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Being open, feeling safe and getting creative: The role of team mean openness to experience in the emergence of team psychological safety and team creativity

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Abstract

Although the effects of openness to experience (OTE) on individual creativity are well-established, research on how such effects unfold in a team context is scarce. Drawing on theories of group norms and uncertainty reduction, we argue that team mean OTE leads to a climate of team psychological safety which, in turn, facilitates team creativity. We test our hypothesis over three independent studies, the first comprising 35 business student project teams, the second based on 28 professional teams from the automotive industry, both conducted in the United Kingdom, and the third comprising 24 healthcare teams in Portugal. As predicted, across all three studies, team mean OTE was positively associated with team creativity via the affective emergent state of team psychological safety. Furthermore, the mediating role of team psychological safety remained significant even when accounting for team OTE variance, alternative motivational and cognitive emergent states, namely team promotion focus (studies 1 and 2) and team exploration climate (study 3), as well as empowering leadership (study 3). Finally, in study 3, we examined the differential impact of the two major facets of OTE, intellect, and openness, and found that intellect, but not openness, was responsible for driving the indirect effects. Further analysis did not support alternative perspectives concerning team OTE variance or the interaction between mean and variance. Our findings not only contribute to theoretical understanding regarding the relationship between team personality composition, specifically OTE, and team creativity but also provide much-needed insight into *how* such effects unfold. We delineate several practical implications for team design and development.

KEYWORDS

openness to experience, team creativity, team personality composition, team psychological safety

1 | INTRODUCTION

The rapid growth of the creative economy, coupled with organizations striving to compete in increasingly volatile and dynamic environments, has seen team-based working emerge as the dominant form of work design for enabling organizational survival, success, and innovation (Meinhardt et al., 2018). Work teams represent the fundamental building blocks for acquiring, integrating, and delivering knowledge in organizations, with their creative output being increasingly acknowledged as vital for organizational growth and thriving (Anderson et al., 2014; Razinskas et al., 2022). As such, understanding the drivers of team creativity, defined as "*the joint novelty and usefulness of a final idea developed by a group of people*" (Hoever et al., 2012, 983), and considered a crucial outcome of teamwork (Yuan et al., 2022), remains one of the most fundamental questions for researchers and practitioners alike.

Practitioner points

- Individuals' personality is not only relevant for individual performance but also critical for team outcomes.
- Team composition in terms of openness to experience can influence the extent to which teams will be creative.
- Teams that have on average a higher level of openness to experience will develop a stronger team climate for psychological safety which, in turn, leads to team creativity.
- Managers should aim to recruit team members high on openness to experience in order to maximize team psychological safety and team creativity.

Within the burgeoning literature on team creativity (see Gilson et al., 2019; Hülsheger et al., 2009), there is a strong tradition of viewing team creativity as contingent on the creative dispositions of team members (Chatzi et al., 2022). At the same time, an extensive body of evidence supports the intuitive notion that at the individual level, openness to experience (OTE), a major dimension of the Big Five Model of personality (McCrae & Costa, 1987), is associated with creativity (e.g., Taggar, 2002; Zhang et al., 2020). OTE captures an individual's propensity to be imaginative, unconventional, and flexible in their work (McCrae & Costa, 1987). Accordingly, individuals high on OTE have been shown to be more adaptive in absorbing and combining unrelated information into novel and useful forms, prompting higher levels of individual creativity (Feist, 1998, 1999). One might, therefore, logically assume that teams composed of members with, on average, higher levels of OTE—hereafter referred to as team mean OTE—will generate greater levels of team creativity. Yet, there are surprisingly few empirical studies to verify such assumptions, with those available reporting inconsistent results. For instance, while Baer et al. (2008) found that having more team members high in OTE was associated with higher team creativity, Schilpzand et al. (2011) failed to confirm such effects, instead finding a positive relationship between team creativity and team OTE variance (i.e., the level of dispersion around the team mean). Furthermore, den Hartog et al. (2020) found no support for the effects of either team mean OTE or team OTE variance on student-team innovation. Such divergent findings reflect two pertinent tensions in the team creativity literature.

