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An Exploration of Psychological Safety in Allied Healthcare Clinical Education

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Abstract: *Psychological safety impacts learning in various professions and settings, including healthcare. While the construct has been investigated in medical and nursing education, less is known within allied health education. This study aimed to investigate athletic training and physical therapy students' perceptions of psychological safety within clinical experiences using the Psychological Safety Scale. Participants of this quantitative, cross-sectional survey were students and recent graduates of Master of Athletic Training and Doctor of Physical Therapy programs. Data was collected anonymously via Qualtrics using a convenience sample. Following data cleaning and imputation, the study returned 338 usable responses, 169 from each profession. Descriptive statistics were used to analyze demographic data, and ANOVA analyses were used for between-group comparisons. No differences in psychological safety were found based on age, gender identity, profession, student versus graduate status, degree progress, or number of clinical experiences completed. Although not statistically significant, data analysis revealed students early in their degree progression reported the highest levels of psychological safety, 5.73 (SD = 1.16) which declined with degree progress, reaching the lowest levels among recent graduates at 5.46 (SD = 1.20). Psychological safety was remarkably similar between athletic training and physical therapy students and was higher than reported findings for nursing and medical students. This study provides a baseline understanding of psychological safety within allied health professions' clinical experiences. Further research is needed to understand the influence of psychological safety in clinical experiences.*

Keywords: clinical reasoning, psychological safety, clinical experience, athletic training, physical therapy

Learning in allied health professions is a prominent topic in the literature, with thousands of related publications over the last 10 years covering various strategies to facilitate learning

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(Appelbaum et al., 2016; Appelbaum et al., 2020; Appelbaum et al., 2018). However, research has yet to fully understand the impact of the clinical experience environment on students' development, including the impact of psychological safety within that environment.

LITERATURE REVIEW

PSYCHOLOGICAL SAFETY: CHARACTERISTICS AND HISTORY

Psychological safety focuses on the relationship between an individual or a group of individuals and the environment of interest (Edmondson, 1999). Specifically, the construct refers to a person's comfort voicing opinions, seeking and giving feedback, collaborating, taking risks such as asking a question or admitting to a lack of competence, and experimenting (Edmondson, 1999; Edmondson, 2018). A psychologically safe environment positively contributes to an individual's willingness to communicate effectively and honestly, source creative solutions to problems, innovate, share knowledge, and learn (Edmondson, 2003; Edmondson et al., 2016; Edmondson et al., 2004; Edmondson & Lei, 2014). Psychological safety is considered foundational to the success of teams and individuals working in high-stress or high-stakes environments (Edmondson, 2003; Edmondson et al., 2016), which includes healthcare. Early work theorized environments with strong psychological safety help individuals overcome feelings of defensiveness or anxiety around learning (Schein, 1992). Of particular interest to the concept of psychological safety is the process of solving a puzzle or learning a new skill, which was termed "cognitive insight" by Schein in his research on learning (Schein, 1992). When one fails to achieve cognitive insight based on complexity of the problem, anxiety results, and one may develop an aversion to learning in the future (Schein, 1992). Schein (1992) also discussed how the behaviorist side of learning requires the vulnerability to admit to a lack of knowledge and a willingness to unlearn bad habits; to succeed in this learning method, individuals must feel safe admitting to a lack of knowledge or skill, and the organizational culture must recognize errors as a learning opportunity (Schein, 1992). Each of these concepts contributes to a psychologically safe environment.

