Connection Index Manual
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Why Assess Interpersonal Interactions in Medical Education?

Medical education has unique stressors that other careers don't have: sick and dying patients, exposure to traumatic situations, and many work hours to meet the demands of a heavy workload. In addition, there is a never ending amount of information to learn and absorb, debt accrued in the process, and often stress to come home to as well. Medical students and residents are strong and resilient, but they also come up against significant stressors and thus, must adapt. To do this, recovery from these stressors must take place. Where does recovery occur? How do we optimize wellness, meaning, and thriving in those that train in this incredible, humanitarian field? Without recovery, chronic stress results in increased risk for burnout, depression and even suicidality. Burnout and depression leads to decreased educational goals and subpar patient care. To better study how to optimize what occurs in training, we must look at how to create better work environments and work relationships, which can be part of the recovery process. If we have ways of accurately assessing interpersonal dynamics within the medical team, we can start to target interventions that increase connection, which will lead to better educational and patient outcomes.

The Problem that Exists

1. Burnout

Definition

Burnout, defined as "a syndrome of depersonalization, emotional exhaustion, and a sense of lower personal accomplishment that leads to decreased effectiveness at work," is high among medical students and resident physicians (Cook, Arora, Rasinski, Curlin, & Yoon, 2014; Dahlin & Runeson, 2007; Dyrbye et al., 2008; Dyrbye et al., 2010; Fahrenkopf et al., 2008; Maslach, Jackson, & Leiter, 1996). One longitudinal study showed that depression scores above the 80th percentile for three medical school classes rose from 18% before starting medical school to 39% at year 2 and 31% at year 4 (Rosal et al., 1997). In a cross-sectional study involving 4287 medical students at 7 medical schools, 49.6% reported that they were burned out and 11.2% reported suicidal ideation (Dyrbye et al., 2008). Burnout was also found to be significantly associated with increased risk for suicidal ideation (Dyrbye et al., 2008).

Cause

There are three components of the Maslach burnout inventory: emotional exhaustion, personal accomplishment, and depersonalization (Maslach, Jackson, & Leiter, 1997). Identified attributors of burnout include: excessive workload with higher patient volumes, frequent overnight calls, greater work-hours, and lower autonomy (Martini et al., 2004; Prins et al., 2007). One narrative review cited the following factors as contributing to burnout: dissatisfaction with overall learning environment, dissatisfaction with faculty support, and working with cynical residents (Dyrbye & Shanafelt, 2016). Attending physician demands, stressful relationships with supervisors, lack of timely feedback, and a perception that personal needs are inconsequential were all are associated

with burnout (Fahrenkopf et al., 2008; Martini et al., 2004; Prins et al., 2007; Rosal et al., 1997). For medical students, mistreatment by attendings and residents was also reported as a reason for increased burnout rates (Cook et al., 2014).

Correlation to Connection

Interpersonal stress in the medical education environment plays a significant role in physician trainee burnout (Prins et al., 2007). Specifically, medical student mistreatment is explicitly linked to burnout. In one study looking at mistreatment of 3rd year medical students across 24 medical schools, 10.7% of medical students reported recurrent mistreatment by faculty and 12.6% reported recurrent mistreatment by residents (Cook et al., 2014). 57.4% of those who had been recurrently mistreated by faculty reported high burnout, versus 31.5% of those who had not been recurrently mistreated by faculty, while 49.1% of those recurrently mistreated by residents also reported high burnout, versus only 32.1% of those who had not been recurrently mistreated by residents (Cook et al., 2014).

Impact

This burnout, whether explicitly tied to interpersonal stress or not, has been shown in multiple studies to correlate significantly with poorer patient outcomes and poorer educational outcomes for physician trainees. Medical students who had higher burnout were more likely to cheat, plagiarize, and "impair the delivery of timely and accurate patient care" (Dyrbye et al., 2010). This impediment to good patient care took various forms including reporting a lab test as "pending" when unsure that they had ordered it and reporting a patient's physical exam finding as "normal" when they had not performed that part of the physical exam (Dyrbye et al., 2010).

A national study that surveyed almost all US internal medicine residents from 2008-2009 found that burned out residents who reported decreased quality of life, decreased satisfaction with work-life balance and increased frequency of burnout symptoms scored significantly lower on **standardized examinations** (i.e. Internal Medicine In-Training Examination [IM-ITE]) with differences in medical knowledge as measured by IM-ITE score as large as the difference observed across an entire year of residency training when compared to their peers who were on the opposite side of the burnout spectrum (West, Shanafelt, & Kolars, 2011). What is even more stunning is that the most burned out residents with lower quality of life who started with lower scores did not recover to the level of their colleagues during the course of training, showing the persistence of burnout throughout residency (West, Shanafelt, & Kolars, 2011).

Burnout has also been shown to be significantly associated with an increase in **medical errors**. In another cross-sectional study surveying 2773 US anesthesiology residents, 41% of respondents were at high-risk for burnout and burnout was significantly associated with deviance from the best practices of anesthesiology care (de Oliveira Jr. et al., 2013). Residents with high risk of burnout also reported more errors and lower quality of care than residents with low-risk for burnout (de Oliveira Jr. et al., 2013).

A cross-sectional study surveying 258 residents across 11 US pediatric residency programs found that burnout was also highly prevalent among pediatric residents and was associated with self-reported **negative patient care attitudes and behaviors** (Baer et al., 2017). For the 39% of respondents that met criteria for burnout, they were significantly more likely to discharge

patients to make the service more manageable, spend less time with patients in discussing treatment options and answering their questions, make treatment or medication errors, and ignore the social or personal impact of an illness (Baer et al., 2017). Burnt-out residents were also significantly more likely to feel guilty about how a patient was treated (Baer et al., 2017).

In another study, burned-out residents were significantly more likely to engage in "suboptimal patient care practices" (Shanafelt, Bradley, Wipf, & Back, 2002). A study of 115 internal medicine residents in Seattle found that 76% of the residents met burnout criteria on the Maslach Burnout Inventory, and these residents were 2-3 times more likely to report "suboptimal patient care practices" weekly (32% vs 11%) and monthly (53% vs 21%) than non-burned out residents (Shanafelt et al., 2002). These "suboptimal practices" included: intentionally not performing a diagnostic test because of desire to discharge a patient, ordering restraints or medication for agitated patients without evaluating him or her, and discharging patients because the team was very busy (Shanafelt et al., 2002). In addition, burnout was the most significant predictor of the number of monthly "suboptimal care practices" compared to other possible predictors (e.g. gender, self-reported depression, substance abuse, and at-risk alcohol use) (Shanafelt et al., 2002).

Finally, burnout increases the risk of dropping out of medical school and continued career dissatisfaction if not addressed. About 11% of medical students consider dropping out of medical school each year, which contributes to the national yearly attrition rate of about 3.3% of medical students (Association of American Medical Colleges, 2018; Dyrbye et al., 2010). Even in the absence of depression, burnout among medical students is a significant predictor of serious thoughts of dropping out and with each medical student that drops out, society not only loses on its financial investment, but also loses out on future medical care, which is a serious concern for a growing, aging population (Association of American Medical Colleges, 2019; Dyrbye et al., 2010). For burnt out medical students that continue onto residency, or residents that become burned out, burnout in residency is significantly correlated to career dissatisfaction (41% versus 11% for residents without burnout) with 59% of burnt out residents feeling unhappy with their career choice and 26% unsure if they would choose medicine as a career again (Shanafelt et al., 2002).

