5-2024

Shift Schedule Justice and Clinician Outcomes: A Quasi-Experimental Approach

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SHIFT SCHEDULE JUSTICE AND CLINICIAN OUTCOMES: A QUASI-EXPERIMENTAL APPROACH

A Dissertation
Presented to
The Graduate School of
Clemson University

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy
Industrial-Organizational Psychology

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by
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May 2024

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ABSTRACT

Emergency Physicians (EPs) work in stressful and unpredictable work environments. Due to these factors and the nature of their work scheduling (in shifts), EPs experience heightened levels of adverse work outcomes. As such, it is important for EPs to believe their shift schedule is fair, and for them to have adequate recovery time away from work. The present research examined the effects of Emergency Department leadership approving a 1-hour increase to EP shifts, equating to roughly two fewer shifts per month (8-hour shifts will become 9-hour shifts). As such, EPs should experience more time off from work per month, allowing for more recovery time. This study sought to examine the effectiveness of this system-level intervention, in addition to contextual factors outside of the shift intervention, on EP outcomes through a quasi-experimental, mixed-model design. Survey data were collected at two points in time, two months apart. The first survey assessed Work Schedule Justice perceptions and relevant outcomes prior to the shift change, and the second survey collected perceptions on the same constructs two months after the shift change occurred. Semi-structured interviews were conducted in the Spring after the second survey was closed to provide context for the quantitative results. Data on shifts EPs worked for six months were also collected. Shift data analyses concluded that the EPs did work fewer shifts overall, fewer hours overall, fewer 8-hour shifts, and more 9-hour shifts after the intervention was implemented. Survey data showed that Procedural Shift Schedule Justice was the only variable that significantly changed in a positive direction as a function of time. Thematic analyses from semi-structured interviews highlighted five themes relevant to the shift change, contextual information surrounding events occurring in tandem with the change in the ED, as well as overall EP shift preferences. EPs frequently stated that although they experienced fewer shifts per month, the shifts themselves were more stressful due to understaffing within the

ED. These findings can be used to understand the multifaceted nature of implementing an organizational intervention and the importance of collecting multiple data types to understand the findings.

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CHAPTER I

OVERVIEW AND THEORETICAL FRAMEWORK

Introduction

Compared to the general working population, employees in healthcare professions experience negative outcomes at significantly higher rates (Patel, 2018; Seidler et al., 2014). These adverse outcomes can be attributed to the nature of their work, which may include the unpredictability of patient volumes, shift schedule fluctuations, administrative policies, and high staff turnover (Barker et al., 2011; Hoff et al., 2019). Emergency Physicians (EPs) are particularly susceptible to these adverse work outcomes, which can generate fatigue, burnout, and turnover (Croskerry, 2014; Kuhn, 2001). Research also suggests that occupations which involve shift work are more susceptible to negative work outcomes when compared to occupations without this type of scheduling (Costa, 2003).

Given these demands, it is not surprising that recent findings of fatigue in Emergency Medicine (EM) are stark. A report published by the Association of American Medical Colleges in 2022 identified Emergency Medicine as the fourth most common specialty in the US (46,857), preceded by Internal Medicine, Family Medicine, and Pediatrics (AAMC, 2022). Despite being the fourth most popular specialty, data released in 2023 ranked Emergency Physicians (EPs) as the most burnt-out specialty, with more than 65% of all EPs reporting experiencing some level of burnout (Medscape, 2023). This is a 20% increase in burnout when compared to 2018 rates (Medscape, 2023).

The present dissertation investigates the role of justice perceptions, particularly through examining a schedule change intervention implemented in a Southeastern Emergency Department (ED). Furthermore, this study seeks to examine the effects of the schedule change on

(shift) schedule justice, or the perceptions of fairness employees have regarding their work shifts, as well as their perceived ability to recover between shifts, burnout, and job satisfaction. Lastly, this study examines how contextual factors outside of the shift intervention may work to influence EP fatigue and burnout.

While many burnout interventions have focused on enacting change at the employee level, problems have been associated with this approach. For example, individual-level interventions tend to identify employees based on individual need for assistance, which can lead to stigmatization (Kalfa et al., 2021). Furthermore, individual interventions focus on changing employee responses to certain workplace experiences, and do not focus on the cause of the issue. As such, the intervention in the present study uses a system-level approach to mitigate burnout, which entails making changes to the work environment to reduce adverse employee outcomes and increase worker well-being (Fox et al., 2022).

Background

In Spring of 2022, an open-ended question was sent out to all EPs in the Emergency Department (ED) of a Southeastern hospital system. This question was asked in response to ongoing monthly well-being data collected from the same ED. Data collected across two years displayed concerning levels of burnout within the healthcare providers, including nurses, EPs, APCs (Advanced Practice Clinicians), and Residents. These data largely showed that even though the Covid-19 pandemic was slowing down, which resulted in less patients in EDs presenting with Covid-19, rates of burnout, fatigue, and turnover within healthcare staff continued to rise (see also Rania et al., 2023). In response to these results, a Fatigue Risk Management Team (FRMT) who had previously been working with the ED sent out an open-ended question to all EPs asking them to share system-level recommendations that could reduce

their fatigue. All the responses were coded by the FRMT (Dr. Emily Hirsh, Dr. Lauren Fowler, Dr. Thomas Britt, Caroline George, and Hanna Jiang). The outcomes of the coding resulted in responses from 60 EPs that included 143 individual recommendations, which were categorized into eight themes. The most common theme was the need for more time away from work to recover (this category received 48/143 responses).

In the 'Time Away from Work' category, the two most common recommendations were to 1) reduce total hours needed to work, and 2) elongate shifts. Elongating shifts would allow EPs to work fewer shifts per month, if the number of hours required to maintain full time status remained the same. Both recommendations reflected EP's need for more time off to recover from their work. Depending on the EPs Full Time Equivalent (FTE) status at this hospital, their contract may be for full time (130 hours per month) or less than full time. EPs who are not full time do not accrue PTO or vacation days, because this is thought to already be included in their hours off. For example, if an EP wanted to take a vacation at the end of the month, they would have to lump all their shifts in at the beginning of the month (back-to-back, night and day shifts possibly) to work all their required hours that month. There were several comments which highlighted the extreme fatigue this scheduling creates.

The results of the one question survey were presented to the ED leadership in August of 2022. This information, in addition to other contributing factors, led ED leadership to implement an intervention that elongated some EP shifts by one hour. A shift modification was implemented in January of 2023, and resulted in some EPs working 9-hour shifts, instead of the previous 8-hour shifts. The resulting one-hour addition to the shift equates to EPs adding roughly two days off from work per month.

Prior to this shift change, full time EPs would be working roughly 17 shifts per month, since 130 (number of hours per month) divided by eight (length of each shift) is 16.25. Since it is uncommon for EPs to work fractions of a shift and they are usually scheduled 'up,' this equates to working 17 shifts per month. Lengthening shifts by one hour reduced the 17 shifts per month to 15 shifts (130 divided by 9 is 14.44). As such, EPs should experience two more days off from work a month.

Overall, the present study aims to analyze this shift schedule intervention to determine if shift lengthening results in favorable employee outcomes (higher levels of shift schedule justice, overall justice, job satisfaction, burnout, and shift readiness). As such, the main research question this study seeks to answer is if the system-level change requested by EPs (increased time away from work) results in a positive change regarding work outcomes, particularly within decreases in fatigue and increased justice perceptions.

Although the intervention which this study is seeking to analyze was implemented to lessen EP adverse outcomes, it is important to note that elongating shifts resulted in other changes as well. As such, when shifts lengthen, this changes the structure of the general shift schedule. For example, 8-hour shifts result in three general shifts (24 hours divided by 8 equals 3). The elongation of shifts by one hour resulted in the removal of shifts from the shift pool. The outcome of certain shift removals and EP perceptions of this outcome was further analyzed when coding interview transcripts (described below). Additional ED changes included the introduction of 'zones' in the largest ED in the hospital system. The red zone and the blue zone were created in part to allow EPs more flexibility when seeing and treating patients, and to allow them the ability to cover larger distances in the ED. EP perceptions of the zones will also be discussed in the Results section to allow for further understanding of EP outcomes.

A detailed visual of the study design can be found in Figure 1. The quasi-experimental nature of this study involves collecting data from EPs pre and post intervention. Additionally, a qualitative interview component was included to shed light on the contextual factors and opinions of the participants regarding the shift change in addition to other variables and experiences outside of the intervention. Using mixed methods to collect qualitative and quantitative data to answer a research question is a commonly used research method to achieve triangulation (Fielding et al., 2012). Triangulation can otherwise be thought of as convergent validation, or the determination that results coming from multiple methods are related in some way (Fielding et al., 2012). In this study, quantitative and qualitative data were collected. Quantitative data were derived from survey responses and shifts worked, and the qualitative data were assessed through interviews and assisted in understanding the results of quantitative study. This mixed method approach is sometimes used when there is time to analyze qualitative data in depth, and the number of responses is manageable for the research team to analyze (McCusker & Gunaydin, 2014).

An illustration of the Theoretical Framework can be found in Figure 2. Figure 2 depicts the predictor variables of shift schedule justice (procedural, distributive, interactional and informational) and the ability to recover from work between shifts influencing the outcome variables (job satisfaction, burnout, overall justice). In summary, it is hypothesized that the shift schedule change will affect the shift schedule perceptions of the EPs, and those perceptions will impact the outcome variables of interest. These variables are discussed in depth in the Introduction section and in subsequent chapters.

In conclusion, this study analyzes the outcomes of a 1-hour shift increase intervention in an Emergency Department, with particular emphasis on the impacts this change has on

Emergency Physician occupational outcomes. Furthermore, this study introduces a novel scale assessing the perceived ability to recover from work shifts and uses data from participatory research as pilot data that informed the main shift lengthening intervention. On a macro scale, this study contributes to the knowledge of the Fatigue Risk Management Team mentioned previously, in hopes that these findings and interventions may be generalizable to other Emergency Departments and healthcare occupation scheduling practices.

Theoretical Framework

The theoretical framework that this study is based on relies on equity theory (Adams, 1963) and organizational justice theory (Cropanzano et al., 2001). Equity theory states that individuals are sensitive to perceived fairness and how that fairness can impact those around them. Whether fairness has been attained, overachieved, or underachieved can result in certain behavioral outcomes. Organizational justice theory was introduced in the research literature after equity theory. Organizational justice resembles Equity theory in that it is concerned with the perception of fair processes in the workplace, and how those perceptions can impact and predict employee outcomes. The independent variable in this project was the shift schedule intervention. The predictor variables in this study are the four dimensions of shift schedule justice; procedural justice, interactional justice, distributive justice, and informational justice. These justice dimensions were created from the same four facets of organizational justice. The outcome variables in this study are burnout (primarily emotional exhaustion), job satisfaction, overall justice, and the ability to recover from work. Organizational justice theory and equity theory are addressed in the third chapter of this proposal and are preceded by the second chapter that focuses on how shift work has been defined, the many different types of shift work, and outcomes of this type of work. Following these sections, occupational interventions are discussed

in relation to type, target audience, and associated outcomes. The outcome variables of interest are addressed, followed by a summary of the hypotheses for the present study.

CHAPTER II

SHIFT WORK

Overview of Shift Work

Working in shifts is common, as NIOSH reported that 27% of the US working population participates in shift work (NIOSH, 2015). Since the rise of shift work in America during the Industrial Revolution, this type of work has increased in occupational fields and industries. For example, shift work was originally associated with factory workers, but has now expanded to include healthcare workers, retail and fast-food employees, mechanics, and servers and bartenders. Although there remains a lack of consensus on the exact definition of shift work, it is usually referred to as any (usually team-oriented) work that exists outside of a normal 9am-5pm (daytime) schedule (Vogel et al., 2012). Shifts are typically structured at three time points throughout the day, although this can vary depending on the occupation and the organization. For example, 8-hour shifts are usually classified into three categories: day shifts (9 a.m. to 5 p.m.), evening shifts (4 p.m. to 11 p.m.) and night shifts (11 p.m. to 7 a.m.) (Perrucci et al., 2007).

There are multiple different reasons for scheduling work in shifts. One of the main reasons for this type of scheduling is organizations seeking to meet consumer demand (Boggild & Knutsson, 1999). Examples of this include fast food chains staying open all day (on a 24-hour cycle) and companies such as Amazon quickly shipping out packages every day of the week, and Netflix switching from mailing out DVDs to 24/hour streaming. These operations require employees to work outside of a daytime schedule. Another reason shift work is so prevalent is the need for certain businesses to stay open 24 hours a day (Vogel et al., 2012). Some examples include emergency rooms and chemical and manufacturing plants. The global nature of work is another reason for the rising popularity of shift work (Vogel et al., 2012). Many organizations

employ people from around the globe, who operate in different time zones, and need to maintain 24/hour business availability to remain competitive.

Reasons why employees might engage in shift work may include increases in pay (night shift workers tend to make more money than day shift workers), accessibility of services outside of their working hours, the ability to work more and thus make more money outside of normal working hours (weekends, night work, for example), and the lack of certain higher educational requirements that employees might see aligning with jobs in similar pay grades (Shen & Dicker, 2008). However, research suggests that although these factors might entice job seekers to apply for positions that require shift work, most employees tend to opt out of working nights and weekends, if given the option (Shen & Dicker, 2008).

Shift work can be structured around fixed or rotating schedule patterns. Fixed patterns mean that an employee will be working the same shift (day, evening, or night) for a certain length of time, or indefinitely. Rotating shift schedules are cases where an employee might work a specific pattern of day, evening, and/or night shifts. There are different outcomes depending on whether shift schedules are fixed or rotating. Fixed shifts are generally easier to adapt to for the workers, in terms of sleep, eating, and social behaviors. Rotating shifts tend to increase the likelihood of adverse outcomes, such as sleep deprivation and conflicts in interpersonal relationships (Perrucci et al., 2007). One study on paramedics found that those working in a rotating shift schedule were significantly more likely to develop chronic health issues such as insomnia and depression, compared to those who did not work in rotating shifts (Khan et al., 2021). This may be due to the adjustment/assimilation period that is required when frequently working different types of shifts.

Furthermore, the three main categories of shifts (day, evening, and night) can elicit different occupational outcomes. The negative effects shift work can have on employees is well researched, some of which include declines in overall health, alertness, and performance at work (Knauth & Hornberger, 2003). Not surprisingly, day shifts require the least amount of adjustment to different sleeping/wake times, and thus tend to elicit fewer adverse outcomes compared to evening and night shifts. For example, one study examined nurses who worked day, evening, night, and a combination shifts and found that nurses who predominantly worked day shifts were the only nurses who did not have significant increases in their body mass index (BMI) over a four-year period (Buchvold et al., 2018).

Night shifts, generally defined as shifts occurring sometime between 9/10 p.m. and 6/7 a.m., tend to elicit more negative outcomes than day and evening shifts (Vogel et al., 2012). Employees that solely work night shifts are referred to as nocturnists (Catalanotti et al., 2021). There is variability depending on sleep and length of shifts worked, but research shows that it takes anywhere from three to five days to fully recover from working one night shift (Haluza et al., 2018; Totterdell et al., 1995). In one study on nurses who worked two consecutive 12-hour night shifts, three days off from work was the estimated recovery time needed to return to their initial baseline prior to the night shifts (Haluza et al., 2018). However, there is still a gap in research for understanding exactly how long it takes to fully recover from a night shift, or consecutive night shifts. There is also a lack of research concerning nocturnists, and how working mostly, if not all, night shifts impact their functioning, recovery time, and general well-being.

Research on shift workers suggests that certain attributes may act as a buffer against the negative effects of this type of work. One study on nurses found that hardiness (adaptability and

resilience to stress) and (younger) age were both related to night shift work tolerance (Saksvik-Lehouillier et al., 2012). As such, younger employees may have an easier time adapting to shift work when compared to older employees. However, this relationship was only true for nurses who were new to night work. For nurses who had more experience working night shifts, flexibility was positively related to shift tolerance. The same review also concluded that for experienced shift workers, caffeine consumption, languidity (lacking in energy), and hours worked per week were all negatively related to shift work tolerance (Saksvik-Lehouillier et al., 2012).

Another study found that adequate sleep and days off functioned as protective factors against negative shift work outcomes (Wisetborisut et al., 2014). One systematic review found that physical exercise can act as a protective factor against the negative effects of shift work (Booker et al., 2018). A different study showed that years of shift work were positively related to burnout, and that nurses who had at least eight full days off per month had lower chances of experiencing burnout when compared to nurses who had less than eight days off per month (Wisetborisut et al., 2014). As such, it generally appears that the longer one engages in shift work, the less tolerant they become, rather than the opposite.

Shiftwork has been linked to an array of adverse employee outcomes. One alarming review found that shift workers were 40% more likely to develop cardiovascular disease compared to people that did not work in shifts (Boggild & Knutsson, 1999). Other studies have found that shift workers are more prone to absenteeism, lower job satisfaction, and poorer sleep quality and deficits in sleep quantity (Vogel et al., 2012). Shift work schedules have even been associated with psychological disorders, such as depression, anxiety, obsessive-compulsive disorder, interpersonal sensitivity, and paranoia (Vogel et al., 2012). In addition to mental and

physical health declines, shift work can also create social consequences. Research suggests that those who work on shifts experience declines in social activities and interpersonal relationships, due to regular absences during daytime or evening activities, which can lead to interpersonal conflict (Vogel et al., 2012).

There are a few common recommendations to reduce the adverse effects caused by shift work. One of them is to schedule shifts in forward rotations, rather than backward rotations. For example, if you have shifts categorized into morning, evening, and night shifts, you should schedule employees first with morning shifts, transitioning to evening shifts, and then night shifts (Knauth & Hornberger, 2003). Other recommendations include providing bright light on night shifts, wearing sun blocking sunglasses on the drive home, and taking melatonin before sleep (Knauth & Hornberger, 2003). Another primary recommendation for night shifts is to schedule them as either single shifts dispersed throughout the work schedule or having less than three consecutive night shifts in a row (Garde et al., 2020; Knauth & Hornberger, 2003). This is mainly because of the severe circadian rhythm interruptions that night shifts have on workers. Recommendations for night shifts from 15 shift work research SMEs stated that no more than three night shifts should be scheduled in a row, time between shifts should be 11 hours or greater, and shifts should be less than or equal to 9-hours long (Garde et al., 2020).

As discussed throughout this chapter, shift work can pose a great threat to occupational outcomes. Work Schedule Justice (WSJ) perceptions and overall justice are additional important predictors and outcomes to consider in occupational populations. The next chapter discusses organizational justice and the important role it plays in occupational outcomes.

CHAPTER III

ORGANIZATIONAL JUSTICE

Overview of Organizational Justice

Tyler and colleagues (1997) suggest that the origins of organizational justice research can be viewed in waves. The first wave included the emergence of relative deprivation, the second wave included the introduction of distributive justice, and the final wave (up until that point) was known as procedural justice. The premise of the first wave (relative deprivation) can be defined as a state of distress or unease that occurs when one notices a deficit in their situation/reality, compared to someone else's (Stouffer et al., 1949).

Organizational justice focuses on perceptions of fairness in the workplace and is the psychology of justice directly applied to workplace settings (Byrne & Cropanzano, 2001). The notion of justice within the field of psychology first originated in the realm of social psychology, with many of the first organizational justice scholars receiving their education in this subfield (Byrne & Cropanzano, 2001; Lam et al., 2002). The study of justice within the context of social psychology has historically centered around the fairness of perceived resource allocation between individuals and groups (Kazemi & Tornblom, 2008). Furthermore, the construct of justice is not believed to be an objective phenomenon, but rather an employee's subjective perception of justice-related issues (Greenburg, 1987). The notion of 'perceived' fairness gives rise to individual differences when studying justice, as well as different areas of justice.

The first phase of organizational justice (relative deprivation) was coined by Stouffer and colleagues in 1949, in research examining promotion satisfaction between Military Police and Army Air Corps personnel (Stouffer et al., 1949). Results showed that promotion satisfaction was higher in Military Police personnel compared to Army Air Corps personnel, even though

promotions were less frequent in the former group, and much more frequent in the latter group. The Military Police group were making comparisons to those around them, inside their own group, as opposed to outside their group. Stouffers' argument for the occurrence of relative deprivation is that even though the military personnel knew that the Army personnel received more frequent raises, they only cared about the experiences of those in *their* group. This suggested that relative deprivation was occurring and had an influential effect on satisfaction levels within their jobs.

Relative deprivation can also be studied by viewing the avenues in which these comparisons take place, and the consequences of such comparisons (Lam et al., 2002). For example, Crosby (1976) formulated a model to suggest that relative deprivation mostly occurs when comparisons are being made when several conditions are present: 1) someone similar to you has something that you do not, 2) you want that thing, 3) you feel like you are owed that thing, and 4) you feel as if you are not responsible for your lack of possessing it. As such, a quote that aligns the trajectory of relative deprivation research into organizational justice research from this study is "People are, in fact, concerned with justice and fairness and do feel dissatisfied when their own internal codes are violated" (Crosby, 1976, p. 85).

The second wave of organizational justice included the development of the construct of distributive justice, or the perceived fairness of outcomes each employee receives in relation to enacted policies (the extent to which rules apply to all employees) (Byrne & Cropanzano, 2001). Cohen (1987) published an extensive paper on the topic of distributive justice, in which he posits that there are four elements that must be present for distributive justice to exist. The first dimension of distributive justice is referred to as 'receipts' by Cohen (1987), or things given (tangible or intangible items). These receipts can appear in the form of goods, services,

opportunities for advancement, mentoring, monetary items, positions, etc. Furthermore, Cohen (1987) stated that receipts must possess two features. Receipts must be viewed as possessions that can be removed from said recipient, and receipts must also be seen as stored in a pool of some sort, to be dispersed out or allotted to individuals in the future (Cohen, 1987). For example, a receipt might look like an end of year bonus which can be given and taken away depending on the year and is 'stored' in the organization's finance account.

The second and third requirements for distributive justice are that the receipts must be given to persons whose allocation of the receipts can be described by the role or station in which they preside (Cohen, 1987). As such, there must be some characteristic that determines what type of person or what personal characteristic the receipts are contingent upon. These characteristics may include demographic characteristics or job role or title, for example. The last dimension is that the said rules can be judged by a standard of some kind (Cohen, 1987). Cohen states that while justice is not the only moral standard that might be used to determine the allotment of resources, it is a primary one. In conclusion, the notions of justice and fairness are deeply rooted in our society, which we can see through laws, public policy, and social interactions.

