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SHARED TEAM EXPERIENCES AND TEAM EFFECTIVENESS: UNPACKING THE CONTINGENT EFFECTS OF ENTRAINED RHYTHMS AND TASK CHARACTERISTICS

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This study explores the conditions under which shared team task-specific (STTS) experiences in crew-based arrangements may negatively influence team effectiveness. We suggest that the entrained rhythms featured in social entrainment theory act as a dual-edged sword with the potential to generate complacency detriments in addition to the commonly cited synchronization benefits. We argue that the manifestation and influence of the countervailing forces (i.e., synchronization and complacency) on the STTS experience—team effectiveness relationship will depend on salient task characteristics (i.e., frequency and difficulty). More specifically, frequently performed tasks create conditions for complacency to manifest (generating an inverted-U shaped relationship between STTS experience—team efficiency), whereas infrequently performed tasks do not (generating a positive, linear relationship). We further this distinction by layering on task difficulty that, we posit, acts to amplify the respective negative and positive consequences. Analyses of archival data from 8,236 surgeries performed over one year at a large hospital located in the southwestern region of the United States were consistent with our hypotheses and 30 semi-structured interviews with operating room personnel added richness and precision to our theory. Ancillary analyses on patient post-surgery recovery rate yielded additional insights. Implications and future directions are discussed.

From surgeons to commercial airplane pilots, members of crew-based teams often request to work with the same people due to the belief that their prior shared experiences will enhance team effectiveness (e.g., Huckman & Staats, 2013). This claim is enticing to organizational scholars and practitioners alike as they are continually striving to pinpoint factors that enhance team effectiveness (Mathieu, Maynard, Rapp, & Gilson, 2008). Despite the intuitive appeal of the idea that shared team experiences enhance team effectiveness, the empirical evidence is more equivocal (Sykes, Gillespie, Chaboyer, & Kang, 2015), yielding positive (e.g., Goodman & Garber, 1988; Humphrey, Morgeson, & Mannor, 2009), negative (e.g., Australian Transport Safety Bureau, 1999; Kim, 1997) and even curvilinear (e.g., Berman, Down, & Hill, 2002; Katz, 1982) relationships. Thus, it appears that shared team experiences are not universally beneficial for teams and our understanding is limited as to when and why the benefits fail to materialize.

Given these inconsistent findings, we seek to advance theory and test hypotheses regarding the contingencies of the shared team experience—team

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effectiveness relationship. We do so by incorporating the notion of complacency and specifying the conditions under which it is most likely to manifest itself and influence team effectiveness. Building on existing research, we acknowledge that shared team experiences are generally posited to generate team- and task-related competencies (Dyer, 1984; Mathieu, Heffner, Goodwin, Salas, & Cannon-Bowers, 2000; Rentsch, Heffner, & Dully, 1994), which enable the development of entrained rhythms and enhance team effectiveness (Harrison, Mohammed, McGrath, Florey, & Vanderstoep, 2003). Social entrainment theory describes how these rhythms develop synchronicities both between members and to the rate of an external pacer (such as a task) to positively influence team functioning (e.g., Harrison et al., 2003; Moon et al., 2004; Standifer & Bluedorn, 2006). However, these theories largely ignore the potential for entrained rhythms to generate complacency thereby limiting our understanding of when shared team experiences may lead to unintended negative consequences. Herein we argue that entrained rhythms can generate the countervailing forces of synchronization and complacency, contingent on contextual factors.

The literature concerning the relationship between shared team experiences and team effectiveness has given scant attention to contextual moderators. Prior research has largely focused on teams with either high (e.g., ongoing/intact teams; Gino, Argote, Miron-Spektor, & Todorova, 2010; Grund, 2016) or low temporal stability structures (e.g., laboratory investigations; Gruenfeld, Mannix, Williams, & Neale, 1996; Harrison et al., 2003; Okhuysen, 2001). In contrast, less is known about the influence of shared experiences in teams with moderate levels of temporal stability—specifically, ones that are only together for short durations but whose members bring prior experiences and expectations of future interactions to the team (i.e., crews; Webber & Klimoski, 2004). This is problematic as crew-based staffing is widespread across a variety of industries such as airline, retail, restaurant, and healthcare.

In this study, we focus on teams that have a crew-style staffing structure (i.e., surgical teams), and examine the contextual contingencies associated with task characteristics. We argue that the manifestations of the countervailing forces (i.e., synchronization and complacency) will depend on two key team conditions: task frequency and task difficulty. Specifically, we posit that, for infrequent tasks, the synchronization benefits will manifest as a positive linear relationship between shared team experiences and team efficiency. Alternatively, for frequent tasks, the complacency detriments will produce a weakening quadratic relationship whereby the generally positive slope tapers off at relatively high levels of shared experiences yielding an inverted-U form. We also submit that the countervailing forces of synchronization and complacency are further impacted by task difficulty which positively moderates the relationship between shared team experience and team efficiency for frequent tasks, but negatively moderates the relationship for infrequent tasks.

Overall, this work has several important contributions to both theory and practice. First, we extend social entrainment theory by explicitly acknowledging the potential for deeply entrained rhythms to generate complacency detriments as a countervailing force to the commonly cited synchronization benefits. This balanced approach allows for a richer investigation of the influence of entrained rhythms. Second, we examine the role of task type to explain when complacency is likely to manifest itself and when it is particularly detrimental. In doing so, we contribute to the team effectiveness literature by illuminating key boundary conditions regarding when shared team experiences may yield unintended negative outcomes and thereby follow the recommendation of Mathieu, Hollenbeck, van Knippenberg, and Ilgen's (2017: 461) to "feature task characteristics more prominently than we have in the past." Third, we offer practical implications for staffing crews, especially within healthcare settings. Guidance regarding crew assignments is particularly important in the surgical context because: (1) surgeons often strongly lobby to have the same personnel across surgeries believing that it will increase team effectiveness (Huckman & Staats, 2013); and (2) surgical suite effectiveness is a key driver of hospital profitability (Kunders, 2004).

THEORETICAL BACKGROUND AND DEVELOPMENT

Shared Team Experiences

In developing our theoretical framework, we draw from theories traditionally used to explain the effects of shared team experiences, such as learning and knowledge acquisition models (Okhuysen, 2001; Schmidt, Hunter, & Outerbridge, 1986; Weiss, 1990), while also integrating more novel perspectives from social entrainment theory (Harrison et al., 2003; McGrath & Kelly, 1986). First, learning theory suggests that job experiences enhance job competencies through the accrual of relevant knowledge, skills, and abilities (KSAs), which, in turn, leads to better performance (Okhuysen, 2001; Schmidt et al., 1986;

Weiss, 1990). In the team context, as members gain more shared experiences with one another and the task, they also gain shared knowledge that leads to greater efficiencies. This connection between shared team experiences and team outcomes via knowledge accrual has been empirically supported in the team experience (Berman et al., 2002; Katz, 1982) and task experience literatures (Campbell, 1990; Hunter, 1983), as well as the crew familiarity literature in both the healthcare (e.g., surgical crews: Huckman & Staats, 2013; Xu, Carty, Orgill, Lipstiz, & Duclos, 2013) and other contexts (e.g., coal-mining crews: Goodman & Garber, 1988; Goodman & Leyden, 1991).

In addition to knowledge accrual theories, some scholars have drawn on social entrainment theory to advance a rhythm-focused explanation of the shared team experiences – team outcome relationship (Gevers, Rispens, & Li, 2016; Harrison et al., 2003). Considerations of entrainment have been developed primarily within the biology literature. For example, circadian rhythms are a well-known example of the entrainment process, as most bodily cycles are entrained to the 24-hour light–dark cycle of the earth. Building on this, scholars suggest that social entrainment is the "adjustment or moderation of one's behavior either to synchronize or to be in cycle or rhythm with another's behavior" (Ancona & Chong, 1992: 7). Social entrainment is salient to shared team experiences because, as team members work together, they are likely to develop interaction patterns with "one another and to the 'beat' of an external pacer" (Harrison et al., 2003: 642). At the core of social entrainment theory is the notion that, within teams, there are endogenous cycles that are strengthened and influenced by other cycles within, or outside, the system to help the team act in synchronicity (Ancona & Chong, 1999). These cycles are captured by an external pacer (e.g., the type of task) and allow team members to develop entrained rhythms that then "pull" others into synchronicity. The entrained rhythms developed by these endogenous cycles enhance team effectiveness because they create "a dominant temporal ordering that serves as a powerful coordination mechanism for that [team]" (Ancona & Chong, 1999: 7).

Whereas prior research suggests that entrained rhythms provide coordination benefits through *synchronization*, we extend social entrainment theory to suggest that they may also generate negative consequences in the form of *complacency,* as members fall into familiar patterns of behaviors. Consistent with Wiener (1981), we conceptualize complacency as a psychological state of automaticity with affective and cognitive components. The cognitive component contributes a sense of predictability due to the assumption that "all is well" (Billings, Lauber, Funkhouser, Lyman, & Huff, 1976; Parasuraman & Manzey, 2010) and the affective component contributes a sense of comfort and trust (Sauer, Chavaillaz, & Wastell, 2016). Together, these components manifest in similar behaviors, such as lower levels of system monitoring, lower levels of learning, and reduced vigilance-type behaviors (Johnson, 2012).

Complacency may be particularly detrimental to teams because it has been found to reduce reaction time and undermine efficiency (Parasuraman & Manzey, 2010). Notably, complacency was implicated as a reason for several highly visible mishaps, including that of NASA's Nuclear Compton Telescope in 2010 (Johnson, 2012), and the space shuttle Columbia disaster (e.g., Reichhardt, 2003) where trained and experienced personnel failed to scan the environment for potential problems. Research on experienced teams supports the notion that complacency may occur and counteract any positive synchronization benefits (cf., Rico, Sánchez-Manzanares, Gil, & Gibson, 2008) by reducing work-related discussions, which contributes to a decline in performance (Thomas & Petrilli, 2006).

Task Characteristics

Contextual factors, such as task characteristics, influence the behavior of work teams and often serve as contingent effects on the relationships associated with team effectiveness (Hollenbeck, Beersma, & Schouten, 2012; Mathieu et al., 2017; McGrath, 1984). In the healthcare context, specifically in surgical suites, two salient characteristics are task frequency and task difficulty. Task frequency refers to how often a task is performed in an organization and represents a contextual feature of the work environment (Bowers, Baker, & Salas, 1994). Unlike one-shot or ongoing/in-tact teams, members in crew-based arrangements work on similar tasks multiple times with a wide variety of different people. This represents a critical distinction between the team feature of shared team experiences and contextual feature of task frequency for crews as compared to other types of teams (Hollenbeck et al., 2012). Within the surgical context, task frequency refers to how often a particular type of procedure is performed at a given hospital (e.g., multiple times per day versus only a few times per year). Task frequency is particularly salient within the healthcare context because patients, practitioners, and policy makers often question whether hospitals should focus on a few specific types of procedures (specialty hospital) or conduct a wide variety of procedures (general hospital). The specialist vs. generalist debate highlights that procedures infrequently performed at a hospital tend to have lower surgical efficiency and worse patient outcomes (e.g., Begg et al., 2002; Schrag, Cramer, Bach, Cohen, Warren, & Begg, 2000).