Summary

Based on the studies cited above, the literature shows that burnout is significantly correlated to suboptimal patient care, poorer educational outcomes, and decreased satisfaction in a medical career that can even result in people leaving it entirely. Interpersonal stress is known to increase physician trainees' burnout scores and therefore should be quantified and studied in more detail.

2. Depression

Definition

Depression is a functional impairment in emotional regulation, motivation, cognition, motoric functions, and neurovegetative symptoms. The DSM-V describes clinical depression as a set of 5 or more of the 9 pre-determined symptoms within 2 weeks. The type and symptomatic extent of the depression guides the behavioral interventions such as pharmacotherapy, psychotherapy, and

environmental modifications. These interventions aim to alleviate the symptomatic manifestations of depression that may range from isolation to suicidality.

Cause

Depression is a multimodal disease that involves monoamine neurotransmitter imbalances, hypothalamic-axis dysregulation, and inflammatory cytokines that elicit a reduction in neurogenesis and neuroplasticity (Dean & Keshavan, 2017). Although depression does have some genetic components, there are also various risk factors that can lead to depression (McCarron, Vanderlip, & Rado, 2016). Alcohol dependence, family history of depression, comorbid diseases, and stressful events all increase the chance that an individual will develop depression (McCarron, Vanderlip, & Rado, 2016).

Correlations

Medical Students

In a large meta-analysis consisting of 167 cross-sectional studies (n = 116,628) and 16 longitudinal studies (n = 5,728) from 43 countries, 27.2% of medical students screened positive for depression on the PHQ-9 questionnaire (Rotenstein et al., 2016). The prevalence of depressive symptoms remained relatively constant from the survey range of 1982-2015 with a small increase of 0.2% per year (Rotenstein et al., 2016). The longitudinal studies also found that the median absolute increase in depressive symptoms before vs after entering medical school was 13.5% (Rotenstein et al., 2016). Of the medical students who screened positive for depression, only 15.7% sought psychiatric treatment, which is concerning as not only is depression a risk factor for an increased short-term risk of suicide, but it also leads to an increased risk of long-term depression that could carry on into residency (Rotenstein et al., 2016).

In terms of **risk factors** for developing depression, medical students not only face stressful personal life events (e.g. illness, death of a loved one, marriage, child rearing, etc.) but also the stresses associated with medical training (e.g. academic workload, high student loans, sleep deprivation, mistreatment by residents/attendings, exposure to traumatic patient experiences, etc.) (Dyrbye et al., 2006; Dyrbye, Thomas, & Shanafelt, 2006; Haglund et al., 2009; Hojat, Glaser, Xu, Veloski, & Christian, 1999). In addition, medical students with personality traits of neuroticism and conscientiousness have also been found to have greater risk of experiencing more stress during medical school, which has been shown to increase depressive symptoms (Tyssen et al., 2007). Medical students with depression are at increased risk for decreased empathy, increased cynicism, decreased academic performance, increased academic dishonesty, poor attitude towards patient care, and substance use (Dyrbye et al., 2006; Dyrbye, Thomas, & Shanafelt, 2006; Dyrbye et al., 2010; Dyrbye et al., 2011; Thomas et al., 2007).

Residents

There is significant documentation on the high rates of depression in residents. In a cohort study consisting of 123 pediatric residents at three urban children's hospitals, 20% met criteria for depression (Fahrenkopf et al., 2008). Thoughts of death increased 370% in the first 3 months of residency training and severe depression (PHQ>20) increased from 0% to 2.3% at 3 months into

residency (Sen et al., 2010). **Risk factors** associated with an increased risk for depression in residency included working >70 hours per week, smoking, female gender, and having >5 drinks per week (de Oliveira Jr. et al., 2013). Like burnout, depression has also been shown to be significantly correlated with an increased risk of **medical errors** (Fahrenkopf et al., 2008). Depressed pediatric residents made 6.2 times the number of medical errors as compared to their non-depressed peers (Fahrenkopf et al., 2008).

Summary

The research shows that depression is significantly correlated to decreased resident and medical student well-being along with patient and educational outcomes. Furthermore, given the link between depression and burnout, and as highlighted in previous sections, combating depression may also yield benefit in regards to resident/medical student burnout. We believe that depression rates may be, in part, combatted through improving connection between teaching attendings and residents/medical students. This conclusion is supported by our studies in progress, which demonstrate that increased connection is associated with an increased sense of personal accomplishment in a linear fashion and very high rates of connection see a drop in emotional exhaustion. Future studies may expand our understanding of depression and connection.

3. Suicidality

Definition

Suicidality can be defined as the thought or act of intentionally and voluntarily taking one's life.

Medical Students

In a large meta-analysis using data from 24 cross-sectional studies (n = 21,002) from 15 countries, the prevalence of suicidal ideation among medical students was 11.1% (Rotenstein et al., 2016). In a survey of 2246 medical students across seven US medical school, burnout, depression, mental quality of life (QOL), physical QOL, fatigue, and stress were all associated with an increased risk for suicidal ideation (Dyrbye et al., 2011). Students that reported 2, 4 or 6 of the aforementioned forms of distress were 5, 15 and 24 times, respectively, more likely to have suicidal ideation compared to students with no forms of distress (Dyrbye et al., 2011).

Certain demographics in the medical student population are at increased risk for suicidality. In a cross-sectional study surveying all medical students at one US medical school, third- and fourth-year students were more likely than first- and second-year students to report suicidal ideation (7.9% vs 1.4%) (Schwenk, Davis, & Wimsatt, 2010). Female medical students also have an increased risk of suicidal ideation compared to male medical students, which coincides with female physicians having an increased risk of suicidal ideation as compared to their male counterparts (Andrew & Brenner, 2015; Frank & Dingle, 1999; Lindeman, Läärä, Hakko, & Lönnqvist, 1996; Schernhammer & Colditz, 2004; Schwenk, Davis, & Wimsatt, 2010).

Resident

Suicide is a major cause of death in residency as it is the leading cause of death in male residents and the second leading cause of death in female residents behind death due to malignancy (Yaghmour et al., 2017). From 2000 to 2014, there were 51 male residents and 15 female

residents among 381,614 residents in ACGME-accredited programs that were documented to have died of suicide with 16 residents dying using firearms, 16 intentionally overdosing on drugs or other substances, 18 from leaping from heights or by asphyxia by hanging, strangulation, or inhalation, and 16 residents dying by other means or by unspecified means (Yaghmour et al., 2017). In a 2015 survey of 5274 OBGYN residents nationally, 2.86% of respondents reported thoughts of suicidal ideation and/or attempted suicide or knew of fellow residents who had thoughts of suicidal ideation and/or attempted suicide (Winkel, Nguyen, Morgan, Valantsevich & Woodland, 2017). The majority of suicides (74%) occurred in the first 2 years of residency training with 35% of those suicides occurring in the first three months of residency (Yaghmour et al., 2017). This drastically increased risk of suicidal ideation and suicide in the first few months of residency has been previously noted by Sen et al. (2010), who found that thoughts of death increased 370% in the first 3 months of training and severe depression (PHQ>20) increased from 0% to 2.3% at 3 months into residency.

Attendings:

A meta-analysis took account of approximately 2100 suicides from a total of 25 studies, revealing **higher risk of physician suicide than the general population** (Schernhammer & Colditz, 2004). A study by Davis et al. (2003) found than an estimated 300-400 physicians died by suicide each year. The mortality ratio of male physician suicide was 1.41 (95% CI 1.21- 1.65) and female physician suicide was 2.27 (95% CI 1.90-2.73) (Schernhammer & Colditz, 2004).

