TO MULTITASK OR NOT, THAT IS THE QUESTION

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ABSTRACT

Connectivity through the use of smartphones takes place both on the job, as employees "multi-task," talking/texting with friends and family, and out of the workplace, as employees continue to work on job-related tasks. Our research examines how work productivity increases and decreases through the use of smartphones. It increases, e.g., when work related outcomes are accomplished during off-work hours, while productivity decreases, as when social connections are maintained during working hours. As more and more people become tech savvy, social and business connectivity blurs the boundaries between work and home. In 2010 there were 62.6 million smartphones, and in 2014 the estimate of smartphones in the U.S. went up to 163.9 million, a little over half of the number of people in the U.S. (Number of smartphone users…, 2015). Globally, over one-quarter of the population has smartphones (1.8 billion phones for 7.1 billion people) and this is expected to increase to over a third of the population by 2017 (eMarketer, 2014). Adding to the complexity of determining the impact on productivity is the concept of Work/Home Interference (WHI). WHI is also affected positively and negatively by the use of smartphones, both increasing the tension created by this interference when home life is affected and decreasing this tension when recovery occurs from WHI. Recovery, the notion of "human sustainability," re-energizes employees which is required for organizations to be successful in a competitive environment. Connectivity is changing our culture so that completing work-related tasks at home is both more expected by employers and accepted by employees.

Keywords: Multitasking, Work/Home Interference, Smartphones at work, Millennials, Human sustainability

INTRODUCTION

We watched in awe as a student (President of his college class and one of the top graduating students this year) accessed and conversed on several social media applications by using his computer and two smartphones, and occasionally paid attention during class . . . all at the same time. When he was asked to close his laptop and join the class, his response was: "haven't you ever heard of multitasking?" We have continually noticed that students and employees spend considerable amounts of time in class and on the job paying attention to their smartphones and cyber loafing on their electronic devices (smartphones/tablets/laptops). People at Home Depot text and talk on their phones while, or instead of, stocking the shelves with merchandise; wait staff and bus persons in restaurants check their emails/tweets/messages while, and in between, clearing and waiting on tables; students busily attend to their smartphones, laptops and tablets during

discussions in class; receptionists make customers wait while they finish on their smartphones; drivers do not pay attention to traffic or street lights while texting; executives pay more attention during meetings to their smartphones than to discussions taking place; and salespeople interrupt clients to check a message or take a phone call. And so we started thinking about the impact of the smartphone on the performance of workers and students: is technology increasing or decreasing our efficiency and effectiveness? The relationship between smartphones and job performance is a complex one. Performance may be directly increased through its usage, for example, when smartphones are used at night to solve a pressing problem that may occur overseas, while at the same time this usage causes added stress on employees, thereby making the overall impact on performance highly uncertain.

Smartphones are everywhere! People bump into each other on the streets because they are so busy looking at and typing on their phones that they are not paying attention to where they are walking. Are they also paying so much attention to their phones that they are not aware of their jobs? In the Spring of 2011, 35% of all adults in the United States owned smartphones, and today, that number has increased to 64% (Smith, 2015). If we look only at people in the18-29 age group, this number increases to 85% (Smith, 2015). In 2010, there were 62.6 million smartphones, and in 2014 the estimate of smartphones in the U.S. goes up to 163.9 million, a little over half of the number of people in the United States (Statista, 2014). Globally, the number of smartphones is greater than one-quarter of the population (1.9 billion phones for 7.3 billion people for 2015) and this is expected to increase to over a third of the population by 2018, with more than 2.56 billion users (Number of smartphone users…, 2015). As of 2013, fifteen countries already have over 55% smartphone penetration of their population, including the U.S., which is only thirteenth on this list (Fox, 2013).

Millennials today comprise the largest single generation in the U.S. workforce, with 53.5 million workers, according to Richard Fry of the Pew Research Center (2015). By this research, Millennials are those people born between 1981 and 1997, while the Bureau of Labor Statistics defines them as being born between 1976 and 2001 (Burridge, 2014). Duggan and Rainie (2012) indicate that 85% of American adults own a mobile phone. That percentage increases to 90% when looking only at ownership for Gen X (those born between 1965 and 1980, according to Taylor & Gao, 2014, of the Pew Research Center) and to 94% for Gen Y (the Millennial generation). Our class president, who started this inquiry, is more the norm than the exception in class. Multitasking in the classroom and on the job has been both applauded as improving performance and questioned as costing companies based on lost time by employees who are using work time to deal with personal issues on electronic devices (see, for example, Choudhary, 2014; Harmon.ie, 2011; Spira & Feintuch, 2005).