The second salient task characteristic is the level of difficulty of the surgery. The management and work psychology literatures have examined task difficulty in a wide variety of ways (e.g., Bakker & Demerouti, 2007; Gilliland & Landis, 1992; Hackman & Oldham, 1976). We focus on task difficulty as a property of the task (Hackman & Morris, 1975) that dictates the amount of focus and knowledge necessary to complete it successfully (Perrow, 1967). More specifically, task difficulty reflects the level of allowable variation in the task processes, where higher difficulty tasks have less room for error than lower difficulty tasks (Van de Ven & Delbecq, 1974). In the surgical suite, task difficulty refers to how demanding a specific surgery is as a function of several patient case characteristics. For example, all else equal, the same type of procedure will be objectively more difficult on an unhealthy patient than on a healthy patient. Task difficulty is a salient issue in the healthcare context because it is central to the value and quality of the care debate, as policy makers struggle to decide which factors should be used in patient risk adjustments and hospital reimbursements/plan payments (Centers for Medicare & Medicaid Services, 2009; Nicholas, Dimick, & Iwashyna, 2011). Notably, research has demonstrated a strong link between several patient case characteristics (e.g., patient age, physical status, diabetes, in-patient/out-patient, level of anesthesia) and surgical efficiency as well as other patient outcomes (e.g., Makary et al., 2010; Ouattara et al., 2005; Toschke, Tilling, Cox, Rudd, Heuschmann, & Wolfe, 2010).

HYPOTHESIS DEVELOPMENT

Shared Team Task-Specific Experience

Shared team experiences have been conceptualized in a variety of ways with some focusing on instances of prior work with other team members (i.e., the number of times members have worked together before; Kor, 2006) and others focusing on individuals' experiences on similar tasks (i.e., the extent to which individuals have each worked on a task before; Cooke, Gorman, Duran, & Taylor, 2007). A core assumption of social entrainment theory is that conceptualization of shared experiences should incorporate both *team* and *task* components. Specifically, the theory suggests that, as members gain more experience with each other, they develop interaction patterns both among themselves and with the rate of an external pacer (e.g., the task type; see Harrison et al., 2003). This creates a theoretical imperative for conceptualizing shared work experiences using both components. In response, some researchers have incorporated both team and task elements into their conceptualization of shared team experience (i.e., the extent to which members have worked together before on a similar type of task; Huckman & Staats, 2010). In line with this thinking, we feature shared team task-specific (STTS) experience, which is defined as the extent to which team members have previously worked together on tasks that are similar to the one they are performing.

Interactions with Task Characteristics

Beginning to unpack the relationship between STTS experience and team efficiency, we suggest that task frequency creates conditions under which both the positive and negative effects of STTS experience are likely to manifest. We then incorporate the effects of task difficulty, which, we posit, act to amplify the positive or negative consequences of STTS experience on team outcomes. For clarity of argumentation and ease of interpretation, we contrast different forms of the STTS experience—team efficiency relationships (i.e., linear vs. curvilinear) that occur during infrequently versus frequently performed tasks—and then explore how task difficulty moderates those relationships.[1]

Task frequency. Task frequency, as a contextual variable, captures how often the focal task (i.e., a particular type of surgical procedure) is performed in a setting. The requirements and processes associated with the type of procedure generate norms and prompt the anticipation of team actions and needs, which in turn, promotes efficiency (Kolbe, Künzle, Zala-Mezö, Wacker, & Grote, 2009; Rico, et al., 2008). In organizations utilizing crew-based staffing

[1] We acknowledge that task frequency is a continuous variable and that organizations have portfolios of task types that occupy different ranges on that continuum. However, in this paper, we advance complex interactions with different forms at higher and lower levels of task frequency and, for pedagogical reasons, use the frequent/infrequent distinction in both our theoretical presentation and methodology. This distinction does not substantively alter our theorizing or the interpretation of our results, particularly when contrasting against a three-way interaction (see online Appendix A).

arrangements, there is a constant reshuffling of team memberships, which enables the development of entrained rhythms in the larger collective (e.g., work area/unit) beyond the rhythms established by any team or subset of individuals. The coalescence of patterns of behavior in the larger collective is conceptually akin to organizational or unit rhythms of different procedures as knowledge transfers between members of different crew configurations. Accordingly, task frequency in crew-based arrangements fosters the emergence of procedure-level rhythms in addition to the team-level rhythms generated by greater STTS experience. The presence (or absence) of procedure-level rhythms helps to determine if the conditions are ripe for the behavioral components of complacency to manifest and thereby influence the relationship between STTS experience and team efficiency. Infrequently performed tasks do not generate procedure-level rhythms due to insufficient opportunities for the interaction patterns to develop and norms to coalesce into entrained rhythms. This likely staves off the behavioral manifestations of complacency, even if members have worked together on a particular type of procedure. Because infrequent tasks lack the necessary conditions for complacency to manifest, the dual-edged sword of STTS experience will shift toward synchronization benefits. As such, we suggest that, for infrequent tasks, the shared knowledge and synchronization benefits of STTS experience will yield a positive linear relationship with team efficiency.

Alternatively, for frequently performed procedures, there will be entrained rhythms and task processes leading to predictability, affording members with feelings of comfort. These feelings, in turn, allow for reduced focus associated with complacency rather than consistent vigilance on the task at hand (Aarts & Dijksterhuis, 2000). As STTS experience grows and generates team-level rhythms in addition to the procedure-level rhythms generated by the task frequency, the benefits of shared knowledge inherent in STTS experience may be offset by complacency detriments. For example, enhanced shared knowledge can allow the surgical team to anticipate problems, make the necessary adjustments, or do what is needed to perform the surgery more efficiently; however, such changes are less likely to be made when the team is less vigilant and there is nothing that would encourage them to revisit their assumptions and routines. In other words, although the team would initially benefit from increases in knowledge and ability to efficiently perform the task, at higher levels the combination of procedure- and team-level rhythms would generate complacency associated behaviors (i.e., reduced vigilance and lower levels of system monitoring) and hinder the team's ability to efficiently apply that knowledge to the task (cf. Parasuraman & Manzey, 2010). As such, we anticipate a curvilinear (inverted-U) relationship between STTS experience and team efficiency when the team is engaging in frequently performed tasks.

Hypothesis 1a. For infrequent tasks, there will be a positive linear relationship between shared team task-specific experience and team efficiency.

Hypothesis 1b. For frequent tasks, there will be a curvilinear (inverted-U) relationship between shared team task-specific experience and team efficiency.

Task Difficulty

Building on our enhanced understanding of when complacency is likely to manifest, we look at task difficulty to help explain when it may be particularly detrimental to team efficiency. We consider task difficulty as a property of the task that restricts the amount of allowable variation and makes it harder to accurately assess the current state and anticipate future states (Theeuwes, Alferdinck, & Perel, 2002; Van de Ven & Delbecq, 1974). Scholars suggest that task difficulty generally exhibits a negative relationship with team efficiency because it increases the complexity of the search process necessary for task completion (Hackman & Morris, 1975) and alters members' interactions (Van de Ven, Delbecq, & Koenig, 1976).

Beyond the negative direct effect on team efficiency, task difficulty may also operate as a moderator of the STTS experience—team efficiency relationships. Notably, Hackman and Morris (1975: 70) submitted that "there are some tasks that require only a minimal level of knowledge or skill for effective performance, and there are others for which performance measures will be substantially affected by the level of knowledge and skill group members bring to bear on the task". They suggested that relatively easy tasks could be completed simply through members' efforts, whereby greater team knowledge and coordination are necessary to complete more difficult team tasks. Specifically, difficult tasks require more shared knowledge to navigate the lower tolerance for errors in the task process (Cannon-Bowers, Salas, & Converse, 1993). In short, this suggests that task difficulty amplifies the effects of STTS experience on team effectiveness.

For infrequent tasks, as STTS experience increases within a team, the amount of knowledge resources at the team's disposal also increases, which helps the team better align their entrained rhythms to the task (cf., Harrison et al., 2003). The benefit of this synchronization is amplified in difficult tasks, as they have a smaller margin for error. Therefore, because infrequently performed tasks are less likely to engender complacency, the team is positioned to utilize their knowledge resources and the positive effect of synchronization will be amplified for more difficult tasks, steepening the positive linear relationship between STTS experience and team efficiency.

For frequent tasks, we again submit that task difficulty amplifies the importance of aligned team interactions. Given that the procedure-level rhythms generated by frequently performed tasks create ripe conditions for the behavioral components of complacency to manifest, the relationships being magnified are negative. Specifically, the complacency generated by higher levels of STTS experience on frequent tasks reduces the team's vigilance. This complacency ultimately increases the time needed by team members to adjust to difficult task requirements. For lower difficulty tasks, this should only have a slightly negative effect on team efficiency because the procedures have greater margins for error (Hackman & Morris, 1975). In contrast, the higher difficulty tasks require greater focus and precision due to their lower margins for error, suggesting that increased complacency would have a more detrimental effect on team efficiency. We posit that these detrimental effects exhibit a negative linear interaction between STTS experience and task difficulty, further pulling down the arc of the curvilinear relationship between STTS experience and team efficiency.

Hypothesis 2a. For infrequent tasks, task difficulty will moderate the relationship between shared team task-specific (STTS) experience and team efficiency. Specifically, the positive relationship between STTS experience and team efficiency will be strengthened to the extent that task difficulty is relatively higher.

Hypothesis 2b. For frequent tasks, task difficulty will moderate the relationship between shared team task-specific (STTS) experience and team efficiency. Specifically, the relationship between STTS experience and team efficiency will shift from an upwardly trending positive curve at lower levels of task difficulty, to a relatively negative trending curve at higher levels of task difficulty.

Team Effectiveness

Consistent with the extant literature, we conceptualize team effectiveness as a multi-faceted outcome of team interactions (Mathieu et al., 2008). Here, we focus on a more proximal speed-focused outcome of team efficiency (i.e., a ratio of actual vs. planned duration of a surgery), and a more distal quality-focused outcome of patient post-surgery recovery rate (i.e., the time between leaving surgery and hospital discharge). We suggest that team efficiency is a signal that the surgery likely went well with minimal complications (Fleischmann, Goldman, Young, & Lee, 2003). Indeed, prior research has demonstrated that operating room functioning is significantly related to patients' speed of recovery and timeliness of release (e.g., Catchpole, Mishra, Handa, & McCulloch, 2008). Longer than anticipated surgeries have a greater chance for infections (Berbari et al., 2012), and the longer that patients are under anesthesia, the greater their risk of encountering adverse effects during the recovery process (Fecho, Moore, Lunney, Rock, Norfleet, & Boysen, 2008). In short, team efficiency and patient post-surgery recovery rate are distinct indicators of team effectiveness that are temporally separated and likely to be positively related. Stated formally,

Hypothesis 3. Team efficiency will be positively related to patient post-surgery recovery rate for both (a) infrequent and (b) frequent tasks.

METHODS

We examined the relationships between STTS experience, task characteristics, and team effectiveness using a combination of quantitative and qualitative methods in the perioperative unit at a large general medical and surgical community hospital in the southwestern region of the United States. As noted earlier, our theory focuses on crew-based team arrangements. Surgical teams are a particularly salient example of crews because they are typically only together for a short duration (i.e., the length of the surgery), they are made up of members with clearly defined roles (e.g., surgeon) that are not transferred or undertaken by other members of the team (e.g., scrub nurse), and the procedures have well-established patterns of completion known to all members (see Webber & Klimoski, 2004 for a review of crews).