In his 1963 paper, Adams discussed distributive justice in relation to equity. Equity theory posits that experiencing too much, or a deficit of something (relative to those around you) leads to psychological distress, which then acts as a motivator to restore equity (Adams, 1963; Huseman et al., 1987). Equity theory in the workplace has largely been studied in terms of pay and status inequities, which encompasses distributive justice (Greenberg, 1988). As such, equity theory suggests that workers tend to evaluate their own situation (pay and performance) in relation to their peers' situation. For example, if two employees are contributing the same amount of time and effort in their jobs, but one makes more than the other, then the employee

who makes less money will feel dissatisfied in their position, leading to a decrease in performance. Positive inequity occurs from receiving too much of something relative to the input or effort that resulted in what was received. As such, the primary reactions to positive inequity involve experiencing guilt, and thus changing behavior (performance) in attempts to remedy the ratio (Brockner et al., 1986).

Continued research of justice in social psychology gave rise to the interest of this construct within the field of Industrial-Organizational psychology, otherwise known as organizational justice (Byrne & Cropanzano, 2001; Lam et al., 2002). The term 'Organizational Justice' was used for the first time in 1987 in the *Academy of Management Review* (Greenberg, 1987). Since then, numerous studies have been conducted on the premise that organizational justice (or perceptions of fairness in the workplace) can lead to important occupational outcomes (Aryee et al., 2002; Lam et al., 2002). Some of these outcomes have included job satisfaction, retention, and organizational commitment (Aryee et al., 2002).

The next phase in the history of organizational justice includes the development of the construct of procedural justice (Lam et al., 2002). Procedural justice is defined as the perception of fair organizational processes and gained popularity in the 1970's due to the groundbreaking research conducted by Thibaut and Walker (1978). In their research on legal dispute resolutions, Thibault and Walker characterized two areas of control that a contestant can possess. The first area is referred to as process control (Thibault & Walker, 1978). Process control is "control over the development and selection of information" (Thibault & Walker, 1978, p. 546). The second area of control was defined as decision control, or the "degree to which any of the participants may unilaterally determine the outcome of the dispute" (Thibault & Walker, 1978, p 546).

In addition to differences in control that people may have regarding decision making, Thibaut and Walker also classified two areas concerning dispute resolution. These areas included "adversary methods" and "inquisitional methods." The adversary method involves each person having autonomy over their defense and being responsible for choosing who will defend them and presenting facts to the judge or jury (Greenberg et al., 1987). The second method (inquisitional) entails each party being represented by an appointed third party (Greenberg et al., 1987). An example of an inquisitional system is a court system in which one person is appointed to defend both sides of opposition to come to a resolution. Research on the outcomes of both methods points to the adversary method as the method that is most favored and was found to possess the highest fairness and justice perceptions (Greenberg et al., 1987). The adversary system is also viewed as the least biased, and more accurate. This may be due to the autonomy to choose that provided through this method, even though each person is given the same defense in the inquisitional method.

Several years later, Folger and Bias (1989) proposed seven ways in which organizations could help facilitate procedural justice in the workplace, adding on to Thibault and Walker's (1975) literature on control: 1) Managers make an effort to understand and to hear their employees' points of view regarding topics that involve them or impact them in some way, 2) Managers maintain objectivity surrounding the treatment of their employees, and ensure biases do not influence employee outcomes (hiring, firing, promotions, etc.), 3) Managers should maintain consistent standards and expectations across employee roles, 4) Managers should provide employees with feedback on a regular basis that is constructive and time relevant, 5) Managers should communicate with all employees in a transparent and truthful way, 6) Managers should interact with all employees in a civil manner, and 7) Managers should

communicate with employees about reasons why certain actions were carried out/decisions were made (Folger & Bias, 1989).

Outside of legal settings, the concept of procedural justice has also been applied to perceptions of fair processes regarding performance appraisal processes (Greenberg et al., 1987). Evaluating occupational performance through performance systems and performance appraisals is a huge undertaking for organizations and research institutions. As such, there remain threats to validity and fairness surrounding performance ratings. While evaluating performance and giving constructive feedback to employees has many positives, poorly designed systems can quickly outweigh the pros with cons. Following this, research has been conducted on how procedural justice can play a role in these systems and relevant employee outcomes.

One study conducted by Taylor and colleagues (1995) divided government agency employees into two categories: half were asked to participate in their current appraisal system, and half were asked to participate in a new performance appraisal system which consisted of meeting at least three times during the appraisal period to discuss performance and give/receive feedback. The new appraisal system (called a 'due process' system) consisted of new performance appraisal forms to complete, a process, manual, and new training for managers and employees (one manager was paired with one employee for this study). 'Due Process' is a law term that refers to fair and equal treatment for those who are charged with a crime (Taylor et al., 1995). Results showed that employees who were rated with the new system experienced lower performance ratings than those who were rated with the old system. However, the employees in the treatment category (they participated in the due process system) perceived the new system more favorably than the old system, even though their ratings were lower compared to the non-

treatment group. This study sheds light on the importance of fair processes in determining employee outcomes, behaviors, and attitudes at work.

As organizational justice research increased in practice and scope, one more dimension was added, interactional justice. Interactional justice includes two dimensions, informational justice, and interpersonal justice. Informational justice is defined as explanations and reasoning given to employees by management regarding why certain procedures are implemented and under what conditions certain outcomes are distributed (Cheung et al., 2013). Interpersonal justice relates to perceived fairness around interactions and treatment that is doled out regarding the implementation of procedures and the results of them (Johnson et al., 2014).

Research supports the premise that interactional justice is a strong predictor of employee behaviors, feelings, and attitudes (Kernan & Hanges, 2002; Scott et al., 2007). Some of these behaviors include increased instances of organizational citizenship behaviors (OCBs) and the increase of interpersonal resources, such as energy throughout the day to complete tasks (Cheung, 2013; Johnson et al., 2014). Additionally, scholars have suggested that while procedural and distributive justice can only be judged in certain instances (when processes are being enforced or are impacting employees, for example), interactional justice can be assessed by employees on a more frequent basis (Scott et al., 2007). This is due to the inclination we have to make judgements surrounding fairness and respect in most interactions throughout the workday. Informational justice is most often assessed by managerial communication with employees, namely through the perceptions employees hold regarding the justification and truthfulness of those interactions (Scott et al., 2007). Because many employees interact with their managers/supervisors frequently throughout their workday, employees often form opinions regarding the nature of the interactions.

Informational justice has not been studied as extensively as procedural and distributive justice (Kim, 2009). However, there is adequate research on informational justice, particularly around how it relates to downsizing and layoffs. One study conducted by Konovsky and Folger (1991) found that when layoff decisions were being communicated with employees, the way in which the layoff was communicated, and providing those employees with advance notice to make other employment arraignments, both resulted in positive employee reactions, even in the face of job loss. Another study that assessed downsizing showed that if the employees 1) perceived adequate communication from their company during the downsizing period, 2) perceived the organization was being honest as to why the downsizing was occurring and were 3) given enough notice regarding downsizing decisions, they were more likely to maintain a good relationship with the company after the layoffs occurred (Kim, 2009).

In addition to layoffs, informational justice has also been studied in relation to mergers and acquisitions (M&A's) (Ellis et al., 2009). Ellis et al (2009) studied informational and procedural justice in this context, due to the importance of communicating processes of this major category of organizational change to employees to increase fairness perceptions. As such, informational justice can mitigate employee apprehension of the unknown, through direct and effective communication. In one study conducted on firms that recently experienced a large acquisition, informational justice was positively related to financial return (defined as the long-term success of the M&A) (Ellis et al., 2009). Additionally, procedural justice lessened the positive effects of information justice on financial returns during integration periods of firms (when they were being combined) (Ellis et al., 2009). Particularly in times of change, communicating with employees about policies that affect them is important to instill trust and fairness. However, too much procedural justice has the potential to result in negative outcomes.

Organizations may appear too strict or inflexible if they introduce a multitude of policies that place restrictions on employees, which are known as legalistic organizations (MacQueen & Bradford, 2017).

In addition to layoffs and M&A's, informational justice has also been studied in relation to general organizational change and organizational commitment. Organizational commitment refers to the amount of connection and involvement an employee has with their place of employment (Meyer & Allen, 1991). Shin and colleagues (2015) researched how informational justice *climate*, or the shared perceptions of informational justice employees have at an organization, can influence the commitment outcomes of employees. Through a one-year longitudinal survey of government employees who were experiencing a large-scale organizational change, Shin et al. (2015) found that employees' organizational commitment over time was stronger when they experienced frequent communication regarding the change (informational justice), coupled with transformational leadership. Furthermore, results showed that informational justice strengthened the positive relationship between employee's initial commitment to change and affective commitment to change over time (Shin et al., 2015). This study highlights the importance of informational justice in relation to organizational change efforts, and how informational justice can strengthen employee commitment and buy-in over time.

The final area of the organizational justice literature is interpersonal justice, which is the extent to which the people being affected by decisions are treated with respect and dignity (Bies & Moag, 1986; Cheung, 2013; Johnson et al., 2014). Interpersonal justice is a subtype of interactional justice and has been noted to be one of the most frequently occurring or experienced forms of organizational justice, due to the frequency of day-to-day interactions

employees have with their supervisors. As such, employees can gauge this type of justice in most interactions they have with their supervisor. This is unlike procedural or distributive justice, because those two types are specific to policy and process implementation, which are not as frequent as general interactions that occur at work.

While informational and interpersonal justice are dimensions of interactional justice, they are sometimes not differentiated and thus discussed solely as interactional justice. Although the literature on interpersonal justice is not as robust as procedural or distributive justice, there is still ample research that highlights the importance of this type of justice. Studies have shown that interpersonal justice can be a powerful buffer against undesirable organizational polices, and high interpersonal justice perceptions can offset negative reactions to organizational change, policies, and regulations (Skarlicki & Folger, 1997). For example, research on retaliation behaviors of employees in a manufacturing plant study showed that interpersonal justice can act in the place of procedural justice. In one study, participants were given a questionnaire that contained assessments for distributive, procedural, and interpersonal justice, as well as a scale to assess organizational retaliatory behaviors (ORBs). ORBs are defined as retaliatory behaviors that are conducted to hurt the organization, in response to perceived unfairness of policies or treatment (Skarlicki & Folger, 1997). One of the main research questions this study aimed to address was if procedural and interactional justice have similar effects. This hypothesis is based on cognitions theory, which states that ratings of certain workplace outcomes (pay, job satisfaction) can interact with ratings of managerial practices (interactional and procedural justice) to predict employee attitudes and behaviors. Findings from this study confirmed the hypothesis that interactional justice and procedural justice can be interchangeable in some contexts and that employees may be more willing to experience negative policies and not

retaliate if they are perceiving high levels of interactional justice (Skarlicki & Folger, 1997). Regarding the differentiation of procedural justice and interactional justice, researchers generally agree that procedural justice represents justice surrounding the 'formal structure' of decision making and communication, whereas interactional justice refers to the more social aspects of this communication.

Another study that examined interpersonal justice was conducted by Greenberg (1993) on college students. This study assessed stealing behaviors and divided students into two groups. The first group was asked to complete a task and was told that they were being underpaid for the task. The second group was asked to do the same task and was told they were being paid adequately (fairly) for the task. Furthermore, the students were either told what they were being paid (fairly paid or underpaid) in a respectful way, or in a disrespectful way. Then, the students were asked to collect their payment themselves, and the researchers would not know how much they had taken. Results showed that students were more likely to steal in the absence of interpersonal justice, and the amount that was stolen was moderated by the accuracy of the information given to students (the students who were underpaid but were given a thorough explanation as to why stole less than those who were not given a detailed reason as to why they were underpaid) (Greenberg, 1993). Although this study was conducted in a university setting, it sheds light on how interpersonal justice can elicit or mitigate counterproductive work behaviors, such as theft, in organizational settings. In support of these findings, studies have been done more recently that provide ample research that shows injustice can lead to rule breaking, theft, and retaliatory behaviors (Swanberg et al., 2005).

Work Schedule Justice

Work Schedule Justice (WSJ) arose from the concept of organizational justice, or the perceptions of fairness one has surrounding one's place of work. The four different categories of WSJ are the same as the categories that make up organizational justice: procedural, distributive, interpersonal and informational justice (Sinclair et al., 2009). Procedural justice is the perception of fair processes around the creation of the shift schedule; distributive justice is the perceived fairness of the allocation or distribution of the shift schedule; interpersonal justice is how someone is treated by those in their organization regarding their schedule, and informational justice refers to explanations given regarding the mechanisms by which the shift schedule was created, and responses to inquiries regarding the shift schedule (Sinclair et al., 2009).

As discussed earlier, workplace justice has been linked to many positive occupational outcomes, including retention, job satisfaction, and occupational health and wellbeing (Heponiemi et al., 2013; Zahednezhad et al., 2021). However, there is little research to date concerning justice as it directly applies to the work schedule using all four justice dimensions (procedural, distributive, interactional and informational). In one of the few studies conducted on the topic, Posthuma and Campion (2005) examined nurses and found a positive relationship between procedural justice regarding their work shifts and their willingness to have their names used in recruiting advertisements. Another study on nurses reported that their WSJ perceptions increased because of having input into their schedule and number of hours worked, which also increased their job satisfaction (Nelson & Tarpey, 2010). These studies indicate the importance that justice pertaining to work schedules can have on important work outcomes, and how an unjust schedule might lead to dissatisfaction with one's work.

A WSJ study conducted by Sinclair et al. (2009) was the first of its kind to test a model of WSJ that contained the four categories of organizational justice for work schedules on four

different occupational samples: employed students, long term care employees, (employed) readers of a solar power blog, and nurses. Results supported the model possessing a four-factor structure on all samples. Furthermore, results showed that higher WSJ perceptions were linked to lower scores on both turnover intentions and job seeking behavior in the nurse sample (WSJ outcomes were not assessed in the other three samples). Findings also showed that informational justice was positively related to organizational support and affective commitment and was negatively related to turnover intentions, distributive justice was negatively related to turnover intentions, procedural justice was positively related to affective commitment an organizational support, and interpersonal justice was not related to any outcomes (Sinclair et al., 2009). Two out of these four populations included healthcare professionals, which suggests these findings may be generalizable to other healthcare professionals.

As discussed, WSJ perceptions and overall justice are important predictors and outcomes to consider in occupational populations. Other important factors to consider when determining occupational outcomes include the contextual influences on the way work is done. The next chapter will discuss the history of occupational interventions, contexts, and populations in which they have been implemented, along with the important outcomes associated with the implementation of interventions.

CHAPTER IV

OCCUPATIONAL INTERVENTIONS

Overview

Occupational interventions can be defined as pre-planned changes, either through the elimination or introduction of policies, programs, or initiatives, aimed to better the lives of employees or to change employee behaviors and attitudes (Watts et al., 2022). Occupational interventions are intended to be created and implemented based on empirical findings that can be applied to organizational settings (Cox et al., 2010). The two main types of occupational interventions are individual-level interventions and organizational-level interventions (system-level interventions) (Cox et al., 2010). These interventions target many different areas, although the most common include employee stress management, followed by health promotion interventions, and work-life balance (Sauter & Murphy, 2004).

Individual-Level Interventions

Individual-level interventions have been viewed as targeting employees based on the specific and unique needs of each worker (Cox et al., 2010). Historically, Occupational Health Psychology (OHP) interventions have been conducted using individual-level intervention approaches (Martin et al., 2016; Richardson & Rothstein, 2008). This focus is due to several reasons. One primary reason is that implementing individual-level interventions is generally less costly and simpler to implement than large scale organization-level interventions (Richardson & Rothstein, 2008). Furthermore, implementing individual-level interventions has been shown to increase organizational commitment in employees, and possibly attract more applicants (Schulz et al., 2014). This may be because when employees see organizations taking interest in their well-being (or appearing to do so), they think more positively of that organization. Another

reason individual-level interventions are more popular than organization-level interventions lies in the inherent difficulty of organizational-level change management. Enacting organization-level changes (policy, job redesign, general employment practices, etc.) is time-consuming and requires buy-in and funding from top management and relevant stakeholders. One primary critique of individual-level interventions is that they may come across as victim-blaming by placing the burden of well-being on the employee, rather than holding the organization accountable (Martin et al., 2016).

One type of individual-level intervention is cognitive-behavioral programs (Richardson & Rothstein, 2008). Cognitive-behavioral programs involve educating employees on how their thoughts and emotions can serve to help or hinder their adaptation to certain situations. These interventions can be employed as a treatment for employees exposed to traumatic events that develop PTSD, depression, or anxiety because of experiencing said event(s) (Richardson & Rothstein, 2008). In jobs that routinely expose employees to traumatic experiences (military positions, healthcare positions, first responders, law enforcement), not everyone exposed to an event may develop PTSD. However, those that do may require therapy (individual-specific treatment). This is a salient example of how some employees who do develop mental health problems from job-related events may be expected to deal with their recovery on their own, which may stigmatize these individuals.

A meta-analysis on organizational stress interventions conducted by Richardson and Rothstein (2008) reported that in 36 experimental studies that included 55 interventions, the overall effect size was .526, and the average length of intervention was 7.4 weeks. They also reported that cognitive-behavioral programs produced a larger effect size when compared to other intervention types, but adding on intervention components reduced this effect (Richardson

& Rothstein, 2008). The same meta-analysis also reported that relaxation techniques were the most popular intervention used (averaging medium effect sizes), and organizational interventions were implemented the least (Richardson & Rothstein, 2008).

Other types of individual-level interventions may include time management, meditation, coping behaviors, and combinations of these interventions (Briner & Reynolds, 1999; Richardson & Rothstein, 2008). Time management interventions are generally structured as individual-level interventions. Individual-level time management interventions generally entail employee education surrounding organizing time efficiently, goal setting, conflict resolution, and how to optimize scheduling based on individual attributes (Richardson & Rothstein, 2008). Meditation and relaxation interventions can be conducted in group settings or done individually and are meant to draw someone's focus from their own stress to a non-stressful target. These interventions generally entail asking someone to focus on one object, as well as focusing on breathing (counting, holding, or deepening their breath) (Richardson & Rothstein, 2008). Relaxation therapies involve tightening and releasing certain muscles to bring about body and mind relaxation.

Relaxation techniques appear to be used most often in healthcare settings, while multimodal (multiple component) interventions are used most often in office settings, and cognitive-behavioral are most often implemented in educational settings (Richardson & Rothstein, 2008). Time management interventions are commonly implemented in jobs that require shift work (Brough & O'Driscoll, 2010). Ultimately, individual-based interventions appear to be the most common, and generally have moderate to strong effects. These interventions are easier to implement than organization-level interventions and can target individual people based on need. However, depending on the nature of these interventions, they

can stigmatize employees who participate in them, and they can appear to place the blame on the employee, rather than the organization, for addressing the work environment for causing adverse occupational outcomes.

Organizational-Level Interventions

Organization-level interventions target a large group uniformly (they are not created based on individual needs) (Cox et al., 2010). Organizational interventions are not as common as individual-level interventions; however, their popularity has continued to rise (Richardson & Rothstein, 2008). Martin and colleagues (2016) suggest that organizational interventions not only mitigate negative employee outcomes, but facilitate positive ones, such as gain spirals. Gain spirals, or the procurement of subsequent resources, can be facilitated by both job resources and personal resources (Martin et al., 2016).

Common types of organizational interventions include work-family programs and organizational culture interventions (Sauter & Murphy, 2004). The most common work-family interventions include flexible scheduling, childcare stipends, unlimited PTO, job sharing, and remote work (Sauter & Murphy, 2004). Although organizational interventions are more difficult and costly to implement than individual-focused interventions, these interventions can produce positive change.

Cultural interventions are less common, but studies that have been conducted report large scale positive effects (Sauter & Murphy, 2004). The main goal of any cultural intervention is to create unity in organizational values to improve employee performance (Harris & Ogbonna, 2002). Despite their intention, not all organizational interventions have resulted in favorable outcomes. One analysis on work-family interventions on 34,000 federal employees reported that flexible schedule interventions had a weak negative effect on job satisfaction (Saltzstein & Ting,

2001). One primary reason that the effectiveness of organizational interventions remains under scrutiny is that many of these initiatives lack sound program evaluation techniques. This may include a deficit or absence of data being tracked over time, or simply the inability to control for or consider outside variables due to the applied nature of these interventions (Briner & Reynolds, 1999). Other reasons may include the skepticism that one intervention could resolve all organizational issues (Briner & Reynolds, 1999). Although these policies are implemented in hopes of improving employees' lives, it has been documented that employees who choose to participate in them can be stigmatized. This discrimination can include termination, lack of upward mobility opportunities, unplanned changes to work hours, and hostility from other employees (Brough & O'Driscoll, 2010).

OHP Interventions can also be classified based on their timing of implementation. The Occupational Safety and Health Administration (OSHA) has classified public health interventions within three main categories: primary interventions, secondary interventions, and tertiary interventions. Primary interventions are viewed as the most preventative intervention type. These interventions are usually aimed at preventing a disease or adverse outcome prior to its occurrence. An example of a primary intervention in an occupational health context would be implementing a policy that requires mandatory breaks every X amount of time to decrease fatigue and work accidents. Secondary interventions are aimed at targeting a subset of the population that may be more susceptible to experiencing a certain outcome through mitigation techniques. An example of this would be offering stress management classes to employees prior to a merger with another company. Tertiary interventions are the most reactive type of intervention. These interventions focus on treatment after a disease or event has occurred and are largely seen as the costliest intervention type. An example of a tertiary intervention would be

offering Cognitive Behavioral Therapy to first responders who recently witnessed a traumatic event through their work. Although these interventions are framed in terms of public health, they can inform the understanding of OHP and occupational interventions.

Sauter and Murphy (2004) applied these classifications to organizational intervention types. They noted, however, that depending on the intervention type, there may be overlap between classifications. For example, 'stress management' may fall into both primary and secondary categories if a stress management program involves training employees on how to alter negative coping behaviors/lifestyle habits or alter negative thinking regarding organizational policy or practices. In addition to work-family balance and organizational policy interventions, the authors also classify 'legislative policy' as an organizational intervention type. Important examples of employment laws include the passing of the Family Medical Leave Act (FMLA) of 1993, and the Fair Labor Standards Act. Both acts have had widespread influence in both public and private organizations in the United States, as long as the company employees 50 or more employees.

