (Wilson, 2013).
Finally, behavior-tracking products are associated with increased productivity. A
recent study conducted by Rackspace revealed that employees wearing wearables
at work became 8.5 percent more productive (Boitnott, 2015). These examples
suggest that behavior-tracking products have the potential to impact various orga-
nizational outcomes, if they are introduced and integrated appropriately. The

potential for behavior-tracking products to impact various organizational outcomes suggests that these products may quickly be adopted by organizations. The possible pervasiveness of behavior-tracking products also highlight that it is important to consider the psychological costs and benefits for employees using these products.

33.4.1 Behavior-Tracking Products for Monitoring: Benefits and Downsides

Behavior-tracking products enable fine-grained, digital monitoring of employees by continuously collecting large amounts of data on employees' behaviors. Organizations can now use employees' personal networks of beacons and sensors connected to behavior-tracking products to identify people and track their behaviors based on personal information gathered through those devices. In addition to tracking personal health-related data through fitness trackers, organizations also track employees' behaviors at work through sensors added to employees' desks and behavior-tracking badges. For example, the senior management at the Daily Telegraph tracked the amount of time their journalists spent at their desks through sensors that picked up on body heat (Derousseau, 2017). Another behavior-tracking product that is becoming increasingly popular among organizations is the sociometric badge. Sociometric badges are wearable electronic badges that automatically measure micro-behaviors of employees such as the amount of face-to-face interaction they have with others, their conversational time, their physical proximity to other people, and physical activity levels using social signals from vocal features, body motion, and relative location (Kim, McFee, Olguin, Waber & Pentland, 2012). In addition to allowing organizations to closely and intensely monitor their employees, behavior-tracking products enable organizations to monitor various minute aspects of employees' physical states and behaviors. The influx of large amounts of data about employees' behaviors through these behavior-tracking products may be used by organizations to improve their work processes, communication and feedback mechanisms, and their management practices.

As organizations are increasingly integrating behavior-tracking technologies into the workplace, employees are becoming vulnerable to innumerable privacy-related risks. Behavior-tracking products are connected to the Internet and many of them transmit user-generated data, including consumers' names, email-addresses and passwords without encryption (Hunt, 2015). Moreover, gathering personal information about employees' behaviors outside work (such as in the case of company-sponsored fitness trackers) can be perceived as a breach of employees' privacy. Integrating immense amounts of employees' personal data into the organization's system could also be a huge security risk. In fact, when employees are digitally connected to the organization via behavior-tracking products, these devices can likely become an enabler for cyberattacks (Cox, 2017). In 2016 alone, there were a total of 980 security breaches across various industries including the government/military and healthcare compromising over 35 million records (Identity Theft Resource Center, 2016). People are, in general, reticent to share personal information with others (especially employers). Yet, it is interesting to

note that people are quickly embracing behavior-tracking products, as evidenced by the rapid proliferation of these devices in organizations. In fact, three out of five people who responded to the State of Workplace Productivity Survey said that they would be willing to use behavior-tracking wearable devices at work if they helped them do their jobs better (Corsello, 2013).

In addition to privacy and security related risks, behavior-tracking products can also have a direct, negative psychological impact on employees. When organizations use behavior-tracking products to continuously track employees' micro-behaviors – such as the amount of time spent at desks, face-to-face interactions, tone of voice in meetings, and physical proximity to others – employees may begin experiencing their work environments as autonomy-infringing. When employees experience a lack of autonomy, it can negatively affect their job satisfaction (Hackman & Oldham, 1975), hinder creativity (Oldham & Cummings, 1996), and reduce motivation and productivity (Spector, 1986). In fact, studies show that employees are inherently opposed to monitoring (Chalykoff & Kochan, 1989) and may also experience monitoring as coercive (Sewell & Barker, 2006). Given that behavior-tracking products allow organizations to continually monitor employees' micro-behaviors, employees might experience such intensive monitoring as both denigrating and stress-inducing (Nussbaum & duRivage, 1986), hindering health and well-being. In addition to the sense that one is being constantly monitored, the access to real-time feedback that behavior-tracking products offer can negatively affect employees' motivation. This is consistent with research showing that receiving feedback that can hurt one's sense of self can be detrimental for both motivation and performance (e.g., Kluger & DeNisi, 1996). Thus, both the salience of constantly being monitored and the continuous access to feedback about one's behaviors that behavior-tracking products afford can lead to negative psychological consequences for employees.