Data from the National Violent Death Reporting System of 31,636 suicides and 203 physician suicides found that compared to non-physicians, physicians had a 3.1 times higher odds of having a job problem (Gold, Sen, & Schwenk, 2013). Physicians also had 28.78 times higher odds of having antipsychotics, 21 times higher odds of having benzodiazepines and 39.5 times higher odds of having barbiturates present on toxicology compared to the general population (Gold et al., 2013). In comparison to the general population, physicians had a 0.37 times lower odds of having a death of a friend or family and 0.61 times lower odds of having a crisis in the last two weeks (Gold et al., 2013). In a study of Finnish anaesthesiologists, 25% had at some time seriously considered suicide and suicidality was associated with poorer health, lower social support, and family problems (Lindfors, Meretoja, Luukkonen, Elovainio & Leino, 2009). Furthermore, those with a higher number of issues relating to these categories had an increasingly higher rate of suicidality (Lindfors et al., 2009).

In a study of 385 Swedish and 126 Italian female physicians, 13.7% of the Swedish respondents and 14.3% of the Italian respondents reported suicidal thoughts within the prior 12 months (Fridner, Belkic, Marini, Minucci, Pavan & Schenck-Gustafsson, 2009). In the Swedish population, degrading experiences/harassment at work was found to have significant association with recent suicidal ideation whereas being handed assignments without adequate resources was found to have significant association with recent suicidal ideation in the Italian population (Fridner et al., 2009). For both populations, having meetings to address stressful situations at work were found to be protective factors against suicidal ideation (Fridner et al., 2009).

In another study by Fridner et al. (2011) with Swedish and Italian male physicians, 12% reported recent suicidal thoughts. Role conflict increased the odds of suicidal thoughts by 1.6 in the Swedish group whereas degrading work experiences increased the odds by 2.1 in the Swedish

group and 3.3 in the Italian group (Fridner et al., 2011). Questions asked for role conflicts included: having to do things that one feels should be done differently, being given assignments without adequate resources to complete them, and receiving incompatible requests from 2 or more people (Fridner et al., 2011). Having support at work when things got tough decreased odds of suicidal thoughts by 0.7 while having the ability to have confidential discussions at work about experiences decreased odds by 0.6 (Fridner et al., 2011). Interestingly in this study, long work hours did not increase the odds of suicidal thoughts (Fridner et al., 2011).

Summary:

Physicians and physician trainees face many stressors in medicine: a culture of perfectionism, high levels of stress, difficult patient encounters, long and challenging work hours, working with or under abusive physicians and a culture that traditionally has not supported seeking help in times of need. Burnout and depression have long been shown to be linked to an increased risk for suicidality and by addressing burnout and depression through increased connection, we hope that through our effort, we can decrease suicide in physicians and physician trainees by improving the teaching culture of medicine.

Components of Connection and Disconnection:

In studying connection, we reviewed the literature for previous surveys developed to measure interpersonal aspects of connection. Based on this research, we initially created 7 domains to study the interpersonal quality and connectedness that took place between the resident and the attending. In this section I will highlight: 1) Definition 2) Studies previously done regarding these domains and 3) Development of particular questions.

1. Psychological Safety

Psychological safety has been linked to personal engagement in work, and is defined as “feeling able to show and employ one’s self without fear of negative consequences to self-image, status, or career” (Kahn, 1990, p. 708). We also looked at psychological safety via **Edmondson’s psychological safety scale**, which was designed to pinpoint the psychological safety level for a team in general (Edmondson, 1999). Edmondson (1999) described psychological safety as a collective belief, held by a team, that their environment is a safe place for interpersonal risk taking. If mistakes are made, the team members can speak up and report them without feelings of embarrassment. Psychological safety leads to increased learning behavior due to increased willingness to seek feedback, share information, ask for help, and talk about errors (Edmondson, 1999). Her study compared two team environments, with the selection of both high and low learning teams. Per the high learning team, feedback with regards to their work and mistakes was found helpful. One team member viewed correction of their mistakes as a way to ensure that everyone was working together to provide a good outcome. In other words, if feedback is given with the intention of being helpful rather than negative, it will likely be interpreted as friendly. In addition, Edmondson found that teams with a lack of psychological safety were reluctant to ask for help, thus the creation of CI question PS002 stating, “It was easy to ask this person for help”

(Edmondson, 1999). Later work by May, Gilson, and Harter (2004) found that psychological safety and psychological meaningfulness significantly related to engagement at work. Individuals who felt self-conscious (i.e. often worried about what others thought of them) experienced less psychological safety at work (May et al., 2004).

Psychological safety must also consider how comfortable the learner is at asking questions. Shortell et al. (1991) developed the ICU Nurse-Physician Questionnaire with one section addressing leadership. Their question, "ICU physician leadership discourages physicians from taking initiative" was adapted to create CI question PS004 which states, "This person encourages me to ask questions." Being able to ask questions is important to learners. This was highlighted through Thurgur, Bandiera, Lee, & Tiberius' (2005) creation of focus groups to evaluate what medical learners want from their teachers. In these focus groups, the principle that teachers are open to learners' questions, came up 15 times (Thurgur et al., 2005). It was from this finding that we developed CI question PS006, which states that the teacher "Proactively communicated that he/she was open to questions."

Being open to discuss problems with another individual is also a good indicator of the presence of psychological safety. This was explored by Accurso, Hawley, and Garland (2013) who studied therapeutic alliance between caregivers, patients, and therapists. They associated negative therapeutic alliance with patients' desire to avoid working on problems with their therapist, wanting the session to end quickly, and preferring to spend their time in ways other than meeting with the therapist (Accurso et al., 2013). From this study, we created CI question PS005, "I would voice my concerns or questions with this person." Additionally, once concerns are voiced, the hope is that the teacher takes them seriously. According to the additional 2016 accreditation requirements placed by the ACGME, program directors must create a supportive educational environment with interprofessional team based care. From this requirement, we created CI question PS084, "I trusted this person to take my concerns seriously."

Finally, the following questions were adapted from already existing surveys. CI question PS008, "I felt free to express the things that worry me," was adapted from Roxane Agnew-Davies' Agnew Relationship Measure (AMR) (Agnew-Davies, Stiles, Hardy, Barkham, & Shapiro, 1998). The AMR question directly states, "I feel free to express the things that worry me" (Agnew-Davies et al., 1998). In developing the CI questions, we also referenced the Veteran's Affairs' 2017 Learner Perception Survey (LPS), which was a survey created to gain information on how to improve the educational experience of trainees at VA facilities (Kashner et al., 2017). The LPS survey question, "I feel free to question the decisions or actions of those with more authority," was the basis for the development of CI question PS022, "I feel free to ask for more information about his/her decisions or actions." (Kashner et al., 2017).

2. Empathy

Empathy was defined by Carl Rogers in 1959 as an ability "to perceive the internal frame of reference of another with accuracy . . . as if one were the other person but without ever losing the 'as if' condition" (p. 210). More recently, empathy has been effectively separated into a 3-element framework consisting of cognitive, affective, and compassionate empathy (Ickes, 2003).

Functional neuroimaging supports this distinction with each form of empathy being associated with a separate neural system (Zaki & Ochsner 2012).