General Interventions

The National Institute of Occupational Safety Administration (NIOSH), governed by the Center for Disease Control and Prevention (CDC), went a step further in classifying intervention types, creating a hierarchy of actions an organization can take to prevent adverse workplace outcomes. As such, NIOSH created a 'Hierarchy of Controls' pyramid that incorporates five levels of intervention types, categorized by most effective to least effective (NIOSH, 2023). This classification includes: 1) elimination, 2) substitution, 3) engineering Controls, 4) administrative controls, and 5) personalized protective equipment (PPE) (NIOSH, 2023).

'Elimination' is the most effective level for improving workplace safety and occurs when the actual hazard is removed from the workplace, thus eliminating any chance of exposure. 'Substitution' is the second most effective protocol, and entails replacing a workplace hazard with a less hazardous one. The best substitutes are ones that create less risks than the hazard being removed. 'Engineering controls' create a barrier of some sort between the employees and the hazard. 'Administrative controls' change the ways in which people work. These may include job redesign, job rotation, and integrating breaks. PPE protects the workers from hazards and is the least effective in protecting workers from environmental threats. NIOSH recommends that organizations never rely on PPE alone (NIOSH, 2023). The Hierarchy of Controls Model is mainly an organizational-level intervention type. This is because all five areas are concerned with the work environment or instilling protocols that all employees must abide by.

Interventions in Healthcare Settings: Background

According to the 2019 Census Bureau's American Community Survey, healthcare workers make up 22 million Americans, which equates to 14% of the labor force (United States Census Bureau, 2019). Most of these employees work in medical hospitals or specialty hospitals, and are registered nurses (United States Census Bureau, 2019). Despite healthcare being a very popular profession to enter, studies show that healthcare workers are struggling with mental health difficulties at increasing rates both prior to, during, and after the Covid-19 Pandemic. A recent study on work overload and burnout involving 43,000 healthcare professionals found that 49.9% of all respondents reported experiencing burnout (Rotenstein et al., 2023). This was further broken down by specialty, with reported burnout rates of 56% in nurses, 54.1% in other clinical staff, and 47.3% among physicians. Furthermore, work overload, or experiencing an increase in

job demands paired with an inability to effectively handle them, was significantly related to burnout and intent to leave (Rotenstein et al., 2023).

The high occurrence of burnout within healthcare has resulted in alarming outcomes. In 2022 the U.S. Surgeon General stated that there was a projected shortage of 3 million lower wage healthcare workers, and 140,000 physicians, by 2033. Additionally, a 'Clinician of the Future' report released in 2022 stated that 31% of clinicians globally and 47% of healthcare workers in the United States plan on leaving their roles within two to three years (Elsevier Health Report, 2022). In those that stated they wished to leave their current jobs, 39% stated that they would most likely leave the healthcare profession all together (Elsevier Health Report, 2022). These studies point to the need for change within these healthcare professions, which has been responded to through different types of interventions.

Interventions in Healthcare: Research

DeChant and colleagues (2019) conducted a systematic review of 50 system-level interventions in healthcare systems aimed at reducing physician fatigue. This review included articles published from 2007-2018, and four themes emerged from the organizational workplace interventions that were included; 1) *teamwork*, 2) *time*, 3) *transitions*, and 4) *technology* (DeChant et al., 2019). *Teamwork* involved hiring more support personnel, such as medical scribes, and facilitating teamwork responsibilities and communication strategies. *Time* changes incorporated changes to shifts schedules, duty hour restrictions, and time banking changes. *Transitions* described workflow changes and policy updates. *Technology* referred to improvements in electronic health record IR) systems.

The interventions targeted dimensions of burnout (depersonalization, personal accomplishment, and emotional exhaustion), job satisfaction, and stress. Most of the

interventions made changes to teamwork (20/50), with 10/20 hiring more scribes in the ER. Time changes accounted for 14/50 interventional adjustments, followed by transitions (9/50), with only one study implementing policy changes, and 10/50 studies either implemented or improved EHR systems. The use of scribes and improvements to EHR systems were the most effective ways to increase job satisfaction and decrease burnout in physicians in the review, and scheduling adjustments were found to significantly decrease burnout in three of the five studies that implemented schedule changes. Interestingly, of the six studies that examined lessening physician working hours, only two found that this alleviated burnout (DeChant et al., 2019). Overall, 70% of the studies showed significant improvements in burnout, job satisfaction and stress in physicians. Future research into the intricacies of schedule changes should be examined to help understand this area better. It is also important to note that these studies were conducted before the Covid-19 pandemic, and the increased burden of patients and policy changes that the pandemic caused may show different outcomes in the future.

Shift Interventions: Overview

As noted earlier, shift work has risen exponentially in developed nations since the Industrial Revolution, which gave rise to 24/hour factory work (Gordon et al., 1986). Due to the health threats posed to employees by shift work, interventions have been geared toward changing shift work in some way to mitigate the potential adverse outcomes shifts can cause. Within the organizational intervention literature, there lies a subset of research on interventions that evaluate changing shift work somehow to increase positive occupational outcomes. Examples include increasing or decreasing shift lengths or shift times (Lingard et al., 2018).

There have also been interventions that assess the speed of shift rotations, particularly changing the speed of rotation from ‘slow’ to ‘fast.’ Slow rotations refer to shift schedules that

stay fixed for longer amount of time. Faster shift rotations (in 8-hour segments) tend to be preferable when compared to slower ones for both management and employees (Smith et al., 1998). This is due to faster shift schedules causing less circadian rhythm disturbance and being less disruptive to social life outside of work, particularly because fast shift rotations involve fewer consecutive night shifts (Smith et al., 1998; Bambra et al., 2008; Viitasalo et al., 2008). One study conducted by Viitasalo and colleagues (2008) analyzed the difference in occupational outcomes of a shift intervention, which involved comparing sets of three consecutive morning, evening, and night shifts (slow rotation) to a new shift system that entailed single morning, evening, and night shifts. Results showed that fast shift rotation schedules were significantly associated with a decline in daytime sleepiness.

Scheduling shifts in terms of direction is another recommendation for optimizing shift schedules (Bambra et al., 2008). Shift schedule direction refers to the direction or movement of shifts, such that a forward shift pattern would be scheduling day shifts, followed by evening shifts, followed by night shifts. Shift rotation can also be referred to as clockwise (forward) or counterclockwise (backward) and delayed (forward) or advanced (backward) shift rotations (Barton & Folkard, 1993; Kantermann et al., 2014). A backwards shift rotation would involve the opposite; scheduling night shifts, followed by evening shifts, followed by day shifts. Research supports the premise that forward shift patterns are better for shift worker health, work attitudes and behaviors (Van Amelsvoort et al., 2004). The main reasoning behind this recommendation is due to the body naturally delaying sleep in the absence of cues, which means that it is easier for people to stay awake later, and harder for people to fall asleep earlier than they normally would (Barton & Folkard, 1993).

Shift Interventions in Non-Healthcare Occupations

One study on shift rotation within the food packaging industry found that even though workers were compensated less in a faster moving shift rotation system (because of reductions in overtime brought on by the new system), they appeared to prefer fast rotations (daily) to slow (weekly) rotations (Knauth & Kiesswetter, 1987). Another study on controllers of an emergency service changed workers' original weekly shift rotation that included working seven consecutive morning, afternoon, and night shifts, to a rapidly rotating roster with no more than three consecutive night shifts worked (shifts stayed in the forward rotation pattern of day, evening, night). Findings showed that five months post change, significant improvements were seen in the experimental group regarding social drug use and anxiety (declines in both), due to decreased circadian rhythm interruption from fewer consecutive night shifts (Williamson & Sanderson, 1986).

A study on employees of a sewage treatment facility conducted three shift schedule interventions; one plant experienced rapidly rotating 8-hour shifts and then worked a rapid rotation 12-hour shift, and the other two plants worked in a continuous 12-hour shift system. All previous shifts were slow rotating 8-hour shifts, with seven consecutive shifts preceding days off. Slow rotating shifts included more night shifts in a row than fast rotating shifts. Results showed that employees working in the rapid rotation system reported increases in satisfaction, decreases in circadian rhythm disruptions, improved day sleep quality, and less tiredness. Furthermore, these improvements were seen to be greater in the 12-hour shift when compared to the 8-hour shift (Smith et al., 1998). These findings may be due to fast shift rotation systems being hypothesized to aid in recovery compared to slow rotating systems, because the reduction in disturbances to body rhythms such as circadian rhythms is minimized (CCOHS, 2023). When there are three or fewer consecutive night shifts, this lessens the strain on circadian rhythm

disruption, particularly when the shifts are scheduled forward instead of backward. One study found that a rapid forward rotation (two consecutive morning, evening, and night shifts) did not significantly alter circadian rhythm function (Costa et al., 1994).

Some interventions have looked at the effects of shift rotation and length simultaneously. One such study on three different groups of steel workers assessed a fast-clockwise rotation shift schedule, a slow counterclockwise rotation shift schedule and a daytime shift schedule in employees who had at least five years of experience in their current work schedule (Kantermann et al., 2014). Blood samples were collected from participants in each group. Results showed significant differences in fasting glucose and HOMA (homeostatic model assessment) between the fast-clockwise shift workers and slow-counterclockwise shift workers. HOMA is a marker of insulin resistance, and higher HOMA indexes usually point to a higher risk for developing diabetes. Results showed lower glucose levels and a HOMA index in the shift workers on the fast-clockwise rotation and higher glucose levels and a HOMA index among the employees experiencing the slow rotating counterclockwise rotation (Kantermann et al., 2014). This suggests that the fast-clockwise rotation reduced worker's metabolic risk compared to the other schedule types, which could potentially decrease workers risks in developing diabetes and heart disease.

Another study assessed outcomes associated with an advancing (backward rotation) shift system, and a delayed (advancing in a forward rotation) shift system, as well as the presence or absence of a 'quick return' (an 8-hour break between shifts) or a longer break between shifts (Barton & Folkhard, 1993). Shifts were scheduled sequentially in groups of threes for both systems. Results showed that the advanced backward rotation shift workers displayed poorer physical and mental health, more sleep disruption, poorer work-life balance, and lower job

satisfaction compared to the delayed forward rotation shift workers. Additionally, the health of the advanced rotation shift workers who had quick returns between shifts did not appear to be significantly different from the health of the workers with longer periods between shifts. However, health outcomes were more favorable in the workers who were not scheduled with quick returns, concluding that while advanced rotations led to poorer outcomes than delayed rotations, advanced rotations with quick returns produced even worse effects than advanced rotations with a longer break between shifts.

In terms of shift interventions, research findings generally support the recommendations made by Bambra et al. (2008). The ideal schedule (besides abstaining from night shifts all together, which is improbable) is to schedule shifts in forward, quick rotations. The findings suggest that shifts scheduled in this way tend to elicit fewer adverse outcomes when compared to slow backward rotation shift schedules, in both job behaviors and attitudes, and physical health.

There have also been interventions geared toward compressing shifts together to improve employee work-life balance. Work-life balance has been defined as a state that occurs when someone feels as though they can effectively balance responsibilities, events, and engagements in both their work and personal lives (Williams, 2008). Compared to regular day workers, shift workers routinely report dissatisfaction with their work-life balance (Williams, 2008). As such, improving scheduling to allow more time with their families and other activities is one way to improve the work-life balance of shift workers.

Compressed Work Weeks

Compressing schedules generally refers to condensing a schedule to fit in a fewer number of days, by adding more work hours to certain days (Moores, 1990). The first documented deviation from the 21st century 40-hour, five day work week occurred in 1940 when

the oil and gas company Mobile and Gulf Oil Companies implemented a four day, 10-hour work week. Since then, compressed work weeks have continued to gain popularity.

A review by Chyleen et al. (2012) outlined empirically based recommendations for how an organization should best implement a compressed work week schedule. The first recommendation made was to review the stakeholders who will be affected by the change (Chyleen et al., 2012). This could include employees, management, unions, or clients of the organization. Data could be collected formally through focus groups and surveys, or informally through telephone calls or meetings. Another focus should be on external stakeholders, such as transportation services used, any security needed to enter/exit the workplace, and policies to be aware of. These avenues need to be aligned with the new schedule as well if it is going to be effective and plausible.

A third recommendation is that management be made aware of the purpose behind the compressed schedule (Chyleen et al., 2012). Was there consistent data showing employees preferred this type of schedule to facilitate work-life balance or recovery time? Will this schedule benefit the organization by improving productivity? A fourth recommendation is that the process of implementation should be participatory, flexible, and fair (Chyleen et al., 2012). As such, workers should not be made to participate in this compressed schedule when it is first introduced, managers should be aware that people may still need schedule modifications and be amenable to them, and that the amenities (e.g., sick leave, vacation time) should be dispersed to employees fairly. Chyleen and colleagues (2012) also note that it is important to determine how much an organization will pay workers for overtime, and how leave will be calculated. According to the Fair Labor Standards Act (FLSA), non-exempt employees are required to be paid one and one half times their hourly rate once they exceed 40 hours per week (Chyleen et al., 2012).

Furthermore, leave policies, paid time off, vacation and sick days should be made available to all full-time employees regardless of their shift/schedule type (Chyleen et al., 2012).

In addition to providing recommendations for how to implement a compressed work schedule, Chyleen et al. (2012) reviewed outcomes associated with such a schedule. Compressed work schedules have been shown to increase manager enthusiasm, foster more effective communication between managers and their employees, and even increase employee's enthusiasm for greater job responsibility (Facer et al., 2009). These schedules have also been examined as predictors of absenteeism, with many studies showing that compressed work schedules are one of the most effective ways to reduce employee absenteeism (Pierce et al., 1989). Additionally, compressed work schedules have been shown to improve employee satisfaction, autonomy, and morale (Facer et al., 2009). However, the opposite effects can occur if only some employees are given the option to participate in compressed work schedules as this may foster jealousy and resentment in employees who are not offered participation (Facer et al., 2009). Depending on the nature of the compressed schedule, these types of schedules also can increase worker fatigue and decrease productivity levels (Monk & Folkard, 1992). Caution should be taken regarding compressing schedules too severely. Specific studies of compressed work schedule are discussed in the following paragraphs.

In the 1980s and 1990s, compressing work weeks were studied with police officers (Moore & Morrow, 1987; Vega & Gilbert, 1997). One study compressed their regular five day work week into four, 10-hour days (Moore & Morrow, 1987). The other study compressed their participants' 40 hour work week even further, into three days. The effects of these changes were observed for 12 months, and both studies reported positive outcomes regarding participant work attitudes, work-life balance, and productivity levels. Furthermore, there were no significant

differences found in the control groups fatigue and stress levels compared to the experimental groups for the four day work schedule, and the three day schedule was associated with increases in productivity and positive work attitudes (Moore & Morrow, 1987; Vega & Gilbert 1997). The main negative effect found in the three day schedule study was a lack of communication between officers, particularly surrounding the pre-shift briefing after extra days off. These studies support the hypothesis that more time off work can have lasting beneficial effects, primarily on productivity and work attitudes.

One intervention conducted with Australian construction workers compressed their work week to five longer days, instead of six shorter days (Linguard et al., 2007). This gave the workers one extra day off per week and was rated extremely positively by the employees. Employee job satisfaction and work-life balance perceptions were notably higher in the treatment group compared to the control group, as were employee productivity levels post intervention. These results may be because the primary predictors of work-life conflict among construction workers include inflexible and long working hours, so adding on an extra day off per week may be advantageous (Linguard et al., 2007).

Moores (1990) conducted a meta-analysis on the outcomes of compressed work weeks, which included 47 studies. Results further corroborated the effectiveness of compressing work weeks discussed above. Moores (1990) reported that companies that offered compressed work weeks had significantly less absenteeism after the implementation. Results suggested that job type (blue collar or white collar) can have a moderating effect on productivity, where white collar employees saw a greater improvement in productivity than blue collar employees.

In the present day, compressing work weeks is still a common practice and is appealing to job candidates. Well-known companies that offer compressed four day work weeks include Toshiba,

Microsoft Japan (who noted a 40% increase in worker productivity post intervention), Panasonic, and thredUp (Carter, 2023; Crawley, 2023). Although these companies employ predominantly white-collar employees, compressed work weeks also can be successful in different industries as well, as noted previously.

Shift Interventions in Healthcare Settings

Shift length in emergency medicine physicians generally ranges from 8-12 hours, however this may fluctuate depending on position and location (medical student, resident, attending physician). Numerous studies have provided evidence to suggest that longer shift lengths are directly related to poor patient and employee outcomes. For example, one study found that nurses who worked less than 12-hour shifts were less likely to smoke and have better mental health than nurses who worked shifts longer than 12 hours or longer (Melnyk et al., 2022).

In 2011, the Accreditation Council for Graduate Medical Education placed a limit on consecutive work hours for first year medical residents, not allowing them to work over 16 hours in a row. Looking at results from a cohort study based on first year residents in the US, findings showed that residents who abided by this regulation had fewer motor vehicle crashes, less risk of percutaneous injury (breaking the skin), and fewer attentional failures (mistakes on shift) (Weaver et al., 2020). This may be due to increased amounts of fatigue that longer shifts elicit, thus paving the way for an increase in mistakes on while on shift (Park, 2010).

Consequently, shift interventions have also been implemented within healthcare settings. A systematic review conducted by Bambra and colleagues (2008) reviewed studies that focused on the implementation of an organizational intervention focused on altering shifts. Twenty-six studies met the criteria and were included in the analysis, which included healthcare workers,

factory workers, police officers, and transportation workers (Bambra et al., 2008). Results provided evidence for neutral or positive effects on shift worker health and work life balance. There was no evidence to support that any one intervention type was detrimental for employee health. However, three types of interventions that produced the most positive effects were switching from slow to fast rotation, changing from backward-forward rotation, and self-scheduling shifts (Bambra et al., 2008). As discussed earlier, these types of schedules have been associated with coronary risk factors and poor sleep quality (Bambara et al., 2008). The self-scheduling option allowed employees to have some control over which shifts they work, what time the shifts start, and when their shift rest days are. The systematic review analyzed three studies that allowed for self-scheduling and reported that all three studies improved certain health metrics and work-life balance, and decreased absences and fatigue (Bambra et al., 2008).

Self-scheduling of shifts occurs frequently in healthcare contexts, particularly in nursing professions. Self-scheduling refers to the autonomy a worker has regarding the ability to sign up for shifts that work best for their schedule. One of the primary reasons for the common implementation of self-scheduling is that it has been linked to staff retention through increasing autonomy (Bluett, 2008). A second reason is that nurses are often scheduled around the clock (especially when they work for hospital systems), and thus need to be available to work outside of normal daytime hours (Russell et al., 2012). Russell et al. (2012) noted two main guidelines that should be followed to implement a successful scheduling program for nurses. First, the authors noted that nurses should be given the opportunity to participate/give feedback on the schedule's development (Russell et al., 2012). Management should seek nurse feedback during the design process, throughout the rollout and after its implementation. This ensures that feedback is collected in a timely manner and changes can occur if needed. Russell and colleagues

also noted that prior to implementation, a needs assessment should be conducted, involving qualitative and quantitative data sources. Secondly, organizational support should be obtained prior to implementation (Russell et al., 2012). This requires acceptance and support from all necessary leadership and stakeholders, especially from nurse managers, who will be overseeing the schedule change. Furthermore, the schedule should be made available to everyone.

One study showed that self-scheduling among nurses can increase perceived flexibility, control, and patient care, and may reduce shift change requests (Bailyn et al., 2007). However, if the self-schedule rules are not followed in terms of shift restrictions and sign-up times, it can cause significant disruption. For example, there were instances of nurses putting their names down next to shift times that were already full and leaving other less desirable shifts unmanned (Bailyn et al., 2007). A systematic review that assessed 23 self-scheduling studies reported that there was no clear consensus regarding the outcomes of this type of scheduling practice (Wynedaele et al., 2020). The review reported that the outcomes assessed ranged from quality of care, job satisfaction, absenteeism, health and well-being, turnover and professional development. This review highlights the importance of contextual factors that may be affecting these outcomes, on top of the self-scheduling practice. Furthermore, the review notes that employee and organizational outcomes are most influenced by the implementation process and sustainability of the scheduling system (Wynedaele et al., 2020). As previously noted, self-scheduling should be balanced by accountability and clear process guidelines to be successful.

As discussed in this chapter, there have been many intervention strategies that have been implemented to alleviate the strain that shift workplaces on employees. The next chapter discusses the outcome variables the present study is assessing, which include job satisfaction and burnout.

CHAPTER V: OUTCOME VARIABLES

Job Satisfaction

Job satisfaction is the most investigated job attitude in industrial-organizational psychology and has been extensively researched as both an important occupational predictor and outcome (Judge & Klinger, 2020). A frequently used definition of job satisfaction was provided by Spector (1997) and described how employees feel about aspects of their job (either like or dislike). Early literature on job satisfaction stipulated that it was an outcome largely determined by rewards the employee expected to receive from their job (compensation, benefits, etc.) (Hodson, 1985). Hodson (1985) also found evidence to suggest that workers form these expectations by comparing themselves to those around them, which ties into relative deprivation theory in explaining occupational outcomes. As relative deprivation theory states, we form our injustice opinions by comparing our reality to the reality of those around us.

Throughout the literature on job satisfaction, there are generally three major categories of variables that have been examined as predictors. The first area involves characteristics of the job and the tasks performed in that job. An example of this may include general job duties, and the environment in which the job is done. The second area involves the personal characteristics of the job holder or job seeker. These characteristics may include personality, age, experience. Lastly, the third area involves aspects of the organization itself. This includes factors such as organizational culture or climate and policies or procedures (Glisson & Durick, 1988).

One study analyzed the predictors of both job satisfaction and organizational characteristics and found that different variables contributed to both constructs (Glisson & Durick, 1988). The sample used in this study consisted of 319 employees from 47 work groups

(employees in the same group who provide the same type of service and are responsible to the same leader), across 22 different service organizations. A researcher met with the CEO of each company to collect information about the workers, which included education, gender, age, work experience, size of work group, tenure of organization, annual budget, types of services provided, job tasks, job satisfaction and commitment, skill variety, task identity, task significance, and perceived characteristics of their leader. Results showed that job satisfaction and organizational commitment were highly correlated (Glisson & Durick, 1988).