MULTITASKING

Multitasking is doing several things at the same time, but is it? Medina (2008), for example, notes that it is virtually impossible to multitask when it comes to paying attention. Furthermore, he indicates how people who are interrupted take 50 percent longer to accomplish a task and tend to make up to 50 percent more errors. Strayer and Watson (2012) report that "our performance deteriorates drastically when we attempt to focus on more than one task at a time" (p. 24). They also found that only a very small percentage of people can actually multitask, in their studies only

2½ percent. Multitasking allows people to achieve more than one goal at a time and to take part in more activities. "However, engaging in multiple attention demanding tasks simultaneously may be cognitively and physically taxing. Moreover, performance on individual tasks may suffer such that errors are made and overall productivity is diminished" (Sanbonmatsu, Strayer, Medeiros-Ward, & Watson, 2013, p. 1). People who are likely to multitask are those who believe they are good at handling multiple activities at the same time and who expect the highest rewards at the lowest costs. Those who exercise high levels of executive control are able to focus on task goals while avoiding conflicting distractions (Kane & Engle, 2002). However, Sanbonmatsu, et al., (2013) suggest that "although perceived multi-tasking ability may increase the willingness to multi-task, multi-tasking activity may also affect perceptions of multi-tasking ability" *(*p. 7). Ophir, Nass and Wagner (2009) found that individuals who report multitasking more frequently, multitask less well than those who are less frequent multitaskers.

Much of the literature distinguishes between conscious and subconscious multitasking (see, e.g., Bannister & Remenyi, 2009). Since the conscious mind can only focus on one task at a time**,** tasks must be handled sequentially. When this is done, however, multitasking takes some time to switch from one task to another, thereby adding additional time needed to complete both tasks (see, e.g., Dzubak, 2008; Jarmon, 2009; Wiley & Jaroz, 2012). When the subconscious is involved, one task takes priority and is attended to by the conscious mind. Remaining tasks are put on "autopilot" and are dealt with as if they were done by rote. Bour (2010) provides the example of a student who is attending to reading and responding to text messages during a class lecture. Since the lecture is the task that is handled by the subconscious, it is the lecture material that is not absorbed by the student. With no self-monitoring, such as the self-restraint needed to simply put the phone away, multitasking dramatically lowers the amount of learning that takes place. Grinols and Rajesh (2014) discuss how smartphones "enable users to divert attention from the task at hand to non-germane matters" (p. 89). How many times have we been driving and talking on the phone in the car. Our subconscious mind is handling the driving task, while we attend to the phone conversation. Many car accidents have occurred while the subconscious is on auto-pilot. In the U.S. many states have laws which are designed to prevent individuals from holding a phone in one hand and the steering wheel in the other, while 46 states prohibit text messaging for all drivers (Distracted driving laws, 2015).

Multitasking actually amounts to a stream of interruptions. These types of interruptions for office workers in the U.S. occur as often as eleven times per hour (González & Mark, 2005). In most offices in the U.S. and other countries, it is not unusual to see knowledge workers involved with multiple tasks at the same time. However, such employees are actually juggling tasks. Jobs often require constant shifting among several tasks, although many jobs are more effective without any interruptions (Bannister & Remenyi, 2009). As new technologies such as smartphones, tablets and laptops have become available, more multitasking is expected so that employees may respond more quickly to peers, superiors, customers, vendors, and so forth. One basic issue is whether these new technologies actually improve productivity, performance and quality of life. Mintzberg (1970, 1973) found that managers carry out many tasks during the day and often spend only a minute on some tasks before they are interrupted and move on to another task. More recently, González and Mark (2004) state:

> What surprised us was exactly how fragmented the work is. In a typical day, we found that people spend an average of three minutes working on a single event before switching to another event. Informal interactions average somewhat more than four and a half minutes each. Further, people spend on the average somewhat more than two minutes on any use of electronic tool, application, or paper document before they switch to use another tool. The longest duration of tool use is with PC's, yet this averages only slightly more than three minutes at any one time. (p. 119)

Research indicates that when humans switch from single tasking to multitasking, the effectiveness of the brain is greatly reduced. People who are engaged in multitasking become more fatigued and exhibit both raised stress and adrenaline levels (Dzubak, 2008).

