Knowing and sharing: Transactive knowledge systems and psychological safety

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Abstract Transactive knowledge systems and psychological safety are important requirements for the effective functioning of organisations. However, both constructs have not yet been discussed in conjunction. This contribution presents both constructs and develops a theoretical approach that allows both further empirical exploration and practical application. Several propositions are made that intend to foster the further development of empirical study and related theory.

Keywords Transactive knowledge systems · Psychological safety · Organisational learning · Team development

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Wissen und Teilen: Transaktive Wissenssysteme und psychologische Sicherheit

Zusammenfassung Sowohl transaktive Wissenssysteme als auch psychologische Sicherheit sind wichtige Voraussetzungen dafür, dass Organisationen effizient funktionieren. Bislang wurden diese beiden Konzepte jedoch nicht im Zusammenhang erörtert. Dieser Beitrag stellt beide Konzepte vor und entwickelt einen theoretischen Ansatz, der sowohl die empirische Untersuchung als auch die praktische Anwendung in Betracht zieht. Es werden mehrere Vorschläge zur Weiterentwicklung der Empirie und der Theorie gemacht.

Schlüsselwörter Transaktive Wissenssysteme · Psychologische Sicherheit · Organisationales Lernen · Teamentwicklung

Toxic workplaces cost companies internationally billions every year. Dollard et al. (2017) highlight the 36 billion AUD cost that a negative psychosocial safety climate had on the Australian workforce in 2010. According to the *Society for Human Resource Management*, one in five U.S. workers have left their job because of a negative workplace culture. Of those, 58% say they left primarily because of their supervisors, and one in four employees do not feel safe, respected, and valued at work (Mirza 2020). In a study conducted in German-speaking countries in 2019, a bad work environment was the overall second-leading cause to leaving one's job and the top-leading cause for women to quit their job (Hermann and Zimmermann 2020). Thus, creating a healthy workplace can be fiscally motivated while simultaneously positively affecting other work-related factors, such as general job satisfaction, job performance, and work productivity.

Many factors contribute to a toxic workplace. Mirza (2020) identifies a breakdown in communication as the most important indicator of a toxic workplace. Edmondson (1996, 1999, 2019) describes the critical importance of psychological safety in environments in which volatility, uncertainty, complexity, and ambiguity (VUCA) are high. Examples of such environments are hospitals, the stock market during turbulent times, or the COVID-19 pandemic during which this article was written. In order to deal adequately with VUCA environments, individuals have to feel safe enough to take interpersonal risks in voicing their concerns (Edmondson 1999) or owning up to their mistakes (Schein and Bennis 1965). Thus, a breakdown in communication can trigger increasing errors, decreasing performance, and a loss of productivity.

Communication can be considered the most critical tool of goal achievement in organisations. Therefore, we will focus this contribution on a phenomenon resulting from communication but not commonly addressed in studies of psychological safety, namely transactive knowledge systems (e.g., Brauner in press; Moreland 1999; Wegner 1995). Specifically, we will discuss the reciprocal relationship between psychological safety and the ability of a group or organisation for building effective and efficient transactive knowledge systems. We will first elaborate on these ideas separately, then discuss the interrelationships between psychological safety

and transactive knowledge systems. We will conclude by making recommendations to practitioners who work with organisations on improving transactive knowledge systems by increasing psychological safety in workplaces.

1 The role of transactive knowledge systems in organisations

Transactive memory systems (e.g., Wegner 1995) or transactive knowledge systems (e.g., Brauner 2002) are a prerequisite for, and a result of, efficient and effective organisational communication. The concept of transactive memory was first developed to explain the interdependence of individuals in dyads and couples. Recognizing that any kind of social organization develops interdependence, various researchers expanded the concept to teams (e.g., Moreland 1999) and entire organisations (Anand et al. 1998). Transactive memory in its original form is defined as the knowledge that a person has about the knowledge of other people along with "knowledge-relevant transactive processes among group members" (Wegner et al. 1985, p. 256). Knowledge-relevant processes comprise any interactions among people that enable and allow a transfer of knowledge from one person to another. Whereas transactive, knowledge-relevant processes can lead to a shared foundation of shared knowledge, the more interesting component of a transactive knowledge system is the idea of metamemory (Flavell 1979; Flavell and Wellman 1977; Nelson and Narens 1990) or social metaknowledge (e.g., Brauner 2002; Wegner 1995). Social metaknowledge is knowledge about other people's knowledge. It allows the monitoring and control of the flow of information between and among people in organisations. Social metaknowledge leads to a person knowing with whom to locate the knowledge required to solve an organisational problem or pursue an organisational goal without having to memorize everything the other person knows. Social metaknowledge allows for a differentiation of expertise within a group or an organisation and provides the basis of efficient division of labour among members of a team or of an organisation as a whole.