PSYCHOLOGICAL SAFETY IN HEALTHCARE EDUCATION

Psychological safety has been researched in medical school programs, primarily in clinical experiences, and nursing programs, predominantly within simulation-based education (Edmondson & Lei, 2014; Ko & Choi, 2020; McClintock et al., 2022; Nembhard & Edmondson, 2006). However, there is a lack of literature investigating psychological safety within allied health education. One concept particularly applicable to allied health professions is the hierarchy among healthcare team members, which refers to the different levels of authority held by individuals. Edmondson and colleagues emphasized the impact of the hierarchy that exists within healthcare, specifically, the difficulty individuals have speaking up when a status difference exists (Nembhard & Edmondson, 2006; Newman et al., 2017). The hierarchical structure that is predominant in healthcare settings is known to negatively impact information sharing among colleagues and is linked to the incidence of medical errors (Newman et al., 2017; O'Donovan et al., 2021). A hierarchical structure is also known to inhibit psychological safety and learning (Newman et al., 2017; Olson & Bialocerkowski, 2014). Just as a hierarchy exists within the professional field, it also exists in clinical experiences. In these settings, students work under the supervision of a clinical preceptor who evaluates their competence, creating a hierarchy in which the preceptor has authority over the student. In situations where an adult learner is evaluated by a superior, the

learner tends to underachieve (Page, 2004). Work by McClintock and colleagues expanded on this concept in a study involving medical students in clinical experiences; they found that students considered it risky to admit to a lack of knowledge or skill, ask questions, or chance answering a question incorrectly (McClintock et al., 2022).

Researchers also presented findings suggesting that difficulty speaking up across status lines can negatively impact learning and growth (Newman et al., 2017; O'Donovan et al., 2021; Park & Kim, 2021; Regmi & Jones, 2020). To better enable student learning in clinical experiences, preceptors should be aware of the hierarchy's potential impact on students, and actively facilitate a psychologically safe learning environment. Preceptors can promote psychological safety by prioritizing learning as a central goal of the experience, communicating respectfully, disclosing their knowledge or skill gaps, creating opportunities for informal assessment, safeguarding time for debriefing, and providing clear assessment rubrics (McClintock et al., 2022). Benefits of taking these steps include students are better able to focus, less afraid to ask questions, and are less inhibited by concerns about their image or appearing to lack knowledge (Edmondson & Lei, 2014; Roh et al., 2021; Ryall et al., 2016).

The purpose of this study was to establish baseline measures of psychological safety within allied health, specifically among students in Doctor of Physical Therapy and Master of Athletic Training programs. The goal was to understand the current climate within clinical experiences from the student perspective and suggest areas for improvement or future research.

METHODS

The study used a quantitative, cross-sectional survey design. Participation was voluntary following click-through informed consent, and data was collected anonymously through Qualtrics® as part of a larger electronic survey. The study utilized convenience and snowball sampling through contact with program directors, faculty, and professional organizations via email and social media. Descriptive statistics were used to analyze demographic data, and ANOVA analyses were used for between-group comparisons through Intellectus Statistics™.

PARTICIPANTS

Participants included students and recent graduates (within the last 12 months) from Master of Athletic Training (MAT) and Doctor of Physical Therapy (DPT) programs. Students enrolled in and graduated from MAT and DPT programs were selected because both are allied health populations in which little is known about the perception of psychological safety. Feedback from program directors during recruitment indicated the population estimates may have been inflated; not as many MAT programs had launched as anticipated, resulting in a smaller target population. Though the exact number of MAT students cannot be calculated, we estimated the population of MAT and DPT students to be 36,822 based on available data. Using a confidence level of 95 and a confidence interval of 5%, the minimum sample size needed for generalizability was 380 individuals. Using the same metrics, our sample of 338 is above the minimum response needed for a 90% confidence level: 271 responses. Consequently, we can say with 90% confidence that the results of our study are generalizable to the population.

INCLUSION/EXCLUSION CRITERIA

Inclusion criteria included active enrollment in an accredited MAT or DPT program or successful matriculation from an accredited program located within the United States, within the

last 12 months. MAT programs are accredited by the Commission on Accreditation of Athletic Training Education (CAATE), and DPT programs are accredited by the Commission on Accreditation in Physical Therapy Education (CAPTE). Additionally, students had to be currently or recently (within the last 12 months) enrolled in a clinical experience. For the purposes of this study, a clinical experience refers to an opportunity for students to participate in clinical practice under the supervision and guidance of a preceptor or clinical instructor (Recker-Hughes et al., 2014). Students who had not yet been enrolled in a clinical experience were excluded from the study. This was part of a larger study, and participants for this study were limited to those who completed the Psychological Safety Scale (PSS) measure.