Further analyses showed that the characteristics of the job tasks were the strongest predictor area of job satisfaction and were more predictive than the characteristics of the organization and the worker (Glisson & Durick, 1988). In the job characteristics category, role ambiguity had the strongest (negative) relationship to job satisfaction, followed closely by skill variety (positive) (Glisson & Durick, 1988). Leadership was the third strongest predictor of job satisfaction, which was generally defined as the initiation of structure in the respective group, the consideration a leader has for their group, and the types and determinants of punishment of the leader's followers (Glisson & Durick, 1988). The strongest predictors for organizational commitment were leadership and the age of the organization (Glisson & Durick, 1988).

Researchers have also examined job satisfaction as a predictor of job performance, with studies showing different results (Keller & Semmer, 2013; Okpara, 2004; Wright & Cropanzano, 2000). Importantly, research has shown that other variables can moderate the relationship between the two constructs. One study by Podsakoff and Williams (1986) found that the relationship between job satisfaction and performance was moderated by rewards, and that when rewards were strongly linked to performance, the correlation between job satisfaction and performance was .27. A meta-analysis on 312 studies with a sample size over 54,000 found that

the relationship between job satisfaction and performance was correlated at .30, and that job satisfaction and performance were correlated higher when the job was particularly complex (Judge et al., 2001).

Job satisfaction has also been shown to act as a catalyst for other sought after job behaviors (Biswas & Mazumder, 2017). A review by Biswas and Mazumder (2017) collected evidence of over thirty articles to support job satisfaction being related to Organizational Citizenship Behaviors. Organizational Citizenship Behaviors (OCBs) are discretionary behaviors that are not generally written in job descriptions, and usually help other employees or the organization. OCBs can impact employee performance reviews, retention, and reward allocations (Rotundo & Sackett, 2002).

Another review on job satisfaction in physicians in various specialties was conducted by Williams and Skinner (2003). They reviewed 44 articles on the subject and were primarily driven to consolidate these articles due to the stark decline in job satisfaction this profession has seen over the years. Turnover was the most studied topic with respect to job satisfaction in this population (Williams & Skinner, 2003). A sample of 2,325 physicians showed that intent to leave was negatively associated with job satisfaction (Linzer et al., 2000). Physician health was assessed as a job satisfaction outcome in four studies, with three out of the four showing significant relationships between the two variables. One study found a significant positive relationship between job satisfaction and perceived health status (Fielding et al., 1995). The last outcome that was studied in relation to job satisfaction among physicians was work-related issues. One study found that lower levels of job satisfaction were predictors of negative attitudes toward the healthcare system (Richardsen & Burke, 1993). Another study looked at job satisfaction and its relationship to nonwork satisfaction (Gazewood et al., 2000). In these studies,

the outcomes of interests were perceptions of health maintenance organization (HMO) work conditions, perceptions that HMOs create competition, and perceptions of HMO service quality. Job satisfaction predicted beliefs about HMO work conditions and perceptions that HMOs create competition, but not regarding beliefs about HMO service quality (Ferraro, 1993). Another study found that job satisfaction predicted clinical rank, but not individual clinician scores on their Board exams (Girard & Hickam, 1991).

Burnout

Burnout, or burnout syndrome, was first written about in the 1970's by Freudenberger (1974). Freudenberger was a psychiatrist working for a healthcare agency when he noticed patterns among the free clinic personnel working there. He borrowed the term 'burnout' from the then current illicit drug scene, the effects of which the clinic saw in the patients that were chronic drug users (Schaufeli, 2008). In his article 'Staff Burn-Out,' Freudenberger (1974) characterized burnout using both physical and mental descriptives. He described the physical signs entailing the presence of fatigue and exhaustion, as well as gastrointestinal issues, headaches, and shortness of breath (Freudenberger, 1974). The behavioral signs included frequent irritation and short temper, suspicion, lack of emotional regulation in public, depression, and overconfidence (which may compromise patient safety). Freudenberger (1974) stated that it usually takes a year for a healthcare worker to experience burnout, although this onset is unique depending on the person. Freudenberg (1974) also identified 'dedicated and committed' people as being the most prone to burnout, mainly due to the long work hours and investment in this type of work (healthcare), which generally yields an unbalanced return (lack of adequate financial compensation and time off).

Freudenberger (1974) ended the paper by discussing some preventative steps that can be taken to mitigate burnout. The first recommendation entails a weed-out process that may occur by creating mandatory training periods before hire. These trainings would hopefully present a realistic view of the job the trainees would be doing, which would allow them to fully understand what their duties would be before committing. The second recommendation was to train staff on evaluating the trainee's motivation for wanting the job, in essence, are they there for the right or wrong reasons? Are they truly altruistic, or are there some other motivations that are driving them, that may not be effective long term? Do they have low levels of energy?

Freudenberger suggested that energy levels and general health status should also be evaluated during the training period. The fourth recommendation involved the importance of job rotation to reduce burnout and boredom. Freudenberger also recommended limiting the length of shifts to 9-hours, suggested that people take evenings off, and that the location was adequately staffed to even the workload. Physical exercise was also suggested to alleviate burnout, because while burnout may cause insomnia due to mental tiredness, physical tiredness may allow workers to fall asleep quicker (Freudenberger, 1974). If burnout occurred, the two primary recommendations to alleviate it included asking the employee to take time off from work to recover, and to support that person and let them know they there were resources available to them. Although Freudenberger was a psychiatrist, his recommendations entail many industrial-organizational psychology principles (job rotation, person-job fit, realistic job preview and work-life balance).

Around the same time, Maslach, a social psychologist by trade, was researching how social service workers coped with emotional arousal (instigated by their work) through certain cognitive strategies (Schaufeli et al., 2008). During interviews with these workers, Maslach and

her team learned that the social workers referred to the emotional exhaustion and depleting professional competence they were experiencing as ‘burnout’ (Schaufeli et al., 2008). Intrigued by this construct, Maslach and colleagues decided to create a scale to operationalize it. In 1981, Maslach and Jackson published ‘The Measure of Experienced Burnout’, which included the Maslach Burnout Inventory (MBI). To create this scale, Maslach and colleagues collected data from healthcare and social service personnel. The original MBI statements were scored on both intensity and frequency, much like the Hassles Scale pioneered by Lazarus and Cohen in 1977.

Forty-seven items were originally tested on a sample of 605 people in human service work (police officers, teachers, nurses, attorneys, social workers). Factor analysis was used, and the items were reduced to 25. These 25 items were then used on a new sample of 420 people who worked in human services as well, whose responses were like those of the original sample. These two samples were then combined, and three subscales emerged: Emotional Exhaustion, Depersonalization, and Personal Accomplishment (Maslach & Jackson, 1981). The Emotional Exhaustion and Depersonalization subscales had a moderate correlation, with .44 for frequency and .50 for intensity, and the Personal Accomplishment was not related to the other subscales (Maslach & Jackson, 1981). Emotional exhaustion was noted as the most important aspect of burnout and was defined as the depletion of emotional resources over time. Depersonalization was defined as the loss of feeling or sympathy one has toward the well-being of others. Personal accomplishment entails the feelings of success and competence one feels toward the work that they do.

In the same article, Maslach and Jackson (1981) discussed the differences they observed in the demographic data. Data analysis showed that female workers were more likely to experience emotional exhaustion than male workers (in both frequency and intensity), and male

workers scored higher than female workers on the frequency and intensity of depersonalization. However, these findings should be taken with caution due to the low levels of ethnic diversity found in the sample, as well as the breakdown of profession per gender. For example, although the sample had similar numbers of male and female participants, the males tended to work as physicians, police officers and psychiatrists, and the females generally worked as nurses, counselors, and social workers (Maslach & Jackson, 1981).

As previously discussed, burnout was originally thought to be a syndrome instigated only through work, particularly working in professions that provide some type of care to others (Maslach & Jackson, 1981). There is some debate as to whether burnout can exist independently from one's job. A study conducted over the course of 30 years from a community sample provided evidence that burnout can be predicted by enduring mental disorders (psychopathy), and showed that people with a lifelong mood disorder, coupled with an anxiety disorder, were more susceptible to developing burnout (Rossler et al., 2014). However, there may be comorbidity happening between burnout and depression, which have been shown to be closely linked, with some scholars arguing there is no difference between the two constructs (Scarfone, 1985; Schonfield & Bianchi, 2016).

Throughout the 80's and 90's, research on burnout continued to grow, creating new questions and research interests. In one paper by Leiter and Maslach (1988) investigated whether different types of interpersonal interactions can elicit different outcomes in terms of burnout and organizational commitment. Data were collected from 54 nurses in the same ward, predominantly female. Interpersonal relationships included those between colleagues and those relationships employees had with their supervisors. Results showed that emotional exhaustion was predicted by role conflict and negative supervisor interactions, and personal accomplishment

was also found to be positively associated with positive coworker interactions. Findings also showed that all the burnout subscales were associated with organizational commitment, and that negative coworker and supervisor interactions were associated with lower levels of organizational commitment. Regression analysis showed that emotional exhaustion and personal accomplishment uniquely predicted organizational commitment (Maslach & Leiter, 1988). These results highlight the importance that the work environment has on burnout (outside of patient interactions), and how it can lead to employee turnover.

Burnout has been studied extensively within healthcare personnel, due to the large amount of patient care healthcare jobs require. As such, there have been many studies seeking to assess the predictors of burnout for these occupations. One study on military mental health providers assessed predictors of burnout (Ballanger-Browning et al., 2011). Descriptive statistics showed that 27.8% of the 97 healthcare providers included in the study scored high in the emotional exhaustion dimension of burnout. Analysis showed that working increased hours, having high patient loads, caring for patients with personality disorders, being female, and being a psychiatrist were all significant predictors of burnout. Protective factors against burnout included having interpersonal relationships with colleagues, having a large percentage of patients with traumatic brain injuries, having increases clinical experience, and being a psychologist. These results also provide evidence to support the hypothesis that military service providers experience the same levels of burnout as civilian healthcare providers (Ballanger-Browning et al., 2011).

Lee et al. (2015) analyzed the predictors of burnout in 1,846 nurses in Taiwan. Physical and psychological traits, such as being tense, quick to anger and having trouble sleeping, and whether someone was engaged in their work, were the strongest predictors of burnout. Younger

nurses were more likely to experience burnout than older nurses, and those will lower levels of job satisfaction were more likely to experience burnout compared to nurses with higher job satisfaction (Lee et al., 2015).

It has also been reported that physicians who work closely with frontline patient care (emergency medicine, internal medicine, and neurology) report higher levels of stress when compared to other specialty areas (Patel et al., 2018). Emergency medicine physicians treat some of the most unpredictable cases, which may contribute to increased fatigue and burnout. A report compiled between June and September 2021 which included burnout and depression prevalence among 13,000 physicians across various medical specialties found that emergency medicine had the highest burnout, with 60% of EM physicians reporting burnout, followed closely by critical care physicians at 56% (Carbajal, 2022). Additionally, a report published by the Association of American Medical Colleges in 2022 identified Emergency Medicine as the fourth most common specialty in the US (46,857), preceded by Internal Medicine, Family Medicine, and Pediatrics (AAMC, 2022). Despite being the fourth most popular specialty, data released in 2023 ranked Emergency Physicians (EPs) as the most burnt-out specialty, with more than 65% of all EPs reporting experiencing some level of burnout (Medscape, 2023). This is a 20% increase in burnout when compared to 2018 rates (Medscape, 2023).

A meta-analysis conducted by Swider and Zimmerman (2010) sought to assess potential predictors and outcomes of burnout in healthcare professionals, due to the general lack of research into personality and its ties to burnout. They analyzed 115 empirical studies that assessed measures of personality type and burnout. Most studies assessed personality using the Five Factor Model (FFM), which is one of the most commonly used personality models in research. For those studies that did not address the exact dimensions of the FFM (neuroticism,

extraversion, agreeableness, conscientiousness, and openness to experience), the trait was coded into one of the 5 FFM categories, or it was labeled as 'other' if it did not conceptually make sense to code as an FFM personality trait. Results showed that neuroticism had the strongest (positive) relationship with the emotional exhaustion and depersonalization subscales of burnout, and extraversion had the strongest positive relationship with the personal accomplishment burnout subscale. Furthermore, agreeableness was negatively related to emotional exhaustion and depersonalization and had a positive relationship with personal accomplishment. Agreeableness was also found to be the second strongest personality predictor for burnout. Conscientiousness was found to follow the same pattern for predicting burnout as agreeableness. In addition to collecting information on burnout and personality, this study also assessed potential relationships between burnout and the job outcomes of absenteeism, turnover, and job performance (Swider & Zimmerman, 2010). Results supported a positive association between burnout and absenteeism (.23), turnover (.33), and a negative relationship with job performance (-.36).

Physical and mental health outcomes of burnout have been studied as well. A longitudinal study on teachers found that burnout was positively associated with depression and anxiety, and negatively associated with self-efficacy and proactive attitude (Tang et al., 2001). A review by Khamisa and colleagues (2015) found that burnout was most strongly related to the health outcomes of anxiety and insomnia. Beyond occupational and organizational outcomes, burnout has also been linked to patient health and safety outcomes. Patients that are cared for by providers who are experiencing burnout have higher instances of recovery time and experience more medical errors, as well as report lower patient satisfaction (West et al., 2016).

Ability to Recover from Work

The perceived adequacy of recovery time in between shifts has not been studied or conceptualized extensively. Recovery from work is generally studied one of two ways; as a process, or as the outcome of a process (Steed et al., 2019). The former defines recovery as what an employee is doing to achieve recovery. This path to recovery may involve social or physical activities or family/friend engagement. The goal is for these activities to have a replenishing effect on employee resources through engaging in these activities outside of work (Steed et al., 2019). Scholars have proposed that these activities can be broken down into 'low duty activities' and 'high duty activities' (Demerouti et al., 2009). Low duty activities refer to activities that may enable recovery, such as taking a walk or having a conversation with a trusted friend. High duty activities are generally viewed as activities that are required of someone and can impede recovery. An example of this may be childcare or strenuous household chores. However, these two recovery classifications have not been widely supported empirically (Steed et al., 2019).

The second area in recovery research involves viewing recovery from work as an outcome from certain processes. Sonnentag and Fritz (2007) proposed that there are four major outcomes that are the result of recovery activities: psychological detachment, mastery, relaxation, and control. They postulated that the activities were not as important as the states that the activities facilitated. Psychological detachment is generally defined as the ability to mentally remove oneself from work and pause thinking about work and work-related issues/stressors (Sonnentag & Kruel, 2006). Relaxation is the occurrence of ease or the absence of alarm/stimulation that can be brought about by non-demanding activities. Control is the sense of command or autonomy one feels they possess regarding how they spend their time away from work, and mastery involves gaining competence or increased self-efficacy in the face of goals, personal growth, or a hobby.

The ability to recover from work has mainly been operationalized by scales that assess the state of being recovered from work (Sonnentag & Fritz, 2007). Scales that measure this construct generally determine whether someone is detaching from work while they are not working, rather than inquiring about whether that employee believes they have enough recovery time *in between* shifts. In high stress occupations, detachment from work while off the clock is generally seen as a protective factor against negative work outcomes. Although recovery from work has been conceptualized in different ways, the constant is that recovery from work is time away from work (Steed et al., 2019). Particularly in high stress occupations, positive relationships have been found between work demands and the need for recovery of work (Sluiter et al., 2003).

The primary framework for understanding occupational recovery is the Effort-Recovery Model (Meijman & Mulder, 1998). This model states that when effort is extended through work, this leads to "load reactions," which are defined as negative emotional reactions that can result in physical and psychological tension and stress (Meijman & Mulder, 1998). To return to baseline and to reduce the load reactions, the authors state that removing oneself from work is the best way to achieve normality (Meijman & Mulder, 1998). This theory stipulates that a high workload is not necessarily detrimental if adequate recovery time is able to be achieved. For example, if someone works 45 hours a week in the office and proceeds to work several extra hours on their laptop at home every evening, then their 'off work time' would not result in maximum recovery. This may lead to a downward spiral, which results in increased strain and requires even more recovery time off from work (Tromp & Blomme, 2012).

As demonstrated, adequate recovery time between shifts is an important factor when determining schedules. This is particularly true since extended schedules, or schedules that go beyond the standard 9-5/ 40 hours per week, often characterize healthcare positions (Trinkoff et

al., 2006). Inadequate recovery time off between shifts has been linked to several detrimental outcomes, including declines in performance, increases in shift accidents, and increases in sick leave (Haluza et al., 2018).

At this time, OSHA (Occupational Health and Safety Administration) has not released any uniform guidance regarding how much time shift workers need to achieve recovery in between shifts (OSHA, 2023). OSHA defines a standard shift as a period of work over five consecutive days that involves 8-hours of work per day, with at least 8-hours of rest in between each shift (OSHA, 2023). It is unclear whether the 8-hours of rest is meant to be defined as an actual sleeping period with additional hours, or not. If the time between shifts is meant to be 8-hours in total, then one is expected to factor in eating time, commuting time, and sleeping time into the 8-hours off. Research also suggests that the transfer from acute to chronic fatigue states can be influenced by time between shifts, and the inability to fully recover during that time (Winwood et al., 2006). Countries outside the US have implemented policies that place minimums on the number of hours that are required off in between working shifts. For example, healthcare providers in Taiwan must allow for a minimum of a 24-hour break in between scheduling day and night shifts (Haluza et al., 2018). Furthermore, many researchers agree that one day off between shifts is insufficient for full recovery from night shifts (Blasche et al., 2017; Knauth, 1993).

One study by Totterdell and colleagues (1995) analyzed recovery experiences of a group of nurses. Results showed that increased days off between shifts were positively related to outcomes such as increased social satisfaction, reaction time, sleep, alertness, and mood. Furthermore, significant improvements were seen across all measures at rest day two compared to rest day one (Totterdell et al., 1995). Recovery from work research in the field of occupational

health psychology has generally not been applied to recovering from shift work. The perception of having adequate recovery in between shift times has not been operationalized in a scale format. As such, a 3-item scale was created for this study. This novel scale is further discussed in the Measures sub-section of the Methods section.

Overall Justice

Overall justice refers to broad evaluations of fairness perceptions that are based on both personal experience and experiences of others in that same entity (Holtz & Harold, 2009). Overall justice research has grown alongside organizational justice research over the past several decades (Ambrose & Schminke, 2009). The interest in overall justice partially arose due to some concerns surrounding the three most studied organizational justice dimensions (distributive, procedural, and interactional). One primary difference between overall justice and organizational justice that certain researchers have proposed is that the different categories of organizational justice may be perceived 'holistically' rather than independently by employees (Greenberg, 2001). As such, when gathering data, study participants may not be teasing apart their justice perceptions based on dimensions, even though the survey instruments are designed to do so. If this is the case, gathering overall justice perceptions would be less time consuming and would achieve the same result. Another argument for the use of overall justice over organizational justice dimensions entails overall justice acting as the main proximal driver for certain workplace outcomes, while organizational justice dimensions serve a secondhand role (Ambrose & Schminke, 2009).

Additionally, research has found some evidence that overall justice has the capacity to change over time. One such study aimed to understand how overall justice could fluctuate over time (Holtz & Harold, 2009). Participants included college students who additionally worked a

minimum of 20-hours a week outside of school (N = 213). Surveys were disbursed at three time points, four weeks apart. Variables collected included an overall justice dimension, the four organizational justice dimensions (procedural, informational, interpersonal, and distributive), organizational trust, agreeableness, and demographic information. Results showed significant variability in within-person and between-person organizational justice over time. It was also found that distributive, interpersonal, and procedural justice, as well as agreeableness, accounted for 61% of the variance in overall justice perceptions (Holtz & Harrold, 2009). Additionally, trust emerged as a significant predictor of within and between person variability for overall justice perceptions. This article was influential in shifting the understanding of overall justice. Prior research has generally shown that overall justice is relatively resistant to change in the absence of major organizational events. However, this study revealed variability of the construct in just under 12 weeks, with no major organizational change occurring.

Justice has also been explored in groups in terms of overall justice climate. One study assessed the potential impact justice climate could have on the frequencies of counterproductive work behaviors (CWBs) among employees (Priesemuth et al., 2013). This study assessed the occurrence of two types of CWBs, interpersonal deviance and self-serving political behavior. Interpersonal deviance has been defined as aggressive acts intentionally directed at others, which may include gossip, physical violence, or threats (Priesemuth et al., 2013). Self-serving behavior involves acting in a way that is manipulative in nature, to achieve a personal want or need, or putting oneself before others for personal gain (Priesemuth et al., 2013). Participants included 652 employees from 113 work units across 101 organizations. Overall justice was assessed using a referent shift approach; individual statements were reworded to assess group perceptions of justice rather than individual beliefs in the 3-item scale created by Ambrose and Schminke

(2009). Furthermore, functional dependence of groups moderated both outcomes. As such, when a work group perceived their environment to be unfair, they would be much more likely to engage in self-serving and interpersonal deviant behavior if the group functional dependence was low. These results provide evidence that counterproductive behavior can be a group-level phenomenon, and that justice climate can facilitate adverse work behaviors (Priesemuth et al., 2013).

CHAPTER VI

CONTEXT OF THE PRESENT STUDY AND HYPOTHESES

Context for the Present Study

As discussed earlier in the Background section of this paper, pilot data were collected to identify system-level changes EP recommended to reduce overall levels of fatigue. The primary theme that arose from this pilot study was needing more time away from work. These results, in addition to other studies that pointed to heightened levels of fatigue and burnout in the department, were the primary catalysts of the shift schedule elongation by one hour that was implemented in January of 2023. As such, most 8-hour shifts were converted to 9-hour shifts.

Participatory research has been described as increasing the autonomy of participants in a study or those who may be impacted by a change effort through data collection methods (Xu & Maitland, 2019). The most common theme (time away from work) to decrease fatigue was then acted on by hospital management less than a year later. Although there were other factors that contributed to this schedule change decision, management did consider the EPs recommendation. As such, the pilot data that were a contributing factor for the schedule change suggest that the input from the physicians may positively impact ED employees' perceptions of fair processes (procedural justice). Literature shows that to gain the trust and understanding of employees, informing employees of decision-making processes is important (Schminke et al., 2000). This transparency is particularly impactful when employees are directly affected by decisions being made and have a say in decisions that affect them (in this case, their work schedule). Prior to the shift schedule change (elongated by one hour), EPs were notified via the monthly department meetings (in both November and December) about the shift change. Those not in attendance were emailed the PowerPoint slides that were discussed during the meetings.

Primary Hypotheses

There are several studies that assess the four dimensions of organizational justice in relation to shift schedules. One study reported that in a sample of over 3,000 call center employees, procedural and distributive justice were positively related to feelings of satisfaction with their work schedules (Sims et al., 2021). In another study that included 1270 healthcare shift workers, organizational justice was found to mitigate stress and burnout symptoms in those that worked night shifts and three or more shifts in a row (Heponiemi et al., 2013). As such, organizational justice has been significantly linked to shift attitudes both in healthcare and non-healthcare professions.