Transactive knowledge systems develop over time mostly through interpersonal interaction and communication. Brauner (2006) and Brauner and Robertson (2009) differentiate four processes that allow the development of transactive knowledge systems: knowledge disclosure, knowledge acquisition, knowledge allocation, and knowledge requisition. Knowledge disclosure allows others to see what a person knows. Knowledge acquisition requires a person to learn about what others know. If certain expert content is assigned to a certain person, knowledge allocation takes place. Finally, once it is known where knowledge is located, it can be retrieved through a requisition with the respective person.

Brauner (in press) defines different degrees of veracity (or accuracy) of transactive knowledge systems. High veracity is achieved when a large number of team members are certain to know who knows what, and the others indeed possess this knowledge. It is also achieved when team members are all aware that knowledge is not available in the team. In the first case, the transactive knowledge system is accurate and there is no need for action. In the second case, team members are aware that there is a high need for acquiring required knowledge from outside the team. Low veracity of the

system can pose a larger problem for the organization. Low veracity occurs when team members believe that knowledge is present in the team, but the knowledge is neither accessible nor available. Two separate cases come with different problems. If a team member believes that the knowledge is not available, they will possibly try to correct a problem that does not require correction. Although the cost is high, damage to the system or the organization is limited because it amounts to a waste of resources. However, if a team member falsely believes that knowledge is present in the team, they may not become aware of the need for action and for accessing outside sources. In this case, damage to the organization could become significant because a problem may not get addressed.

Numerous studies have shown that transactive knowledge systems have a significant positive effect on team performance (e.g., Liang et al. 1995; Ren and Argote 2011). Therefore, ensuring that transactive knowledge systems have high veracity is critical for the overall success of the organisation. Increasing the veracity of a transactive knowledge system requires the four previously discussed transactive processes, knowledge disclosure, knowledge acquisition, knowledge allocation, and knowledge requisition. However, disclosing what one knows and, more importantly, what one *does not know*, necessitates a degree of vulnerability of each member of the team. Awareness of what is *not* known in a transactive knowledge system is critical for the continuous improvement of the veracity of transactive knowledge systems. Each person must trust others sufficiently to not be embarrassed by speaking up and disclosing, learning, or requesting knowledge, thus allowing the continuous improvement of the transactive knowledge system.

Robertson et al. (2013) show that the relation between transactive knowledge systems and trust amongst teammates can increase satisfaction for individual employees as well as have a positive effect on team performance. Other research has shown mixed results with regard to the effect of trust on transactive knowledge systems (Akgün et al. 2005; Rau 2005). This could be in part due to the fact that trust has for the most part been conceptualized as an interpersonal variable in organizational research (e.g., Cook and Wall 1980). Thus, trust may not be the adequate concept for understanding the conditions under which transactive knowledge systems can achieve high veracity as opposed to being characterized by low veracity. To achieve high levels of veracity, the team as a whole needs to feel safe enough to share what they know and what they don't know. The need to experience what Edmondson (1996, 2019) has termed psychological safety to speak up and voice concerns, questions, and problems, which consequentially permits a transactive knowledge system to be improved and further developed. In the following, we will elaborate on the concept of psychological safety and thereafter discuss the interdependence between psychological safety and transactive knowledge systems.