Empathy has been studied in many fields, but there has been a lack of research looking at empathy in the physician teacher and trainee relationship. We found the **Interpersonal Reactivity Index** (Davis, 1983) and **Hogan's Empathy Scale** (Hogan, 1969) useful for generally defining empathy. The **Jefferson Scale** looks at a patient's post-clinical encounter perception of his or her physician's empathy levels (Hojat et al., 2001). The Jefferson Scale in particular has been used to measure outcomes for patients (Hojat et al., 2011, Kim et al., 2004, Del Canale et al., 2012).

The term **cognitive empathy** refers to a situation being viewed from another's perspective (Davis, Conklin, Smith, & Luce, 1996). This type of empathy makes individuals more likely to see someone's behaviors as similar to his/her own. Overall, there is a "de-biasing" of personal stereotypes (Galinsky & Moskowitz, 2000) and cultivation of an environment where others feel understood. Shortell et al. (1991) acknowledges this in the ICU-Nurse Physician Questionnaire stating, "ICU physician leadership is out of touch with physician perceptions and concerns." This was adapted to become CI survey question EM021, "This person was in touch with my perceptions and concerns." Patients desire to be understood by their physicians and medical learners by their teachers. This is expressed in Steine et al.'s (2001) Patient Experience Questionnaire with the statement, "The doctor understood what was on my mind." This was adapted for our CI survey to become EM014, "I felt heard and understood."

One way that humans feel understood is via **affective empathy** (Hoffman, 1981). This form of empathy uses the mirror neuron system (Rizzolatti, Fogassi, & Gallese, 2001) to mimic others' facial expressions in order to feel their emotions (Decety & Jackson, 2004). Hojat et al.'s (2001) Empathy Scale measures the empathy that attendings, residents, and medical students have towards patients. The scale highlights the effect of body language and non-verbal cues on patients feeling understood. This study led to the development of CI questions EM016, "I felt understood and heard based on this person's body language, nonverbal cues, and facial expressions," and EM017, "This person clearly understood my perspective." In fact, the mirror neuron system mimicry is the most appreciated in forming powerful emotional bonds (Clark, 2010) as there is a sharing of the other's personal emotional state (Hoffman, 1981).

We also know that individuals value clear communication and an environment in which their supervisor is attentive. Once again referencing an ICU-Nurse Physician Questionnaire question "ICU physician leadership effectively adapts its problem-solving style to changing circumstances," we developed EM018, "I felt that communication between me and this person was clear at all times" (Shortell et al., 1991). In Thurgur et al.'s (2005) focus group interviews, medical learners brought up 30 different times the importance of teachers being attentive to them. This became the basis for CI question EM007, "I felt that this person was attentive when I was speaking." Similarly, the Agnew Relationship Measure was created to assess therapeutic alliance. We adapted the question, "At times the therapist seems distant" for our teacher-learner model to become EM020, "This person did not seem distant or distracted" (Agnew-Davies et al., 1998.

3. Educational Alliance

The idea of an **educational alliance** between teacher and learner is a relatively new construct; however, it draws upon the considerable foundation laid by therapeutic alliance research (Telio, Ajjawi, & Regehr, 2015). Although there is no single consensus definition of therapeutic alliance, definitions found in various papers on the topic converge on several themes (Baldwin, Wampold, & Imel, 2007).

Many of the definitions describe the therapeutic alliance as a collaborative relationship between patient and therapist (Frank & Gunderson, 1990; Krupnick et al., 1996). Several authors adopt the definition of Bordin (1979), which identifies 3 aspects of the alliance: "an agreement on goals, an assignment of task or a series of tasks, and the development of bonds." Bordin (1979) proposes that the alliance may be key to the process of change. Studies throughout the following decades supported the significance of the therapeutic alliance with a statistically significant association found between good working alliance and positive outcome (Horvath & Symonds, 1991).

In a meta-analytic review in 2000 by Martin, Garske, & Davis, a moderate correlation was found between alliance and outcome. By optimizing therapeutic alliance, therapists may increase the probability of a good outcome. Thus, it's understandable that there are post-therapy session surveys to assess the quality of the therapeutic alliance. Similarly, there should be some way to judge the quality of an educational alliance.

As there are no supervisory alliance scales specific to the medical teacher-trainee relationship, we looked at therapeutic alliance scales measuring how much connection patients felt with their therapists during a single clinical encounter. These scales are therefore closer in their approach to connection than general empathy scales. These scales included the Agnew Relationship Measure (Agnew-Davies et al., 1998), the Helping Alliance Questionnaire (Luborsky et al., 1996), the Working Alliance Inventory (Client Form) (Hovarth & Greenberg, 1989), the Scale to Assess Therapeutic Relationships in Community Mental Health Care (STAR) (McGuire-Snieckus, McCabe, Catty, Hansson, & Priebe, 2007), and Therapeutic Alliance Scales for Children - Revised (TASC - R) (Accurso et al., 2013).

By referencing existing therapeutic alliance surveys, we developed questions to assess the alliance between learner and teacher. Two existing scales recognize the importance of liking and enjoying time spent with the person you are to be in alliance with (Accurso et al., 2013; Luborsky et al., 1996). Considering this, we created CI EA033, "I respected this individual as a person," and EA036, "I looked forward to meeting with this person." Therapeutic alliance also refers to individuals working together toward a common goal (Luborsky et al, 1996; Horvath & Symonds, 1991). In order to adapt this concept to educational alliance, we created question CI EA058, "I believe this patient supervision encounter will help me accomplish my goals for this patient," and EA026, "The way we communicated was clear or helpful to our goals."

Per Horvath and Greenberg's (1989) Working Alliance Inventory, it appears that not only should therapeutic alliance involve two people working towards a common goal, the time spent working towards this goal should be spent efficiently. This was the basis for CI EA060, "The time we

were together was spent efficiently." It is also important that the learner feels safe in this alliance and not as if they may say or do something that will diminish the teacher's regard for them. This concept led to CI question EA034, this individual "seems to respect me regardless of my mistakes," (McGuire-Snieckus et al., 2007).

The work of Dijksterhuis et al. (2009) was referenced in the 2011 ACGME Common Duty Hour Standard. Their study found that although a medical trainee may become competent in a certain procedure, that competence does not necessarily lead to an increase in independent practice of that procedure (Dijksterhuis et al., 2009). This finding led to the development of CI EA094, "This person accurately gauged my competency."

Finally, Gelso & Carter (1994) studied the psychotherapeutic relationship between client and therapist. They found that with time, as the client and therapist work in alliance with one another, the more positive reactions the client will have towards the therapist. Clients may begin to notice qualities about the therapist that they admire (Gelso & Carter, 1994). This became the basis for the final Educational Alliance CI question, "I felt grateful to have worked with this person."

4. Effective communication of feedback

Effective communication of feedback should be education-level appropriate and specific to the needs of the particular trainee in such a way that can be heard and understood by the trainee receiving the feedback (Thurgur et al., 2005; Van De Ridder, Stokking, McGaghie, & Ten Cate, 2008; Hewson & Little, 1998; Thoo, Maguire, & Moorhead, 2004).

The ACGME writes in their 2016 Milestones Guidebook, "Feedback to the resident or fellow is an essential and required activity of the Milestones Assessment System. Research has clearly shown that feedback is one of the most effective educational tools faculty and programs have to help residents and fellows learn and improve." This document outlines five basic features of high quality feedback about a residents' milestones-related achievements, which are: timeliness, specificity, balancing reinforcing ("positive") and corrective ("negative") feedback, learner reaction and reflection, and creating action plans after a milestones review.