33.4.2 Reducing Social Evaluation Through Technology: Implications for Monitoring

In the context of monitoring, reducing social evaluation through technology may influence subordinates' attitudes toward monitoring. Although monitoring is a key component of organizational control, close supervision of subordinates through monitoring is known to reduce perceived autonomy and sense of self-responsibility (Deci, 1975). Studies show that monitoring discourages employees from engaging in extra-role organizational citizenship behaviors (i.e., behaviors that are above and beyond one's roles and responsibilities and have a positive effect on the organization) as they might believe that those behaviors will not be evaluated positively by their managers (Neihoff & Moorman, 1993). Technology can mitigate these negative effects of monitoring by reducing employees' concerns about social evaluation associated with monitoring. This has important implications for the extent to which employees have favorable attitudes toward technologies used for monitoring. In our earlier work, we demonstrate that participants in the role of employees show a greater preference for technology-backed monitoring compared to human-backed

monitoring, and have a higher willingness to work for organizations that use behavior-tracking products (with no human involvement) to monitor them (Raveendhran & Fast, 2018). Thus, behavior-tracking products may be more positively received by subordinates when they know that these devices can reduce the experience of social evaluation that is prevalent in direct monitoring by managers.

33.5 Virtual Reality/Augmented Reality (VR/AR): Novel Technologies for Communication and Implications for Social Evaluation

Virtual reality (VR) is a computer-generated simulation of a three-dimensional (3D) environment "that surrounds a user and responds to that individual's actions in a natural way" (Gartner, 2018b). In this sense, VR allows the creation of virtual environments where people can interact with one another through avatars that represent their digital selves. An avatar is a digital representation of the user that reflects the user's behaviors, typically in real time (Bailenson & Blascovich, 2004). Virtual reality allows users to immerse themselves into their simulated environment and experience it as if it were real. Users can experience these virtual environments visually through devices such as VR headsets, in a tactile manner through devices such as VR gloves and in a fully immersive manner through virtual avatars where body language and social cues are salient.

A distinct, but related form of technology is augmented reality. Augmented reality (AR) refers to "the real-time use of information in the form of text, graphics, audio, and other virtual enhancements integrated with real-world objects" (Gartner, 2018c). In other words, augmented reality is a technology that integrates virtual information, such as digital images and objects, with the user's environment in real-time. In doing so, AR adds richness to the user's environment while allowing the user to interact with the environment in a realistic way. While VR allows for user experience in a virtual space, AR allows users to enhance their real-world experience by superimposing virtual digital objects on to the real-world environment.

Virtual reality/augmented reality technologies have the potential to transform organizational communication as increasing numbers of employees are working remotely. In fact, Gallup's recent State of the American Workplace report revealed that 43 percent of American employees spend at least some time working remotely, while 20 percent work entirely remotely (Gallup, 2017). Reiterating this idea, IDC suggests that by 2020, more than 105 million employees – nearly three quarters of the American workforce – will be mobile workers (IDC, 2015). Effective communication is both critical and challenging when employees work together remotely and VR/AR technologies can help enable it. VR offers an immersive experience where users can seamlessly interact and work with others in a virtual environment. Similarly, as AR exists at the intersection of the physical and digital worlds, it can

enable users to interact with people in remote locations by projecting their digital image in real-time to the three-dimensional spaces surrounding them (Steiner, 2017).