There are many knowledge-based tasks where workers need to stay focused on a single task and not be interrupted. Furthermore, multitasking is very inefficient and negatively impacts performance since time is needed to refocus on the initial activity. The need to constantly refocus requires knowledge workers to jump around like grasshoppers (Walesh, 2013). Bannister and Remenyi (2009) indicate that there is minimal research which provides a meaningful evaluation on the effect of multitasking on organizational productivity or on the financial impact of continuous task switching. Arguments about the impact of multitasking on productivity result in uncertainty regarding the effectiveness and desirability of multitasking. Its complexity makes it virtually impossible to conclude that the total impact of multitasking is effective or ineffective. Despite this, multitasking is increasing as a way of working for knowledge workers (Kim, 2007).

Silverman (2010), defending multitasking in a Harvard Business Review Blog, identifies several ways in which multitasking provides positive impacts on performance at work:

> 1. Multitasking helps us get and give critical information faster . . . . 2. It keeps others from being held up. . . . 3. It gives you something to turn to when you're stuck. . . . 4. The higher up you are in the organization, the more important multitasking is. (para. 4-5)

Without looking into the available support for his argument, there are clearly areas in which multitasking enhances performance, for the group and organization, certainly, if not for the individuals involved as well. In contrast, the comparison to the short-term vs. the long-term impact might provide a more 'sustainable' perspective.

INTERRUPTIONS

With the expansion of competitive pressures on most companies, jobs have been restructured as a method of reducing costs and adding to profits. The increasing use of technology both allows for and requires employees to respond more immediately to teammates, supervisors, customers and others via smartphones, tablets and laptops. These expectations and practices result in multiple interruptions during the day. Such interruptions require more multitasking in order to meet the demands of the position. Corragio (1990) defines: "an interruption is an externally-generated, randomly occurring, discrete event that breaks continuity of cognitive focus on the primary task" (p. 19). Such interruptions occur at random times and the individual is expected to respond to these externally-generated events immediately which in many cases require some form of action

(Murray & Kahn, 2014). When technology-driven interruptions occur, and the source may be internally or externally generated, the impact on performance can be negative. Spira and Feintuch (2005) found that "Interruptions now consume 28% of the knowledge worker's day, based on surveys and interviews conducted by Basex over the past 18 months . . . This translates into 28 billion lost man-hours per annum to companies in the United States alone" (p. 4). And, they found, the cost of such interruptions has been estimated to be as much as $588 billion (Spira & Feintuch, 2005). Interruptions resulting from multitasking restrict performance. Harmon.ie (2011) found that people check their smartphones 150 times per day, or every 6.5 minutes, which costs companies $10,375 per employee per year, an amount even greater than the total of $588 billion dollars estimated by Spira and Feintuch (2005). These interruptions not only take a person away from his/her primary task, they actually result in greater inefficiency. Walesh (2013) states that multitasking "is very inefficient because of the time, perhaps unnoticed, needed to resume a task" (p. 61).

A recent study suggests that even the briefest interruption could have an exponential effect on productivity. In this study a 4.4 second long interruption tripled the rate of errors (Altman, Trafton & Hambrick, 2014). This study also found that interruptions cause a significant loss of time for white collar (knowledge) workers while both reducing performance and increasing stress. However, some studies suggest that interruptions may help workers who need a break from monotonous tasks and allow them to start fresh after returning to their original tasks (Speier, Vessy & Valacich, 1999). These self-initiated interruptions, such as taking a walk or getting a drink of water, may be therapeutic and beneficial to knowledge workers (Corragio, 1990).

Some researchers have suggested that tools or approaches (Corragio, 1990; Lanaj, Johnson, & Barnes, 2014) may be used to control interruptions, but many employees are reluctant to use these methods since in many cases they do not know who may be interrupting them (Horvitz, Apacible, & Subramani, 2005). If such interruptions come from the employee's supervisor, they are expected to take precedent over the tasks which he or she is doing at the time (Galluch, Grover, & Thatcher, 2015).