In Yarris et al.'s (2009) work on feedback in medical education in the emergency department (ED), feedback was defined as "a specific and timely appraisal of a resident's performance in the ED, verbally communicated to them during or directly after their ED shift by an attending who has been working with them." This feedback from supervising physicians is a critical aspect of trainees' evolution from test takers to independent, competent clinicians. Yarris et al. (2009) and Sender Liberman, Liberman, Steinert, McLeod, & Meterissian (2005) both demonstrate that attending physicians can overestimate the usefulness of feedback they deliver to trainees; and that trainees are far more dissatisfied with this feedback than attending physicians may realize. Yarris et al. (2009) compared the overall satisfaction of ED residents who received specific, detailed, and improvement-focused feedback with residents from programs that had no formalized structure for giving feedback. The residents that received specific, improvement-focused feedback were overall more satisfied with their feedback than the residents from the control groups (Yarris et al., 2009). This led to the development of CI question FB031 which states, "I learned from this person what things I could improve." Yaris et al.'s (2009) findings

confirmed the earlier work of Hewson and Little's 1998 study which states that helpful feedback is observation based, focuses on specific skills, and contains specific suggestions for improvement. It should be goal directed and non-judgmental, while also eliciting the participant's ideas and feelings. From these studies, we created CI questions FB029, "This person asked about my thoughts and feelings before giving feedback," and FB027, "gave feedback with specifics (not with generalizations) and based on observations (not hearsay)."

It was determined in Thoo et al.'s (2004) study that learners appreciate being given the opportunity to work out answers for themselves, rather than being told what to do. Question FB032 thus became, "gave me a chance to work out answers for myself." This collaborative approach is supported by the ACGME's supervision standards, which state that effective supervision should include "opportunities for joint problem solving" between the supervisor and trainee. In addition, the supervisor should provide clear expectations as to which situations warrant the supervisor's input (Whalen & Wendel, 2011). This led to CI manual questions FB089, "This person gave me opportunities for joint problem solving with him/her or others on the team," and FB090, "This person set clear expectations for the types of patient situations that warranted his/her input."

Shortell et al.'s (2009) Teamwork and Leadership question 15 from his ICU Nurse-Physician questionnaire was the basis for CI FB023, "When this person made decisions, they explained their thought process to me." Finally, FB101 "I learned valuable information from this person," was developed based on the concept framework.

Our final modality, feedback, has mainly been studied in terms of what "good feedback" and "bad feedback" empirically looks like (Hewson & Little, 1998; Yarris et al., 2011; Van de Ridder et al., 2005; Thoo et al., 2004; Thurgur et al., 2005). For our purposes, we used a novel approach of adapting these qualitative findings as assessment questions. We then adapted these questions to allow teachers to grade themselves and for trainees to do the same. In our study, teachers were both attending physicians (to resident physicians and medical students) and resident physicians (to medical students). In creating this study, we hope to capture how realistically these teachers understand their own ability to teach, as well as any disparities that exist between teacher and trainee perceptions of the feedback delivered. This disparity has been documented by previous empirical studies on feedback quality in medical education: 90.9% of surgical attendings surveyed in Sender Liberman et al. (2005) felt that they were successful at giving effective feedback, but only 16.7% of resident physicians agreed.

Comparable Measures:

Bullying and harassment

Bullying and harassment are extreme, potentially harmful behaviors that occur in the context of significant disconnection. Bullying and harassment can take on many forms and we will attempt to outline what we feel are the most pertinent to ACGME's focus.

As stated in the introduction, **medical student mistreatment is explicitly linked to burnout**. In one study, having poor role models and being mistreated by physician superiors caused increased stress and depression in 3rd year medical students; however, for the same students, witnessing trauma, as defined by DSM-IV PTSD's criteria, was associated with personal growth and development of resiliency (Haglund et al., 2009).

It is already known that bullying and harassment leads to poor performance in the workplace. For example, rude behavior being directed at a medical team significantly decreased team members' diagnostic and procedural performance scores (Riskin et al., 2015). It is therefore important to be able to assess for the presence of bullying in the medical environment. Quine (1999) developed a questionnaire to determine how prevalent workplace bullying is in an England national health service community trust. When questioned, multiple survey respondents reported being bullied by "persistent attempts to belittle and undermine your work" from which we created Q062, "This person made persistent attempts to mock, belittle or undermine me." Many also responded to the survey, saying they were bullied with "verbal and non-verbal threats," from which we developed Q064, "This person made verbal or non-verbal threats against me."

Another scale, the Sexual Experiences Questionnaire (SEQ-W) was developed to assess sexual harassment in the workplace (Fitzgerald, Gelfand, & Drasgow, 1995). We based two questions under the *Bullying and Harassment* domain from Fitzgerald et al.'s (1995) scale. The first, question Q075, "This person paid me unwanted sexual attention and/or made crude sexual remarks" was developed from the SEQ-W item "unwanted sexual attention". The next question, Q076, "This person made me afraid of poor treatment if I didn't cooperate" was developed from the SEQ-W statement "made you afraid of poor treatment if you didn't cooperate." To further assess bullying, we referenced Brondolo et al. (2005), who developed a Perceived Ethnic Discrimination Questionnaire to assess discrimination or perceived racism among various ethnic groups. One questionnaire item "hinted you are stupid" was the basis for Q068, "This person hinted that I am stupid." Finally, the last three questions were developed based on the concept framework. These were, Q012, "showed negative or demeaning body language like eye rolling or sneering", Q061 "This person crossed professional boundaries," and Q082 "This person directed curse words at me."

Subjective Emotional Experience

There is much information to be obtained from the observance of emotions among individuals. For example, by watching the emotions expressed between couples, researchers could predict divorce, marital stability and satisfaction, and even the rate of future occurrence of medical issues (Gottman, Levenson, & Woodin, 2001). Likewise, we can observe medical students' encounters with their supervisors to determine their emotional state and conjecture about the connection between supervisor and trainee. With increased connection comes positive emotion; conversely, specific negative emotions such as shame, disgust, and hopelessness decrease connection by causing shutdown or fight-or-flight reactions. Anger is a common emotion seen between trainee and supervisor when one party does not feel heard, understood, or is unable to achieve the desired outcome of protecting a patient. The emotion of fear can be seen when one party is concerned that the lack of connection may cause harm to the patient (Edmondson, 1999).

This supervisor-trainee relationship can gain insight from previous research studying the client/counselor relationship including the Modified Izard Emotions Scale (Lilius et al., 2008) and the Patient Experience Questionnaire (PEQ) (Steine et al., 2001). Horvath and Greenberg (1989) created a working alliance inventory which assessed some of the variables in the client/counselor relationship that affect counseling success. One question from this validated working alliance inventory, “I find what I am doing in therapy confusing” was the basis for SE53, “I felt confused while working with this person”. Just as having a strong therapeutic partnership is important in counseling, so too is the therapeutic partnership between supervisor and trainee (Hovarth and Greenberg 1989).