First, different perspectives on the direct effects of team composition on team creativity leave organizations unclear as to how to design and compose teams when there is a creative imperative (Prewett et al., 2018; van Knippenberg, 2017). While some studies theorize about the effects of team mean OTE, others make a case for team OTE variance, leading to divergent conceptualizations, measurement approaches and practical implications, and an overall lack of clarity in the literature. Second, we have very little insight regarding *how* such effects might unfold—leaving the underlying theoretical mechanisms between team OTE composition and team creativity both unspecified and untested. Team creativity is not simply a summation of individual inputs but is understood to emerge from dynamic interactions among team members concerning the generation and evaluation of new and useful ideas (Hu et al., 2018). The established Input-Process-Output (IPO) model of team effectiveness would imply that team inputs (i.e., team OTE composition) shape team outputs (i.e., team creativity) via their influence on team processes and emergent states (i.e., dynamics that emerge between team members; Hackman, 1987). With existing studies focusing primarily on direct effects, elucidating the underlying mechanisms at play between team OTE composition and team creativity is a crucial next step for enabling theoretical progress in this field.

Accordingly, the primary objective of this research is to extend understanding of how and why team OTE composition impacts team creativity. Drawing on theories of social and group norms (Brown, 2000; Taggar & Ellis, 2007), uncertainty reduction (Lind & van den Bos, 2002; Tangirala & Alge, 2006), and team climate (Anderson & West, 1998; van Knippenberg, 2017), we argue that team mean OTE influences team creativity indirectly via the emergence of team psychological safety. Given that team creativity is largely dependent on social processes that

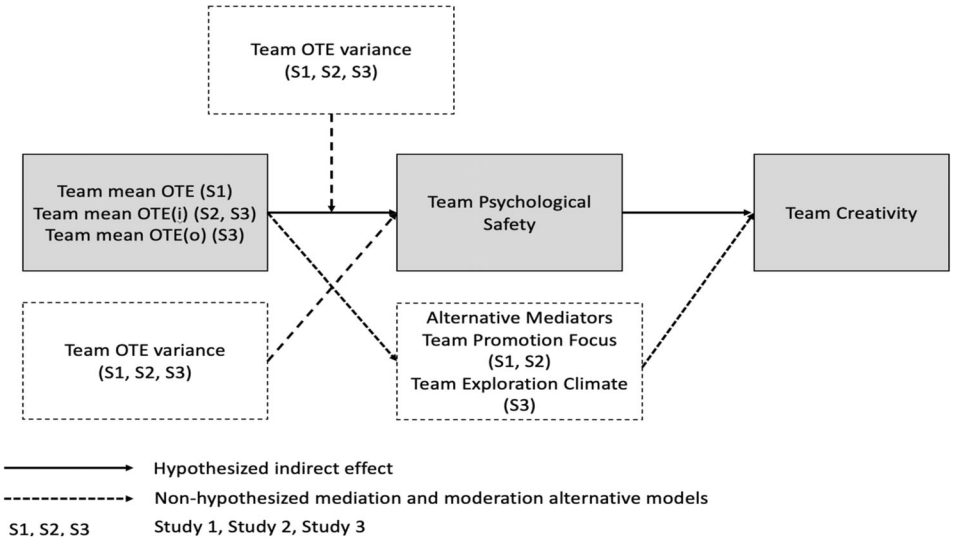

FIGURE 1 Theoretical model.

enable the discussion and development of diverse ideas, it is crucial that team members feel safe to think out loud, experiment with new ideas, and learn from making mistakes (Mukerjee & Metiu, 2022). Defined as the extent to which members perceive the team as interpersonally safe for risk-taking (Edmondson, 1999, 2003), we propose that team psychological safety represents a crucial team emergent state for legitimizing the expression of OTE in team interactions. Put differently, team psychological safety is the mechanism *through which* a team is able to capitalize on its collective predisposition toward OTE, and ultimately generate more creative team outputs.