There is no worse time to be interrupted than at that moment. When people have nearly completed a task, they are overtaken by goal proximity. This increases irritation at being interrupted, and individuals have no spare time for it, which increases their unwillingness to interrupt present activities relative to potential willingness to be interrupted in the future (Jhang & Lynch, 2014). This, of course, contradicts Silverman (2010) indicating that finishing a task may also interfere with the ability of others to complete their tasks as time pressures affect them.

WORK/HOME INTERFERENCE

Technology, and in particular the smartphone, is dramatically increasing work/home interference (WHI). The boundary is becoming so blurred that people often spend time at home checking their emails, both social and work related, right up until bedtime. And the first thing many people do when they wake up in the morning is to once again check their smartphones for messages. Harmon.ie (2011) found in a survey conducted by uSamp that a majority of people under 40 years of age stay digitally connected in bed. Millennials are so attached to their electronic devices that

one survey noted how 51% would ignore any policy banning the use of personal devices from the workplace (Rebels with a smartphone, 2013).

Perlow (2012) conducted experiments with employees of the Boston Consulting Group (BCG) during the downturn of 2008. Starting with two groups, the experimental group was required to take time off while the control group continued with their 24/7 approach to consulting. After five months the work situation for both groups was measured. On all factors, including job satisfaction and client relationships, the experimental group scored significantly higher. Based on three more years of this research at BCG, Perlow recommends that teams require each individual to take one night off every week. This approach dictates that team members work more closely and provides for needed rest for individuals on a weekly basis. Also highly recommended is that everyone take a break from using their smartphone on a 24/7 basis. According to Perlow's findings, teams meet individual needs better and clients benefited in unexpected ways.

Thomas (2015), in a Harvard Business Review Blog, notes how several companies now prohibit sending emails after 11:00 pm because many team workers come to work too tired to be productive during the day after interacting via email late into the previous night. Lanaj, et al., (2014) studied the impact of smartphone use on sleep quantity, morning depletion and work engagement the next day: "We found that smartphone use for work at night disrupted sleep that night, which was associated with greater depletion the next morning and less engagement during the workday" (p. 18). These findings occurred in both of their studies, the first involving middle and upper level managers and the second including lower level employees. Since most smartphone owners keep them in their bedrooms at night, with over 40% having them within arms' reach of their beds, "your employees might feel pressure to instantly respond to emails or start working on tasks in their off hours. As much as it can be helpful, it might also cause your workers to work longer hours and carry more stress" (Huhman, 2011, p. 2). This lack of clarity regarding the impact of WHI on job performance and productivity is consistent throughout the literature on effects of smartphone usage by employees.

One of the main sources of stress comes from lack of control (Jhang & Lynch, 2014). If an employee is fatigued, he may be tired, depleted and sluggish (McNair, Lorr, & Doppleman, 1992; Watson & Clark, 1994). Employees need energy in order to complete everyday tasks as well as go beyond what is expected of them (Fritz, Fu Lam, & Spreitzer, 2011). Energized employees make the organization run more successfully and such employees are required for the high performance that organizations need to effectively compete in today's competitive environment (Dutton, 2003). Sonnentag, Binnewies, & Mojza, (2008) found that positive unwinding experiences during evenings result in high levels of energy during the following workday. Fritz and Sonnentag (2005) noted that relaxation, mastery experiences and psychological detachment from work can be very beneficial in recovery. Fritz, Sonnentag, Spector, and McInroe (2010) suggest that weekends are particularly important in this recovery process. Pfeffer (2010) suggests that many organizations do not understand the need for human sustainability.