As VR/AR are becoming both commercially viable and affordable, consumers and businesses alike are investing heavily in these technologies. Forecasts suggest that worldwide spending on VR/AR technologies will be $13.9 billion in 2017, and that this will increase to over $143 billion by 2020 (IDC, 2017a). VR and AR are currently being used in various industries such as defense, medicine, gaming, architecture, manufacturing, marketing, and education, to name a few. In fact, VR and AR are among the top technological trends that are expected to have a strategic impact on organizations in 2018 (Gartner, 2017). A recent survey of 4,000 full-time employees from small, medium and large businesses in ten countries revealed that two-thirds (66 percent) of employees were willing to use VR products at work (Future Workplace Study, 2016). Similarly, it is expected that by 2021, one-third of employees working in the information sector will leverage AR to interact with real-world objects, utilize digital information, and collaborate with others (IDC, 2017b).

The utility of VR/AR is evident in the numerous ways these technologies are being used in different organizations. In the manufacturing industry, for example, Ford uses Oculus Rift, a popular VR device, to create virtual models of cars so that designers from different teams can collaborate and work on design improvements (Gaudiosi, 2015). Raytheon, a defense organization, uses fully immersive VR technology that allows employees to manipulate virtual prototypes of warfighters, create simulations that indicate how ground battles unfold, what missiles look like in flight, and how satellites move in space (Pepitone, 2016). Similarly, NASA used virtual reality to train astronauts where they created a virtual simulation of the repair of Hubble telescope and allowed astronauts from different locations across the globe to simulate the repair as though they were in the same room (Roberts, Kossek & Ozeki, 1998). Organizations such as Toyota, American Apparel, IBM, Reuters, Sun Microsystems, and Wells Fargo have experimented with Second Life, a VR platform, as a potential way to reach consumers (Wasko, Teigland, Leidner & Jarvenpaa, 2011).

Not unlike VR, augmented reality is also currently used in diverse ways by organizations. ThysenKrupp, an elevator manufacturer, uses AR to visualize an elevator repair before a technician reaches a site and provides the technician with resources to effectively complete the repair (Lopez, 2016). In the retail sector, organizations like IKEA, Overstock.com, and Wayfair use AR to superimpose virtual images of furniture onto their physical environments in order to help them see exactly how a piece of furniture will look like in their own space (Armstrong, 2017). In marketing, there are numerous examples of organizations leveraging AR to enhance consumer experience. To promote their Jurassic Park franchise, Universal Studios Orlando uses AR to allow park visitors to directly engage with digital dinosaurs (Levski, 2017). From these examples, it is evident that VR and AR have numerous useful applications in various business domains.

33.5.1 Virtual Reality/Augmented Reality for Communication: Benefits and Downsides

VR and AR are promising communication tools that allow people to interact with others in highly realistic virtual or virtually augmented environments. Communicating via VR/AR affords an immersive and natural way to interact and collaborate more effectively when working remotely. The rising popularity of VR/AR tools and the increasing effectiveness of computing power are motivating numerous organizations to use virtual workplaces as a complement to the real world for communication. VR can be quite cost-effective for organizations as employees can meet and work together in a virtual environment without being physically present (Colbert et al., 2016). VR/AR may also help virtual team members feel more psychologically present by blocking out the external environment and reducing the perceived distance between users (Cummings & Bailenson, 2016). Furthermore, by creating an immersive interaction experience where people can see each other's facial expressions and gestures in real-time, these tools create a holistic communication experience that may make them more preferable than traditional video conferencing tools. Virtual or virtually augmented environments can also be more engaging for users for a number of reasons. First, such environments are objectively rich because they offer a variety of social cues by making a range of visual stimuli, objects, and environments available to the user. Second, they simultaneously offer numerous channels for communication including audio, video, and text (Wasko et. al., 2011). Next, three-dimensional virtual environments enhance perceptions of telepresence and enjoyment (Nah, Eschenbrenner & DeWester, 2011).