Dissatisfaction gleaned from pilot data suggests that scheduling is a major point of work stress for physicians. Physicians reported frustration with a lack of input in their scheduling, which can be seen from comments such as “Schedules should be clinician focused and not simply convenient for the scheduler” and “I think that having a survey of individual scheduling preferences was fantastic, but I don't know how well ShiftAdmin is adhering to those preferences?” The latter comment suggests that the ED administration has tried to prioritize schedule preferences but has not necessarily been successful in doing so.

Key antecedents of procedural justice include having a voice in the process, and being treated with dignity by the whomever oversees managing the new system or policy (Watson & Angel, 2007). The EPs were involved in the decision-making process, and informed as to why the decision regarding the shift change was made. This should enhance perceptions of voice, which is a tenant of procedural justice (Watson & Angel, 2007). The number and identification of shifts that were switched from eight to 9-hours for this intervention will be gathered from shift administration personnel to understand the spread of this change. Both antecedents were present

in this case. The EPs were asked for their recommendations from a fatigue risk management team working in conjunction with the Emergency Department. This team had made several previous presentations to the department, and one of the members on the team is an EP employed by the department. Furthermore, the EPs were notified that these changes were being made to reduce their fatigue levels, which displays department concern for the well-being of their staff.

Hypothesis 1: EPs will experience higher levels of Procedural WSJ after the shift schedule change (Time 2) compared to before the change was implemented (Time 1).

Distributive justice is the perceptions of fairness surrounding the allocation of resources, or the evaluation of one's input/output ratio compared to their peers (Erdogan, 2002). Key antecedents of distributive justice include resource and relational judgements (Tyler, 1994). The implementation of 9-hour shifts was designed to affect most employees, not only a chosen group of people. The fairness of the allocation of shift length across the emergency department should increase distributive justice. One study on nurses found that distributive justice was positively predictive of work schedule satisfaction (Nelson & Tarpey, 2010). Because this new work schedule was created to allow EPs more time off work (their primary recommendation), it was hypothesized that distributive justice perceptions will increase from time one to time two.

Hypothesis 2: EPs will experience higher levels Distributive WSJ after the shift schedule change (Time 2) compared to before the change was implemented (Time 1).

Informational justice is a subtype of interactional justice and refers to the perception of justice surrounding how decisions are disclosed and enacted by management (Kernan & Hanges, 2002). In other words, are the procedures/changes deemed to be fair, are they communicated to employees in a timely manner, and is this communication respectful. Necessities for implementing informational justice include honest and adequate communication (Kernan &

Hanges, 2002). The department scheduled frequent meetings regarding the shift schedule change, as well as sent out numerous emails reminding EPs of this decision. In fact, some of the comments gleaned from the pilot data alluded to EPs receiving 'too much' communication from the department. The shift elongation was designed in a way to produce roughly two fewer shifts per month for full time EPs. As such, time off requests may be less frequent, which would involve less denials of time off.

Hypothesis 3: EPs will experience higher levels of Informational WSJ after the shift schedule change (Time 2) compared to before the change was implemented (Time 1).

Research on interpersonal justice has shown that ethical leadership is a significant predictor of interpersonal justice (Rahaman et al., 2021). As discussed, hospital leadership was involved with and attentive to the information collected from the fatigue risk management team. Fatigue started to be discussed more openly and emergency department leadership informed staff of potential new change efforts (beyond this schedule change) that they hope will contribute to fatigue and burnout reduction within EPs. These efforts to create conversations around the negative aspects of fatigue, as well as the attempts to reduce it, signal to EPs that their leaders care about their well-being and are attempting to make significant changes. As such, it was hypothesized that interpersonal justice perceptions will increase from Time 1 to Time 2.

Hypothesis 4: EPs will experience higher levels of Interpersonal WSJ after the shift schedule change (Time 2) compared to before the change was implemented (Time 1).

Management's action of changing the shift schedule length was heavily influenced by archival wellness data collected from the emergency department. These data highlighted the high levels of burnout within the department. The lengthening of the shifts from eight to 9-hours was a frequent recommendation gathered from the one-question survey submitted by EPs. Studies

have shown that when suggestions are asked for, heard, and acted upon, this can increase feelings of fairness (Chiaburu & Marinova, 2006; Cooper et al., 1992). As such, management's enactment of this recommendation may increase EPs overall perceptions of justice for their organization.

Overall justice, or the perception that one's organization is fair, has not been studied as extensively as individual organizational justice dimensions in the context of shifts and the ways in which they are scheduled. However, organizational justice has been linked to important employee outcomes, some of which include emotional exhaustion (burnout), physical withdrawal, and job performance (Whiteside & Barclay, 2013). Scholars have suggested that overall justice is more encompassing than the organizational justice dimensions, and that overall justice mediates the relationship between independent justice dimensions and important outcomes (Ambrose & Schminke, 2009). This suggests that overall justice may be more sensitive to the shift schedule change than the organizational justice dimensions themselves.

Hypothesis 5: Overall justice perceptions will be greater for EPs at Time 2 than at Time 1.

Schedules have been identified as primary contributors to job satisfaction in healthcare professionals (Han et al., 2015; Kovner et al., 2006). One of the main themes in the pilot data was the preference for shifts to be longer (currently physicians work 8-hour shifts), which coincides with working fewer shifts overall, and thus having more time off. One study on nurses found that nurses rated 'efficient and personal time away from work' as the most important community/lifestyle factors, and that this, in addition to climate and social activities were contributing factors to nurse retention (Molinari & Monserud, 2008). Another study on physicians found that time away from work was one of nine faucets that contributed to job

satisfaction (Konrad et al., 1999). Therefore, I hypothesized that the shift intervention change would have a positive impact on EP job satisfaction, and that the resulting increased time away from work that the EPs requested with their shift change recommendation would result in greater job satisfaction.

Hypothesis 6: EPs job satisfaction will be greater at Time 2 than at Time 1.

Unfortunately, research aimed at capturing recovery time between shifts is scarce. Scales that attempt to capture this concept are often geared toward perceived recovery status ("Today I would have needed more time for relaxing and recovering from work") or are captured with day-level measures ("This morning, I feel well rested") (Debus et al., 2014; Sonnentag & Zijlstra, 2006). To capture the concept of perceived ability to recover between shifts, the intervention team created a 3-item scale that can be found at the end of this document.

In the emergency department from which this sample was drawn, 'full time' is defined as 130 hours per month. It is important to note that 'full time' for EPs depends on how their hospital system defines it, and for EPs in different organizations, full time is more or less than 130 hours. Full time status (130 hours) was previously broken down into 16 or 17 shifts per month (16.25 shifts per month). This leaves roughly 13 days off per month. However, this does not factor in overtime, night shifts (which are sometimes scheduled longer than day shifts) or staying after a shift to complete electronic charting. Adding an extra hour to each shift equates to 14 or 15 (14.44) shifts per month (for full time EPs). This means the EPs would have roughly two days off extra per month and have more recovery time.

Hypotheses 7: EPs will perceive a greater ability to recover from work at Time 2 compared to Time 1.

Shift schedules have been shown to have a direct impact on burnout, outcomes of which can include increased rates of errors on shifts, fatigue, and undesirable patient outcomes (Block et al., 2015). Furthermore, nonstandard work schedules (night work, weekend work) contribute to burnout and fatigue (Jamal, 2004). Studies show that fatigue and burnout in shift work are caused (in addition to other factors) by excessive work, paired with a deficit of recovery time between shifts (Shen & Dicker, 2008). This schedule intervention is attempting to reduce burnout by giving EPs more time off (roughly two more recovery days per month). This intervention study is proposing that burnout will be lower after the schedule change has occurred.

Hypothesis 8: EPs will experience lower burnout at Time 2 than at Time 1.

As discussed in Chapter 1, the theoretical model for this study includes equity theory and organizational justice theory leading to the conception of work (shift) schedule justice theory, in which four dimensions are present: procedural justice, distributive justice, and informational and interpersonal justice. The shift schedule intervention that this study is analyzing is proposed to influence the four shift schedule justice components and the ability to recover from work, due to the increased time away from work the intervention was designed to allow for. As such, increases in the shift schedule justice dimensions are hypothesized to predict higher job satisfaction, lower job burnout, greater ability to recover between shifts, and greater overall justice due to greater satisfaction with the work schedule, and more days off from work per month.

Hypothesis 9: Changes in the four dimensions of SSJ from Time 1 to Time 2 will be positively related to changes in the outcome variables from Time 1 to Time 2.

CHAPTER VII

METHODS: QUANTITATIVE INTERVENTION STUDY

Participants

Participants included EPs that were employed in the Emergency Department of a large southeastern hospital system from December 2022 to March 2023. This hospital system had a joint IRB with Clemson University, who approved this research project. The first survey was sent out to 239 participants in December, and the second survey was sent out to 236 participants in March. This latter group included those that had been employed by the hospital system in December when the first survey was released and were still working there. Participants were notified of the study by one of their colleagues who works on research projects in conjunction with Clemson University.

Survey 1 yielded 54 responses. Ten responses were discarded due to lack of survey completion (Qualtrics captured them as respondents because they moved past the introduction page of the survey, but they did not answer any survey questions). Out of the 44 responses left, three were completed by APCs and were dropped. This resulted in Survey 1 yielding 41 responses in total. Survey 2 received 82 responses. Three of the surveys were discarded due to a lack of completion of any answers, eight surveys were discarded because they were completed by APCs, and four surveys were discarded because they were completed by Residents. This resulted in a total of 67 responses. After evaluating both survey respondents based on individual IDs, 75 unique EPs responded in total across Survey 1 and Survey 2. Further comparison showed that out of the 75 in total, 32 EPs responded to both surveys.

Demographic descriptives were calculated for Survey 1 and Survey 2 data. The mean age for Survey 1 respondents was M = 43.6, SD= 9.9. Most Survey 1 respondents worked full-time

(FTE) (31), with six respondents working at .75 FTE, and four respondents working at .50 FTE. Most of the Survey 1 respondents were male (56.1%), and white (82.9%). The mean age for Survey 2 respondents was *M* = 42.21 (*SD*= 9.6). Most Survey 2 respondents worked full-time (51), with 12 respondents working at .75 FTE, and four respondents working at .50 FTE. Most of the Survey 2 respondents were male (56.7%), and white (82.1%). Demographics were also calculated for the repeated measures sample (*N* = 32). The average age was 42.4, most of the sample worked full time (75%), were white (84.4%) and male (59.4%).

Measures

The primary variables in this study included shift schedule justice, emotional exhaustion (burnout), overall burnout, job satisfaction, overall justice, and the ability to recover from work. All the measures can be found in the Appendix section of this paper. Demographics variables for this study included age, gender, ethnicity, and full-time equivalent status (FTE). FTE is the extent to which the clinician is working full time, or the employees' scheduled hours divided by the employer's hours for a full-time work schedule.

Shift Schedule Justice. A measure of work schedule justice developed by Sinclair and colleagues was used to measure shift schedule justice (Sinclair et al., 2009). The word "shift" replaced the word "work" to measure shift-related justice. For example, the original item "My work schedule is fair compared to what I feel I deserve" was changed to "My shift schedule is fair compared to what I feel I deserve." The scale contains four subscales: distributive justice, procedural justice, informational justice, and interpersonal justice. The original scale included 4-items per scale, resulting in 16-items total. After consulting with SME's regarding the relevance of some of the items to EPs, several items were removed from the scale to account for this, as well as survey fatigue and to hopefully increase the response rate. The final scale included 12-

items, including at least two items from each category. The response scales for all four justice dimensions were presented on a 7-point Likert scale, with "1" being "strongly disagree", and "7" being "strongly agree." Internal consistencies were calculated for each dimension of Shift Schedule Justice across both surveys. Internal consistencies for Survey 1 scales were as follows: Distributive Justice*:* α = .93, Informational Justice: α = .65, Interpersonal Justice: α = .89, Procedural Justice: α = .89. Internal consistencies for survey 2 were as follows: Distributive Justice*:* α = .90, Informational Justice: α = .82, Interpersonal Justice: α = .93, Procedural Justice: α = .87.

Emotional Exhaustion. Emotional exhaustion was measured using the Maslach Burnout Inventory measure of experienced burnout (Maslach & Jackson, 1981). Emotional exhaustion has been identified as the best predictor of burnout, when compared to the other dimensions of burnout identified by Maslach (depersonalization, lack of personal accomplishment and emotional exhaustion). This scale consists of 9-items, a sample item is "I feel emotionally drained from my work." The response scale consisted of a 7-point Likert scale, with "0" being "never", and "6" being "every day." This emotional exhaustion scale has been found to have a reliability of .88 in a large sample of nurses, and the construct validity of this scale has also been supported as the most prominent factor in defining burnout (Schaufeli & Van Dierendonck, 1993). Internal consistencies for Survey 1 (α = .90) and Survey 2 (α =.93) were high.

Overall Burnout. In addition to the Maslach measure, a single item measure assessing overall burnout was used (Rohland et al., 2004). This item asks participants to choose one answer out of five to describe their burnout, ranging from "I enjoy my work, I have no symptoms of burnout" to "I feel completely burned out. I am at the point where I may need to seek help." The response scale consisted of a 5-point Likert scale, with "1" being the least burnout out, and

"5" symbolizing the most burnt out. This measure of burnout was found to be correlated at r =.64 with the Maslach Burnout Inventory in a sample of 307 medical students (Rohland et al., 2004). Another study found the measure to be correlated at r =.80 with the MBI in a sample of 92 general practitioners (Hansen & Pit, 2016).

Job Satisfaction. Job satisfaction was measured using the job satisfaction subscale from the Michigan Organizational Assessment Questionnaire (MOAQ) created by Bowling and Hammond (2008). This scale includes 3-items, however only two items were included in this study to keep the survey as short as possible. A sample item is "In general, I like working here." The response scale consisted of a 6-point Likert scale, with "1" being "disagree very much", and "6" being "agree very much." A meta-analysis reported the reliability of this scale to be .85 for internal consistency and .49 for test-retest reliability (Bowling & Hammond, 2008). Furthermore, this review supported the construct validity of this scale, and reported that job characteristics, social and organizational support and person-environmental fit were positively related to, and that stressors were negatively related to the scale (Bowling & Hammond, 2008). Internal consistencies for Survey 1 (α = .78) and Survey 2 (α =.84) were adequate.

Overall Justice. Overall justice was measured by the scale developed by Ambrose and Schminke (2009). This scale is originally 3-items, but 2 items were removed for brevity. The single item that will be included to assess overall justice perceptions is "For the most part, this department treats its employees fairly." The response scale consisted of a 7-point Likert scale, with "1" being "strongly disagree", and "7" being "strongly agree." The internal consistency for this scale was reported to be .79, and this scale was found to be positively correlated with Affective Commitment Scale (Myer & Allen, 1984) at .97 (Ambrose & Schminke, 2009).

Ability to Recover from Work. A scale was created to measure participants' perceived ability to recover from work between shifts. This scale included 3-items and sample items include "I have sufficient time between shifts before starting my next shift and "I am able to rest sufficiently between shifts." The response scale consisted of a 7-point Likert scale, with "1" being "strongly disagree", and "7" being "strongly agree." These items are consistent with previously created recovery items, such as "I do not normally relax, if I have only had one day without work" and "by the end of the working day I feel really worn out" (Stevens et al., 2019; van Veldhoven & Broersen, 2003). Within the recovery literature, 'rest' is a primary construct that is discussed to achieve recovery. In this case, it has been theorized that 'external recovery' occurs when one is engaging in recovery activities outside of work (Demerouti et al., 2009). Furthermore, engaging in daily recovery has been linked to higher rates of well-being and performance, when compared to concentrated recovery (such as going on a vacation) (Demerouti et al., 2009). As such, the items used to create this scale focus on capturing time off work between shifts to rest. Internal consistencies for Survey 1 (α = .95) and Survey 2 (α =.95) were high.

Procedure

A proposal for this study was submitted to the Institutional Review Board at Clemson University and was approved in early December 2022. To foster buy-in from Emergency Department leadership and study participants, a brief PowerPoint presentation was given by a member of the ED leadership in early December 2022 at a staff meeting. The first Qualtrics survey was released to participants in mid-December of 2022. One reminder email was sent out to participants a week after the survey was released. In addition to the survey, access to the number of shifts each EP worked during the study periods was also granted. The number of

shifts was analyzed to deduce whether EPs worked fewer shifts after the intervention was implemented. Due to concern surrounding the lack of responses received from the first survey, funds were acquired for the second survey and for the interview portion to secure more participants and an IRB amendment was approved to reflect the monetary incentives. These incentives were in the form of Amazon electronic gift cards. Participants received $10 for completing the second survey, and $25 for participating in an interview.

The shift intervention began on January 1st, 2023, and entailed EP shifts changing from 8-hours to 9-hours in length. Although the survey was open after the shift intervention occurred, participants were asked to reflect on their experiences prior to the shift change in the survey instructions. The second survey was sent out after the change (February 28th, 2023, through March 7th, 2023). Both surveys were open for a 2-week period, with a reminder email being sent to participants one week after the initial survey distribution. Both surveys collected information on the same variables (shift schedule justice, overall justice, burnout, job satisfaction, and the ability to recover from work). The second survey was only sent to EPs who were employed at the hospital system prior to the schedule change.

Planned Analyses

Initial analyses were conducted to ensure that participants worked fewer shifts at Time 2 compared to Time 1. To analyze the shifts worked, shift data were aggregated for each provider. This entailed gathering data from the three months leading up to the intervention (October, November, December of 2022) and the three months following the intervention (January, February, March of 2023). Seventy-five individual physicians responded to either or both the Time 1 and Time 2 surveys. Shifts were aggregated across physicians to capture the number of shifts worked pre and post intervention for each provider and the average length of shift worked

by each provider pre and post intervention. These calculations allowed for a better understanding of the actual impact the shift change had on the days each EP worked in the ED after the intervention compared to before it was implemented.

The primary hypotheses were tested using multilevel repeated measures models, where time (Time 1 vs. Time 2) acted as a predictor variable, and the outcomes of interest included shift schedule justice dimensions, burnout, job satisfaction, overall justice, and recovery. Utilizing multilevel repeated measures models allowed for the use of all participants who completed the survey at Time 1 (N = 41) and Time 2 (N = 67). Structuring the data for the multilevel models entailed some participants only having data for Time 1 or Time 2, and some having data for both time periods. Participants were assigned a subject ID that was treated as a random effect. Time was treated as a fixed effect in each multilevel model. A significant effect of Time would provide support for the hypothesis that the given outcome measure had changed from pre-intervention to post-intervention, assuming the change in outcome was in the direction predicted.

In addition to examining the effects of the intervention on the primary variables through the use of multilevel repeated measures models, the relationships between the measured variables at Time 1 and Time 2 were also examined. Correlations were examined between all the Time 1 and Time 2 variables for all repeated measures responses. In addition, changes in the measures of Shift Schedule Justice and Ability to Recover were correlated with changes in the outcome measures of Burnout and Job Satisfaction.

METHODS: QUALITATIVE STUDY

The aim of adding the interview component was to further enrich the analysis and conclusions from the quantitative data received from the survey. The interview component

acknowledged that there was more to understand regarding the schedule change and its impacts, and that there were different opinions surrounding this change. In addition to the elongation of shifts in the new year, there were several other changes that could influence EP outcomes, such as the combining of pods (units) and the opening of a new emergency room (requiring more staffing). The interview questions served as an avenue for allowing participants to discuss these changes in addition to the schedule change, and further inform the results of the schedule intervention.

Participants

Participants included 17 EPs from the sample who responded to the quantitative study. The participants were contacted if they expressed interest in participating in a virtual interview, which involved listing their email addresses in text blank in the last question of the survey at Time 2. The interviews were conducted via Zoom between April 12th, 2023, and June 22nd, 2023. The interview participants included nine men and eight women. Twelve EPs worked full time (1.0 FTE) and 5 EPs worked at .75 FTE. Ten EPs had protected time, in the form of administrative, teaching, and/or research duties, and seven EPs only worked clinical shifts.

Measures

Participants were asked five main questions, in addition to follow-up questions, to address additional topics discussed by participants. A list of all the interview questions can be found in the Appendix. A sample interview question was “Did the schedule modification allow you to have more time away from work? Why or why not?” The interview questions were shared with an EP SME who works at the hospital system prior to the interviews and were modified based on the feedback received. The interviews lasted 21 minutes each on average, ranging from 12 to 35 minutes long.

Procedure

Participants were contacted via their email addresses that they included in the survey. Interviews were conducted via Zoom and transcribed using a free transcription service. After each interview, the notes and interview transcripts were uploaded to a password protected file and were de-identified of any personal information (if any was collected during in the interview). Participants received a $25 Amazon gift card for participating in the interview.

Interview transcripts were coded using a codebook derived from two SMEs and two researchers. After all interviews were conducted and the transcripts were cleaned by the primary researcher, each coding team member was given two random transcripts (eight were used in total) and were asked to independently code them based on thematic importance and the appearance of the four shift schedule justice dimensions. Coders were asked to create specific codes that had the ability to be grouped together into larger themes. After the transcripts were coded, the first meeting was held with all four coders to agree on the created codes and review the eight transcripts. After the first meeting, the primary researcher took the codes discussed across all eight transcripts and created an initial codebook.

In the first meeting, consensus was reached that the themes and codes should be mainly focused on topics directly related to the shift change and overall shift perceptions. After the initial codebook was created and provided to all team members, a second meeting was held to review the codebook and discuss further modifications that were needed. After this meeting, the primary researcher incorporated the feedback and sent the updated codebook and a new transcript to the team. Each team member received the same new transcript and used the updated codebook to code the transcript asynchronously. Once everyone completed their coding, all transcripts were sent to the primary researcher, who combined all team member codes into one

transcript document. While coding the new transcript with the updated codebook, team members identified new codes that they observed.

After all team members completed their independent coding of the same transcript, a third meeting was held to review the codes and identify any new codes. During this meeting, the coding team felt that the coding of the positive shift change themes were adequate but did not feel that the transcript covered negative and unanticipated outcomes. Therefore, a fourth meeting was held to go over a longer transcript that included more of the negative and unanticipated theme categories. Additional changes to the coding framework were recommended by three of the team members present at the fourth meeting. After the fourth meeting, the primary researcher applied the updated codebook to all 17 transcripts.