Depletion described by Lanaj, et al., (2014) is consistent with Pfeffer's (2010) concern for human sustainability. Fritz, et al., (2011) focused on maintaining or recharging one's energy at work. They looked at strategies people used to replenish their energy. One of the most common is to use their smartphones to surf the internet while at work. Multitasking was another basic strategy. Neither of

these strategies was associated with higher levels of energy. Instead, they found that work-related strategies that "reflect notions of learning, relationships, and meaning at work" were positively related to vitality, while "micro-break strategies were mostly related to lower vitality and to higher levels of fatigue" (p. 34). Yun, Kettinger, and Lee (2012) studied smartphone usage at both work and home, what they called office-home smartphone (or OHS) and its impact on work-to-life conflict. This study was carried out in South Korea, and while there may be cultural differences that help explain some results, conclusions seem to be transferrable to other cultures including the United States. "The findings of this study show that an increased work overload due to OHS use results in greater work-to-life conflict, which creates job stress and user resistance to OHS; however, productivity gained due to OHS use can reduce work overload" (p. 121). These negative results occur when "OHS use is only concerned with expanding flexibility in terms of work hours and locations. Instead, when OHS use allows workers a means to 'work smart' and improve the quality of their work and productivity, work overload and work-to-life conflict will decrease" (p. 145).

According to Fritz, et al., (2011) there are many factors which contribute to depletion of human energy at work. First, long work hours prevent workers from having adequate time to unwind from work. Second, more employees are "attached" to work via smartphones, tablets or laptops. They are expected to respond to calls and emails outside of work. Third, during recessions or financial downturns, employees are threatened by job security and may be less likely to take vacations. They are also more likely to work on job related tasks at home, thereby being unable to unwind while off the job. Moreover, companies often eliminate those perks which might help to reenergize employees, such as free food or fitness facilities, during these downturns (Storseth, 2007). At such times worries about work security may negatively impact sleep leading to higher levels of fatigue during work hours (Sonnentag, et al., 2008). Furthermore, with the advent of more dual-income families, employees may have a second shift at home involving childcare and housework (Hochschild, 1990).

Cyber loafing and electronic interruptions of knowledge workers in the United States take a phenomenal amount of time away from the job as Spira and Feintuch (2005) noted. For all of the work interference at home, there is certainly a large amount of social and personal activity taking place at work. And the general culture, particularly created by Millennials, who today comprise over one-third of the total workforce, supports this blurring of boundaries (Fry, 2015).

The effects of WHI are both positive and negative from the perspective of the work organization. Studies note, for example, how productivity is increased as a result of multitasking, particularly resulting from the use of technology. While multitasking may initially increase productivity, Bannister and Remenyi (2009) note that the relationship really follows an inverted "U" curve: "Productivity improved when workers moved from single tasking to multitasking. As the number of tasks increased, productivity levelled off and after a critical number of tasks was reached, productivity declined precipitously" (p.6). Cavazotte, Lemos, and Viladsen (2014) note how workers perceived that they had more autonomy and flexibility in getting work done, although in reality, electronic devices were adding constraints and lessening autonomy in completing tasks.

Some studies conclude that cyber loafing provides one of the more critical positive effects on WHI, reducing the stress by allowing for recovery. Previous studies note that "respite" breaks, i.e.,

socializing or relaxing, aided recovery and performance while breaks that included running errands or preparing for another activity did not improve recovery (Fritz, et al., 2011). They actually found that browsing the Internet (cyber loafing) was not related to improving energy at work.

Several studies use net income per employee as an appropriate metric to identify the impact of smartphone usage on performance on the job. Perhaps most people equate the amount of time spent on job-related activities with overall performance. Therefore, spending more time, either on the job itself or at home working on job tasks, is evidence that performance has improved. Most studies use impressionistic data regarding whether performance has been enhanced.

Choudhary (2014), on the other hand, actually measured the impact on the organization's bottom line. He describes the mixed effects of the blurred lines between work and home life. Increases in net income per employee were noted for the organization. This short term improvement came, however, at the expense of an extended workday for the workers. In addition, there were more health problems resulting from the added stress created by WHI. He also found there was an increased social isolation for employees resulting from the greater time spent on work activities.

These mixed effects help explain employee behaviors on the job that have a negative impact on the work organization. For example, cyber loafing and multiple work distractions may be necessary for the employee to overcome the sense of social isolation resulting from the perceived lack of opportunity to interact with others while at home, since employees feel they are spending additional time doing work-related activities. The acknowledgement that their workday is extended may also support the belief that cyber loafing is acceptable in the workplace. And the Millennials' belief that multitasking has no negative impact on performance, supported by our culture that holds multitasking actually increases performance and, at the very least, certainly does not decrease performance, suggests that cyber loafing is an acceptable activity at work.