VR and AR also provide several advantages for collaboration by enhancing communication and enabling real-time feedback. In this sense, these tools can enable collaboration without employees having to be co-located. In the manufacturing industry, for example, AR tools such as smart glasses can deliver appropriate information and real-time feedback directly to workers' line of sight at the right moment. This allows workers to continue their jobs without needing to stop what they are doing to go through a training manual. When workers are faced with pressing issues, AR tools allow them to launch training videos or connect with experts who may be in different locations to get real-time assistance. The efficiency gains that AR affords allows employees to be more productive at work. Various studies show that, across different contexts, the use of AR increased productivity by an average of 32 percent (Abraham & Annunziata, 2017). In the context of team work, VR tools allow remote teams to be present in the same "virtual" room where teams can work together by using collaborative tools such as whiteboards that may be present in the virtual environment. AltspaceVR, a virtual reality company that creates communication platforms, enables organizations and individuals to connect in shared digital environments. In these environments, users can use VR headsets to meet with each other in a way that is more natural than possible through video conferencing, brainstorm like they are in the same room and communicate seamlessly. These examples suggest that both VR and AR enable users to more effectively collaborate with each other in virtual or virtually augmented environments.

Despite these benefits, VR and AR are not without limitations. First, given that VR technology may not be able to always accurately simulate real-world environments in the virtual world, users may find it difficult to treat virtual recreations of things with the same psychological merit. Palmer Luckey, the founder of Oculus VR, has indicated that until technological advances allow for tools that can perfectly capture the real-environment and map that to a virtual environment, it might be difficult to ensure that users treat virtual environments with the same weight (Lapowsky, 2015). Second, VR users face a significant challenge in making sense of the new virtual environments and in understanding how to interact with other avatars and objects in such environments (Wasko et al., 2011). For instance, people are inclined to mimic their behaviors from the real world in a virtual environment and do not easily let go of the physical and social constraints of the real world when interacting in a virtual environment (Brown, 2011). Moreover, navigating and interacting with others in a virtual environment can sometimes be distracting for users and can create negative affect (Nah et al., 2011).

Third, people's levels of engagement when using VR depends heavily on the extent to which they identify with their digital avatars. Studies show that people reported feeling more engaged and immersed in the virtual environment when they perceived the avatar as an extension of themselves rather than as an interaction tool (Wasko et al., 2011). A key factor that influences whether people identify with their avatars is the extent to which the avatar's facial and bodily characteristics bare resemblance to their actual selves. This is a limitation because organizations may not have the resources to create avatars that physically resemble each member of their workforce and, therefore, may run the risk of creating virtual environments where employees are not fully engaged. Thus, to improve users' identification with and cognitive connection to their digital avatars, it will be important to create VR technologies that are realistic representations of the users. Finally, various individual and situational factors influence the extent to which people perceive VR technologies as useful. The perceived usefulness of VR affects users' likelihood of using these technologies. For example, people's propensity to trust, their degree of anxiety about communicating via novel technologies, and other stable personality traits such as extraversion and openness affect people's likelihood of using VR (Jacques, Garger, Brown & Deale, 2009). Therefore, it is important to ensure that VR tools have features that can make people feel at ease, increase their levels of trust, and reduce their anxiety towards the technology.

Augmented reality also has some important limitations. First, the constant overlay on digital information on to our physical environment could lead to users experiencing cognitive overload and digital fatigue (Busel, 2017). A constant stream of incoming information through augmented reality can also be quite distracting and can take away from people's experience of their immediate physical and social environments (Eaton, 2009). Moreover, people using AR tools tend underestimate their reaction times in the real-world due to the difficulty associated with switching focus back from the augmented versions of their environments (Sabelman & Lam, 2015). This can be especially problematic as this can directly affect people's ability to react to hazards in their physical environments. Finally,

augmented reality also poses serious threats to privacy and cyber security. AR tools blur the divide between the physical and the digital worlds and, in doing so, increases the severity of security threats that can permeate the physical world (Busel, 2017). For example, if the data appearing in a cockpit AR display becomes compromised, the jet may potentially veer off course. Given the limitations associated with both VR and AR, it will be important for organizations to consider how to effectively integrate these tools in the workplace.

33.5.2 Virtual Reality/Augmented Reality and Social Evaluation

In the context of communication, reducing social evaluation through technology can have important implications for both managers and subordinates. Communication research suggests that technology is quite effective in reducing communication apprehension. For example, shy individuals experience less communication apprehension when they interact via virtual reality in virtual worlds (Hammick & Lee, 2014). Compared to face-to-face interactions, virtual environments are described as quite effective in reducing people's likelihood of detecting negative or inhibitory feedback cues from others (Stritzke, Nguyen & Durkin, 2004). Reducing employees' communication apprehension and concerns about negative evaluation will be critical for ensuring they speak up and offer feedback and suggestions intended to improve organizational functioning. This is important, given that employee voice behavior is an important component of effective organizations (Detert & Burris, 2007).