Planned Analyses

Interview data were collected to enrich the findings gathered from both surveys and was analyzed using the Consensual Qualitative Research Guidelines (Hill et al., 1997). This approach emphasizes team member agreement regarding the coding framework and application (Hill et al., 1997). The final themes and categories underlying the interview responses were determined and counts were recorded for the number of times each theme and category were mentioned at least once in the 17 interviews. This approach has been recently used with emergency physicians from the same academic department (Klinefelter et al., 2023).

Following the literature on mixed methods research, this design allows for greater support for and explanation of the primary findings. Firstly, gathering qualitative data may compensate for concerns in other areas of the study, such as a smaller sample size (Migiro & Magangi, 2011). Mixed methods can also add further insight into analyses conducted on the quantitative data and can thus increase the generalizability of the results (Migiro & Magangi,

2011). Each major question will have several themes attached to it, and those themes will appear in percentages based on responses given, as well as the value and insight they add to the research questions. These themes are included in the results and the discussion section alongside the quantitative data, to shed light on those findings.

Findings from the interview data were used to supplement and enrich findings from the quantitative data. For example, if there is no relationship found between pre and post intervention burnout scores, interview data themes including outside contextual factors (overtime shifts, zoning changes) were discussed as a possible explanation for this finding. The objective variable of number of shifts worked pre and post intervention were also discussed alongside the qualitative and quantitative findings to shed light on the outcomes.

CHAPTER VIII

RESULTS

Quantitative Analyses of Shift Data Before and After the Intervention

Objective shift data were collected from 75 EPs who responded to either the Time 1 or Time 2 surveys. Shift data were retrieved from ShiftAdmin that included three months prior to the schedule modification, and three months after the schedule modification, resulting in a total eligibility of six months of shift data per participant. The variables analyzed included the total number of shifts worked per month (all shifts included) and the number of eight and 9-hour shifts worked per month. Although 75 EPs shift data were available to analyze, three EPs did not have any shift data available in ShiftAdmin. This resulted in a total number of 72 EPs shift data available. Out of the 72 individual shift data, some EPs did not have data for certain months, and some EPs did not work either shift type (eight or 9-hours) in each month. This resulted in some aggregate variables with fewer than 72 responses.

During initial data analyses, it became clear that EPs worked shifts outside of eight and 9-hours in length. Since the major focus of this study was whether EP shifts changed from 8-hours to 9-hours after January 1, 2023, those categories of shifts were the ones that were analyzed. While some shifts were shorter or longer than eight or 9-hours pre and post shift change, the bulk of the shifts were eight or 9-hours in length across EPs. A description of the average number of shifts worked in the months before and after the intervention is provided in the first column of Table 1. Overall, EPs worked an average of 1.5 fewer shifts per month post shift change. The number of eight- and nine-hour shifts worked was also captured before and after the shift intervention and are also included in Table 1. Before the intervention, the average number of 8-hour shifts worked per month was 10.2 shifts. After the intervention, EPs worked an average of 2.7 8-hour shifts per

month. The average number of nine-hour shifts worked before the intervention was 4.6 shifts per month. Post intervention, EPs worked eight, 9-hour shifts on average per month. The total hours worked per month were also calculated and can be seen in the far-right column in Table 1. Overall, EPs worked an average of 111.1 hours per month leading up to the intervention, and they worked an average of 107.4 hours per month following the intervention. Overall, EPs worked 3.6 hours more per month before the intervention than after.

Paired sample t-tests were performed on the shift variables of interest that included the average number of shifts for the three months prior to the intervention and the average number of shifts for the three months post intervention for those EPs who had data at both time periods. The paired sample t-test was significant for the overall number of shifts worked, $t(67) = 10.670$, $p < .001$, showing that EPs worked significantly fewer shifts per month after the intervention ($M = 11.89$; $SD = 3.01$) than before the intervention ($M = 13.40$; $SD = 3.22$). The paired sample t-test was also significant for the number of 8-hour shifts worked, $t(36) = 14.073$, $p < .001$, showing that EPs worked significantly more 8-hour shifts before ($M = 10.31$; $SD = 3.49$) the intervention than after (M = 2.82; SD = .95). Finally, the paired sample t-test was also significant for the number of 9-hour shifts worked, $t(32) = -4.267$, $p < .001$, showing that EPs worked significantly more 9-hour shifts after the intervention ($M = 8.09$; $SD = 3.32$) than before ($M = 5.92$; $SD = 4.48$). The paired sample t-test for the overall hours worked was also significant, $t(67) = 4.25$, $p < .001$, showing that EPs worked significantly more hours before the intervention ($M = 110.3$, $SD = 3.34$) that after the intervention ($M = 105.3$, $SD = 3.41$). In summary, EPs worked fewer shifts per month, fewer 8- hour shifts per month, fewer total hours per month and more 9-hour shifts per month after the intervention took place.

Quantitative Analysis of Differences on the Primary Measures as a Function of the Intervention

Linear mixed model analyses were conducted to test the primary hypotheses, which can be seen in Tables 2, 3 and 4. The dataset was structured so that each participant was assigned two rows corresponding to the Time 1 and Time 2 survey responses. This allowed all responses to be utilized, not just the matched sample. Age, gender, race (multicategory), and FTE were included as controls for all analyses. Time (Time 1 Survey or Time 2 survey) was included as a fixed effect. Participant ID was included as a random effect. To test whether the different variables changed from Time 1 to Time 2, the significance of the Time variable was assessed.

As seen in Table 2, the linear mixed model for Procedural Shift Schedule Justice revealed that there was a significant difference as a function of time. Procedural Shift Schedule Justice Perceptions were higher at Time 2 than at Time 1. The linear mixed models for Distributive Shift Schedule Justice, Informational Shift Schedule Justice, and Interpersonal Shift Schedule Justice revealed that there were not significant differences in these variables as a function of time, as seen in Table 2. As seen in Table 3, there were also no significant differences in Overall Justice and the Ability to Recover as a function of time. As seen in Table 4, there were also no significant differences in Emotional Exhaustion, Burnout, or Job Satisfaction as a function of time. Additionally, the means for all primary outcome variables at Time 1 and Time 2 are available in Table 5, which were derived from the linear mixed models.

Correlations among the Measured Variables at Time 1 and Time 2

Correlations were examined between all the Time 1 and Time 2 variables and are provided in Table 6. All shift schedule justice variables were positively significantly correlated with one another across the Time 1 and Time 2 surveys. The outcome variables of Emotional

Exhaustion, Job Satisfaction, and Ability to Recover were strongly related to each other at both time periods, as well as from Time 1 to Time 2 for the matched sample.

Correlations were also calculated to examine if changes in any of the Shift Schedule Justice Variables and the Ability to Recover were associated with changes in the outcome measures of Emotional Exhaustion, Burnout, and Job Satisfaction. Correlations between the changes in variables from Time 1 to Time 2 (Time 2 was subtracted from Time 1) are provided in Table 7 and only include the matched sample. Correlations showed that changes in Procedural and Interpersonal Shift Schedule Justice were significantly positively related, as well as changes in Distributive Justice and Emotional Exhaustion, and Emotional Exhaustion and Burnout. The positive relationship between the changes in Distributive Shift Schedule Justice and emotional exhaustion points to both variables increasing after the shift intervention, which was not expected.

Qualitative Analysis of the Interview Transcripts

Five themes arose from the coding consensus meetings. Three of these themes were derived from interview content that directly applied to the shift change, and two themes were included based on the context surrounding the change. The sections below describe each theme and the frequencies of responses to the categories within it.

Positive Perceptions of the Shift Change. Positive Perceptions of the Shift Change was identified as an important theme in relation to the shift change, with 15/17 EPs discussing this theme in their interview. Six categories were identified under this theme: 1) Prefer New Length of Shift, 2) Allows For More Time Away From Work (more days off), 3) Zoning Allows For EP Flexibility Around Seeing Patients in the ED, 4) General Appreciation for the Shift Change,

Although the EP Does Not Appreciate Benefit From it Personally, 5) Staff Flexibility, and 6) Patients Benefit from the Shift Change, as seen in Table 8.

For the first category of this theme, Prefer New Length, 10/17 EPs stated that they were appreciative and preferred the new nine-hour shift lengths over the old eight-hour shift lengths. The second category, Allows for More Time Away From Work, (more days off) was broken into two codes; 1) Working Longer Shifts Allows for More Days off Per Month, and 2) Resulted in increased Recovery Time Away From Work. The first category was identified in 9/17 EP interviews, and the second category was identified in 1 interview. The third category (Zoning Allows for EP Flexibility around Seeing Patients in the ED) was identified in 4/17 transcripts and was discussed as the new zoning being advantageous to EPs, due to the geography of the zones that allow for EPs to see patients as they come in and thus increased helpfulness among EPs. The fourth category (General Appreciation for the Shift Change, Although the EP Does Not Appreciate/Benefit from it Personally) was identified in 3/17 transcripts and was mainly stated due to responsibilities outside of clinical shift work or their age being burdens along with increased shift lengths. The fifth category (Staff Flexibility) was stated by 2/17 EPs, due to EPs perceiving that their colleagues are understanding of the shift change and were willing to help other EPs during the scheduling adjustment period, in the form of picking up extra shifts, for example. The last category (Patients Benefit from the New Shift Change) was identified in one transcript, due to an EP stating that increased time away from the hospital allows them to better care for their patients, due to rest and increased alertness that that more time away allows them to achieve.

Negative Perceptions of the Shift Change. Negative Perceptions of the Shift Change was the second theme and was mentioned in 13/17 interviews. This theme included four categories: 1)

Greater Workload Per Shift Resulting in Increased Stress, 2) Too Much Time in the Hospital/Not Enough Time Away, 3) Prefers 8-Hour Shifts Over 9-Hour Shifts, and 4) Decreased Patient Quality of Care, as seen in Table 9.

The first theme (Greater Workload Per Shift Resulting in Increased Stress) was mentioned in 11/17 transcripts and was described as EPs working longer hours plus more hectic schedules due to loss of physician coverage on shifts, which led to increased workload and stress. The second category in this theme (Too Much Time in the Hospital/Not Enough Time Away) appeared in 7/17 transcripts and was discussed due to increased shift hours paired with increases in the amount of overtime EPs were scheduled, which led to increased time in the hospital. It was also mentioned that EPs with administrative duties may experience this at heightened rates. The third category in this theme (Prefers 8-Hour Shifts Over 9-Hour Shifts) was mentioned by 3/17 EPs, who stated that they would rather work shorter shifts and be in the hospital more. The last category (Decreased Patient Quality of Care) was mentioned by 3/17 EPs, due to increases in workload per shift being perceived to negatively impact EPs ability to properly care for patients, due to increases in fatigue and possibly mistakes as well.

Unintended Negative Consequences of the Shift Change. The third theme was Unanticipated Negative Consequences of the Shift Change and was mentioned in 15/17 interviews. This theme was broken down into two categories: 1) ED Zones and 2) General ED Changes, as seen in Table 10. This theme was created due to changes happening in the ED in tandem with the shift change, which were thought to be important contextual factors that also influenced EP perceptions of the change itself. The first theme (ED Zones) included four categories; 1) EPs are Farther from Nurses, 2) EPs are Farther from Patients, 3) Zones are Detrimental to Learning (Resident Education), and 4) Zones are not Equal in Terms of Workload. The first category (EPs are

Farther from Nurses) was identified in 7/17transcripts and was discussed due to zone restructuring leading to the Zones covering a much larger distance and making it difficult to communicate with/reach nurses. The second category (EPs are Farther from Patients) was identified in 7/17 codes, and also identified that the area of the new zones made seeing and checking up on patients more difficult due to the large space the zones covered. The last theme (Zones are not Equal in Terms of Workload) was identified in 14/17 interviews and was further broken down into six subcategories. The first subcategory (Geography of zones is detrimental to communication and patient care) was identified in 9/17 transcripts. The second subcategory (Unequal physician coverage in zones (red zone has more coverage than blue zone)) was mentioned in 7/17 transcripts. The third subcategory (No downtime in Blue Zone) was mentioned in 7/17 transcripts. The fourth subcategory (Blue Zone is a larger area) was mentioned in 4/17 transcripts. The fifth subcategory (Red zone has the sickest patients, blue zone has the most 'annoying' patients; more behavioral health/substance use disorders- more difficulty of EM, less of the fun, and the red zone has more cases that are pertinent to emergency medicine) was mentioned in 4/17 transcripts. The sixth subcategory (Nonfunctional workspace) was mentioned in 3/17 transcripts, due to comments surrounding a lack of desks/software/equipment to conduct charting, for example.

The second category under this theme (General ED Changes) was included to represent changes outside of the Zones (the Zones were only implemented in one ED). This theme had two categories: 1) Fewer EPs on shifts, and 2) Removal of Shifts from Schedule. The first category (Fewer EPs on shifts) was identified in 6/17 transcripts, due to the removal of EPs from the shifts which then increased the workload per shift. The second category (Removal of Shifts from

Schedule) was identified in 6/17 transcripts and identifies EP frustration with shifts being removed from the schedule in order to lengthen shifts, which disrupted some EP schedules.

Neutral/Ambivalent Perceptions of the Shift Change. The next theme was Neutral/ Ambivalent Perceptions of the Shift Change and was mentioned in 16/17 interviews. This theme included five categories: 1) Shift Change was not Ubiquitous, 2) Did Not Experience a Difference in Stress Levels Post Shift Change, 3) Shift Change was Viewed Positively, but the Change was Counteracted by the Shifts Being More Stressful Overall, 4) Did Not Experience a Difference in Hours Post Shift Change, and 5) Did Not Experience Much Overtime, as seen in Table 11. The first category (Shift Change was not Ubiquitous) was mentioned by 8/18 EPs, who discussed that although it was presented that all shifts would change from 8 to 9 hours, this was not the case, which was also seen in shift data that showed shift times were dependent based on type of shift worked, location of shift, and department. The second category (Did Not Experience a Difference in Stress Levels Post Shift Change) was mentioned in 7/17 transcripts and was described as although the shift change was designed to provide EPs with more time off, this did not translate into a reduction in stress. This may be due to the increased workload per shift, and/or the overtime that was added to normally scheduled shifts. The third category (Shift Change was Viewed Positively, but the Change was Counteracted by the Shifts Being More Stressful Overall) was mentioned by 6/17 EPs, due to the negating impact the increased workload per shift had on the extra time off. The fourth category (Did Not Experience a Difference in Hours Post Shift Change) was mentioned by 3/17 EPs, due to those EPs frequently experienced overtime, in addition to having to stay late after a shift to finish up charting or taking work home. The fifth category (Did Not Experience Much Overtime) was discussed by 3/17 EPs, who stated that they were not scheduled for overtime frequently after the shift change.

Overall Shift Opinions. An Overall Shift Opinions theme was included to shed light on the context surrounding the shift change and was mentioned in all the interviews. This theme included nine categories; 1) Regularly Experiences Overtime, 2) Works More Hours Than Shift Length, 3) Understaffed Overall, 4) Dislikes 12- Hour Shifts, 5) Prefers Longer Shifts, 6) Prefers Shift Overlap, 7) Prefers Shorter Shifts, 8) Prefers Later Shift Start Time, and 9) Work Life Balance Disruption, as seen in Table 12. The first category (Regularly Experiences Overtime) was mentioned by 12/17 EPs, who stated that understaffing in the ED has led to overscheduling, and mandatory overtime. The second category (Works More Hours Than Shift Length) was mentioned by 12/17 EPs, who discussed that they work more hours than the length of their shifts due to commuting times (EPs are not compensated for commuting distances, and commute time is not included in work time), staying after a shift to finish paperwork, and/or finishing shift work at home. The third category (Understaffed Overall) was mentioned by 11/17 EPs, who discussed that the ED was understaffed, although a wave of new hires was expected to be brought on that summer. The fourth category (Dislikes 12-Hour Shifts) was mentioned by 10/17 EPs, who state that 12-hour shifts are too fatiguing, which made it difficult to operate at high capacities needed for effective patient care. The fifth category (Prefers Longer Shifts) was identified in 10/17 interviews and was further broken into three subcategories: 1) Longer shifts in general allow for more time away from work (noted by 7/17 EPs), 2) Prefer 9-hour shifts to 8-hour shifts in general (noted by 5/17 EPs) and 3) Prefers 10-hour shifts in general (noted by 4/17 EPs). The sixth category (Prefers Shift Overlap) was mentioned by 7/17 EPs, who stated that overlapping shifts allows for EPs coming on and off a shift to offset some of their workload. This is because EPs coming on shift are not as immediately inundated with patients and can be brought up to speed and EPs coming off shift have time for updated and charting. The seventh

category (Prefers Shorter Shifts) was mentioned by 5/17 EPs, who prefer to work shorter shifts and come into the hospital more due to fatigue experienced when working longer shifts. The eighth category (Prefers Later Shift Start Times) was mentioned by 3/17 EPs, who stated that they prefer to have evening/night shifts start later rather than earlier, due to wanting to be able to do things during the days they work night shifts, and disruptions in daily schedule/ family time that earlier start times can cause. The last category (Work Life Balance Disruption) was mentioned by 5/17 EPs and was further broken into two subcategories; 1)Work life balance disruption due to other duties responsibilities (charting/administrative duties that are done at home, on weekends, etc.) (mentioned by 3/17 EPs) and 2) EPs stated that keeping a work-life balance was difficult due to the randomness of shifts being assigned, and the mandatory overtime that was being scheduled (mentioned by 2/17 EPs).

Qualitative Themes Informing Quantitative Findings

As noted, Procedural Shift Schedule Justice was the only variable to significantly increase as a function of time. There are several themes that arose from the transcripts that may help to understand this finding. The most frequently stated category under the Positive Perceptions of the Shift Change theme were that the EPs approved of the shift change from 8 to 9-hours in length, and that they experienced more time away from work after the change. Both categories speak to EPs desire to have more time away from work (which was captured in the pilot data collected before the shift change), and that they appreciated the shift change that allowed for increased time away. Procedural Shift Schedule Justice speaks to fairness in the mechanisms and reasons why a shift schedule was made in a particular way. The rise in this justice dimensions alludes to EPs belief that there is fairness surrounding how their schedules were made, and the reasons behind it. Furthermore, there were also categories that arose in the

Overall Shift Schedule theme that may help to explain the increase in Procedural Shift Schedule Justice. Prefers Longer Shifts was a popular category, particularly that EPs preferred longer shifts in general because they allow for more time away from work, and that EPs prefer 8-hour shifts over 9-hour shifts for the same reason. Although there were some EPs who stated that they preferred shorter shifts to longer shifts, most of the interviewed group did appreciate the longer shift change, which helps explain the increase in Procedural Shift Schedule Justice after the change was implemented.

As noted, there were no other significant differences in any other variables after the intervention was implemented. There were several themes that arose from the interviews that may help explain these findings. In the Neutral/Ambivalent Perceptions of the Shift Change theme, the most popular categories were that the shift change was not ubiquitous, and that EPs did not experience any changes in stress after the shift change. It was noted that although the original message to EPs was that the shift change would entail all 8-hour shifts transitioning to 9-hour shifts, this was partially dependent on department, shift type, and shift location. As such, many EPs may not have experienced extra time off work. This finding may explain why Distributive Shift Schedule Justice did not increase post shift change, since this dimension of justice is concerned with fairness surrounding the allocation of shifts. The second most popular category under this theme was that EPs did not experience differences in stress after the shift change. This category may account for the quantitative findings that burnout and emotional exhaustion did not significantly decrease as a function of time. Many EPs stated that although they experienced extra day(s) off, this increased time away from work was offset by the increased workloads they experienced on shifts.

Working more hours than they were normally scheduled (overtime), working longer hours than their shift length, and ED understaffing were the three most popular categories in the Overall Shift Opinions theme. The understaffed nature of the ED (which was separate from the shift change itself) helps with the understanding of the quantitative findings. Many EPs reported experiencing mandatory overtime, due to a lack of EPs in the ED. Additionally, a potential outcome of this understaffing was that EPs frequently reported that they worked more hours than their shift length. This was because when shifts were not fully staffed, this increased the number of patients for each EP, and more patients require more charting. EPs stated that finishing charting during the shift was increasingly difficult, and many took charting home, or stayed after the shift to finish their charting. These findings may help explain why the Ability to Recover variable did not significantly decrease after the intervention.

Lastly, the Negative Perceptions of the Shift Change theme provides some insight into the survey findings as well. The two most popular categories in this theme were EPs experiencing increased workloads that resulted in increased stress levels, and that EPs were experiencing too much time in the hospital. EPs were removed from shifts to combat the increased shift length and to keep the total number of work hours the same, as well as in reaction to understaffing. The removal of EPs from certain shifts resulted in increased workloads for EPs on the shifts, such as increased patient loads and charting responsibilities. Spending too much time in the hospital was another popular category under the Negative Perceptions of the Shift Change theme. This category was described as EPs not feeling as though they experienced more time away from work, due to increases in shift length, paired with increases in overtime, and having to stay late to finish up work or take work home to complete. Furthermore, over half of all EPs interviewed had duties outside of clinical shifts. For the EPs who had administrative,

research, and/or teaching responsibilities in addition to clinical work, increases in shift length may have served as an additional burden, because their work was not necessarily done when their shift came to an end. These findings assist with understanding why burnout, job satisfaction, and the ability to recover from work did not decrease after the shift intervention.

IX. DISCUSSION

A shift schedule modification designed to reduce the number of shifts per month worked by EPs was implemented in the ED of a large Southeastern healthcare system. The change lengthened 8-hour shifts by one hour, with the goal of allowing EPs to work less days per month to improve EP recovery from work. The present study used a mixed methods design to analyze the impacts of this intervention and sheds light on the benefits and obstacles that arise when conducting research in an organizational setting. Collecting multiple types of data sources allowed for a better understanding of the perceptions surrounding the change itself, as well as understanding the context in which the intervention took place.

Summary of Findings

The findings of this study, with a few exceptions, did not support the study hypotheses. An analysis of the objective shift-related information showed that EPs did work fewer shifts per month following the intervention than prior to the intervention. Shift analysis showed that EPs worked 1.5 fewer shifts on average per month after the intervention. EPs also worked 9-hour shifts more frequently than 8-hour shifts after the shift change. In this sense, the intervention was successful from an objective standpoint. EPs worked fewer shifts per month in the three months after the intervention compared to the three months leading up to the intervention.