2 Psychological safety in teams

Edmondson (2019, p. 22) describes psychological safety as "a climate where people feel safe enough to take interpersonal risks by speaking up and sharing concerns, questions, or ideas" and that "blends trust and respect" (pp. 6–7). She furthermore

defines psychological safety as a construct that "lives" at the team or group level (p. 11). This means that in some organizational teams or groups, it may be easy to speak up because psychological safety is high whereas in other teams, psychological safety may be low, thus discouraging team members from speaking up. Thinking about psychological safety as a team-level phenomenon also explains cases in which one person in a team may be perceived as not trustworthy yet they may not be negatively influencing the team climate in any significant way (unless they are in a position of power). It also explains the fact that whether psychological safety is experienced can vary between teams. The same person could feel psychologically safe enough to speak up in one team but not in another. Interactions through which team members create a safe and collaborative working environment, as opposed to a hostile or unsafe one, are complex. These interactions relate directly to the levels of trust within the team and the psychological safety experienced by each individual team member.

Within teams, and more broadly at the organisational level, the safety and ability to speak up results from an ongoing experience of "respect and permission" where all employees are invited to participate (Clark 2020, p. 126). In such a climate, people will be more likely to speak up in situations in which an intervention is required. Clark highlights how positive "communication patterns" can foster innovation and increase long-term outputs, whereas negative patterns create a paternalistic environment that leaves employees "content to face a hopeless future". Each of these elements is dependent upon a history of occasions in which either the individual themselves or a team member is made to feel safe or unsafe in their environment (Schein and Bennis 1965). Roussin et al. (2016) make note of the varied influence that leaders have on teams in this regard as some leaders are more influential to team psychological safety than others.

Team development activities to increase awareness that vulnerability and failure are a part of the learning process are key to reinforcing psychological safety (Schein and Bennis 1965). As a result, a team can become more willing to take internal risks and to become more vulnerable while they gather new skills or innovate within existing frameworks (Edmondson 1999). However, the need for a safe learning environment is critical. Roussin et al. (2016, p. 1428) point out that one "poisonous team member" can damage even well-established feelings of safety within a team. Large shifts in personal behaviour are more easily observed in lab environments because it is less risky that failures will become common knowledge and thus damage an individual's reputation (Schein and Bennis 1965). In practice, large shifts in behaviour are possible, but the scale of risk-taking increases in tandem with the level of psychological safety the workplace provides (Edmondson 1999).

It is also critical to emphasize that a safe team may not directly translate to a safe organisation. Edmondson (1999) highlights how error reporting can be negatively construed in one team and positively in another. The contributions and work processes including failures of those teams performing well must be shared widely across the organisation to become collective knowledge. This can be supported by placing attention on crafting training and development activities that teach teams how to do new tasks in low-risk environments that teach them to fail with limited personal risk (Tucker et al. 2007).

Psychological safety contributes to a culture of high-quality work outputs, continuous learning, and performance enhancements where employees are willing to stretch their current knowledge to perform their work duties more effectively (Clark 2020). When employees start to understand that errors will not be turned against them and instead used as a chance to improve team outcomes, it reinforces trust at the team level. In turn, a psychologically safe work climate fosters a transformation from blame focus to innovation focus where errors are addressed as learning opportunities (Edmondson 1999, 2019).

Outputs of a psychologically safe workplace include increased productivity, engagement, inclusion, and innovation (Kahn 1990; Edmondson and Lei 2014; Mirza 2020). It also leads to reduced turnover and an overall reduction of errors (Roussin et al. 2016; Tucker et al. 2007). This is particularly critical in high VUCA environments. Working in a psychologically safe environment provides employees, leaders, and teams with the knowledge that stretching their skills and improving work processes despite errors during the learning process is welcomed and encouraged.

3 Transactive knowledge systems and psychological safety: Interdependence and reflexivity

Just as psychological safety is a group-level phenomenon, a transactive knowledge system is a group-level phenomenon as well. In a transactive knowledge system, stronger and weaker links can exist. Higher veracity could exist in one part of the transactive knowledge system while at the same time lower veracity is present in a different part of the system. Overall, however, the transactive knowledge system may be still strong and able to compensate for some weaker links. In the same vein, the overall psychological climate can be experienced as psychologically safe for the most part even if there are a few team members who may not have the trust of some or most of the others.