Surgical teams present an ideal context to examine shared experiences among team members because they are generally staffed with individuals who have varying patterns of previously working together on a variety of procedures. As many care providers are involved in multiple surgeries per day, it generates a much larger range and potential depth of experience between team members than laboratory studies (e.g., Gruenfeld et al., 1996; Peterson & Thompson, 1997) or even short-term project teams (e.g., Espinosa, Slaughter, Kraut, & Herbsleb, 2007). Furthermore, as the hospital performs a variety of procedures on patients with varying states of health, it provides a naturally occurring experiment of different levels of STTS experience with different task characteristics. In addition, this setting offers key performance-related variables for each task. Finally, preliminary observations of, and discussions with, care providers suggested there was considerable variation in team composition, dynamics, and effectiveness, making healthcare an ideal location to explore STTS experience related relationships.

Study Procedure

The study involved two phases of data collection. First, we collected archival data on all surgeries in the perioperative unit for a two-year period (2012–2013) to test our formal hypotheses and conduct ancillary analyses. Second, we conducted semi-structured interviews with the hospital's operating room personnel to gain further insights and richer explanations of how shared team experiences influence team effectiveness across different procedures. In so doing, we were able to generate rich theoretical insights beyond our initial hypotheses.

Phase 1: Quantitative archival research. We collected archival data from the operating room medical records and patient billing records on all surgeries performed in the surgical suite from January 1, 2012–December 31, 2013. Our focal sample features 8,236 surgeries performed in 2013. The data collected from 2012 were used exclusively to compute shared experiences. In our sample, crew membership was determined from a pool of 62 unique surgeons (individual surgeries performed M = 132.82; SD = 145.02) and 171 other health care providers (individual surgeries performed M = 228.22; SD = 272.50). Notably, 6,342 surgeries (77%) had unique team configurations.

Phase 2: Qualitative interview research. We conducted a qualitative follow-up study consisting of 30 semi-structured interviews with operating room personnel from the same hospital. Most of these interviews occurred in unoccupied hospital offices and break rooms during one of two site visits lasting a total of eight days and were audio recorded, then transcribed. All operating room personnel working during the site visit, approximately 20 surgeons, 16 anesthesia providers, 18 nurses, and 23 technicians, were invited to participate as their work schedule permitted. Twenty-six individuals were interviewed during the first site visit with an (34% overall response rate consisting of 6 surgeons, 7 anesthesia providers, 6 nurses, and 7 technicians). Four of those individuals were interviewed again during the second site visit. The average interview length was 29 minutes. We reviewed the interview transcripts and notes to identify patterns related to team composition, task characteristics, team dynamics, and team effectiveness.

Measures

Shared team task-specific experience. We operationalize STTS experience as prior work experience with the same team members on the same type of procedure. Using data on all surgeries performed in 2012 (N = 6,799) in addition to the data on surgeries performed in our focal year (2013), we indexed STTS experience by counting the number of surgeries of the focal procedure type performed together for each pair in the team during the prior 12 months,[2] and then averaging the pairs at the team-level (M = 43.40; SD = 79.60). For example, for an orthopedic surgery that occurred on March 15, 2013 by members A, B, C, and D, STTS experience was indexed as the average number of orthopedic surgeries that pairs A-B, A-C, A-D, B-C, B-D, and C-D performed together from March 2012–February 2013. Averaging across pairs, as opposed to only counting experiences as an in tact team, is consistent with similar measures of task experience in teams (e.g., Espinosa et al., 2007) and partitioning team member shared experiences by surgical procedure (i.e., task type) is consistent with social entrainment theory.

Task frequency. The focal 8,236 surgeries included 13 different types of procedures. We operationalized four procedure types as *frequent*: general (n = 2,444; 29.7%); ear/nose/throat (n = 1,423; 17.3%); orthopedic (n = 1,331; 16.2%); and urology (n = 923; 11.2%) and nine procedure types as *infrequent*: gynecology (n = 663; 8.1%); neurology (n = 409; 5.0%); vascular (n = 329; 4.0%); ophthalmology (n = 272; 3.3%); robotic assisted gynecology

[2] The use of a rolling 12 month look back period keeps the STTS experience measure comparable across time. The 12-month shelf-life of shared experiences stems from research on team training in healthcare, which suggests that teamwork knowledge and skills decay over time and are not consistently maintained 12 twelve months after training (Weaver, Dy, & Rosen, 2014).

($n = 190$; 2.3%); oral/dental ($n = 141$; 1.7%); plastics ($n = 81$; 1.0%); robotic assisted general ($n = 17$; .2%); and robotic assisted urology ($n = 13$; .2%), Notably, this partition of in/frequent was not an arbitrary median split. Procedure types categorized as frequent each represent 10% or more of the total procedure volume and accordingly are likely to be performed by team members on a daily basis. Independent consultation with hospital administrators confirmed the legitimacy of this threshold and qualitative distinction as experienced at this hospital. Moreover, we account for any remaining variance within the two frequency categories in our substantive analyses by employing them as a grouping factor.

Task difficulty. Our measure of task difficulty is designed to capture important patient case characteristics that, all else equal, would make a surgery relatively more difficult (i.e., less allowable variation and harder to navigate). The case characteristics include patient age, diabetes status, physical status, out-patient/in-patient designation, and level of anesthesia. These factors have been demonstrated to be systematically related to surgery duration and/or patient recovery rate (e.g., Ouattara et al., 2005; Wolters, Wolf, Stützer, & Schröder, 1996). Generally speaking, surgeries are more difficult if patients are older, diabetic, in relatively poor health, and/or require in-patient procedures with higher levels of anesthesia.

The patients in our sample had an average *age* of 45.03 ($SD = 25.01$) and 1.3% had *diabetes* (coded 1 as diabetic, 0 as not). Patient *physical status* is indexed using the anesthesia providers ASA (American Society of Anesthesiologists, 2014) rating of the patient's physical status at the pre-surgery interview. This is a six-point scale: 1 = normal healthy patient; 2 = patient with mild systemic disease; 3 = patient with severe systemic disease; 4 = patient with severe systemic disease that is a constant threat to life; 5 = moribund patient who is not expected to survive without the operation; 6 = declared brain-dead patient whose organs are being removed for donor purposes (American Society of Anesthesiologists, 2014). In this sample, the distribution of ASA ratings was: 19.2% were a 1; 37.2% were a 2; 32.9% were a 3; 10.7% were a 4; 3 patients (0%) were a 5; and 0 patients (0%) were a 6. Furthermore, 67.3% of the surgeries were scheduled to be *out-patient* and 32.7% were scheduled to be *in-patient.* Out-patient vs. in-patient status, coded as 0 and 1 respectively, was determined by clinical criteria, including the severity of the patient's symptoms/condition and intensity of the services required to diagnose/treat the condition (Centers for Medicare & Medicaid Services, 2014). For *level of anesthesia*: 86.7% had general anesthesia; 7.4% regional; 4.7% local, and 1.2% monitored, which was coded from 4 (general) to 1 (monitored) with higher levels representing greater amount of anesthesia. As the five elements of task difficulty are on different scales, we first created a standardized score for each element based on the total number of surgeries, scored each such that higher levels represented greater task difficulty, and then combined them into an equally weighted composite variable ($M = .00$; $SD = .55$).

Team efficiency. We operationalized team efficiency as the actual duration of each surgery relative to its scheduled time (i.e., One minus actual surgery duration/planned surgery duration; $M = .46$; $SD = .33$). Because there are wide variations in surgery durations for different types of procedures, gauging relative to scheduled time represents a suitable scaling function (Pandit, Westbury, & Pandit, 2007). The time scheduled for each surgery is based on procedure complexity as determined by the surgeon and the hospital. Notably, both the planned [$M = 108$ minutes; $SD = 59$ minutes; $F(12, 8223) = 548.10$, $p < .001$] and actual [$M = 62$ minutes; $SD = 58$ minutes $F(12, 8223) = 308.02$, $p < .001$] surgical durations differed significantly across the 13 procedure types. These results support using procedure type as a higher-level grouping variable.

Patient post-surgery recovery rate. We indexed patient post-surgery recovery rate as the patient's length of stay post-surgery. This variable is computed as the time between when the patient leaves surgery and is discharged from the hospital, rescaled so that higher numbers represent faster recovery rate or less time in the hospital (i.e., zero minus (date:time patient discharged from hospital—date:time patient left surgery)). Data were available in minutes (e.g., there were 120 minutes between when the patient left surgery at 10:15am and was discharged from the hospital at 12:15pm), that we converted into days (retaining the minutes as the fractional part) for ease of interpretation ($M = -1.57$ days; $SD = 2.96$ days). Although patient total length of stay is a more commonly used indicator of patient quality of care in healthcare (e.g., Vermeulen et al., 2014), surgical team performance can only influence the recovery rate that happens between surgery completion and discharge from the hospital. In our sample, patient total length of stay and patient post-surgery length of stay were strongly correlated at .73 ($p < .001$).

Covariates. We also include procedure volume, patient sex, task urgency, team members' task experience, and membership churn as potential covariates. *Procedure volume* controls for the number of times each procedure was conducted during the focal year (i.e., 2013). It is the only covariate at the procedure grouping level (level 2). *Patient sex* was dummy coded 0 = female (53.4%) and 1 = male (46.6%). Patient sex is often included as a potential covariate in studies involving patient length of stay (e.g., Husted, Holm, & Jacobsen, 2008). *Task urgency* represents the level of temporal immediacy of the surgery, coded as 1 = elective (84.4%), 2 = emergent (6.6%), and 3 = urgent (9.0%; $M = 1.25$; $SD = .61$). Generally speaking, for a surgery to be classified as "urgent" it needs to be an emergency, requiring the surgery to occur within 24 hours; "emergent" suggests that an emergency is beginning to arise, and the surgery should be scheduled within 48 hours, whereas elective surgery can be scheduled at the patient's and surgeon's convenience. Although task urgency often includes some variance attributable to the surgeon's schedule, we included it as a covariate as it has the potential to influence team dynamics.

We also included *members' task experience* as a potential covariate to ensure that the phenomenon we are capturing with STTS experience reflects team members working together on the same type of procedure, as opposed to just task expertise. We indexed task experience by counting the number of times each person had participated in a corresponding type of procedure over the prior 12 months. Consistent with similar measures of task experience in teams (e.g., Espinosa et al., 2007), we then averaged the count of same task prior experiences for the team members (i.e., *members' task experience*; $M = 756.91$; $SD = 475.26$).[3] Finally, *membership churn* represents the level of change in the surgical team membership ($M = .10$; $SD = .14$). In our sample, 38.4% of the surgeries experienced change in team membership during the surgery. To adjust for varying team size, this variable is computed as the number of members in the surgical team less the number of members replaced, divided by the number of members in the surgical team. For example, if six members were involved in a surgery, and three were relieved, the membership churn would be .50. We included it as a covariate because it has been argued to disrupt team dynamics, which can influence team performance-related outcomes, including delays (ElBardissi, Wiegmann, Dearani, Daly, & Sundt, 2007).[4]

RESULTS

Our hypotheses were tested using a multi-level hierarchical linear analysis (Raudenbush, Byrk, Cheong, Congdon, & du Toit, 2004). We utilize the procedure types as a higher-level grouping to account for the significant differences across the procedure types, both conceptually and on key variables of interest, such as team efficiency [$F(12, 8223) = 65.38$, $p < .001$] and patient post-surgery recovery rate [$F(12, 8223) = 74.33$, $p < .001$]. The only variable at the procedure type level of analysis (level 2) is procedure volume; all other variables are modeled at the surgery (task) level of analysis (level 1). We adopted a model building approach to analyze the data. First, we fit a baseline (null) model to determine the percentage of outcome variance that exists within and between procedures (Bliese & Ployhart, 2002). We then added: (1) the linear effects; (2) the curvilinear term (i.e., STTS experience squared); (3) the linear two-way interactions; and (4) the interactions with curvilinear terms. Although the computation of overall effect sizes in multi-level analysis is somewhat tenuous, for comparative purposes, we report the pseudo R^2 (Snijders & Bosker, 1999).