When examining the different justice-related and outcome variables, analyses revealed that Procedural Shift Schedule Justice was the only variable that was significantly higher after the intervention than before the intervention. This finding suggests that EPs may have felt that the reasoning and decision making around why the intervention was implemented was fair. This finding was also supported in the interview themes, which will be discussed more in the following paragraphs. The other three dimensions of Shift Schedule Justice (distributive,

informational, and interpersonal) did not change significantly after the intervention. This may be due to several factors. For example, when conducting the interviews, how the schedule was made became clearer.

Informational shift schedule justice did not increase significantly. A possible reason for this is that the reality of the shift changed differed from initial information given to EPs. Leading up to the shift intervention, EPs were told several times, through several different modes of communication, that their shifts would be lengthening by one hour starting January 2023. However, a common theme among the interviews was that although EPs knew the change was taking place, they experienced more than just the shift lengthening. As the interview transcript coding revealed, some EPs perceived the benefits of the shift change to be offset by increased workloads per shift, due to understaffing and removing shifts from the schedule.

Distributive shift schedule justice did not significantly increase after the shift change intervention. This finding could be attributed to similar reasons discussed regarding Interpersonal Shift Schedule Justice. Distributive shift schedule justice refers to the perceptions of fairness EPs have regarding how shifts are distributed to employees. As previously discussed, while shift preferences are asked of everyone several times a year, it is widely understood that all shift preferences will be addressed, particularly due to the number of hours the ED needs to be staffed, and the understaffed nature of the department at this time. Given these overarching procedures, the lengthening of the shift by one hour may not have been sufficient to change overall perceptions of distributive justice regarding the shift schedules.

Burnout, emotional exhaustion, and job satisfaction also did not significantly differ between Time 1 and Time 2. Several interview transcript themes could account for these findings. It was discovered that not all shifts changed from 8 to 9 hours, which may have meant

some physicians did not experience the increase in days off. Additionally, the understaffed nature of the ED, in addition to the decrease in EPs on shift, could account for increases in stress and fatigue levels from higher patient loads. Furthermore, there were many comments regarding the new ED zones that were implemented in tandem with the shift change. These comments alluded to the blue zone being particularly difficult to work in, due to the large distance this zone covers, the types of patients seen in this zone, decreases in EP coverage, and disconnectedness from patients and nurses.

Ability to recover from work and overall justice also did not differ significantly between time points. Although the intervention gave EPs an average of 1.5 more days off per month, this was not enough to change their perceptions of recovery. As discussed, the higher workloads experienced by EPs per shift may have offset their perceived ability to recover. Also, 10 EPs who were interviewed also had duties outside of clinical shifts. EPs with administrative protected time, research, or teaching responsibilities, as well as clinical duties, routinely reported that they completed work at both the hospital and at home. This at home work could impact whether the 1.5 more days on average was spent in recovery activities, or if it was spent completing work.

Correlational analyses showed that all variables were significantly positively related to each other at Time 1 and Time 2. Ability to recover was significantly negatively related to burnout at Time 1 and Time 2. Overall justice was significantly positively related to all SSJ variables at Time 1 and Time 2. Job satisfaction was significantly negatively associated with burnout at both time points. Procedural SSJ was significantly negatively related to burnout at Time 1 and Time 2. Job satisfaction was significantly positively related to all SSJ dimensions across both time points; however, these relationships were stronger at Time 2. Distributive SSJ was more strongly negatively related to burnout than emotional exhaustion at Time 1 and Time 2. Job

satisfaction was not significantly related to Distributive Shift Schedule Justice at either time point. emotional exhaustion at Time 1 was not significantly related to interpersonal shift schedule justice at Time 1, but these variables were significantly negatively related at Time 2. Prior research has found similar relationships between these variables, particularly negative relationships between justice and recovery in relation to burnout, and positive relationships between organizational justice and job satisfaction (Al-Zu'bi, 2010; Lambert et al., 2010; Poulsen et al., 2015).

Theoretical Implications

This study used the Work Schedule Justice Dimension scale (Sinclair et al., 2009) to assess the four types of shift schedule justice that were hypothesized to be the proximal outcomes of the shift schedule intervention. This scale has been previously used on two healthcare populations (nurses and long-term care employees). Despite the small sample size, Procedural Shift Schedule Justice was significantly higher post intervention when compared to pre-intervention scores. The other three dimensions (distributive, informational and interpersonal) did not significantly differ between time points. However, scores on the four shift-schedule justice measure were correlated in expected ways with overall justice and the study outcome variables.

Folger and Bias (1989) noted the importance of procedural justice in occupational environments, and discussed ways in which organizations can increase these perceptions among employees. One of the most important ways in which they proposed this was through voice, particularly that managers should make an effort to ask for and understand their employees' points of view on topics that impacted them. One of the reasons for increased procedural shift schedule justice after the shift change may be due to the EPs recommendation that shifts lengthen so they can have more time off, and ED leadership acting on this recommendation.

Additionally, Thibault and Walker's (1975) groundbreaking research on dispute resolutions highlights the importance of Procedural justice that can be applied to this study. Thibault and Walker (1975) discussed the importance of plaintiffs having autonomy to choose their defense representation. In this instance, the question that was posed to EPs in the pilot data asked about ways in which they thought leadership could reduce their fatigue, thus giving them the opportunity to share their opinions on how their fatigue could be mitigated. This tactic allowed for EPs to have influence over leadership's decision to lengthen shifts.

Identifying contextual factors outside of organizational interventions is important when understanding how best to implement interventions, as well as understanding the outcomes of the intervention (Nielsen & Miraglia, 2016; Nielsen & Randall, 2013). Neilson and Randall (2013) note the important difference between ‘theory failure’ and ‘implementation failure’ when analyzing organizational intervention outcomes. For example, while the theory behind an intervention may be plausible in a research or controlled setting, the context in which the intervention occurred was not accounted for in said theory and may have resulted in unexpected outcomes. Following this analysis, Neilson, and Randalle (2013) suggest that intervention outcomes can be understood through three avenues, 1) the intervention design and implementation, 2) the intervention context, and 3) participant perceptions of the intervention and their current attitude toward their work. When assessing the intervention design and implementation, Neilson and Randall (2013) suggest assessing who was responsible for initiating the intervention, and for what purpose. In this intervention, the initiation was from the EPs, but it was also a response from the ED in order to manage the turnover the department was facing.

In the second avenue, context, Nielson and Randall (2013) suggest identifying how different types of context shaped the intervention (omnibus or discrete). The former pertains to who is

participating in or being impacted by the intervention, and who is the main stakeholder in the intervention. A main tenant of omnibus context is how the intervention fits into the culture of the organization. In this case, the ED had previously experienced interventions targeting shift lengths, and the EPs provided feedback that stated they would be amenable to changing shift lengths. Discrete context entails zeroing in on factors that were shifted because of the intervention. For example, zones were introduced, and shifts were cut to accommodate this intervention. Lastly, participants' perceptions of the intervention can shape how they are impacted by the intervention. A common theme within the interview transcripts was that although the EPs were in favor of longer shifts, the impacts of the intervention (increased workloads per shift) negated their positive feelings toward it.

As discussed, an important reason behind the implementation of this intervention was to allow EPs more time away from work to allow them more recovery time. Increased time away from work has been linked to recovery, especially when time away from work is not spent on work-related activities (Strauss-Blasche et al., 2000; Totterdell et al., 1995). However, heightened stress experienced from work may serve to diminish the positive outcomes that can be created from increased recovery. Several popular interview themes centered around EPs stating that they experienced both increased time away from work, and increased workloads on their shifts. As seen in the survey analyses, there was not a significant change in recovery from Time 1 to Time 2. Additionally, the lack of a significant increase in recovery from work may explain why there were not significant decreases found in burnout, emotional exhaustion, or job satisfaction.

Although all hypotheses but one were not supported, understanding the contextual factors surrounding the intervention was immensely helpful in understanding these outcomes. For

example, if only the objective shift data was collected, the outcomes of the survey analyses would be confusing, since the shift data showed that there were in fact significant reductions in overall shifts worked, and 8 and 9-hour shifts worked in the three months after the intervention occurred. Understanding that while the shift change was happening, the ED was understaffed, and had to make changes to lengthen shifts (removing shifts from the schedule and removing EP coverage on shifts) was an important contextual factor surrounding the intervention. As such, the nuances around organizational interventions, and the reasons why they are being implemented are important to examine. For example, it is possible that this intervention would have resulted in more favorable outcomes (in the support of the study hypotheses) if the ED was not understaffed at the time of the implementation, which may have resulted in EPs experiencing less overtime, and more time away from work. However, one of the reasons the shifts were lengthened was because of the understaffing in the ED, so there would be fewer shifts overall.

Strengths

This study had several notable strengths. This study collected three types of data sources, all with unique benefits. The collection of the shifts worked from the EPs who completed the surveys allowed for objective information on the shifts worked before and after the intervention. This allowed for increased understanding regarding the types of shifts EPs were working and the number of shifts EPs worked for three months leading up to and proceeding the intervention. Using this objective, archival data allowed for insights into the impact of the intervention, and the understanding that while the intervention was meant to impact everyone, this was not the case. Although most EPs worked 8 or 9-hour shifts, there were different shift types outside of these two lengths. The finding that the shift change was not ubiquitous was telling of the reality of organizational interventions.

The survey data collected were quantitative in nature but assessed EP perceptions of justice surrounding the shift change, as well as the extent to which these perceptions of justice were related to the outcomes of burnout and job satisfaction. The longitudinal design of the study also allowed for the examination of changes in the justice-related variables and other outcomes as a result of the intervention. The third type of data was qualitative and included transcripts from semi-structured interviews with EPs. These transcripts were vitally important to analyze how contextual factors outside of the shift intervention played a role in the outcomes seen in the survey data. Although perceptions of the shift change itself were the main areas of interest when coding the transcripts, opinions of shift preferences in general, and unanticipated outcomes of the shift change were also included to highlight that the intervention did not exist independently from other factors.

Another benefit of this study was that the recommended shift change intervention was based on previous surveys of the EPs regarding their preferences for reducing fatigue. As a response to concerning levels of fatigue and burnout, a Fatigue Risk Management Team who had a history of conducting research with the ED department sent out an open-ended question to all EPs asking them for creative recommendations to reduce fatigue. The summary of the recommendations was presented to leadership, one of which was to lengthen shifts. As discussed, the aim of reducing fatigue was not the only reason the shift intervention was implemented, but it was a contributing factor. Fox and colleagues (2022) discussed the outcomes of different types of organizational interventions based on whether they are employee or employer driven. Regarding shift schedule interventions, *employee* driven shift interventions (labeled as flex work and self-scheduling) tend to produce better well-being outcomes compared to *employer* driven shift changes. Common employer driven shift changes are compressing shifts and lengthening shifts, which were not

found to be as beneficial as employee driven methods (Fox et al., 2022). Although the current intervention would be defined as employer driven by Fox et al., (2022), it was informed by employees suggesting that shifts should be lengthened. In the case of emergency medicine, employee driven shift changes are often not possible. That is, EPs cannot work from home (for clinical shifts), and self-scheduling is not possible based on the nature of ED scheduling and the demands that scheduling entails. When considering this, it is possible that the employer driven shift change that was influenced by employee feedback contributed to the increased sense of Procedural Shift Schedule Justice in the EPs post shift change.

Limitations

This study had several limitations. Although it was initially communicated that *all* EP shifts would transition from 8-hours to 9-hours, analyses of the shifts prior to and after the intervention took place showed that this was not the case. In an analysis of shifts three months prior to the intervention, most EPs did work 8-hour shifts. However, there were many shifts longer and shorter than 8-hours that were also worked, as well as fractions of shifts (e.g. 8.5-hour shifts). Whether the shift was broken up between multiple EPs, or whether the EP came into the hospital last minute to assist with understaffing, is hard to discern for these shift times shorter than 8 hours. In addition, certain areas (i.e. the Pediatric Emergency Department) tended to schedule shifts in 10-hour increments, although this was not always the case. Data from three months after the intervention was implemented showed a similar pattern. Many EP shifts were 9-hours in length, however, there were shifts that were longer or shorter than that, as well as shifts that were in fractions (e.g. 8.5 hours in length). Although there were shifts worked outside of the proposed 9-hour shift initiative, EPs did work more 9-hour shifts than 8-hour shifts after the intervention. Interestingly, as was seen in the interview themes, shift length may not be as

important as shift workload. An analysis of the interview themes revealed that although the new shift length was favorably viewed by most EPs, their increased workload per shift often negated the potential benefits.

One component of occupational interventions is that they are directed at all employees and are not tailored based on individual need or employment situation (Cox et al., 2010). In this case, the intervention was mostly aimed at EPs working full time, because full time EPs would theoretically benefit the most by receiving an additional two days off per month. Survey results showed that 73.8% of Survey 1 respondents were contracted as full time, and 76.1% of Survey 2 respondents were full time. In this sense, employees not contracted as full-time were not expected to experience as large as a benefit from the shift change. Furthermore, the goal of the intervention was to increase shifts, but have the total hours worked stay the same. The analyses of the shift data showed that EPs worked significantly fewer hours per month after the intervention, introducing a potential confound.

Another study limitation was the relatively small sample size. Although the overall sample was large enough to examine the differences between the primary outcomes before and after the intervention, the overall matched sample was relatively small, reducing the power to detect differences as a function of the intervention. Although the repeated-measures design employed mitigated this concern for investigating changes in the outcomes among the overall sample, the smaller sample size prevented the ability to explore the benefits of the change for subgroups of participants. A second limitation was the short period of time that elapsed between the implementation of the intervention and the collection of data. Due to the lack of significance found between time and the outcome measures of interest, it is possible that the time period was not long enough to capture any significant changes in EPs burnout, job satisfaction, ability to

recover between shifts, or certain shift schedule justice perceptions. Additionally, this study did not examine variations in patient volumes that may have co-occurred with the shift lengthening intervention. For example, certain times of the year (such as flu season) tend to increase ED patient numbers. These data may have provided more insight into the EPs workload on shifts and EP outcomes.

Finally, the context in which the shift schedule was made entailed multiple uncontrollable factors. For example, lengthening shifts resulted in one or more shifts being removed from the schedule entirely, which was a topic of discussion in some of the interviews. Additionally, although the shift data showed that the majority of physicians experienced more 9-hour shifts than 8-hour shifts after the shift change, this is only representative of 73 EPs, which is less than half of the population of interest.

Directions for Future Research

Prior to this study, Shift Schedule Justice had only been examined in a sample of nurses and a sample of long-term care employees (Sinclair et al., 2009). The results of the present study showed that the four dimensions of schedule justice were related in hypothesized ways with different outcome variables and that the Procedural Shift Schedule Justice subscale was sensitive to the effects of an organizational intervention. Although the other justice dimensions did not differ as a function of the intervention, future studies may benefit from studying shift schedule justice over longer periods, and under less confounding circumstances. For example, if the shift schedule was the only variable that changed, perhaps changes in perceptions of justice would have been more pronounced.

In addition to the outcome variables assessed in the present study (burnout, job satisfaction, overall justice, emotional exhaustion, and the ability to recover), future research

may address the four shift schedule dimensions and the impact they can have on other occupational outcomes of interest, including productivity, turnover, organizational citizenship behaviors, and organizational commitment.

A common theme from the interviews was a sense that the shift length benefits were offset by an increase in workload. Future research is needed to understand the nuances of how shift length and workload interact and how decreases in shift workload can offset negative outcomes of increased shift length. Better understanding these tradeoffs may be viewed through the Job-Demand-Resources framework, which states that negative job demands can be reduced through job resources (Demerouti et al., 2001). For example, future research is needed to understand whether strain caused by shift length can be reduced or offset by decreases in workload/increases or in rest time and/or recovery time between shifts.

The shift intervention this study analyzed was implemented due to recognition that EPs were experiencing heightened amounts of stress through their work, and the desire to change reduce this stress and therefore burnout. Although reducing EP fatigue was not the only reason the shift elongation intervention was implemented, it still appeared to increase procedural fairness perceptions among EPs, through increased time away from work. As is the case in many occupational interventions, the shift change was not the only change that the EPs experienced at the time of implementation. Contextual factors outside of the shift change, such as zoning changes in the largest ED in the hospital system, and the understaffed nature of the ED at the time of the shift change, impacted ED perceptions and experiences. Without the semi-structured interview component of this study, understanding the occurrence and the outcomes of these confounding variables would not have been possible. Although the opinions of the shift change varied among EPs, shift data analyses and interview outcomes showed positive improvements in

EPs increased time away from work, and general appreciation for the shift change. Although this study only captured EP perceptions of a single shift change, the outcomes of the study allow for a greater understanding of EP shift opinions, and how organizational factors can influence EP experiences.

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Appendix A: Survey Measures and Interview Questions

A). Shift Schedule Justice

Please indicate to what extent you agree or disagree with each of the following statements about the scheduling of shifts for your primary job.

1 = Strongly Disagree, 2 = Disagree, 3 = Slightly Disagree, 4 = Neutral, 5 = Slightly Agree, 6 = Agree, 7 = Strongly Agree

Distributive Shift Schedule Justice

1. My shift schedule is fair compared to what I feel I deserve.
2. My shift schedule is fair compared to people in other departments of my organization.
3. My shift schedule is fair compared to people in similar jobs in other organizations.
4. Compared to my coworkers, my shift schedule is fair.

Shift Schedule Control/Procedural Justice

1. My needs are considered when setting my shift schedule.
2. I can influence how my shift schedule is determined.
3. If I had a problem with my schedule, my organization would help me address it.

Informational Shift Schedule Justice

1. I receive reasonable explanations for any changes to my shift schedule.
2. I receive clear communications about the procedures for setting my shift schedule.

Interpersonal Shift Schedule Justice

1. When I request changes to my schedule, I am treated well by my department leadership.
2. Department leadership is responsive to my scheduling concerns.
3. Department leadership is respectful regarding my scheduling requests.

Sinclair, R. R., Sears, L. E., Hahn, D., & Charles, K. E. (November 2009). Development and validation of a measure of work schedule justice. Paper presented at Work Stress and Health 2009: Global Concerns and Approaches. San Juan, Puerto Rico.

B). Emotional Exhaustion (Burnout)

Instructions: This page contains 9 statements of job-related feelings. Please read each statement carefully and decide if you ever feel this way about your job. If you have never had this feeling, select the Never option. If you have had this feeling, indicate how often you feel it by selecting the option that best describes how frequently you feel that way.

Never (0), A few times a year or less (1), Once a month or less (2), A few times a month (3) Once a week (4), A few times a week (5), Every day (6)

1. I feel emotionally drained from my work
2. I feel used up at the end of the workday
3. I feel fatigued when I get up in the morning and have to face another day on the job
4. Working with people all day is really a strain for me

5. I feel burned out from my work
6. I feel frustrated by my job
7. I feel I'm working too hard on my job
8. Working with people directly puts too much stress on me
9. I feel like I'm at the end of my rope

Maslach, C., & Jackson, S. E. (1981). The measurement of experienced burnout. Journal of organizational behavior, 2(2), 99-113.

C). Burnout (single item)

Using your own definition of "burnout", please circle one of the answers below:

- I enjoy my work. I have no symptoms of burnout.
- I am under stress, and don't always have as much energy as I did, but I don't feel burned out.
- I am definitely burning out and have one or more symptoms of burnout, e.g. emotional. exhaustion.
- The symptoms of burnout that I'm experiencing won't go away. I think about work frustrations a lot.
- I feel completely burned out. I am at the point where I may need to seek help.

Rohland et al. Validation of a single-item measure of burnout against the Maslach Burnout Inventory among physicians. Stress & Health. 2004 Apr;20(2):75-79.

D). Job Satisfaction

How do you feel about your job?

1 = disagree very much, 2 = disagree moderately, 3 = disagree slightly, 4 = agree slightly, 5 = agree moderately, 6 = agree very much

1. In general, I don't like my job.
2. All in all, I am satisfied with my job.

Bowling, Nathan & Hammond, Gregory. (2008). A meta-analytic examination of the construct validity of the Michigan Organizational Assessment Questionnaire Job Satisfaction Subscale. Journal of Vocational Behavior. 73. 63-77. 10.1016/j.jvb.2008.01.004.

E). Overall Justice Scale

Indicate your level of agreement or disagreement with the following statements.

Scoring on a 7-point scale ranging from 1(strongly disagree) to 7 (strongly agree).

1. For the most part, this department treats its employees fairly.

Ambrose, M.L., & Schminke, M. (2009). The role of overall justice in organizational justice research: A test of mediation. Journal of Applied Psychology, 94, 491-500.

F). Ability to Recover from Work

Please indicate to what extent you disagree or agree with each of the following statements.

1 = Strongly Disagree, 2 = Disagree, 3 = Slightly Disagree, 4 = Neutral, 5 = Slightly Agree, 6 = Agree, 7 = Strongly Agree

1. I have sufficient time between shifts before starting my next shift.
2. I am able to rest sufficiently between shifts.
3. I am able to recover adequately from one shift before starting my next shift.

G). Interview Questions

We acknowledge that your responses to the survey questions can only give us so much information. To further understand your feelings and opinions surrounding the shift change (in addition to other important changes and contextual factors), we would like to interview you to include a qualitative data component as well. These interviews would be virtual or in person depending on preference and should last no longer than 20 minutes. A sample question from this interview is "Have you worked in other places that have implemented longer or shorter shifts than you currently work now? If so, what differences have you observed in respect to your fatigue, workload, and/or burnout levels?". If you are willing to participate in a short interview, please input your email address below.
(Fill in the blank)

1. What is your opinion regarding the recent shift schedule modifications that have occurred (increasing shifts by 1 hour)?
2. Did this schedule modification allow you to have more time away from work? Why or why not?
3. Thinking back to before this schedule modification took place, and comparing your experience to now after it has been implemented, have you observed any changes to your work stress?
4. Have you worked in other places that have implemented longer or shorter shifts than you currently work now? If so, what differences have you observed in respect to your fatigue, workload, and/or burnout levels?
5. Is there anything else you would like to say regarding this recent schedule change and how it has impacted you and/or your colleagues?

Appendix B: Interview Transcript Themes and Codes

EP Interview Codebook
Perceptions of the January 2023 Shift Change

I. Positive Perceptions of the Shift Change

- Code as "P1, P2", etc.