Due to the nature of organisational work, teams are cognitively interdependent on the specialised knowledge of individual team members. Brauner (2002) notes that individual expertise and knowing who knows what supports the team and organisation at all levels because the interdependence of tasks requires many specialists to contribute to a final work product. Knowledge is exchanged among team members whenever one faces an obstacle and seeks information from colleagues to acquire the correct specialty input. However, only team members who feel psychologically safe will be willing to engage in this exchange and allow others to see gaps in their knowledge and expertise. Thus, building and using transactive knowledge systems will depend on whether team members feel psychologically safe. At the same time, increasing psychological safety in a team or organisation will lead to improvements of the transactive knowledge system. This reflexive and mutually reinforcing relationship is illustrated in Fig. 1. Psychological safety at the same time builds and depends on a highly effective transactive knowledge system.

The four previously discussed transactive processes of knowledge disclosure, knowledge acquisition, knowledge allocation, and knowledge requisition all require psychological safety. Knowledge disclosure, which leads to knowing who knows

Fig. 1 The mutually reinforcing and reflexive relation between psychological safety and a group's transactive knowledge system

Psychological Safety

Transactive Knowledge System
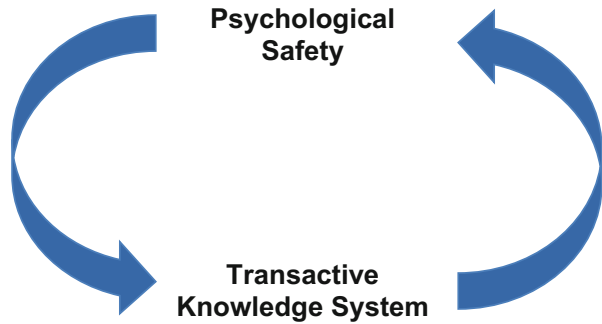
what and thus enables better work practices, ties directly to both group and independent learning activities. If a team has a knowledge gap or a member requires outside expertise, understanding who the specialist is through knowledge allocation can support a team in its work. Some workplace environments may foster knowledge disclosure whereas others foster knowledge hiding behaviours. Jiang et al. (2019) found that "knowledge hiding" erodes the psychological safety of the individual specialist. This reinforces an organisational culture that solicits and celebrates knowledge disclosure and through it knowledge acquisition within the team.

Knowledge acquisition, or group learning, when tied to an individual reflexive practice, can offer positive process and skill enhancement opportunities (Schein and Bennis 1965; Becker and Brauner 2003). When individuals are made aware that insights derived from mistakes and successes alike are welcomed, it fosters knowledge that the team embraces this behaviour. Teams performing this reflexive practice can have productive discussions that foster trust and reinforces psychological safety (Edmondson 1999).

Shared perception of who is the expert in a work environment contributes to high or low effectiveness of the transactive knowledge system because knowledge allocation may be inhibited by a toxic expert. Such a person would be challenging psychological safety and poses a danger to the team. The vulnerability of individual learners may be compromised causing a reduction in disclosure and acquisition processes where team members no longer share what they know or what skills they are seeking to acquire. If the expert makes knowledge inaccessible or is hostile towards those in need of acquiring the knowledge, the psychological risk may motivate the team to create a work-around that can be costly and detrimental to efficiency. Team members may engage in knowledge requisition by going to external sources to bring the specialist skills into their team, thus avoiding the toxic expert. A team member may also seek out knowledge from a person with less specialist skills if the true expert is toxic or uses their vulnerability against them (Schein and Bennis 1965; Roussin et al. 2016). In this circumstance the transactive knowledge system within the group works to resolve the skill gap without sacrificing the psychological safety climate of the team. Although not involving the true expert can be costly and inefficient because important facts may be missed, avoiding an unpleasant person can support the maintenance of psychological safety and lead to creating additional experts within the team.

Leadership behaviours further support or inhibit the cyclical nature of transactive knowledge systems and psychological safety. Leaders within a team are both expert knowledge holders and role models whose actions have a multi-level influence on creating, damaging, or reinstating psychological safety for their teams. This depends on the level of participation the leader has in contributing to work products because the leader who is not also a contributor has a weaker link to team psychological safety (Roussin et al. 2016) and to a team's transactive knowledge system. If the leader is the toxic member of a team, employees may seek to navigate around the toxic leader to deliver their work products.