[3] Naturally, members' task experience exhibits a strong correlation with STTS experience (infrequent: $r = .69$, $p < .001$; frequent: $r = .82$, $p < .001$). We re-ran all of the analyses omitting members' task experience and it leads to the same substantive findings and conclusions. Details available from the first author.

[4] Membership churn is often conceptualized as a disruption and found to be detrimental to team effectiveness (e.g., Leach, Myrtle, Weaver, & Dasu, 2009). However, as one anonymous reviewer pointed out, membership churn also has the potential to disrupt complacency, which could be beneficial for team effectiveness. We ran addition analyses, which suggest that the complacency associated with frequently performed tasks is disrupted when there is high membership churn allowing the benefits of synchronization inherent in STTS experience to shine through. Conversely, with low membership churn, the complacency is not disrupted, which is ultimately to the detriment of team efficiency. We suggest that these results lend support to our argument that complacency manifests on more frequently performed tasks and highlight the potential importance of disruptions in understanding the phenomenon. Adding membership churn, curvilinear and interaction terms did not change the substantive findings and conclusions of our focal analysis. Details available from the first author.

Hypothesis Testing

We split the sample based on the task characteristic that conceptually creates qualitative differences in team dynamics (i.e., task frequency) and report the subsample analyses to aid in interpretability.[5] As outlined above, four procedure types were categorized as frequent (n = 6,121; 74.3%) and nine were categorized as infrequent (n = 2,115; 25.7%) based on the likelihood that members perform the procedures on a daily basis. This split yielded subsamples with sufficient power to test our hypotheses (Mathieu, Aguinis, Culpepper, & Chen, 2012). Prior to creating subsamples, we computed z scores for all variables at their respective levels of analysis to aid interpretation and render the magnitudes of effects comparable across variables and subsamples (Mathieu et al., 2012). Table 1 reports the descriptive statistics and correlations among study variables, with the frequent procedures subsample in the lower left triangle and the infrequent procedures subsample in the upper right triangle.

A summary of the model testing results for team efficiency is provided in Table 2a for infrequent tasks and in Table 2b for frequent tasks. The baseline models of team efficiency indicate that the majority of variance existed within procedure types at the surgery level of analysis (infrequent = 64%; frequent = 94%), and the remaining variance resided between procedure types (infrequent = 36%; frequent = 6%).

We regressed team efficiency on STTS experience, task difficulty, and the covariates (see Model 1 in both tables). STTS experience was positively related to team efficiency for infrequent tasks (β = .49, SE = .17, $p < .01$), yet negatively related for frequent tasks (β = −.14, SE = .03, $p < .001$). However, to assess the hypothesized curvilinear relationship between STTS experience and team efficiency for frequent tasks, we added STTS experience squared to the equation in the next step (Model 2). For frequent tasks, the STTS squared term was significant and negatively related to team efficiency (β = −.05, SE = .01, $p < .001$), consistent with our hypothesized curvilinear (inverted-U) relationship. For infrequent tasks, the STTS experience squared term was, as anticipated, not significantly related to team efficiency (β = −.32, SE = .22, n.s.). Overall, these results demonstrate that the STTS experience—team efficiency relationship is positive linear for infrequent tasks, yet curvilinear (inverted-U) for frequent tasks, providing support for Hypotheses 1a and 1b, respectively.

Then, we added the interaction between STTS experience and task difficulty to the equation (Model 3). For infrequent tasks, the interaction was positive (β = .29, SE = .08, $p < .001$), whereas for frequent tasks, the interaction was negative (β = −.11, SE = .02, $p < .001$), consistent with Hypotheses 2a and 2b, respectively. Model 4 indicates no evidence of a reversal in the curvilinear relationship from an inverted-U shape to a U shape (i.e., an interaction with the curvilinear STTS experience terms) for either the infrequent or frequent tasks. Notably, team efficiency was negatively related to task difficulty for both infrequent tasks (β = −.26, SE = .03, $p < .001$) and frequent tasks (β = −.15, SE = .01, $p < .001$). The total efficiency variance explained ($\sim R^2$) was 57% for infrequent tasks and 19% for frequent tasks.

As illustrated in Figure 1a, for *infrequent tasks*, the positive interaction reveals that the positive relationship between STTS experience and efficiency becomes stronger as tasks become more difficult. Specifically, the simple slopes calculated at relatively low (−1 SD from the mean; β = .45, SE = .20, $p < .05$) and at relatively high (+1 SD from the mean; β = 1.02, SE = .21, $p < .001$) task difficulty values were both significant. In fact, the relationship between STTS experience and team efficiency was significantly positive throughout the upper 92% of the task difficulty range for infrequent tasks (Gardner, Harris, Li, Kirkman, & Mathieu, 2017; Preacher, Curran, & Bauer, 2006). The fact that the simple slope for STTS experience—team efficiency relationship

[5] Our hypotheses suggest a complex relationship between task frequency, task difficulty, and STTS experience. This generates three-way interactions (plus a quadratic term), which challenges presentation and discussion of results. In an online appendix, we provide tables (A1–A3) containing the data and results for the full sample (N = 8,236), which demonstrate the pattern of relationships among the variables of interest (STTS experience was positively correlated with team efficiency r = .14, $p <$ .001; task frequency was positively correlated with team efficiency r = .13, $p < .001$; task difficulty was negatively correlated with team efficiency r = −.24, $p < .001$; and team efficiency was positively correlated with patient post-surgery recovery rate r = .20, $p < .001$) (see Table A1). Table A2 shows the significant effect of regressing team efficiency on the two-way interactions between STTS experience and task frequency (β = .12, SE = .05, $p < .05$); STTS experience and task difficulty (β = −.09, SE = .02, p < .001); and task frequency and task difficulty (β = −.05, SE = .01, $p < .001$), as well as the full three-way interaction (β = .17, SE = .04, $p < .001$). Table A3 demonstrates the positive relationship between team efficiency and patient post-surgery recovery rate (β = .15, SE = .01, $p < .001$).

TABLE 1
Descriptive Statistics and Correlations

Variables	Infrequent task		Frequent task		Correlations								
	M	*SD*	*M*	*SD*	1	2	3	4	5	6	7	8	9
1. Procedure volume	235.00	210.67	1530.25	646.76		−.33***	.06**	−.17***	−.10***	−.23***	−.07**	.26***	.06**
2. Patient sex[a]	1.30	.46	1.52	.50	−.10***		.04	.10***	.20***	.18***	.13***	−.10***	−.13***
3. Task urgency	1.14	.47	1.28	.64	.11***	−.01		−.09***	−.03	−.10***	.11***	.07**	−.26***
4. Membership churn	.15	.16	.08	.13	.12***	−.02	−.02		.10***	−.09***	.30***	−.42***	−.17***
5. Members' task experience	267.50	169.33	926.01	427.38	.14***	−.03*	−.19***	−.17***		.69***	.20***	−.03	−.10***
6. STTS experience	12.45	19.02	54.10	89.19	−.23***	.02	−.20***	−.23***	.82***		−.07**	.06**	.08***
7. Task difficulty	.02	.54	−.01	.55	.11***	−.02	.24***	.19***	−.31***	−.42***		−.31***	−.46***
8. Team efficiency	.39	.35	.49	.32	−.14***	.02	.04**	−.31***	.08***	.14***	−.22***		.24***
9. Patient post-surgery recovery rate	1.30	2.52	1.66	3.10	−.18***	−.01	−.27***	−.11***	.14***	.21***	−.49***	.19***	

Note: STTS experience = shared team task-specific experience.

[a] Coded as 0 = female; 1 = male.

Means and standard deviations are reported in raw score form. Correlations for the infrequent task subset ($n = 2,115$) are above the diagonal; frequent task subset ($n = 6,121$) below the diagonal.

The procedure volume variable was assigned to the patient level for correlations. The magnitude of these correlations accurately reflects the effect sizes at their respective level of analysis. However, the lack of independence at the procedure-type level does bias the standard errors. Accordingly, the significance levels should be interpreted with caution.

* $p < .05$

** $p < .01$

*** $p < .001$

TABLE 2a
Summary of HLM Models Predicting Team Efficiency for Infrequent Tasks

Predictors	Model 1		Model 2		Model 3		Model 4	
Procedure grouping-level effects	γ	*SE*	γ	*SE*	γ	*SE*	γ	*SE*
Procedure volume	1.48**	.40	1.51**	.40	1.50**	.39	1.50**	.39
Patient-level effects	β	*SE*	β	*SE*	β	*SE*	β	*SE*
Patient sex[a]	–.01	.03	–.01	.03	–.01	.03	–.01	.03
Task urgency	.08**	.03	.08**	.03	.08***	.03	.09***	.03
								.02
Membership churn	–.29***	.02	–.29***	.02	–.29***	.02	–.29***	.02
Task difficulty	–.26***	.03	–.26***	.03	–.16***	.04	–.07	.06
Members' task experience	–.12	.10	–.22	.12	–.25*	.12	–.32*	.13
STTS experience	.49**	.17	.62***	.19	.72***	.19	.72***	.19
STTS experience squared			–.32	.22	–.22	.22	–.51	.27
STTS experience x task difficulty					.29***	.08	.29***	.08
STTS experience squared x task difficulty							–.38	.20
$\sim R^2$	.56		.56		.57		.57	

Note: STTS experience = shared team task-specific experience.
$\sim R^2$ = pseudo effect sizes.
[a] Coded as 0 = female; 1 = male.
* $p < .05$
** $p < .01$
*** $p < .001$

among low task difficulty surgeries—remains above that for high task difficulty surgeries simply reflects the influence of the linear effect for task difficulty.