Data looking at emotions expressed in this therapeutic partnership has been somewhat limited; however, validated scales exist to assess patients’ experience of emotion.The PEQ, developed by Steine et al. (2001), is used to assess a patient's experience of emotion, consultation, and outcome in a primary healthcare setting. For the emotion part of the scale, surveyors were asked to rank where they stood after their consultation with regards to being tense or relaxed, sad or cheerful, worn out or strengthened, worried or relieved. With this scale in mind, we developed SE45, “My stress level increased from interacting with this person.” Zigmond and Snaith’s (1983) *Hospital Anxiety and Depression Scale* is another patient assessment used to screen for anxiety and depression in a general medical clinic. We developed Q038, “I was able to be at ease and feel relaxed while working with this person” from the Zigmond and Snaith scale statement, “I can sit at ease and feel relaxed” (Zigmond & Snaith, 1983). We also used their statement, “I feel tense or wound up” to create Q047, “I felt tense or wound-up while working with this person” (Zigmond & Snaith, 1983).

When referencing emotion in medical education, most existing studies have been primarily concerned with the relationship between burnout and mood issues and how it relates to patient outcomes. In fact, outcome studies on burnout have shown that it negatively impacts patient care. One study found that high rates of burnout were significantly related to low clinical-competency scores (Hillhouse, Adler, & Walters, 2000). This was reinforced by Shanafelt et al. (2002), who found that burnout was positively correlated with an increased frequency of self-reporting poor patient care events. Additionally, residents that feel the need to create distance between themselves and their patients experience higher rates of burnout (Purdy, Lemkau, Rafferty, & Rudisill, 1987). Maslach created an inventory manual to assess burnout and one item on the Maslach Burnout Inventory Manual states “I feel frustrated by my job” (Maslach & Jackson, 1981). From this, we developed question SE46, “My frustration increased from interacting with this person” (Maslach & Jackson, 1981). In addition, SE51, “I felt emotionally drained working with this person” was adapted from Maslach Burnout Inventory Manual question, “I feel emotionally drained from my work” (Maslach & Jackson, 1981). Finally, SE49, “I felt small and inferior with this person” was developed based on the concept framework.

Prejudice/Bias

In order to address disconnection due to prejudice/bias, we generated our questions primarily from the 2016 ACGME Common Program Requirements, which focus on sensitivity to patient characteristics like race, gender, sexual orientation, religion, etc. From ACGME requirement number IV.A.5.e).(5), which states there should be “sensitivity and responsiveness to a diverse patient population, including but not limited to diversity in gender, age, culture, race, religion,

disabilities, and sexual orientation" we created the following questions: Q066 "this person focused inappropriately on race," Q066A "this person focused inappropriately on gender," Q066B "this person focused inappropriately on sexual orientation and gender identity," Q066D "this person focused inappropriately on religion," Q066E "this person focused inappropriately on age," Q066F "this person focused inappropriately on disability," and Q066G "this person focused inappropriately on culture." Finally, Q066H, "This person focused inappropriately on socioeconomic status" was developed using the concept framework.

Conceptual framework:

Conceptual frameworks help guide research design and provide the structure necessary to build statistical models. Prior conceptual frameworks have been done to look at access to medical care (Andersen, 1995). This conceptual framework uses Donabedian's structure-process-outcome framework (Donabedian, 1997; see figure 1). The structure involves the teaching physician and learning trainee, the process involves the supervision connection and the outcomes are shown by education outcomes, patient outcomes and facility outcomes.

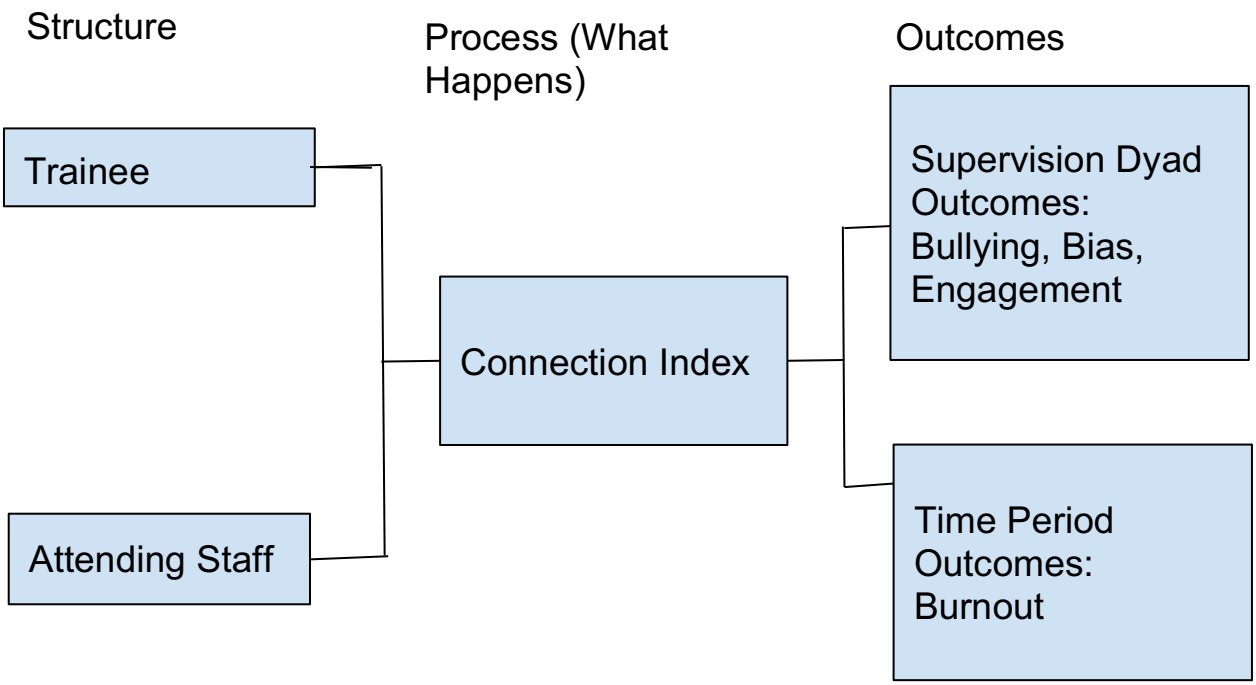

FIGURE 1: Theoretical Framework Describing Predictors and Outcomes of Connection

Structure

The connection index that we created and revised to a 12 question survey is meant to be applicable bidirectionally within any medical supervisor-trainee relationship. There are currently few psychological paradigms and respective quantitative tools that explore the dynamic of interpersonal connection between two parties in medical education. We propose a novel construct of connection and a novel scale called the Connection Index (CI) with the hypothesis that increased connection will be inversely associated with trainee burnout.
Our first study using the Connection Index tested the connection between attending physician supervisors and resident trainees and correlated the results with resident burnout.

Process

The Connection Index will assess every individual in a medical team from multiple angles,in compliance with the interpersonal components of the 2016 ACGME Common Program Requirements. In their requirements for the "Interpersonal and Communication Skills" resident competency section, the ACGME writes, "The program must assess resident performance in V.A.2.b).(1).(d).(i) communication with patient and family, (Detail) V.A.2.b).(1).(d).(ii) teamwork, (Detail) V.A.2.b).(1).(d).(iii) **communication with peers**, including transitions in care, and (Detail) V.A.2.b).(1).(d).(iv) record keeping. (Detail) V.A.2.b).(1).(d).(v) **Assessment must include both direct observation and multi-source evaluation (including at least patients, peers and nonphysician team members).**"

We are covering the interpersonal aspect of this and all other portions of the ACGME Common Program Requirements, as well as from unique requirements for general surgery, internal medicine, and psychiatry residency programs. We have defined "interpersonal connection" via four domains: empathy, psychological safety, feedback, and educational alliance. Our survey operationalizes the ideas and ideals outlined by the ACGME via the empirically-validated questionnaires on these domains of human connection, as well as via the results of qualitative studies in nascent fields.