Thus, the interdependence between transactive knowledge systems and psychological safety is fortified through the practices of knowledge disclosure, knowledge allocation, and knowledge acquisition as each contribute to a positive learning team dynamic in a psychologically safe workplace. Leaders who are a positive influence may spark increased appetite for team learning and knowledge sharing as they are fostering safety both in their specialist contribution and as a role model for the rest of the team. Together these habits foster a willingness for individual team members to take chances because they share a group level knowledge that they are supported in both success and failure.

4 Conclusions: Creating strong transactive knowledge systems in high psychological safety climates

High veracity transactive knowledge systems can help create a feeling of trust and increase a team's competencies for collaboration in the workplace. They offer the opportunity for ongoing learning through active and reflexive practices across all layers of a firm. Daily actions of management to create and defend the workplace as a safe space and show zero tolerance toward bad behaviours contribute to employee well-being and a psychologically safe organisation. Psychological safety translates to increased confidence of employees in management and in their teammates, creating a cycle of continuous improvement of the organisation's transactive knowledge.

The psychological contract between employee-manager, employee-peer, and employee-organisation comes with the assumption of a level of trust and care between both parties (Walker and Hutton 2006). Trust and care support the creation of strong transactive knowledge systems in high psychological safety climates. This foundation of positive interactions builds a constructive organisational culture. Thus, psychological safety is the result of hundreds of thousands transactive experiences that show the individual that it is safe to learn, grow, and contribute to organisational processes and outputs, which in turn strengthens the organisation's transactive knowledge systems.

Schein and Bennis (1965, p. 272) propose the idea of a "basic learning cycle". Moving through four stages 1) identifying a knowledge gap or dilemma, 2) making an attitudinal change, 3) creating a new behaviour, and 4) arriving at an increased level of awareness, individual learners can reflexively probe their impact on others. A secondary output of this learning cycle is the potential shift to the individual's perspective on the learning process, which encourages personal growth. Each of

these learning phases is executed in an environment of low personal risk which increases the willingness to learn. Roussin et al. (2016) use a similar model of small transactive experiences to build psychological safety within a team. Both support the importance of single micro-transactions that contribute to the wider elements of knowledge creation and team dynamics, while context is always critical to the evaluation of group interactions in practice (Brauner 2018).

Edmondson (2019, pp. 35–39) describes four different characteristics of work environments that allow organisational learning through high psychological safety. These four characteristics are: learning from mistakes, learning-what and learning-how, reducing workarounds, and overcoming barriers to speaking up due to low confidence.

4.1 Learning from mistakes

Mistakes are a natural output of the learning process and offer individual and group level information about what works and what does not work in a particular circumstance and what should be done in the future. Creating an environment where employees feel safe to learn from personal mistakes and those made by group members requires positive leadership that guides individuals. Leadership behaviours such as humble inquiry (Schein and Schein 2021) encourage acceptance of errors by listening to employees rather than ordering them what needs to be done.

Edmondson (2019) recommends setting the stage for learning without fear to ensure mistakes and errors are faced not as failures but as a common part of the learning process. Each time an individual makes a mistake it provides an opportunity to reflect on the goals and outcomes through examination of their feelings and reactions (Schein and Bennis 1965). The cyclical process of using reflection to facilitate increased awareness in each stage of learning ensures that personal attitudes do not negatively impact the desire to continue despite setbacks. Reflection also works as a tool to create group-level knowledge and thus allow detecting gaps and errors in the transactive knowledge system. This leads to higher veracity in the transactive knowledge system of a team.