1. Allows for more time away from work (more days off)
    a. Working longer shift lengths allows for more days off per month.
    b. Resulted in increased recovery time from work.
2. Patients benefit from the new shift change
    a. EPs have more time away from work, which increases alertness and translates to better patient care.
3. Staff flexibility
    a. EPs are understanding of the shift change and are remaining flexible with their schedules/working overtime to meet new schedule demands.
4. Prefer new length of shift
    a. Appreciation expressed in terms of the shift change from 8-hour to 9-hour shift length.
5. Zoning allows for EP flexibility around seeing patients in ED.
    a. The geography of the zones allows for EPs to see patients as they come in, and EPs are not restricted to only seeing patients in certain areas. This allows for greater helpfulness between EPs and distributing patient loads.
6. General appreciation for the shift change, although the EP does not appreciate it/benefit from it personally.
    a. EP noted that although they might not prefer the shift lengthening due to other duties diminishing their ability to have more time away from work, they do acknowledge that for the majority of EPs, the change was beneficial.

II. Negative Perceptions of the Shift Change

- Code as "N1", etc.

1. Decreased Patient Quality of Care
    a. Patient care is negatively affected by the shift change, due to the increased workload experienced by the EPs. Patients are not seen as quickly by physicians due to loss of EP coverage per shift, and physicians are fatigued due to increase in workloads.
2. Too much time in the hospital/not enough time away
    a. Increased shift hours paired with increases in the amount of overtime scheduled has led to no change, or an increased amount of time in the hospital. Those with administrative duties may also experience this.
3. Greater workload per shift resulted in increased stress
    a. Working longer hours plus more hectic schedules due to loss of physician coverage led to increased workloads and stress.
4. Prefers 8-hour shifts to 9-hour shifts.

a. Would rather work more shifts/be in the hospital more than work longer shifts and be in the hospital less.

III. Unanticipated Negative Consequences of the Shift Change

- Code as "U1", etc.
- (sub theme of Negative Perceptions of the Shift Change)

ED Zones: A change that occurred at a primary ED location in tandem with the shift change.

1. EPs are farther from nurses
    a. The blue and red zone were created out of pods. EPs state that the zones encompass a much bigger area, and that getting in contact with nurses in such a large area is more difficult than it was prior to the zones.

2. EPs are farther from patients
    a. EPs state that seeing patients/checking up on patients is more difficult due to the larger area that they oversee.
3. Zones are detrimental to learning (Resident education)
    a. Residents work in blue and red zones, and EPs discuss how this has been detrimental to Resident education, because of decreases in learning opportunities, (higher workload decreases teaching time).
4. Zones are not equal in terms of workload
    a. Red zone has the sickest patients, blue zone has the most 'annoying' patients (more behavioral health/substance use disorders- more difficulty of EM, less of the fun).
    b. Blue Zone is a larger area.
    c. No downtime in blue zone.
    d. Nonfunctional work space.
    e. Unequal physician coverage in zones (Red zone has more coverage than blue zone)
    f. Geography of zones is detrimental to communication and patient care.

General

- Code as G1

1. Fewer EPs on shifts
    a. Elongating shifts and staffing shortages resulted in less EPs on each shift, which increased the workload of each shift.
2. Removal of shifts from schedule
    a. In order to lengthen the shifts, shifts had to be removed from each location. This disrupted certain EPs schedules who were more accustomed to those shifts that were removed.

IV. Neutral/Ambivalent Perceptions of the Shift Change

- Code as A1

1. Did not experience a difference in stress levels post shift change
    a. Although the shift change was designed to provide EPs with more time off this did not translate into a reduction in stress. May be due to the increased workload per shift, and/or the overtime that added on to normally schedule shifts.

2. Did not experience a difference in hours post shift change
    a. Frequently experiencing overtime, staying late to finish up charting, and/or having administrative duties resulted in no perceived change in hours after the change was implemented.
3. Shift change was not ubiquitous
    a. Although it was presented that all shifts would change from 8 to 9 hours, this was not the case. Shift data showed not all shifts changed, and that this was dependent based on type or shift worked, location of shift, and department.
4. Did not experience much overtime
    a. Was not scheduled a (perceived) large amount of overtime after the change was implemented.

5. Shift change was viewed positively, but the change was counteracted by the shifts being more stressful overall
    a. Positive change was negated by the increase in stress and workload that accompanied the shifts.

V. Overall Shift Opinions

- Code as O1
    a. The codes under this theme were separate from the shift change itself.

1. Dislike 12-hour shifts
    b. Too fatiguing, it is difficult to do the job well when the shift is this long. Especially in this system where there is no ability to rest on a 12-hour shift due to high patient loads.
2. Prefers longer shifts
    a. Longer shifts in general allow for more time away from work.
    b. Prefer 9-hour shifts over 8-hour shifts
    c. Prefer 10-hour shifts
3. Prefers shift overlap
    a. Shifts that overlap allow for EPs coming on and coming off shift to offset some of their workload- EPs coming on shift are not as immediately inundated with patients and can be brough up to speed- EPs coming off shift have time for updated and charting.
4. Understaffed overall
    a. EPs state that the EDs are understaffed overall. (A new wave of new hires was brough on in the summer, after interviews took place).
5. Works more hours than shift length
    a. Although shifts changed from 8 to 9 hours, EPs find that they regularly work more hours than their shift length, due to commuting times, and staying late to finish charting, or finishing charting when they are away from work.
6. Work life balance disruption
    a. EPs stated that keeping a work-life balance was difficult due to the randomness of shifts being assigned, and the mandatory overtime that was being scheduled.
    b. Work life balance disruption due to other duties responsibilities (charting/administrative duties that are done at home, on weekends, etc.)
7. Regularly experiencing overtime

   a. Understaffing in the ED has led to overscheduling EPs more than their regular hours, and EPs experiencing mandatory overtime.
8. Prefers shorter shifts.
   a. Preference is to work shorter shifts and come into hospital more.
9. Prefer later shift start time
   a. Prefers to work shift night shifts that start later than earlier.

Table 1: Averages and Counts for the Number of 8 and 9-Hour Shifts, Total Shifts Worked and Total Hours Worked Per Month

Months	**Average Number of 8-Hour Shifts**	**Average Number of 9-Hour Shifts**	**Average Shifts Per Month**	**Average of Total Hours Worked**
October	10.4	5	13.7	111.5
November	9.8	4.3	13.1	108.2
December	10.6	4.6	13.3	113.5
January	2.4	8.1	12.1	110.5
February	3	7.8	11.4	101.2
March	2.7	8.1	12.2	110.6

Table 2: Linear Mixed Model Results for Shift Schedule Justice Dimensions

Variables	*F*	*df*	*p*
Procedural Shift Schedule Justice	4.99	1, 36.932	0.031*
Intercept of the Model	3.321	1, 68.324	0.077
Age	0.305	1, 68.896	0.583
FTE	2.161	1, 67.620	0.146
Gender	0.123	1, 67.601	0.726
Race	0.602	4, 69.339	0.662
Distributive Shift Schedule Justice	0.12	1, 36.954	0.731
Intercept of the Model	6.007	1, 67.776	0.017
Age	0.443	1, 68.620	0.508
FTE	1.087	1, 66.809	0.301
Gender	0.169	1, 66.751	0.682
Race	1.552	4, 69.503	0.197
Informational Shift Schedule Justice	2.343	1, 36.701	0.134
Intercept of the Model	5.009	1, 65.990	0.029
Age	0.00	1, 66.911	0.991
FTE	0.407	1, 64.864	0.526
Gender	0.678	1, 64.976	0.413
Race	0.779	4, 67.648	0.543

Interpersonal Shift Schedule Justice	0.053	1, 40.761	0.819
Intercept of the Model	4.027	1, 66.412	0.049
Age	0.396	1, 67.869	0.531
FTE	2.598	1, 64.572	0.112
Gender	0.012	1, 64.735	0.913
Race	0.624	4, 69.054	0.647

Table 3: Linear Mixed Model Results for Ability to Recover and Overall Justice

Variables	*F*	*df*	*p*
Ability to Recover	0.013	1, 33.704	0.911
Intercept of the Model	13.82	1, 66.721	0.001
Age	0.289	1, 67.175	0.593
FTE	0.02	1, 66.100	0.888
Gender	0.009	1, 66.017	0.926
Race	0.698	4, 67.061	0.596
Overall Justice	0.038	1, 32.749	0.846
Intercept of the Model	2.814	1, 65.372	0.098
Age	0.046	1, 65.954	0.831
FTE	3.29	1, 64.575	0.74
Gender	2.712	1, 64.467	0.104
Race	0.474	4, 65.811	0.755

Table 4: Linear Mixed Model Results for Emotional Exhaustion, Burnout, and Job Satisfaction

Variables	*F*	*df*	*p*
Emotional Exhaustion	0.251	1, 33.047	0.62
Intercept of the Model	3.751	1, 64.733	0.057
Age	0.42	1, 65.207	0.519
FTE	0.03	1, 64.184	0.864
Gender	0.003	1, 64.147	0.995
Race	1.228	4, 65.616	0.308
Burnout	0.015	1, 32.926	0.903
Intercept of the Model	10.834	1, 64.720	0.002
Age	0.042	1, 65.128	0.839
FTE	0.437	1, 64.271	0.511
Gender	0.257	1, 64.274	0.614
Race	0.454	4, 65.432	0.769
Job Satisfaction	1.532	1, 56.529	0.221
Intercept of the Model	79.77	1, 71.844	0.001
Age	1.413	1, 75.280	0.238
FTE	0.011	1, 65.936	0.915
Gender	0.314	1, 65.017	0.577
Race	1.476	4, 73.577	0.218

*Reported at 95% Confidence Interval

Table 5: Means and Standard Deviations for all Survey Variables from the Linear Mixed Models

Variables	*M* (Time 1)	*M* (Time 2)	*SE* (Time 1)	*SE* (Time 2)
Procedural Shift Schedule Justice	4.93	5.25	0.517	0.507
Distributive Shift Schedule Justice	5.06	5.11	0.458	0.448
Informational Shift Schedule Justice	4.54	4.83	0.559	0.544
Interpersonal Shift Schedule Justice	5.21	5.26	0.499	0.479
Emotional Exhaustion	3.31	3.37	0.436	0.428
Burnout	2.36	2.37	0.269	0.266
Job Satisfaction	3.20	3.29	0.136	0.126
Overall Justice	5.28	5.25	0.586	0.577
Ability to Recover	5.43	5.41	0.504	0.498

TABLES

Table 6: Correlations Between all Time 1 and Time 2 Survey Variables

	M	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. ProcJ_1	4.4	1.7	1																
2. DistJ_1	4.6	1.5	.83**																
3. InfJ_1	4.1	1.5	.69**	.56**															
4. IntJ_1	5.0	1.4	.70**	.73**	.69**														
5. EE_1	3.9	1.2	-.47**	-.42**	-.38*	-.23													
6. B1_1	2.5	0.6	-.46**	-.44**	-.36*	-.28	.56**												
7. JS_1	4.3	0.7	.43**	.40*	.40*	.39*	-.67**	-.68**											
8. OJ_1	5.1	1.7	.70**	.66**	.56**	.71**	-.54**	-.31	.42**										
9. ATR_1	4.7	1.7	.74**	.65**	.37*	.40*	-.49**	-.51**	.55**	.51**									
10. ProcJ_2	4.8	1.5	.88**	.68**	.70**	.58**	-.52**	-.35	.40*	.73**	.65**								
11. DistJ_2	4.9	1.3	.83**	.82**	.55**	.64**	-0.35	-.45*	0.34	.59**	.71**	.73**							
12. InfJ_2	4.3	1.7	.60**	.54**	.73**	.54**	-.44*	-.35	.51**	.37*	.39*	.72**	.63**						
13. IntJ_2	4.9	1.5	.73**	.61**	.69**	.63**	-.45**	-.42*	.53**	.63**	.64**	.84**	.66**	.75**					
14. EE_2	4.0	1.4	-.44*	-.56**	-.26	-.21	.84**	.53**	-.53**	-.36*	-.42*	-.32**	-.31*	-.30*	-.33**				
15. B1_2	2.5	0.8	-.53**	-.49**	-.45*	-.35	.63**	.87**	-.72**	-.32	-.57**	-.37**	-.44**	-.44**	-.42**	.68**			
16. JS_2	4.2	0.7	.59**	.54**	.45*	.43*	-.55**	-.59**	.74**	.48**	.62**	.43**	.43**	.43**	.35**	-.56**	-.61**		
17. OJ_2	4.7	1.8	.68**	.71**	.48**	.71**	-.55**	-.38*	.42*	.86**	.37*	.64**	.59**	.53**	.68**	-.47**	-.41**	.46**	
18. ATR_2	4.8	1.5	.75**	.65**	.44*	.45*	-.53**	-.60**	.58**	.50**	.93**	.51**	.61**	.43**	.42**	-.51**	-.51**	.50**	.33**

*Correlation is significant at the 0.01 level (2-tailed).

**Correlation is significant at the 0.05 level (2-tailed).
Key: ProcJ_1: Procedural Shift Schedule Justice Time 1; DistJ2_1: Distributive Shift Schedule Justice, Time 1; InfJ_1: Informational Shift Schedule Justice, Time 1; EE_1: Emotional Exhaustion, Time 1; B1_1: Burnout, Time 1; JS_1: Job Satisfaction, Time 1; OJ_1: Overall Justice, Time ; ATR_1: Ability to Recover, Time 1

Table 7: Correlations of Change Scores for the Matched Sample

Change	1	2	3	4	5	6	7
1. Distributive Justice	1						
2. Procedural Justice	.27	1					
3. Informational Justice	.09	.09	1				
4. Interpersonal Justice	.31	.42*	.29	1			
5. Ability to Recover	.09	.00	.04	-.19	1		
6. Emotional Exhaustion	.36*	.12	-.14	-.19	-.12	1	
7. Burnout	.00	.26	-.02	-.16	-.25	.67**	1
8. Job Satisfaction	-.08	-.17	-.04	-.05	.20	-.10	-.11

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 8: Positive Perceptions of the shift change

Positive Perceptions of the Shift Change		
Codes	Definitions	Counts (Out of 17)
Prefers new length of shift	Appreciation expressed in terms of the shift change from 8-hour to 9-hour shift length.	10
Allows for more time away from work (more days off)	a. Working longer shifts allows for more days off per month.	9
	b. Resulted in increased recovery time from work.	1
Zoning allows for EP flexibility around seeing patients in ED	The geography of the zones allows for EPs to see patients as they come in, and EPs are not restricted to only seeing patients in certain areas. This allows for greater helpfulness between EPs and distributing patient loads.	4
General appreciation for the shift change, although the EP does not appreciate it/benefit from it personally	EP noted that although they might not prefer the shift lengthening due to other duties diminishing their ability to have more time away from work, they do acknowledge that for the majority of EPs, the change was beneficial.	3
Staff flexibility	EPs are understanding of the shift change and are remaining flexible with their schedules/working overtime to meet new schedule demands.	2
Patients benefit from the new shift change	EPs have more time away from work, which increases alertness and translates to better patient care.	1

Table 9: Negative Perceptions of the Shift Change

Negative Perceptions of the Shift Change		
Codes	Definitions	Counts (Out of 17)
Greater workload per shift resulting in increased stress	Working longer hours plus more hectic schedules due to loss of physician coverage led to increased workloads and stress.	11
Too much time in the hospital/not enough time away	Increased shift hours paired with increases in the amount of overtime scheduled has led to no change, or an increased amount of time in the hospital. Those with administrative duties may also experience this.	7
Prefers 8-hour Shifts to 9-Hour Shifts	Would rather work more shifts/be in the hospital more than work longer shifts and be in the hospital less.	3
Decreased Patient Quality of Care	Patient care is negatively affected by the shift change, due to the increased workload experienced by the EPs. Patients are not seen as quickly by physicians due to loss of EP coverage per shift, and physicians are fatigued due to increase in workloads.	3

Table 10: Unanticipated Negative Consequences of the Shift Change

Unanticipated Negative Consequences of the Shift Change		
ED Zones**:** A change that occurred at a primary ED location in tandem with the shift change.		
Codes	Definitions	Counts (Out of 17)
EPs are farther from nurses	The blue and red zone were created out of pods. EPs state that the zones encompass a much bigger area, and that getting in contact with nurses in such a large area is more difficult than it was prior to the zones.	7
EPs are farther from patients	EPs state that seeing patients/checking up on patients is more difficult due to the larger area that they oversee.	7
Zones are detrimental to learning (Resident education)	Residents work in blue and red zones, and EPs discuss how this has been detrimental to Resident education, because of decreases in learning opportunities, (higher workload decreases teaching time).	5
Zones are not equal in terms of workload	a. Geography of zones is detrimental to communication and patient care.	9
	b. Unequal physician coverage in zones (Red zone has more coverage than blue zone)	7
	c. No downtime in Blue Zone.	7
	d. Blue Zone is a larger area.	5
	e. Red zone has the sickest patients, blue zone has the most 'annoying' patients (more behavioral health/substance use disorders- more difficulty of EM, less of the fun).	4
	f. Nonfunctional workspace	3
General ED Changes**:** These changes were seen across ED locations.		
Fewer EPs on shifts	Elongating shifts and staffing shortages resulted in less EPs on each shift, which increased the workload of each shift.	6
Removal of shifts from schedule	To lengthen the shifts, shifts had to be removed from each location. This disrupted certain EPs schedules who were more accustomed to those shifts that were removed.	6

Table 11: Neutral/Ambivalent Perceptions of the Shift Change

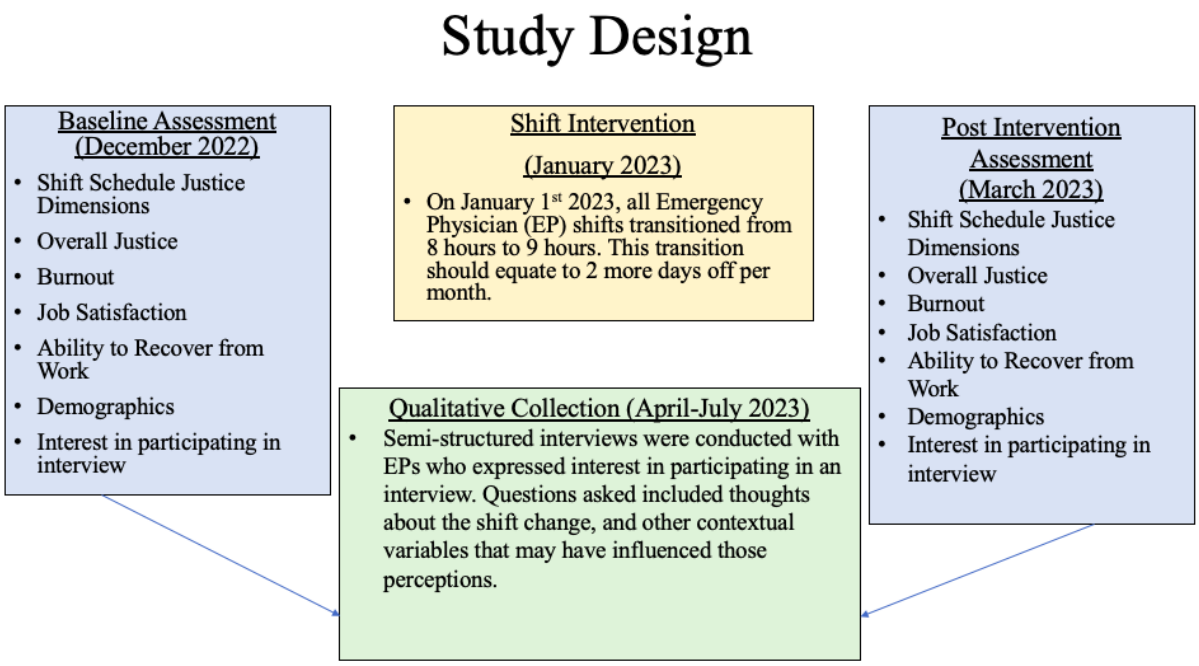
Neutral/ Ambivalent Perceptions of the Shift Change		
Codes	Definitions	Counts (Out of 17)
Shift change was not ubiquitous	Although it was presented that all shifts would change from 8 to 9 hours, this was not the case. Shift data showed not all shifts changed, and that this was dependent based on type or shift worked, location of shift, and department.	8
Did not experience a difference in stress levels post shift change	Although the shift change was designed to provide EPs with more time off this did not translate into a reduction in stress. May be due to the increased workload per shift, and/or the overtime that added on to normally schedule shifts.	7
Shift change was viewed positively, but the change was counteracted by the shifts being more stressful overall	Positive change was negated by the increase in stress and workload that accompanied the shifts.	6
Did not experience a difference in hours post shift change	Frequently experiencing overtime, staying late to finish up charting, and/or having administrative duties resulted in no perceived change in hours after the change was implemented.	3
Did not experience much overtime	Was not scheduled a (perceived) large amount of overtime after the change was implemented.	3

Table 12: Overall Shift Opinions

Overall Shift Opinions		
Codes	Definitions	Counts
Regularly experiences overtime	Understaffing in the ED has led to overscheduling EPs more than their regular hours, and EPs experiencing mandatory overtime.	12
Works more hours than shift length	Although shifts changed from 8 to 9 hours, EPs find that they regularly work more hours than their shift length, due to commuting times, and staying late to finish charting, or finishing charting when they are away from work.	12
Understaffed overall	EPs state that the EDs are understaffed overall. (A new wave of new hires was brough on in the summer, after interviews took place).	11
Dislikes 12-hour shifts	Too fatiguing, it is difficult to do the job well when the shift is this long. Especially in this system where there is no ability to rest on a 12-hour shift due to high patient loads.	10
Prefers longer shifts	a. Longer shifts in general allow for more time away from work.	7
	b. Prefer 9-hour shifts over 8-hour shifts	5
	c. Prefer 10-hour shifts	4
Prefers shift overlap	a. Shifts that overlap allow for EPs coming on and coming off shift to offset some of their workload- EPs coming on shift are not as immediately inundated with patients and can be brough up to speed- EPs coming off shift have time for updated and charting.	7
Prefers shorter shifts	Prefers to work shorter shifts and come into hospital more.	5
Prefers later shift start times	Prefers to work shift night shifts that start later than earlier	3
Work life balance disruption	a. EPs stated that keeping a work-life balance was difficult due to the randomness of shifts being assigned, and the mandatory overtime that was being scheduled.	3
	b. Work life balance disruption due to other duties responsibilities (charting/administrative duties that are done at home, on weekends, etc.)	2

FIGURES

A. Figure 1: Study Design



B. Figure 2: Theoretical Model