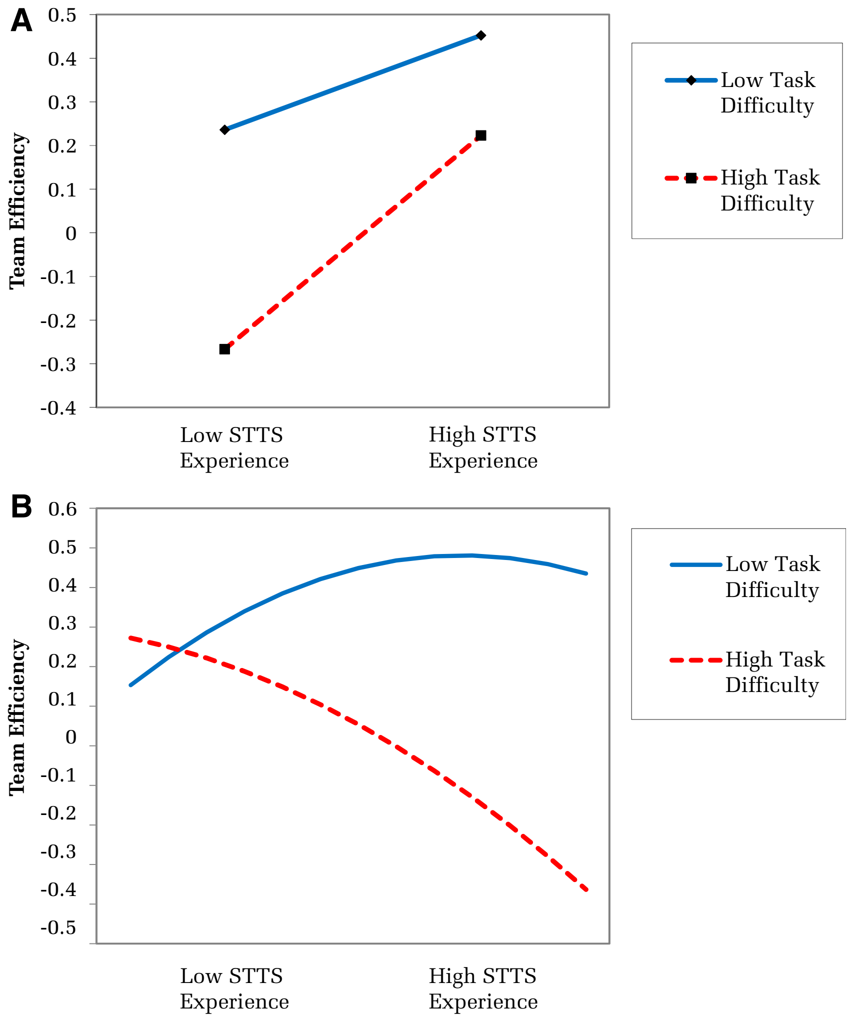
As shown in Figure 1b, for *frequent tasks*, the negative interaction with the linear STTS experience term reflects a downward rotation of the inverted U relationship as tasks become more difficult. Specifically, at average task difficulty levels, the relationship is nonsignificant throughout the lower 88% of the STTS experience distribution of scores, but then becomes significantly negative among the highest 12% of STTS experience values (Gardner et al., 2017; Miller, Stromeyer, & Schwieterman, 2013). In contrast, at a relatively low (i.e., −1 *SD* from

TABLE 2b
Summary of HLM Models Predicting Team Efficiency for Frequent Tasks

Predictors	Model 1		Model 2		Model 3		Model 4	
Procedure grouping-level effects	γ	*SE*	γ	*SE*	γ	*SE*	γ	*SE*
Procedure volume	–.17	.10	–.13	.06	–.15	.06	–.15	.06
Patient-level effects	β	*SE*	β	*SE*	β	*SE*	β	*SE*
Patient sex[a]	–.00	.01	–.00	.01	–.00	.01	–.00	.01
Task urgency	.10***	.01	.10***	.01	.10***	.01	.09***	.01
Membership churn	–.27***	.01	–.27***	.01	–.27***	.01	–.27***	.01
Task difficulty	–.15***	.01	–.15***	.01	–.17***	.01	–.18***	.02
Members' task experience	.12***	.03	.04	.03	.07*	.03	.08*	.03
STTS experience	–.14***	.03	.10	.05	–.01	.06	–.04	.07
STTS experience squared			–.05***	.01	–.06***	.01	–.05**	.02
STTS experience × task difficulty					–.11***	.02	–.14***	.04
STTS experience squared × task difficulty							.01	.01
$\sim R^2$	.15		.18		.19		.19	

Note: STTS experience = shared team task-specific experience.
$\sim R^2$ = pseudo effect sizes.
[a] Coded as 0 = female; 1 = male.
* $p < .05$
** $p < .01$
*** $p < .001$

FIGURE 1a & 1b
Shared Team Task-Specific (STTS) Experience and Task Difficulty Interaction Form on Team Efficiency, for Frequent Tasks



the mean) task difficulty level, STTS experience is positively related to team efficiency throughout the lower 42% of the distribution, nonsignificant in the next 54% of scores, and then turns significantly negative only among the highest 4% of STTS experience scores. Alternatively, for a relatively high (i.e., +1 *SD* from the mean) task difficulty level, the STTS experience relationship with efficiency is nonsignificant for the lower 49% of the STTS experience score distribution beyond which it becomes significantly negative.

The baseline models of patient post-surgery recovery rate indicated that the majority of variance existed within procedure types at the surgery level of analysis (infrequent = 69%; frequent = 90%), and the remaining variance resided between procedure types (infrequent = 31%; frequent = 10%). To test Hypothesis 3, we regressed patient post-surgery recovery rate on team efficiency and found it was positively related for both infrequent tasks ($\beta = .14$, $SE = .02$, $p < .001$) and frequent tasks ($\beta = .15$, $SE = .01$, $p < .001$), yielding support for Hypotheses 3a and 3b, respectively [Tables 3a (infrequent) & 3b (frequent), Model 1].

Ancillary Analyses

We also conducted post-hoc ancillary analyses to explore the potential for the team and task characteristics to directly influence patient post-surgery recovery rate. We were particularly interested in examining whether there would be different effects

TABLE 3a
Summary of HLM Models Predicting Patient Post-Surgery Recovery Rate for Infrequent Tasks

Predictors	Model 1		Model 2		Model 3		Model 4		Model 5	
Procedure grouping-level effects	γ	*SE*	γ	*SE*	γ	*SE*	γ	*SE*	γ	*SE*
Procedure volume	.34	.58	.39	.37	.40	.37	.41	.36	.40	.36
Patient-level effects	β	*SE*	β	*SE*	β	*SE*	β	*SE*	β	*SE*
Team efficiency	.14***	.02	.10***	.02	.10***	.02	.10***	.02	.10***	.02
Patient sex[a]			–.02	.02	–.02	.02	–.02	.02	–.01	.02
Task urgency			–.24***	.02	–.24***	.02	–.24***	.03	–.24***	.02
Membership churn			.01	.02	.01	.02	.01	.02	.01	.02
Task difficulty			–.30***	.02	–.30***	.02	–.20***	.03	–.21***	.05
Members' task experience			–.12	.08	–.15	.10	–.18	.10	–.18	.10
STTS experience			.28*	.13	.32*	.15	.43**	.15	.43**	.15
STTS experience squared					–.10	.17	–.00	.18	.02	.21
STTS experience × task difficulty							.30***	.07	.30***	.07
STTS experience squared x task difficulty									.03	.16
$\sim R^2$	.12		.44		.44		.45		.45	

Note: STTS experience = shared team task-specific experience.
$\sim R^2$ = pseudo effect sizes.
[a] Coded as 0 = female; 1 = male.
* $p < .05$
** $p < .01$
*** $p < .001$

on the speed-focused team effectiveness variable (i.e., team efficiency) as compared to the quality-focused team effectiveness variable (i.e., patient post-surgery recovery). Herein we provide an overview of the results from those analyses (see Tables 3a and 3b), which yielded some interesting insights. We emphasize, however, that these tests are exploratory and our findings should be interpreted cautiously.

Our ancillary analyses revealed some similarities and some differences between the influence of our focal variables on team efficiency and patient recovery. For infrequent tasks, the patient post-surgery

TABLE 3b
Summary of HLM Models Predicting Patient Post-Surgery Recovery Rate for Frequent Tasks

Predictors	Model 1		Model 2		Model 3		Model 4		Model 5	
Procedure grouping-level effects	γ	*SE*	γ	*SE*	γ	*SE*	γ	*SE*	γ	*SE*
Procedure volume	–.18	.20	–.19	.07	–.21	.07	–.19	.06	–.18	.06
Patient-level effects	β	*SE*	β	*SE*	β	*SE*	β	*SE*	β	*SE*
Team efficiency	.15***	.01	.10***	.01	.11***	.01	.11***	.01	.11***	.01
Patient sex[a]			–.04***	.01	–.04***	.01	–.04***	.01	–.04***	.01
Task urgency			–.15***	.01	–.16***	.01	–.15***	.01	–.15***	.01
Membership churn			.00	.01	–.00	.01	.00	.01	.00	.01
Task difficulty			–.46***	.01	–.46***	.01	–.43***	.01	–.40***	.02
Members' task experience			.11***	.03	.14***	.03	.10***	.03	.08*	.03
STTS experience			–.10***	.03	–.18***	.05	–.05	.05	.04	.07
STTS experience squared					.02*	.01	.03***	.01	.01	.01
STTS experience × task difficulty							.15***	.02	.22***	.04
STTS experience squared × task difficulty									–.03*	.01
$\sim R^2$	.04		.35		.36		.37		.37	

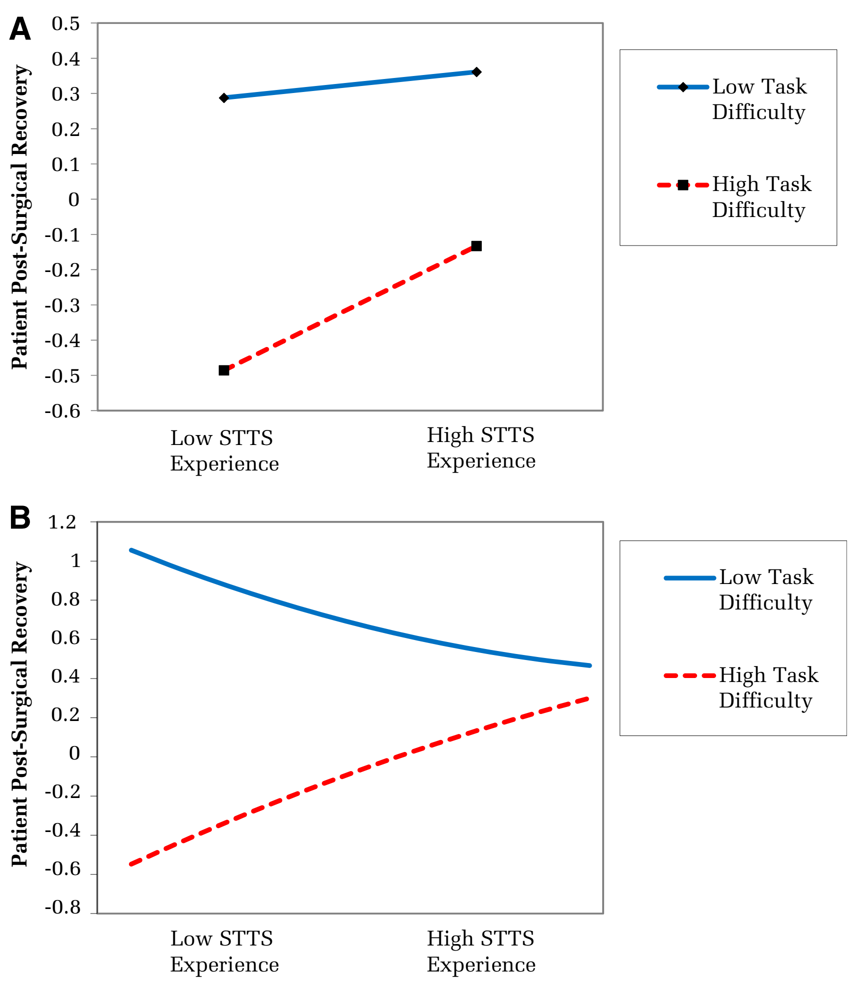
Note: STTS experience = shared team task-specific experience.
$\sim R^2$ = pseudo effect sizes.
[a] Coded as 0 = female; 1 = male.
* $p < .05$
** $p < .01$
*** $p < .001$

recovery rate results generally paralleled the team efficiency results. STTS experience had a positive linear relationship with patient post-surgery recovery rate such that higher levels of STTS experience were related to faster patient post-surgery recovery ($\beta = .28$, $SE = .13$, $p < .05$). Task difficulty had a negative linear relationship with patient post-surgery recovery ($\beta = -.30$, $SE = .02$, $p < .001$), and STTS experience and task difficulty evidenced a positive interaction ($\beta = .30$, $SE = .07$, $p < .001$). As shown in Figure 2a, the positive interaction reflects a stronger (i.e., steeper) positive relationship between STTS experience and patient recovery rate for relatively more difficult tasks—similar to that shown in Figure 1a. Specifically, the simple slope calculated at relatively low task difficulty (−1 *SD* from the mean; $\beta = .15$, $SE = .16$, n.s.) was not significant, whereas it was significant at relatively high task difficulty (+1 *SD* from the mean; $\beta = .74$, $SE = .17$, $p < .001$) values. In fact, the relationship between STTS experience and patient post-surgery recovery rate was significantly positive throughout the upper 63% of the task difficulty range for infrequent tasks. Notably, the patient post-surgery recovery $\sim R^2$ increased from ~12% (team efficiency and procedure volume only) to ~45% when including the additional effects.