Team shared beliefs continuously influence learning behaviours and help facilitate mistake reporting and correction (Edmondson 1999). Each team member must face their own and their peers' errors in order to engage in a learning cycle (Schein and Bennis 1965, p. 272) that starts with the "dilemma or disconfirming information" the team is facing and thus leads to a chance to adjust attitudes at the group level. Group-level knowledge disclosure and awareness of errors facilitates the team in quickly cycling through corrective action and learning from mistakes through knowledge allocation and knowledge acquisition. The result of these transactive knowledge cycles is increased veracity and higher quality error identification and correction. Thus, the transactive knowledge system supports the team not only in identifying errors, creating new systems, and developing individual and team level behaviour modifications, but it also supports transparency and awareness activities that help the team to redistribute the new knowledge and facilitate psychological safety. Thus, we propose that teams that enjoy higher psychological safety will be better at detecting

errors and that this advantage will in term lead to a continuous improvement of their transactive knowledge systems.

Proposition 1   Teams with high psychological safety will be able to detect more errors in in transactive knowledge systems and in this process will be able to increase the veracity of their transactive knowledge systems.

4.2 Quality improvements through learning-what and learning-how

Learning is multifaceted and requires personal exploration and reflection. At its core, learning puts individuals in a vulnerable position. Clark (2020) highlights the importance of inclusion in the creation of a safe learning environment. From this foundation, two core items can be built 1) learning-what and 2) learning-how (Edmondson 2019). This distinction parallels the distinction between object-level knowledge (Kuhn 1999; Nelson 1999) and procedural knowledge (Ryle 1949). Both types of knowledge are required for operating the transactive knowledge system through disclosure, acquisition, allocation, and requisition (Brauner 2002, in press). Learning-what, or object-level knowledge, constitutes the result of individual learning. This result comprises a team member's expertise that is needed to be applied and included in the team's work process. Learning-how, or procedural knowledge, results from a team's collective learning process. This learning process is necessary to complete the team task.

Critical part of these learning processes is the functioning of the transactive knowledge system. When individuals feel both included and able to fail without personal risk, they can fully engage in the learning cycle (Schein and Bennis 1965). From the position of reduced personal risk comes an increased likelihood to disclose their insights to peers which facilitates wider knowledge acquisition for the entire team. During the learning-what process new information is acquired beyond that of the tactical knowledge garnered. This information includes thoughts, feelings, and personal reflections which foster psychological safety and cycle back into the collective safety of the team. Reflective processes offer individuals a chance to transform a negative learning experience (that of failure) while acquiring new skills or poorly executing knowledge disclosure efforts (Becker and Brauner 2003; Brauner in press) into a positive outcome and lesson which will motivate more learning because errors were embraced as a core element of the learning cycle.

Everyone must face into learning-what or identifying the gaps in their knowledge or skills. Once the gaps have been identified they are able to begin the process of learning-how or engaging with collective learning within their team environment. Learning-how offers teams a chance to share individual knowledge more widely in disclosing that they are the individual expert and, in the mentoring, or allocation of that knowledge to other members. In the progression of learning-how knowledge disclosure, allocation and acquisition happen in tandem. Since those learning and those sharing knowledge are vulnerable, psychological safety feeds into the learning cycle. Thus, we propose that provided a team has high psychological safety, transactive processes (learning-how) are highly improved and therefore contribute to a continuous development of the team's transactive knowledge system.

Proposition 2   Teams with high psychological safety will have better transactive knowledge systems because their transactive processes (disclosure, acquisition, allocation, and requisition) will run more smoothly.

4.3 Reducing workarounds

A team whose transactive knowledge system does not function smoothly, due to a toxic team member or generally due to low psychological safety, needs to create potentially costly workarounds (Tucker and Edmondson 2003). For instance, in a team with a toxic team member, all other team members will likely try to avoid any exchange with the respective person. To request required expertise, the team will need to access external sources that are possibly not quite as qualified for the task at hand. This workaround could lead to follow-up problems because it also will take additional time accessing the external source. However, workarounds usually require team members to work across "organizational silos" (Edmondson 2019, p. 38). Thus, whereas it may take more time and effort to seek help from outside the team, workarounds could contribute to team members learning more about other teams and other parts of the organisation. Therefore, a positive side effect of a negative circumstance (a toxic team member) can potentially lead to an improvement of the overall organisational transactive knowledge system. Nevertheless, the goal of the team and of its leadership needs to remain to reduce workarounds in the long term to increase the efficiency and effectiveness of the transactive knowledge system. Thus, we propose that teams that are required to use workarounds will in the short-term improve the organizational processes by working across, and overcoming, organizational silos.