INSTRUMENTATION

Demographic information was collected at the beginning of the survey, including age, gender identity, progress toward degree completion, graduate versus student status, degree type, profession, number of clinical experiences completed, and number of clinical experiences required by the program. To measure an individual's perception of psychological safety, the survey used the PSS, a 7-item Likert scale introduced by Edmondson (Edmondson, 2003), which is considered the preferred instrument in the literature (Newman et al., 2017). The PSS is a validated measure that has been used extensively since its development in the 1990s when it demonstrated a Cronbach's Alpha of .82 (Edmondson, 2003). The PSS is measured on a 7-point scale ranging from "very inaccurate" to "very accurate" (Edmondson, 2003). Since its development, the measure has been modified numerous times to fit various populations and settings (Newman et al., 2017; O'Donovan et al., 2021). The measure's language was modified slightly for the target population; for example, "Members of this team…" was changed to, "Students in this clinical experience…" A sample item from the modified measure includes, "Students in this clinical experience are able to bring up problems and tough issues." The adapted measure was then pilot-tested, yielding a Cronbach's Alpha of .79, indicating acceptable reliability. In the study, the PSS demonstrated a Cronbach's Alpha of .83, indicating good reliability.

ANALYSES

Survey data were analyzed for completeness and accuracy; partial responses were addressed using imputation through Intellectus Statistics™ software. Negatively worded items were reverse-coded before analysis. Descriptive statistics and ANOVA methods were used to analyze the data.

RESULTS

The survey gathered 453 unique responses. Following data cleaning and imputation, the study yielded 338 usable responses, 169 individuals from athletic training, and 169 from physical therapy, a completion rate of 74.6%.

PSYCHOLOGICAL SAFETY SCALE

Data analysis of the PSS yielded a mean score of 5.56 (SD = 1.10) out of 7, with a score of "1" representing "very inaccurate, and "7" representing "very accurate", and higher scores translating to higher perceived levels of psychological safety. Descriptive statistics yielded insightful details about the sample demographics. When analyzed by age group, no significant differences were found among respondents. PSS scores among the levels of age were all similar

based on an ANOVA, $F(5, 332) = 1.18$, $p = .320$, with an eta squared of 0.02, which could indicate a small effect size with limited practical applicability based on Cohen's standard of effect size (Cohen, 1988).

Filtered by gender, females reported an average score of 5.59 (SD = 1.10), while males reported 5.50 (SD = 1.06); although ANOVA found significance with $F(2, 335) = 5.74$, $p = .004$, $\eta_p^2 = 0.03$, indicated a small effect size, there were no statistically significant differences between male and female respondents. Notably, 253 respondents identified as female, and 84 identified as male. One individual selected "prefer not to say." Females were represented at a higher rate in this study at 74.85% compared to the population, 67.04% for AT and 61.75% for PT (CAATE, 2023 & CAPTE, 2023). Males in our study represented 24.85%, compared to 32.73% for AT and 38.12% for PT. Finally, those who selected prefer not to say represented 0.3% in our study, and 0.19% for AT and 0.13% for PT. In the literature, Scheepers (2018) reported 38.1% female, and Roh (2021) reported 92.3% female, indicating large ranges in gender within sample. These authors did not make comparisons in PSS scores based on gender. Differences by gender in this study were between males and prefer not to say, and females and prefer not to say. Scores for the individual who preferred not to say were excluded because of the small N. Although nonbinary and write-in options were included in the gender demographic question, no respondents selected these options.