For the frequent tasks, although task difficulty exhibited a consistent negative relationship with patient post-surgery recovery rate ($\beta = -.46$, $SE = .01$, $p < .001$), surprisingly STTS experience exhibited a U-shaped curvilinear effect (STTS experience, $\beta = -.18$, $SE = .05$, $p < .001$; STTS experience squared, $\beta = .02$, $SE = .01$, $p < .05$).

FIGURE 2a & 2b

Shared Team Task-Specific (STTS) Experience and Task Difficulty Interaction Form on Patient Post-Surgery Recovery Rate, for Frequent Tasks



Furthermore, when we tested the interaction between STTS experience and task difficulty, we found a positive relationship with the linear interaction term ($\beta = .15$, $SE = .02$, $p < .001$) and a small negative relationship with the curvilinear interaction term ($\beta = -.03$, $SE = .01$, $p < .05$). As illustrated in Figure 2b, these relationships manifest as a positive relationship (with a slight inverted-U shaped curve) between STTS experience and patient post-surgery recovery rate at relatively high task difficulty levels. In fact, at $+1$ *SD* above the task difficulty mean, the relationship is significantly positive throughout the lower 78% of the STTS experience distribution. In contrast, at relatively low (-1 *SD* from the mean) task difficulty levels, there is evidence of a negative relationship between STTS experience and patient post-surgery recovery rates throughout the lower 66% of the distribution of STTS scores. The patient post-surgery recovery $\sim R^2$ increased from $\sim$4% (team efficiency and procedure volume only) to $\sim$37% when including the additional effects.

Collectively, these ancillary analyses illuminate some interesting similarities and differences between the speed-focused team effectiveness variable (i.e., team efficiency) and a quality-focused team effectiveness variable (i.e., patient post-surgery recovery). For infrequent tasks, we suggest that the same mechanisms influence team efficiency and patient recovery. Here complacency is not likely to manifest, so the knowledge and synchronized rhythms developed from prior shared task experiences enable the team to be more effective (faster and better)—especially for more difficult tasks that amplify the importance of aligned team interactions because such tasks have lower margins for error. Conversely, for frequent tasks, there appears to be a tradeoff between efficiency and patient recovery. For frequent, high difficulty tasks, the results suggest that, although complacency can harm efficiency, it does not mitigate the higher levels of shared knowledge, present in teams with higher STTS experience, that lead to better patient post-surgery recovery rates. For frequent, low difficulty tasks, higher levels of STTS experience are beneficial for efficiency but slightly detrimental for patient post-surgery recovery. These results warn against the negative effects of complacency on patient care quality, even on relatively easier tasks.

Qualitative Insights

Finally, we used the data from the semi-structured interviews in Phase 2 to better understand the STTS experience—team effectiveness relationship. Our goal for these interviews was to explore how operating room personnel experience the phenomenon and learn more about the relationships between the constructs. We believe this approach adds richness and precision to our theory. Table 4 presents excerpts from the interview data to illustrate insights from three core areas: (1) mechanisms—how STTS experience influences team effectiveness; (2) moderators—how task characteristics influence team interactions; and (3) outcomes—the relationship between surgery efficiency and quality.

The interviews affirmed and expanded our understanding of the STTS experience—team effectiveness relationship in the following ways. First, by highlighting the importance of shared knowledge and rhythms, the interviews confirmed the importance of the two dominant theories in the shared team experience literature: knowledge acquisition theories (Okhuysen, 2001; Schmidt et al., 1986; Weiss, 1990) and social entrainment theory (Harrison et al., 2003; McGrath & Kelly, 1986). For example, the development of shared knowledge from prior experiences was highlighted: "When people have worked together a lot, everybody knows what to do, everybody knows what they are doing, everybody knows each other, they know how to work together, they know what equipment you need, they know what the surgery needs, they know your likes and dislikes" (Surgeon #1), as was the development of entrained rhythms: "For common procedures, they seem to do a better job having everything I need, so we get into rhythm and not stop every ten minutes for something else" (Surgeon #2). In addition, complacency, the theorized countervailing force of shared team experiences, was also highlighted in the interviews: "People are more comfortable with each other, so they're more lax on things" (Scrub technician #1). Interviewees also alluded to one of the challenges of understanding complacency effects—when you are not fully paying attention it is tough to know what you missed: "Sometimes you just get into the swing of things, then you find yourself rolling the patient into PACU, trying to recall exactly what happened to give report" (Circulator nurse #3). In short, expanding social entrainment theory to consider the presence of countervailing forces (i.e., synchronization and complacency) is an important extension that builds on the theoretical foundations of the shared team experience literature.

Second, the interviews helped to illuminate how different task characteristics may influence team interactions. Several people described the complexity

TABLE 4
Qualitative Data from Operating Room Personnel

Knowledge	"When people have worked together a lot, everybody knows what to do, everybody knows what they are doing, everybody knows each other, they know how to work together, they know what equipment you need, they know what the surgery needs, they know your likes and dislikes. You know, it is real helpful if you have the same people, or at least the same cadre of people." (Surgeon #1) "You eventually get to the point when an RN has worked with a scrub [nurse] long enough, everything like that, I don't want to say you know what each other is thinking but you're already anticipating what's coming up. And if you don't have that experience, you can't do that. Instead of being proactive, you're reactive." (Circulator nurse #1) "I want team members that are really familiar with each other and what is going on [in the procedure], people who know the instrumentation, people who know the protocol and stuff because it [the procedure] goes faster, smoother, and I don't need to worry as much about the safety of the patient like I do with someone I've never worked with . . . experience with the other people in the room and the procedure both matter" (Circulator nurse #2).
Rhythms	"When it's an uncommon procedure, the nurse is constantly running for equipment. The scrub techs never seem to have everything we need in the room, the [preference] cards aren't right, the carts aren't stocked. For common procedures, they seem to do a better job having everything I need, so we get into rhythm and don't stop every ten minutes for something else." (Surgeon #2) "[people are more synchronized when] there is consistency, a routine for it. They know every step from start to finish and they understand what their role is; their role is very clear and they understand that. And they understand what the other person's role is . . . I think when everyone has that understanding of the whole room, then you just click. I've been in a room where you have your mask on, you can talk with your eyes, full of blood, I know what you need. I don't know how you build that, but it happens." (Circulator nurse #3)
Complacency	"When teams have worked together a lot, they get comfortable. They don't have to talk as much because it's like second nature. If they are just learning to do it, they pay more attention" (Anesthesia provider #1). "People are more comfortable with each other, so they're more lax on things" (Scrub technician #1) "Sometimes you just get into the swing of things, then you find yourself rolling the patient into PACU, trying to recall exactly what happened to give a report." (Circulator nurse #3)
Task frequency	"I do [specific medical specialty] procedures . . . where I was previously; these procedures were a lot more common, and they went much faster. I used to do [type of procedure] all the time, a couple a day and they were routinely done in an hour. Here, the first time I did one, it took three hours, the second time, almost three and half. I finally had to stop doing them here; it wasn't good for the patients. There was never going to be enough [type of procedure] for the staff to learn them." (Surgeon #3) "If it's a procedure we don't do all the time, then there's more conversation about the case because obviously we need to know, from our position we need to know [the patient] position, type of anesthesia . . . with a surgery you do all the time things that are already pre-ordained, the cart is in the room, the people are all in place, and it kind of follows ABC." (Anesthesia provider #2) "In an uncommon procedure, there isn't as much laughing and playing going on." (Scrub technician #2)
Task difficulty	"Well, if the patient has an unusual anatomy, or the case isn't going well for whatever reason, then they might still want to be lax because, oh you're just doing a [type of procedure]; you've done a hundred of these, it's not a big deal, but you're like no this one is actually difficult, I need you to focus and they might not want to focus. And that's probably because we've gotten so lackadaisical doing it, then when you do need them to focus, it is harder to redirect." (Surgeon #4) "If it's an easy case and there is a deviation from the routine, we make a minor adjustment, no big deal. But, if it's a tougher case that deviation can be much tougher to adjust to. You live in [location] now right? It's like driving a car in [a city with a grid layout] versus [city without a grid layout], when it's a grid and you miss a turn no big deal, but if you miss a turn when there's no grid, it's much tougher to get back on track—especially if you don't know the area." (Anesthesia provider #3) "We do this every day, we got this, easy-peasy." (Scrub technician #3)
Relationship between surgery efficiency and quality	"Most of the time, surgery is 1, 2, 3 simple and a quiet experience—those times you would see both efficient surgery and recovery. Although sometimes the surgery was efficient, but when I see the patient next they're recovering more slowly than expected. Those cases used to drive me crazy, speculating what got missed or messed up. Then other times there's bleeding and things you can't control, that hurt efficiency and recovery. Especially when there are people I don't know and they don't know the road or the way things go. They want to use the same game that "Dr This" uses and "Dr That" uses. So you have to adapt yourself to protocol and change them when necessary. But it is these times, you want to have a team that already comes ready." (Surgeon #5) "Well, it's [the relationship between surgery quality and efficiency] complicated. In one breath they tell you you're not supposed to assume anything, double check everything, they will tell you that repeatedly, but then again by the same token there's a question of well how efficient are you? Why aren't you getting this stuff done? Well if I have to go back and redo everything that's already been done, then there's a problem. Maybe that's where the team comes in—a good team can efficiently provide quality care, but without a good team you have to pick one or the other." (Circulator nurse #4)

TABLE 4
(Continued)

Dynamics in high STTS experience on frequent, difficult cases	"When I see my name on the [assignment] board next to a [type of frequent procedure], next to people I know, I feel relieved, this should be an easy case, and when it isn't, it catches you off guard, so you start questioning everything." (Scrub technician #1) "I guess, well, you walk into those cases thinking to yourself, we've done hundreds of these, it is going to be easy. Then when the patient presents differently, you get a little disoriented, maybe freak out a little. So, then I start running to get a bunch of different things that we might need, just in case, most of it we don't . . . and then each task becomes a bigger deal, like the counts, then I want to count all the sponges and sharps twice, not by group, not by tray, individually" (Circulator nurse #5) "It's like falling off a horse. It is hard to get back on and you are going to super cautious for the rest of the ride. So, yeah it is going to take a lot longer, but at the end everything has been double and triple checked and carefully done so the patient should recover faster." (Anesthesia provider #3)

and intricacies of interactions in different situations and confirmed the importance of examining task-related contingencies. For example, one interviewee expressed how care providers can become complacent on frequently performed procedures and how this creates challenges when it is a difficult procedure: "Well, if the patient has an unusual anatomy, or the case isn't going well for whatever reason, then they might still want to be lax because, oh you're just doing a [type of procedure], you've done a hundred of these, it's not a big deal, but you're like no this one is actually difficult, I need you to focus and they might not want to focus. And that's probably because we've gotten so lackadaisical doing it, then when you do need them to focus, it is harder to redirect" (Surgeon #4). Another interviewee highlighted the interaction of task difficulty while also providing insights into complacency manifesting as lack of vigilance: "If it's an easy case and there is a deviation from the routine, we make a minor adjustment, no big deal. But, if it's a tougher case that deviation can be much tougher to adjust to. You live in [location] now right? It's like driving a car in [a city with grid layout] versus [city without a grid layout], when it's a grid and you miss a turn no big deal, but if you miss a turn when there's no grid, it's much tougher to get back on track—especially if you don't know the area" (Anesthesia provider #3).