Interpersonal connection is only one emphasis articulated in the ACGME Program Requirements listed above. Other ACGME requirements for accreditation focus on domains, including duty hour requirements, qualifications of all staff members in the program, and staff member duties. Interpersonal requirements are described in Table 1, below, as a percentage of each set of residency program requirements.

Table 1: *Interpersonal Requirements as a Percentage of Total ACGME Requirements*

Program Requirements	Total Number of Requirements	Number of Interpersonal-Related Requirements	Interpersonal Requirements = _____ % of this Total
Common Program	262	31	11.8%
Internal Medicine	389	58	14.9%
Psychiatry	408	Either 42 or 45	Either 10.3% or 11%
General Surgery	341	38	11.1%

Requirement V.A.2.b).(1).(d).(v), quoted at the beginning of this section, states, “Assessment must include both direct observation and multi-source evaluation (including at least patients, peers and nonphysician team members).” This multi-source evaluation is a theme that repeats itself throughout the interpersonal emphasis requirements: residents must be evaluated by patients and their interprofessional medical teams; attendings must be evaluated by program directors, who are gathering data from medical trainees as well as patients and/or other healthcare professionals.

Methods:

Creating the Scale:

This scale was constructed based off domains that match major **interpersonal emphases** in the 2016 ACGME Common Program Requirements, as well as the Program Requirements for three specific fields: internal medicine, general surgery, and psychiatry. We found that the latter idea was particularly useful because specific search phrases (for instance “therapeutic alliance” in the Psychiatry Program Requirements) were well-phrased ideas common to all four requirements. Our potential conclusion is that these criteria were applicable to all medical specialties.

Our literature review was initially based on these seven modalities: empathy, feedback, therapeutic alliance, psychological safety, bullying/harassment, burnout and emotion. We did a literature review on Google Scholar and Pubmed using these domain names as search terms, especially in connection with “medical education,” “medical student” or “resident physician.” The authors reviewed 984 papers in 431 different journals in 44 different fields. We found the major studies that described these domains and also reviewed highly cited scales for each domain.

Revising the Scale:

In compiling questions for the scale, we found significant overlap between the questions used to measure these five domains. We also adapted the majority of these questions to fit our need to evaluate individual supervisor-trainee relationships. For instance, Edmondson’s (1999)

psychological safety questions measure the culture of general psychological safety in a work team and do not, in their original formatting, seek to follow fluctuating psychological safety from supervisor-trainee dyad to dyad. Our study design required that we alter verb tense, re-contextualize to individual supervisor-trainee dyads, and examine specific individuals in the medical team. This design allows us to acquire multiple inputs as we follow patients through the course of the medical system to better understand the psychological safety of any given person, which can then be examined in terms of its impact on patient care. We also deleted less relevant questions and double negatives from the scales above.

We found in the course of revising our questions that certain sets of questions only applied to individuals who were answering our questionnaire for a superior. For instance, “This person gave unjustified criticism of my work” is not an applicable situation to attendings evaluating their relationship with a medical student. However, “This person ignored my perspective” is applicable both to residents evaluating attendings and attendings evaluating residents. We also found that certain questions were inapplicable to patients evaluating their medical team. For instance, “This person will hold mistakes against me” was certainly inapplicable or confusing. In contrast, question 012 (“This person showed negative body language like eye rolling or sneering”) was deemed applicable to all members of the medical team in addition to the patient.

Finally, we added Response Section questions for each domain based on a model used by Kashner et al. (2017). In this paper based on the VA’s Learner Perception Survey, the authors asked questions about psychological safety and teamwork and asked respondents how important each domain was to them on a 7-point Likert Scale. For instance, one question read, “How important is psychological safety to you?”

These revisions led to 96 questions, which were reviewed by a focus group of 1 attending, 2 residents and 4 medical students. The focus group reduced the amount of questions and increased the clarity of the remaining questions. Themes that led to these changes included: the importance of using professional language (to nullify personal clashes and biases), the importance of nonverbal communication (one question in the empathy domain), the value of experiencing fairness in supervision (feedback given on direct observation), reducing questions that were too similar, and using questions that most resonated with their experience. At the end of the focus group, 61 questions remained (see appendix 1, 2, 3).

These 61 questions were administered in the initial study population of psychiatry residents, and through factor analysis, the domains of empathy, feedback, psychological safety and educational alliance grouped together and formed the CI 30 (see appendix 1). Subsequently, 30 questions were administered, which fit into one of the 4 subdomains of empathy, psychological safety, feedback and educational alliance. After administration of the test, the 30 questions were reduced to the 12 questions by the first author (3 for each domain) for ease of future administration. Questions for the final 12 embodied the concepts of each domain and seemed to be the most clear, concise, and helpful.

CI12 was tested psychometrically (n=134 residents and 201 dyads): consistency (scalability=0.78, Cronbach alpha=0.98, first factor explained variance=80.46%),

generalizability (test-retest reliability ICC=0.95, Likert scales associated with summary scores (log odds ratio=2.74 - 4.27), and correlation with theory-related variables, p<.001).

Scoring of CI-12

When scoring the CI-12, it is important to recall that each questions' response is rated by a 7-point Likert scale. The questions are directed at measuring the degree of connection within the supervision dyad. For all questions 1-12, a score of 1 indicates the most negative response and a score of 7 indicates the most positive or well connected response. The responses "strongly disagree" and "strongly agree" correlate to scores of 1 and 7 respectively, while a "neutral" response correlates to a score of 4.

For example, (see table 1) question 1 of the CI-12 states "I would voice my concerns or questions with this person" and the respondent is supposed to indicate to what degree they agree or disagree with the statement. Based on this example, if the respondent answered "moderately agree" as marked in the example below, then in scoring this response, one would allocate a score of 6.

Table 1: Scoring example for 1 question

		Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree
1.	I would voice my concerns or questions with this person	o	o	o	o	o	**X**	o
	* numerical scores for each response:	1	2	3	4	5	**6**	7

Each question in the CI-12 is scored in the manner described above, and at the end of this process, the total score is summed by adding each questions' score together.

Table 2: Scoring example for completed CI-12

		Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree
1.	I would voice my concerns or questions with this person **(Psychological safety)**	o	o	o	o	o	**X**	o
2.	I felt free to express the things that worry me **(Psychological safety)**	o	o	o	o	**X**	o	o
3.	I feel free to ask for more information about his/her decisions or actions **(Psychological safety)**	o	o	o	o	o	**X**	o
4.	The way we communicated was clear or helpful to our goals **(Educational Alliance)**	o	o	o	o	o	o	**X**
5.	This person seemed to respect me regardless of my mistakes **(Educational Alliance)**	o	o	o	o	o	o	**X**
6.	I felt grateful to have worked with this person **(Educational Alliance)**	o	o	o	o	o	**X**	o
7.	I felt heard and understood **(Empathy)**	o	o	o	o	**X**	o	o
8.	I felt understood and heard based on this person's body language, nonverbal cues, and facial expressions **(Empathy)**	o	o	o	**X**	o	o	o
9.	This person was in touch with my perceptions and concerns **(Empathy)**	o	o	o	**X**	o	o	o