Proposition 3   By using workarounds, teams will in the short-term focus on improvement of organizational processes, which requires collaborating across organizational silos, and thus will lead to the improvement of the overall transactive knowledge system.

4.4 Countering low confidence

Edmondson (2019) notes the importance of creating a productive learning environment regardless of the quality of specific outcomes. Placing a focus on the positive elements of the effort, for example, celebrating making the attempt rather than the failed outcome, helps employees learn that the risk they are taking is going to be praised and supported as their skills improve.

Clark (2020, p. 44) speaks to the need for a leader to create a learning process with "low social friction and low emotional expense". By being sure that they are safe to fail and celebrated when they learn, individuals can garner confidence as they move through the knowledge acquisition process (Brauner 2006). Therefore, the most critical part of the learning environment is that the leader acknowledges that the learner is vulnerable. Moreover, it is the leader's responsibility to ensure safety (Edmondson 2019; Schein and Schein 2021).

Clark (2020) takes this one step further by reinforcing the importance of support in exchange for vulnerability during knowledge acquisition in the learning cycle. "If I'm the learner, I expect the leader, teacher, coach, or parent to support me in the learning process. It's encouragement to learn in exchange for engagement to learn" (p. 45). As such the transactive nature of learning gives the individual learner a chance to see their risks rewards, offers leaders the chance to role model these behaviours, all of which contribute to the transactive knowledge systems that deliver psychological safety for the team. Thus, we propose that low confidence in knowledge sharing can be overcome with high veracity transactive knowledge systems, and vice versa, that transactive knowledge systems will lead to reduced fear of knowledge sharing.

Proposition 4   Due to the higher veracity of their transactive knowledge systems, teams with high psychological safety will more easily overcome low confidence when it comes to sharing knowledge because they will have higher awareness of who knows what.

5 Conclusions

Organisations that are currently psychologically unsafe for employees generate low veracity transactive knowledge systems. To shift the organisational climate away from risk and towards safety, the environmental influences that form knowledge of safety must be addressed. Given that there are thousands of interactions across an organisation daily, establishing core areas of risk early can facilitate a trend of continuous improvement behaviours that contribute to reducing hazards and reinforcing psychological safety for individual employees and managers. Cultural shifts from hostility and blame to one of learning and improving collectively do not establish psychological safety immediately. Rather, over time the consistency of terminology within the firm, removing risk ramifications from failure, communicating gaps and improvement tactics, intolerance of toxic behaviours, and acting quickly all build and reinforce a foundation of psychological safety at team and organisational levels.

Practitioners should seek to develop team communication and collaboration through efforts to measure performance, acknowledge and correct errors transparently, and to use reflection to aid correction behaviours rather than placing blame on individual team members. Measuring performance requires leaders to clearly communicate expectations. These include expectations of work as well as how errors and successes are discussed amongst team members. Fostering a safe environment requires leaders to engage meaningfully with the team when mistakes occur to ensure the entire team sees it as a chance to improve and learn together (Schein and Bennis 1965). Further, the transformation from blame to collective learning ensures that individual employees feel safe when sharing mistakes that might leave them vulnerable to criticism (Edmondson 1999). While the workplace is not free of risk in the same way as a lab context might be, assuring that team members remain safe to report mistakes supports a wider effort towards willingness to do so

for individuals and teams, which can contribute more broadly to positive outcomes at organisational levels.

Reflexive practice both at individual and collective levels offers organisations an opportunity to learn from past behaviours and adjust accordingly. Fostering this effort through managing clear team expectations supports teams in what behaviours should look like. Managers must model this and offer personal insights into how their behaviour in positive or negative ways impacted the team and how they will adapt to focus on continuous improvement. Clark (2020) highlights that this can also support teams in becoming more innovative by seeing wider impacts of behaviours in practice. Over time these reflections done at individual and team levels should lead to growth of transactive knowledge systems and psychological safety while also creating better overall outcomes for the organization and its members.

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