Tarafdar, D'Arcy, Turel, and Gupta (2015) found employees spent over three and one/half hours per week responding to work emails at home (23 minutes on the average day), commuting (12 minutes) and on weekends (42 minutes), while on vacation days, they spent 43 minutes. However, many interruptions, regardless of who may be interrupting the employee, can produce stress.

CONCLUSION

Bannister and Remenyi (2009) conclude regarding the impact of multitasking on overall performance: "In plain English, it takes more effort as well as more time to do three tasks simultaneously than it does to do the same three tasks sequentially" (p. 4). This is the direct response to our class President mentioned at the beginning of this paper. Multitasking is a widely accepted, "natural" practice among Millennials, and has worked its way into the workplace for many people. Likewise, smartphones have become an additional appendage to many/most people today, intruding into work and home lives with equal opportunity. This "electronic connectivity," a phrase agreed to by participants at the 2015 conference of the International Association of Business Disciplines in Orlando Florida, has a complex relationship with the issue of Work/Home Interference. Productivity often increases, and it is usually at the expense of increased stress and less time available for recovery and stress reduction.

Smartphones provide opportunities to blur the work-home boundary, and result in greater occasions for multitasking. When one or more tasks have been completed so often by an individual that they are essentially done by rote, multitasking becomes very efficient and effective as these tasks can be handled by the subconscious (Bannister & Remenyi, 2009). When attention has to be paid to each of multiple tasks, however, research suggests that the brain can only handle one task at a time in its conscious state and, therefore, is only capable of dealing with such tasks sequentially (Bannister & Remenyi, 2009; Dzubak, 2008). And Silverman (2010) provides many positives of multitasking, taking this one step further when he asks:

> Are we comfortable pretending we really can live our lives not multitasking? Or are we like my father and others who say smoking is bad but can be found on the front porch in the dead of night, a small red glow at their lips, puffing away while texting their BFFs and playing Words with Friends? (para. 8)

This same complexity is seen when trying to identify the real impact of Work/Home Interference. Much of the information suggests a positive impact on performance on the job, while the cost of this process is added stress for the individual and less time available for recovery. Choudhary (2014) states: "It is worthwhile to note that the increases in NI/E [Net Income per Employee] may be at the expense of extended workday, increasing health problems, and social isolation for the smartphone using employees" (p. 15)—the real tradeoff on this whole issue.

People are now part of a community of "hashtag." No longer do we have communities of interest, i.e., communities based on job related skills or interests or concerns rather than groupings based on social media. And, this is more isolating than are face to face interactions. Note also that this suggests practice in and understanding of the politics of situations is being diminished, further reducing the skill development of people as they prepare for a career in upper management.

IMPLICATIONS FOR FUTURE RESEARCH

Millennials have become the major part of the workforce and have brought their use and love of technology to the workplace. They live, work and sleep with their cellphones so they can text at any time of the day or night whether it be for a work request or a response to someone, according to a recent Forbes article (Solomon, 2014). However, the overall impact of smartphones, like the impact of multitasking, is not only mixed, it is often contradictory. While smartphone usage increases tensions found in Work/Home Interference, which is tied to reduced performance and health over time, it also allows for recovery while on the job, enhancing human sustainability. Given this contradictory mix of results, future research needs to consider the performance levels of Millennials with smartphones relative to other generations' performance. There also seems to be a direct relationship between multitasking and the resultant interruptions with depletion, while an additional direct relationship exists between relaxing breaks and other recovery methods with human sustainability. These re-energizing processes enhance organizations' opportunities for success and need to be studied more fully in future research. It also suggests that we need to recognize that we may be in a new situation where the workforce might be changing the workplace rather than what historically has happened, namely, the workers respond to and alter their behavior to fit the requirements of the job.

It takes experience with a new technology before we learn what questions to ask regarding its true impact. What impact does the added stress from WHI have on long term performance on the job? Given the increasing availability and use of smartphones, how can they be integrated into the job to improve performance without having a detrimental impact on overall quality of life? What rules need to be established by the company and the corporate culture to limit the negative effects of smartphone use on WHI? Thomas (2015) states: "Be clear about expectations for email and other communications, and set up policies to support a healthy culture that recognizes and values single-tasking, focus, and downtime" (para. 11).

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