10.	When this person made decisions, they explained their thought process to me **(Feedback)**	o	o	o	o	**X**	o	o
11.	This person gave feedback with specifics (not with generalizations) based on observations (not hearsay) **(Feedback)**	o	o	o	o	**X**	o	o
12.	This person gave me a chance to work out answers for myself **(Feedback)**	o	o	o	o	**X**	o	o

- Total score is 6+5+6+7+7+6+5+4+4+5+5+5 = 65 cumulative score, and 65/12 = 5.41 average score.
- **Questions 1-3** correlating to **Psychological Safety** domain; 6+5+6 = 17 cumulative, and 17/3 = 5.67 average
- **Questions 4-6** correlating to **Educational Alliance** domain 7+7+6 = 20 cumulative, and 20/3 = 6.67 average
- **Questions 7-9** correlating to **Empathy** domain 5+4+4 = 13 cumulative, and 13/3 = 4.33 average
- **Questions 10-12** correlating to **Feedback** domain 5+5+5 = 15 cumulative, and 15/3 = 5 average

To offer further insight beyond cumulative and average scoring of CI-12, the 12 questions can be grouped by the particular components of connection which they address. The CI-12 has 3 questions from each of the 4 domains: psychological safety, educational alliance, empathy, feedback. Questions 1-3 address psychological safety, 4-6 educational alliance, 7-9 empathy, and 10-12 feedback.

Connection Index version CI-12

In the application of the Connection Indexes, we crafted statements to explain the purpose of the survey and ensure anonymity of their participation.

Statement of Purpose

We have embedded in each survey the following statement of purpose: This survey was created for the purposes of measuring connection within medical teams. This survey is intended for medical students, medical personnel, trainees, and physician residents who engage in supervised patient care in a clinical teaching setting. The survey is designed to measure the extent to which the individual is connecting with their supervising attending physician, resident, or other team members from the perspective of the individual. Responses to this survey are completely anonymous and will be held by the authors, study investigators, and data analysts to be in strict confidence. Only aggregate results on groups of six (6) or more respondents will be reported to faculty, program coordinators and directors, and the institution's executive leadership.

Connection Index 12

Loma Linda University, David Puder, M.D.

This survey was created for the purposes of measuring
connection between two people within medical teams and supervision.

Your responses to this survey are kept completely confidential. No personally identifiable information will be reported back to the requestor. Additionally, your responses are combined with those of many others and summarized in a report to further protect your anonymity.

Connection Index 12 (CI-12)

David Puder, M.D.

		Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree
1.	I would voice my concerns or questions with this person	o	o	o	o	o	o	o
2.	I felt free to express the things that worry me	o	o	o	o	o	o	o
3.	I feel free to ask for more information about his/her decisions or actions	o	o	o	o	o	o	o
4.	The way we communicated was clear or helpful to our goals	o	o	o	o	o	o	o
5.	This person seemed to respect me regardless of my mistakes	o	o	o	o	o	o	o
6.	I felt grateful to have worked with this person	o	o	o	o	o	o	o
7.	I felt heard and understood	o	o	o	o	o	o	o
8.	I felt understood and heard based on this person's body language, nonverbal cues, and facial expressions	o	o	o	o	o	o	o
9.	This person was in touch with my perceptions and concerns	o	o	o	o	o	o	o
10.	When this person made decisions, they explained their thought process to me	o	o	o	o	o	o	o
11.	This person gave feedback with specifics (not with generalizations) based on observations (not hearsay)	o	o	o	o	o	o	o
12.	This person gave me a chance to work out answers for myself	o	o	o	o	o	o	o

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Appendix 1: Connection Index 30

Psychological Safety Domain:	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree
PS01 This person will not hold mistakes against me							
PS002 It was easy to ask this person for help							
PS004 This person encouraged me to ask questions							
PS005: I would voice my concerns or questions with this person							
PS006 This person proactively communicated that he/she was open to questions							
PS008: I felt free to express the things that worry me							
PS022: I feel free to ask for more information about his/her decisions or actions							
PS084: I trusted this person to take my concerns seriously							
PS078: Response Category: Overall I felt comfortable asking questions of, asking for help from, and admitting mistakes to this person.							

Educational Alliance Domain:	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree
EA026: The way we communicated was clear or helpful to our goals							
EA033: I respected this person as an individual							
EA034: This person seemed to respect me regardless of my mistakes							
EA036: I looked forward to meeting with this person							
EA058: I believe this patient supervision encounter will help me accomplish my goals for this patient							
EA060: The time we spent together managing patients was spent efficiently							
EA094: This person accurately gauged my competency							
EA037: I felt grateful to have worked with this person							
EA081: Response Category: Overall this person and I shared a supportive and collaborative relationship with mutual goals							

Empathy Domain:	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree
EM007: I felt that this person was attentive when I was speaking							
EM014: I felt heard and understood							
EM016: I felt understood and heard based on this person's body language, nonverbal cues, and facial expressions							
EM017: This person clearly understood my perspective							
EM018: I felt that the communication between me and this person was clear at all times.							
EM020: This person did not seem distant or distracted							
EM021: This person was in touch with my perceptions and concerns							
EM079: Response Category: Overall this person could understand my experience and perspective							

Feedback Domain:	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree
FB023L: When this person made decisions, they explained their thought process to me							
FB027L: This person gave feedback with specifics (not with generalizations) based on observations (not hearsay)							
FB029L: This person asked about my thoughts and questions before giving me feedback							
FB031L: I learned from this person about what things I could improve							
FB032L: This person gave me a chance to work out answers for myself							
FB089: This person gave me opportunities for joint problem solving with him/her or others on the team							
FB090: This person set clear expectations for the types of patient situations that warranted his/her input							
FB101: I learned valuable information from this person							
FB080: Response Category: Overall this person gave me valuable feedback and guidance in a respectful and accessible manner							

Appendix 2: Domains of Harassment:

Prejudice/Bias Domain:	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree
PB066: This person focused inappropriately on race							
PB066A: This person focused inappropriately on gender							
PB066B: This person focused inappropriately on sexual orientation and gender identity							
PB066D: This person focused inappropriately on religion							
PB066E: This person focused inappropriately on age							
PB066F: This person focused inappropriately on disability							
PB066G: This person focused inappropriately on culture							
PB066H: This person focused inappropriately on socioeconomic status							
PB102: Response Category: Overall this person displayed prejudice or bias toward me.							

Bullying/Harassment Domain:	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree
BH012: This person showed negative or demeaning body language such as eye rolling or sneering							
BH061: This person crossed professional boundaries							
BH062: This person made persistent attempts to mock, belittle or undermine me							
BH064: This person made verbal or nonverbal threats against me							
BH082: This person directed curse words at me							
BH074: This person paid me unwanted sexual attention and/or made crude sexual remarks							
BH076: This person made me afraid of poor treatment if I didn't cooperate							
BH068: This person hinted that I am stupid							
BH077: Response Category: Overall this person harassed/bullied me or other people.							

Appendix 3: Subjective Emotional Experience Domain:

Subjective Emotional Experience Domain:	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree
SE038: I was not able to be at ease and feel relaxed while working with this person.							
SE045: My stress level increased from interacting with this person							
SE046: My frustration increased from interacting with this person							
SE047: I felt tense or wound-up while working with this person							
SE049: I felt small and inferior with this person							
SE051: I felt emotionally drained working with this person							
SE053: I felt confused while working with this person							
SE100: Overall I felt negative while working with this person.							