Finally, the interviews yielded a more nuanced understanding of the relationships with and between the team effectiveness indicators. The operating room personnel echoed the importance of surgical efficiency and patient recovery as indicators of team effectiveness and acknowledged the likely correlation between the two. They also spoke about the limitations of each measure, and the importance of the team in overcoming the seeming tradeoffs between doing things well versus quickly: "Well, it's [the relationship between surgery quality and efficiency] complicated. In one breath they tell you you're not supposed to assume anything, double check everything. They will tell you that repeatedly, but then again by the same token there's a question of well how efficient are you? Why aren't you getting this stuff done? Well if I have to go back and redo everything that's already been done, then there's a problem. Maybe that's where the team comes in—a good team can efficiently provide quality care, but without a good team you have to pick one or the other" (Circulator nurse #4).

After asking about the phenomenon and relationships generally, we directly probed for their interpretation of the most surprising finding from our ancillary analyses: specifically, that when teams had a great deal of STTS experience on a procedure frequently performed at the hospital, and the case was difficult, surgeries were less efficient but the patients recovered faster. In short, the interviewees highlighted that complacency can occur when there a sense of comfort generated by perceived knowledge sufficiency to accomplish the task: "We do this every day, we got this, easy-peasy" (Scrub technician #3). However, sometimes presumed to be easy surgeries turn out not to be so easy, triggering members to revisit their assumptions and routines: "When I see my name on the [assignment] board next to a [type of frequent procedure], next to people I know, I feel relieved. This should be an easy case, and when it isn't, it catches you off guard, so you start questioning everything" (Scrub technician #1).[6] They also highlighted how realizing they were being lax

[6] The assignment board is a magnetic white board that contains the scheduled start and end time, room number, procedure description, and assigned staff members for each surgery scheduled for that day. This is a where team members generally go to find their task assignments and potentially contributes to teams focusing on the procedure type rather than patient case characteristics.

prompts them to perform additional checks beyond the standard operating procedures: "I guess, well, you walk into those cases thinking to yourself, we've done hundreds of these it is going to be easy, then when the patient presents differently, you get a little disoriented, maybe freak out a little, so then I start running to get a bunch of different things that we might need, just in case, most of it we don't . . . and then each task becomes a bigger deal, like the counts, then I want to count all the sponges and sharps twice, not by group, not by tray, individually" (Circulator nurse #5). In sum, frequent tasks engender a sense of comfort and lower vigilance, but when the team realizes their complacency, they adjust and deliver quality care—albeit at a delayed pace.

DISCUSSION

In this study, we focused on crew-based arrangements to offer a rich and novel investigation of the relationship between STTS experience and team effectiveness. Toward this end, we integrated social entrainment theory (Harrison et al., 2003; McGrath & Kelly, 1986) and task characteristic theories (e.g., McGrath, 1984) along with more traditional knowledge-focused theories of shared team experiences (Berman et al., 2002; Katz, 1982). Most notably, we expanded social entrainment theory to consider the presence of countervailing forces (i.e., synchronization vs. complacency). We also identified two key task characteristics (i.e., frequency and difficulty) that serve as moderators of the STTS experience—team effectiveness relationship. In contrast to prior studies, we explore the impact of shared team experiences over a relatively long period of time (i.e., one year) and in a field setting as opposed to the more commonly used laboratory setting. We also present quantitative and qualitative data using both a priori and ancillary analyses. In sum, our study helps to unpack the contingencies of the STTS experience—team effectiveness relationship—by illustrating key boundary conditions that describe when the behavioral conditions generated by complacency will manifest, when they will be particularly detrimental, and how those relationships will vary across different measures of team effectiveness.

Our results for infrequent tasks were generally consistent with the broader literature on teams and task work (Berman et al., 2002; Katz, 1982). We demonstrated that STTS experience is related positively to team effectiveness, particularly in relatively more difficult tasks, both in terms of team efficiency in our focal analyses (Hypotheses 1a and 2a), and for patient post-surgery recovery rate in our ancillary analysis. Essentially, infrequent procedures are less comfortable and less predictable, which encourages team members to scan the environment and seek new information, allowing their shared knowledge, and synchronization benefits generated from higher STTS experience, to help the team conduct the surgery faster and better, especially for more difficult tasks. In contrast, our results for frequent tasks demonstrate important boundary conditions for the relationship between STTS experience and team effectiveness. Rather than a positive linear relationship, our results support an inverted U-shaped relationship between STTS experience and team efficiency where, at the highest levels of STTS experience (the top 12% of STTS experience values), the relationship tapers off and becomes significantly negative (Hypothesis 1b). Frequently performed tasks are more predictable for team members evoking deeply entrained rhythms. However, this predictability also appears to generate the behavioral components of complacency—reduced vigilance and lower levels of system monitoring. Our results suggest that complacency is not as detrimental to the team for easier tasks, likely because the task has lower knowledge requirements and more allowable variation. However, for very difficult tasks, even minor deviations can significantly delay surgery completion, so the negative consequences of the complacency are amplified (Hypothesis 2b).

Our ancillary analyses sought to further explore different indicators of team effectiveness, including an indicator that was more speed-focused (team efficiency) and an indicator that was more quality focused (patient post-surgery recovery rate) and yielded particularly interesting results for frequent tasks. Whereas our focal analysis suggested that complacency is manifest in frequent tasks, and is particularly detrimental for team efficiency in difficult tasks, our ancillary analyses and qualitative insights suggest that the shared knowledge resources present in the high levels of STTS experience enable teams to overcome the issues created by complacency. This allows the surgical team to provide quality patient care (manifesting in better patient post-surgery recovery rates)—although doing so requires more time.

Theoretical and Practical Implications

Our study contributes to the social entrainment and team effectiveness literatures as well as offering practical implications regarding shared team experiences in healthcare and elsewhere. First, social entrainment theory has largely focused on the potential for entrained rhythms to generate synchronization benefits and ignored the potential to generate complacency detriments (e.g., Moon et al., 2004; Standifer & Bluedorn, 2006). Yet, our results and interviews help to illuminate the key role complacency can play in limiting team efficiency under certain conditions. Specifically, we move beyond social entrainment theory's focus on task discontinuity (e.g., Harrison et al., 2003) and incorporated the task characteristics of frequency and difficulty as critical conditions that allow the behavioral components of complacency to manifest and become particularly detrimental. This expanded approach to entrained rhythms brings a greater richness to our understanding of the phenomenon.

Second, our study also contributes to the team effectiveness literature, specifically the literature on crew-based arrangements (Goodman & Garber, 1988; Goodman, & Leyden, 1991). Scholars have suggested that the team's structural configuration influences team dynamics and effectiveness (Hollenbeck et al., 2012). We posit that, for crew-based arrangements, the frequent reconstitution of team membership develops entrained rhythms in the larger collective (e.g., work area/unit), more so than for other team structures. This suggests that unit characteristics—such as task frequency—may be particularly important for crew-based arrangements. We also reaffirm the importance of featuring task characteristics (Mathieu et al., 2017) and examining multiple components of team effectiveness (Mathieu et al., 2008). This approach enriches our understanding of STTS experience as a potentially useful lever to enhance team effectiveness.

Our study also offers several practical implications for staffing decisions and selecting interventions to enhance team effectiveness in crew-based arrangements (e.g., airline, retail, service). Focusing on infrequent tasks, our results suggest that scheduling managers may seek to build STTS experience on easier tasks by varying team membership, whereas, for more difficult tasks, they should seek to create teams with higher levels of STTS experience to aid in team effectiveness. For frequently performed tasks, there appears to be some tradeoffs between surgical efficiency and patient recovery. However, it is worth noting that, despite the harmful effects of complacency on team efficiency, our ancillary analysis suggested that the knowledge resources embedded in high STTS experiences will still allow teams to perform well. Our interviews suggested that slowing down helped to get the team back on track and was a deliberate response to assure quality of patient care after the team became aware of the complacency (see Table 4, Anesthesia provider #3). This emphasizes the potential impact of interventions designed to ward off complacency without disrupting the team's rhythms. For example, various interventions such as pre-surgery briefing can be conducted by the team to raise awareness of task characteristics and the potential for complacency to occur. Teamwork training interventions may also help to offset complacency effects and can promote team coordination efforts and structured debriefs following task completion may promote insights for future team efforts (e.g., Burke, Salas, Wilson-Donnelly, & Priest, 2004; Mayer et al., 2011). In short, managers and human resource professionals have several programs at their disposal to promote team effectiveness, but our findings suggest that managing STTS experience levels are among the effective options.

Finally, this study also contributes to the healthcare domain by providing evidence-based guidance on the influence of STTS experience on surgical team effectiveness. The healthcare industry is currently facing a variety of challenges resulting from industry-wide reforms and financial challenges. As hospitals struggle to control costs, every minute in the OR is important. Each minute in the surgical suite costs hospitals on average \$62 (Macario, 2010) and each inpatient day costs the hospital roughly \$2,212 (Kaiser Family Foundation, 2014); so surgical team effectiveness is of utmost importance. Although several of the factors within our study are generally outside the control of hospital staff (e.g., type of patient procedure, patient characteristics), the factors that are within the control of the hospital staff (i.e., STTS experience configurations, average task experience, and membership churn) account for about 5%–25% of the variance across models, suggesting important potential leverage points. Even if the surgical efficiency and patient recovery rate were improved by as little as 3% each, it could generate a cost savings of over \$1,800,000 for the hospital studied here per year.[7] In addition to the potential

[7] In our sample the average surgery duration was 62 minutes and an average patient post-surgery length of stay of 1.57 days. Three percent × 62 minutes × 8,236 surgeries annually x \$62 per minute = \$949,776 cost savings from improved surgical efficiency. Three percent × 1.57 days × 8,236 surgeries annually x \$2,212 cost per inpatient day = \$858,069 cost savings from improved patient recovery rates. \$949,776 + \$858,069 = \$1,807,845.

financial benefits to hospitals, there are multiple constituencies who could also benefit from enhanced patient post-surgery recovery rates such as insurance companies, organizations that offer healthcare plans to their employees, and the patients and their families who may experience suffering and discomfort as well as direct and indirect financial costs.