For managers, novel technologies such as virtual reality reduce concerns about social evaluation when they engage in behaviors that may be perceived negatively by their subordinates. This is particularly evident in the communication context. A survey of 616 managers conducted by Interact (a communication consultancy) and Harris Poll in 2016 revealed that 69 percent of managers were uncomfortable communicating with their employees (Interact Report, 2015; Solomon, 2016). Novel technologies like VR/AR can be particularly helpful to buffer managers from their discomfort associated with communicating with employees. In our prior work, we found that managers showed a greater preference for using virtual reality to monitor subordinates and communicate with them in situations where they anticipated negative evaluation (Raveendhran, Fast & Carnevale, 2017). Moreover, communication between managers and subordinates can be improved through technology due to reduced social evaluation. Research suggests that technology can have a positive effect on subordinates similar to transformational leadership by reducing evaluation apprehension and engendering flexibility in communication between managers and subordinates (Avolio & Kahai, 2003; Kahai, Sosik, & Avolio, 2003). Furthermore, communication via technology may be less noisy as typical impression management tactics that people use in face-to-face interactions to manage or avoid negative evaluation are minimized when interacting via technology (DeRosa, Hantula, Kock & D'Arcy, 2004). Therefore, when interacting via novel technologies like virtual reality, managers may more easily facilitate coordination of work without having to pay attention to

interpersonal impression management behaviors. Thus, reduced social evaluation through technology has several important implications for communication for both managers and subordinates in organizations.

33.6 Downsides of Reducing Social Evaluation Through Technology

In this chapter, we have suggested that technology can reduce people's concerns about negative social evaluation, and highlighted the benefits of reducing social evaluation concerns in the context of monitoring and communication. Despite the numerous benefits described in the previous sections, reducing social evaluation concerns through technology can also have negative consequences for users. Reducing social evaluation concerns through technology can lead to the abandonment of novel technologies, reduced performance, and reduced sensitivity to privacy. Each of these effects can have important implications for employees and organizations. In this section, we briefly examine each of these downsides of reducing social evaluation through technology.

33.6.1 Implications for Abandonment of Technology

Technological products may be abandoned for a number of reasons. For example, if users find that the product is difficult to use, or that the product is no longer useful to them, or if they are bored of using the product, they are likely to abandon the product. A study on assistive technologies for individuals with disabilities revealed that 29.3 percent of all assistive devices were abandoned by users and the most common reasons for abandonment were a lack of consideration of user opinion in selection, easy device procurement, poor device performance, and changes in user needs or priorities (Phillips & Zhao, 1993).

Most of the common reasons cited for the abandonment of technological products pertain to objective aspects of the product itself while ignoring subjective psychological experiences of the users. We suggest that, beyond objective product-related factors, there is an important psychological factor that can help explain individuals' abandonment of technology. Specifically, we suggest that when using technological products, people do not feel negatively evaluated for discontinuing use. As a result, there is no psychological cost to quitting the technology. That is, reducing concerns about negative evaluation through technology also reduces people's commitment toward using the technology as there are no negative psychological or social effects associated with abandoning the technology in such cases.

33.6.2 Implications for Goal Pursuit

In addition to being both psychologically aversive (e.g., Schlenker & Leary, 1982) and physiologically stressful (e.g., Dickerson & Kemeny, 2004), the likelihood of

negative social evaluation in a situation can also affect how we select, perceive and pursue goals. Studies show that when pursuing goals related to performance, people are motivated by a need to demonstrate competence either by seeking favorable or avoiding negative evaluations from others and that these motivations have distinct implications for how individuals choose goals and pursue them (Elliot & Harackiewicz, 1996; Middleton & Midgley, 1997). Thus, when pursuing goals related to performance (especially in the presence of others), people's goals are oriented toward avoiding negative judgments or toward obtaining positive judgments.