Respondents from 8 ethnic groups participated in the survey: Caucasian (269), Latino or Hispanic (31), Two or More (19), Asian (11), African-American (10), Prefer not to say (3), Native Hawaiian or Pacific Islander (2), and Native American (1). An ANOVA analysis indicated there were statistically significant differences in PSS scores based on ethnicity, $F(7, 330) = 2.16$, $p = .037$. The eta squared was 0.04, a small effect size indicating ethnicity may explain approximately 4% of the variance in PSS scores. The mean of PSS scores for Caucasian (M = 5.59, SD = 1.07) was significantly larger than for Native Hawaiian or Pacific Islander (M = 3.12, SD = 2.05), $p = .033$. The mean of PSS scores for Two or More (M = 5.63, SD = 1.18) was significantly larger than for Native Hawaiian or Pacific Islander (M = 3.12, SD = 2.05), $p = .044$. Finally, the mean of PSS scores for African-American (M = 5.75, SD = 1.00) was significantly larger than for Native Hawaiian or Pacific Islander (M = 3.12, SD = 2.05), $p = .042$. Descriptive data are provided in Table 1 with comparisons to population level demographics.

Current athletic training (AT) students had already completed a mean of 3.24 clinical experiences, while current physical therapy (APTA) students had completed a mean of 2.01 clinical experiences, as shown in Table 2. Further, among currently enrolled students, those who were currently in a clinical experience reported slightly higher scores on the PSS compared to students who were reflecting on a previous clinical experience, 5.65 (SD = 1.03), and 5.45 (SD = 1.18), respectively, with 190 students currently in a clinical experience and 148 not actively in a clinical experience. Notably, AT recent graduates reported having completed a mean of 6.32 clinical experiences during their master's program, while PT recent graduates reported a mean of 4.39 clinical experiences during their doctorate program.

When filtered by profession, athletic training respondents showed a mean score of 5.56 (SD = 1.09) on the PSS, while physical therapy respondents scored 5.55 (SD = 1.12), showing no statistical or practical difference between the professions through ANOVA analysis, $F(1, 336) = 0.01$, $p = .941$, $\eta_p^2 = 0.00$. When stratified by profession and student status, we found current students of each profession reported almost identical scores, 5.59 (SD = 1.08) for AT students and 5.60 (SD = 1.03) for PT students, as shown in Table 3. We again found similar scores among respondents who had graduated within the last 12 months, with AT participants reporting 5.52 (SD =1.12), and PT participants reporting 5.41 (SD = 1.37). The results of the ANOVA for PSS scores

were not statistically or practically significant, $F(3, 334) = 0.33$, $p = .800$, $\eta_p^2 = 0.00$, indicating the differences in PSS scores among the levels of student versus graduate status were all similar.

Progress toward degree completion was measured in quartiles, with a fifth category, 100%, representing recent graduates. No significant differences were found based on ANOVA analysis, $F(4, 333) = 0.59$, $p = .669$, though it is of interest to note the highest levels of psychological safety were reported by students early in their degree program at 5.73 (SD = 1.16) and decline as students progressed through their education, with individuals who had already graduated reporting the lowest levels at 5.46 (SD = 1.20). Eta squared was 0.01, a small effect size which may indicate some practical differences between groups. Descriptives are provided in Table 4.

An ANOVA analysis was conducted to assess for differences in PSS scores by number of clinicals completed, further filtered by profession. The results of the ANOVA were not significant, $F(12, 155) = 1.49$, $p = .133$, $\eta_p^2 = 0.10$ for AT, and $F(8, 160) = 0.77$, $p = .632$, η_p^2 0.04 for PT, indicating there were no significant differences of PSS scores by number of clinicals completed or when striated by profession. The means and standard deviations are presented in Table 5.