Limitations and Directions for Future Research

Naturally, this study is not without limitations. Complacency is a challenging construct to examine outside of a laboratory because data are susceptible to evaluation apprehension (for interview and survey-based techniques) and the Hawthorne effect (for observation-based techniques). This point was highlighted by one of our interviewees: "None of us want to admit that maybe, sometimes, we were less than perfect, that maybe there is something else we could have done, could have noticed, part of that is a license and legal issue, but part of that is our profession. This is my calling, and to say that I might have fallen short at times hurts. We are expected to be superhuman, focused for hours on end without eating, sleeping, or [using the restroom], have perfect recall and never making a mistake—that just isn't possible" (Surgeon #6). Accordingly, we used a combination of archival and interview data to offset the individual limitations of each method. The use of archival data allowed us to conduct a large-scale examination (N = 8,236 surgeries), whereas the use of interview data provided rich insights regarding the nuances of the phenomena.

Archival data are limited and unable to formally index the strength of the entrained rhythms for each surgery. We encourage future investigations to employ richer measures of entrained rhythms that will enable their examination over time at a high level of fidelity. This could entail experience sampling type investigations that can test reasons for differing speeds and consequences of team rhythms. One of the interviewees (Anesthesia provider #2), while acknowledging the potential for teams to be "lax," later commented that some reductions in efficiency could be a deliberate proactive response (being careful) rather than complacency or compensating for earlier negligence: "When a surgery goes well, it is likely to be more efficient and the patient will have an easier and faster recovery. When a surgery doesn't go well, it is likely to take longer and patient will have a harder recovery. But that doesn't tell the whole story, sometimes a surgery goes slower because you're being careful, which is a good thing, and sometimes a surgery goes faster, but it's a bad thing because people should have been more careful, taken their time, and done things right." We hope future research will be able to capture the dynamics of the rhythms throughout the surgery and be able to tease out the reasons for, and implications of, varying surgical durations.

Second, although this study is one of the first to consider task characteristics in concert with an examination of the impact of STTS experience, we examined only two characteristics (i.e., frequency and difficulty). Although we selected task characteristics that were salient in our study context, there are likely others that may be important in other contexts. For example, the job characteristics model suggests that task meaningfulness, autonomy, and feedback are salient task features (Hackman & Oldham, 1980). Incorporating these task characteristics invites a variety of questions such as whether feedback could help mitigate the negative consequences of complacency. Furthermore, the interviews suggest that the occurrence of unanticipated events during surgery (see, Table 4, Scrub technician #1 & Circulator nurse #5) could be a potentially fruitful area to explore. We are particularly interested in whether some unanticipated events could have been reasonably anticipated; how long it takes for teams to see the warning signs, and how they responded. We hope future research will explore the influence of task characteristics and expand to consider the influence of attention and situational cues.

Third, our study is limited by the nature of our sample and scope of the study. We featured the operating room in a single hospital in the United States, focusing on a specific type of team (i.e., surgical crews) which does not allow us to compare across hospitals or team types. Although we expanded the number of procedure types typically examined in healthcare studies (e.g., ElBardissi, Duclos, Rawn, Orgill, & Carty, 2013; Xu et al., 2013), and described how task frequency was operationalized in our sample hospital in a way that is generalizable across hospitals (and other contexts), we ultimately only examined the relationships at one hospital. We hope future research will analyze data across multiple hospitals that have different procedure volumes (e.g., for hospital A, vascular surgeries are performed frequently/daily; whereas at hospital B, vascular surgeries are performed infrequently/monthly), to provide stronger evidence of the influence of task frequency. We further suggest that research should explore such relationships across different team structures and compositional issues. For example, a comparison between in-tact teams, crew-based arrangements, ad hoc (one-shot) teams, and multi-team configurations, where individuals are simultaneously members of multiple teams (e.g., Maynard, Mathieu, Rapp, & Gilson, 2012), would likely yield great insights about the development and dispersion of entrained rhythms. Moreover, it would be informative to incorporate members' individual differences and expand the scope of team composition variables (Mathieu, Tannenbaum, Kukenberger, Donsbach, & Alliger, 2015). For example, several interviewees mentioned the presence of personality differences and importance of compatibility: "There are a lot of different personalities around here, although I suppose that is true anywhere… I think surgeries go better when we work with people we like—or at least know" (Scrub technician #4).

Finally, our findings focused on the influence of STTS experiences on team efficiency and effectiveness, while theorizing the role of complacency. However, optimizing the STTS experience or taking other steps to minimize complacency may have other implications when exploring the phenomenon at different levels. For example, at the organizational level, enhancing STTS experience for a surgical team has implications in terms of the availability of personnel for other operations. Future research could examine STTS experience from a strategic human resource utilization standpoint, exploring the array of surgeries that need to be performed in concert with the availability of personnel, their STTS experiences, and the characteristics of the surgeries. Similarly, at the individual level, the minimization of complacency may aid in team efficiency, but may have detrimental effects on care providers' well-being. For example, scholars found that when complacency was induced via computer automation systems, it reduced the individual's cognitive workload, a well-known job demand (Sauer et al., 2016). Furthermore, depending on the other demands on the individual, complacency may serve as a recovery mechanism that ultimately helps the individual contribute to the team more in the future (e.g., Cegarra & Hoc, 2008). For example, one interviewee commented: "There is so much going on during the day… so when you are on a procedure you're comfortable with, with people you know are good, you do calm down, maybe don't watch as closely because you trust they are doing it right" (Circulator nurse #5). Future research could explore whether the benefits of complacency to the individual could potentially outweigh the potential detriments to the team.

CONCLUSION

This study addressed two key issues facing the shared team experience literature, namely the prior exclusion of complacency from theories pertaining to STTS experiences in crew-based arrangements and the limited understanding of the conditions under which complacency is most likely to manifest and detrimentally influence team effectiveness. Drawing from and extending the literatures on knowledge acquisition and social entrainment, we suggest that STTS experience influences team effectiveness via knowledge accrual and entrained rhythms, which we argue have the potential to generate both synchronization benefits and complacency detriments. We also found that two key task characteristics—frequency and difficulty—create the conditions under which the countervailing forces of synchronicity or complacency will manifest and be most detrimental to team effectiveness. Overall, our study illuminated the contingencies present in the relationship between shared team experiences and team effectiveness.

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APPENDIX A

Summary of HLM Models for the Full Sample

TABLE A1
Descriptive Statistics and Correlations—Full Sample

		M	*SD*	1	2	3	4	5	6	7	8	9
1	Procedure volume	633.54	722.02									
2	Patient sex[a]	.47	.50	.07***								
3	Task urgency	1.25	.61	.14***	.02							
4	Task frequency	.74	.44	.74***	.19***	.10***						
5	Membership churn	.10	.14	−.11***	−.03**	−.05***	−.22***					
6	Members' task experience	756.91	475.26	.52***	.11***	−.08***	.61***	−.22***				
7	Shared team, task-specific experience	43.40	79.60	.02*	.07***	−.16***	.23***	−.23***	.77***			
8	Task difficulty	.00	.55	.04***	.01	.21***	−.02*	.22***	−.21***	−.36***		
9	Team efficiency	.46	.33	.04***	.01	.06***	.13***	−.36***	.13***	.14***	−.24***	
10	Patient post-surgery recovery rate	1.57	2.96	−.14***	−.05***	−.27***	−.05***	−.11***	.06***	.18***	−.48***	.20***

[a] Coded as 0 = female; 1 = male.
Notes: Means and standard deviations are reported in raw score form.
The procedure volume variable was assigned to the patient level for correlations. The magnitude of these correlations accurately reflects the effect sizes at their respective level of analysis. However, the lack of independence at the procedure-type level does bias the standard errors. Accordingly, the significance levels should be interpreted with caution.
* $p < .05$
** $p < .01$
*** $p < .001$

TABLE A2
Summary of HLM Models Predicting Team Efficiency—Full Sample

Predictors	Model 1		Model 2		Model 3		Model 4	
Procedure grouping-level effects	γ	*SE*	γ	*SE*	γ	*SE*	γ	*SE*
Procedure volume	.19	.27	.22	.27	.20	.25	.19	.24
Patient-level effects	β	*SE*	β	*SE*	β	*SE*	β	*SE*
Patient sex[a]	.00	.01	−.01	.01	.00	.01	.00	.01
Task urgency	.09***	.01	.09***	.01	.09***	.01	.09***	.01
Membership churn	−.28***	.01	−.28***	.01	−.28***	.01	−.28***	.01
Task frequency	−.04	.25	−.02	.24	.02	.23	.04	.22
Task difficulty	−.17***	.01	−.17***	.01	−.20***	.01	−.17***	.01
Members' task experience	.11***	.03	.03	.03	.05	.03	.05	.03
STTS experience	−.13***	.03	.17**	.06	.15*	.07	.17*	.07
STTS experience squared			−.21***	.04	−.23***	.04	−.24***	.04
STTS experience × task frequency					.12*	.05	.17**	.05
STTS experience × task difficulty					−.09***	.02	−.01	.02
Task frequency × task difficulty					−.05***	.01	.00	.02
STTS experience × task frequency x task difficulty							.17***	.04
$\sim R^2$	.37		.39		.41		.43	

Notes: Level 1 n = 8,236; level 2 n = 13; STTS experience = shared team task-specific experience.
$\sim R^2$ = pseudo effect sizes.
[a] Coded as 0 = female; 1 = male.
* $p < .05$
** $p < .01$
*** $p < .001$

TABLE A3
Summary of HLM Models Predicting Patient Post-Surgery Recovery Rate—Full Sample

Predictors	Model 1		Model 2		Model 3		Model 4		Model 5	
Procedure grouping-level effects	γ	*SE*	γ	*SE*	γ	*SE*	γ	*SE*	γ	*SE*
Procedure volume	−.05	.11	−.13	.09	−.14	.09	−.12	.11	−.12	.11
Patient-level effects	β	*SE*	β	*SE*	β	*SE*	β	*SE*	β	*SE*
Team efficiency	.15***	.01	.10***	.01	.10***	.01	.11***	.01	.11***	.01
Patient sex[a]			−.04***	.01	−.04***	.01	−.04***	.01	−.04***	.01
Task urgency			−.17***	.01	−.17***	.01	−.17***	.01	−.17***	.01
Membership churn			.00	.01	.00	.01	.00	.01	.00	.01
Task frequency			−.04	.08	−.04	.08	−.02	.10	−.01	.10
Task difficulty			−.42***	.01	−.42***	.01	−.38***	.01	−.37***	.01
Members' task experience			.09***	.03	.11***	.03	.08**	.03	.08**	.03
STTS experience			−.07**	.02	−.13*	.06	.00	.06	.01	.06
STTS experience squared					.04	.04	.12**	.04	.12**	.04
STTS experience × task frequency							.08	.05	.09	.05
STTS experience × task difficulty							.16***	.02	.18***	.02
Task frequency × task difficulty							.08***	.01	.09***	.02
STTS experience × task frequency x task difficulty									.06	.03
$\sim R^2$	.08		.40		.40		.41		.41	

Notes: Level 1 $n = 8{,}236$; level 2 $n = 13$; STTS experience = shared team task-specific experience.
$\sim R^2$ = pseudo effect sizes.
[a] Coded as 0 = female; 1 = male.
* $p < .05$
** $p < .01$
*** $p < .001$