Beyond influencing people's motivations during goal pursuit, social situations also impact the salience of people's goals and their commitment toward attaining those goals. For example, Shah (2003) found that even mere mental representations of significant others increased the salience of the goals to which they are closely associated and motivated individuals to persist in attaining those goals. Similarly, Brockner, Rubin and Lang (1981) found that the presence of an audience during goal pursuit can make individuals feel compelled to persist and continually invest resources toward attaining the goal in order to save face and avoid negative evaluations (even when the likelihood of goal attainment is low). Thus, pursuing goals in the presence of others compels individuals to persist in attaining those goals to avoid the likelihood of being negatively evaluated in that social situation. Given that technology reduces concerns about social evaluation, employees may be more likely to slack at work or expend less effort when they know that they are monitored solely through technology (e.g., behavior-tracking products).

33.6.3 Implications for Privacy

Privacy is an important antecedent condition for individuals to maintain a positive social identity as it pertains to controlling which groups and individuals one interacts with and how one is viewed by them (Alge, 2001). One of the main benefits of privacy is anonymity, which allows people to do what they want to do without fear of social evaluation (Pedersen, 1997). In situations where people feel less concerned about social evaluation, such as when using technology, they are likely to feel more in control of their social identity and therefore, their sensitivity toward privacy concerns is likely to reduce. In fact, studies show that increased perceived control decreases people's concerns about privacy and increases their likelihood of disclosing sensitive personal information (Brandimarte, Acquisti & Loewenstein, 2013).

According to a recent survey assessing Americans' attitudes about privacy, security and surveillance, 93 percent of respondents reported that being in control of who can get information about them is very important, 90 percent of respondents reported that controlling what information is collected about them is important and 55 percent of respondents supported the idea of online anonymity for certain activities (Pew Research Center, 2015). A key underlying motivation for seeking control over both the content of information that others can access, and the audience that receives this information pertains to concerns about being evaluated

(potentially negatively) by others. Similarly, desiring anonymity also pertains to avoiding negative evaluation by others. Thus, when technology reduces concerns about social evaluation, people may pay less attention towards privacy threats and may be more likely to divulge personal information through technology (compared to face-to-face interactions).

33.7 Future of Technology in the Workplace and the Role of Social Evaluation

As the modern workplace continues to be transformed by new technologies, employees will work in a digital mesh of intelligent systems that can act autonomously. Artificial intelligence and machine learning will encompass systems that learn, adapt and function autonomously. These systems will have the potential to drive digital innovation in several business areas. Virtual personal assistants may become more prevalent in the workplace and reduce employees' workloads by enabling more efficient coordination. Autonomous robots in the workplace may help make work processes more efficient by performing tasks that are difficult or dangerous without creating liabilities. Entire businesses may be created on digital technology platforms with a fully digital workforce.

Technology can reduce concerns about social evaluation. However, we know that social evaluation has both benefits and downsides in the workplace. Therefore, it will be critical for organizations to consider the implications for social evaluation when deciding to integrate novel technologies in their workplaces. Organizations must carefully consider how the characteristics of their workforce, their organizational culture and the nature of tasks influence the pertinence of social evaluation in a given situation and choose technological solutions appropriately, based on these considerations.

33.8 Conclusion

In this chapter, we discussed how technology has transformed the modern workplace with a specific focus on understanding the psychological impact of novel technologies on employees. In particular, we examined how technology influences people in social situations where there is a possibility for being negatively evaluated by others. We suggested that technology can reduce social evaluation concerns and examined the implications of this idea in the context of monitoring and communication. We contextualized our discussion even further by focusing on two novel technologies that are becoming increasingly pervasive and popular – behavior-tracking technology and virtual/augmented reality. We delved into understanding these technologies, and explored the opportunities and challenges associated with using them for monitoring and communication. Furthermore, we examined how these novel technologies influenced people's experiences of social evaluation in monitoring and communication contexts. Through this chapter, we hope to have

provoked our readers to consider the importance of examining the psychological impact of novel technologies on employees and organizations while providing initial steps toward a more comprehensive understanding of the topic.

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