DISCUSSION

Several demographic characteristics had no statistically significant impact on an individual's perception of psychological safety, namely age, gender identity, profession, student versus graduate status, degree progress, and number of clinical experiences completed. Data showed a striking similarity between professions, with no statistical or practical difference in reported levels of psychological safety between MAT and DPT students, despite the differences in program length, degree level, and number of clinical experiences. With caution, we can draw comparisons to studies of physicians, medical students, and nursing students, noting these studies reported different sample sizes, and used a 5-point Likert scale rather than the 7-point Likert scale originally validated by Edmondson (Edmondson, 1999). One study conducted among physicians in an academic medical center yielded an average score of 3.94 (SD = .54), on a 5-point scale (Scheepers et al., 2018), which would equate to 5.41 on a 7-point scale. Another among nursing students found an average PSS score of 3.07 (SD = .62) on a 5-point scale (Roh et al., 2021), which equates to 4.12 on a 7-point scale. Finally, a study among medical students found an average PSS score of 3.51 (SD = .27) on a 5-point scale (Appelbaum et al., 2018), equating to 4.77 on a 7-point scale. By comparison, our sample reported 5.56 among AT students and 5.55 among PT students. These levels of perceived psychological safety are similar to those reported by physicians, and higher than levels reported by nursing and medical students.

Data analysis revealed a trend between an individual's perception of psychological safety and progress toward degree completion. Those early in their education journey reported the highest levels of psychological safety, while numbers were lower for students who were more than 25% of the way through their degree program, and recent graduates reported the lowest levels of psychological safety. We recommend future research investigate this trend further.

One demographic category, ethnicity, yielded statistically significant results. ANOVA analysis of PSS scores by Ethnicity, $F(7, 330) = 2.16$, $p = .037$, indicated there were statistically significant differences in PSS average scores with an eta squared of 0.04 and implying ethnicity may explain approximately 4% of the variance in PSS average scores. However, differences were between Caucasian (n = 261) and Native Hawaiian or Pacific Islander (n = 2), between Two or More (n = 19) and Native Hawaiian or Pacific Islander (n = 2), and between African-American (n = 10) and Native Hawaiian or Pacific Islander (n = 2). Considering the differences in sample size

between these groups, and the convenience sampling method used, we cannot ascertain practically significant differences in PSS scores by ethnicity. Further research is needed to understand how ethnicity may impact an individual's perception of psychological safety.

STRENGTHS/LIMITATIONS

This study was limited by recruitment. Access to participants was limited because it focused on a student population and relied on convenience sampling. The investigators could not contact students directly and relied on word of mouth through email and social media contacts with program directors and other faculty, as well as professional organizations. This contact method may have impacted the study, as randomized sampling was not feasible. Notably, Asian and African-American groups were under-represented in this study compared to population-level data; see Table 1 for details. Similarly, males were under-represented compared to population-level data. The study did not meet its target number of 380 usable responses, even though it gathered 453 initial responses, leading to a confidence level of 90% rather than 95%. A Type 1 error is also possible, though the authors took steps to minimize this possibility by running ANOVA analyses rather than individual t-tests. The study was strengthened by utilizing a previously validated survey measure, which yielded good reliability after minor population-specific language modifications at $\alpha = .83$.

CONCLUSION

Facilitating psychological safety in the clinical environment is foundational to facilitating learning. This study raises awareness of the importance of psychological safety for the development of clinical reasoning skills within allied health clinical experience settings. This study is the first to establish an understanding of students' perceptions of psychological safety in the clinical experience setting among athletic training and physical therapy students. This knowledge paves the way for future studies on the construct within health professions education and practice. We recommend educators evaluate their programs for potential barriers to psychological safety and take steps to mitigate barriers and promote psychological safety in clinical experiences. Given the limitations of this study, we also recommend future studies investigate whether a relationship exists between demographic characteristics, such as ethnicity, and perception of psychological safety, using a more evenly distributed sample.

ETHICAL APPROVAL

The study was determined exempt following review by the Institutional Review Board at Rocky Mountain University of Health Professions.

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