Our research provides two key contributions. First, we enable new, theoretically driven insights into the relationship between team personality composition in OTE, specifically team mean OTE, and team creativity, bringing clarity to what is currently a small and inconsistent body of evidence. We establish the effects of team mean OTE while also accounting for alternative perspectives on team composition by controlling for and testing the influence of team OTE variance (LePine et al., 2011). Our multimethod, three-study design also enables us to explore the differential effects of facet-level dimensions of OTE, namely openness and intellect, to tease out the unique influence of each. In doing so, we add nuance to the extant literature on personality, which has largely focused on broad-domain effects (DeYoung et al., 2014). Second, we identify a specific creativity-relevant mediator, team psychological safety, as a key mechanism through which team mean OTE indirectly shapes team creativity. Based on IPO principles (see Hackman, 1987; Marks et al., 2001), our conceptual model, thus, moves existing understanding beyond its current focus on direct effects. By integrating theories on social norms, uncertainty management, and team climate, we highlight the unique role that team psychological safety plays in transmitting the effects of team personality composition onto team creativity, while also accounting for alternative explanations. Indeed, research has largely focused on identifying the cognitive and motivational team emergent states that drive team creativity, such as information elaboration (Hoever et al., 2012; Homan et al., 2008), information sharing (Hu et al., 2018), and knowledge sharing (Zhang et al., 2019). In contrast, our research examines the neglected role played by affective team emergent states, specifically team psychological safety, in transmitting the effects of team composition onto team creativity. In doing so, we address recent calls to examine *how* team personality composition, specifically in OTE, shapes the innovation climate and subsequent creative output of teams (see Newman et al., 2017). Consequently, we also contribute to the nascent literature on the antecedents of team psychological safety (see Frazier et al., 2017).

We examine our mediated model across three independent studies in which team creativity is an organizational imperative. Study 1 tests the model in a controlled task context of 35 business student project teams, in which team creativity was independently assessed by trained raters. Study 2 then validates the model in a field context of 28 professional teams working in the UK automotive industry. In both of these studies, team OTE variance, as well as the alternative motivational team emergent state of team promotion focus (Sacramento et al., 2013) were controlled for and examined. Based on a sample of 24 healthcare teams in Portugal, study 3 extends the previous studies by examining the facet-level dimensions of OTE, openness, and intellect, in order to establish their unique influence in driving the indirect

effects of OTE on team creativity. Study 3 also accounts for team OTE variance, as well as the alternative cognitive team emergent state of team exploration climate (Lubatkin et al., 2006) and empowering leadership (Oedzes et al., 2019), thus providing further assurance to the unique mediating role played by team psychological safety. Figure 1 illustrates the proposed mediation model (in shaded), with the non-hypothesized alternative models also depicted (in dashed). Collectively, our findings enable meaningful theoretical progress on understanding the emergence of team creativity as well as better informing managerial decision making on team personality composition in organizational contexts that demand innovation.

2 | THEORY AND HYPOTHESIS DEVELOPMENT

2.1 | Team OTE and team creativity

Research efforts to uncover the antecedents of team creativity have been significantly informed by the IPO model of team effectiveness, which posits that outputs, in this case, team creativity, are shaped by inputs (e.g., team member characteristics, task design, organizational context) via team processes and emergent states that develop from team member interactions (Rapp et al., 2021). While some have examined team creativity itself as a team process, it is primarily conceptualized and measured as an output of teamwork (Hu et al., 2018; Yuan et al., 2022), capturing the extent to which ideas or outcomes generated by a team are deemed as novel and useful (Hoever et al., 2012; Shalley & Zhou, 2008).

In seeking to understand how to best design teams where there is a creative imperative, researchers have consistently recognized that team composition, defined as the configuration of certain team member characteristics (Levine & Moreland, 1990), appears to lay the foundations for team creativity (Zhou & Hoever, 2014). Team personality composition, in particular, has been argued to be a critical input factor, with studies examining trait-based attributes such as dispositional need for closure (Chirumbolo et al., 2004) and creative personality (Somech & Drach-Zahavy, 2013). However, by far the most widely-used and influential model of personality is that of the "Big Five," with demonstrated validity across multiple populations, cultures, and outcomes (McCrae & Costa, 1987; Schmitt et al., 2007). While a wealth of evidence supports beneficial effects of team member conscientiousness and agreeableness for team functioning and performance (e.g., LePine et al., 2011; Prewett et al., 2018), the seemingly intuitive role of team composition in OTE has been largely neglected. OTE is defined as the "*disposition to be imaginative, nonconforming, and unconventional*" (Judge et al., 2002, 765), capturing the extent to which a person is curious and amenable to new experiences, ideas, and alternative points of view (McCrae, 1996). While OTE is generally conceptualized and examined as a unidimensional construct, it comprises two distinct facets—openness, hereon OTE(o), and intellect, heron OTE(i) (DeYoung et al., 2014; Woo et al., 2014). OTE(o) is characterized by engagement with fantasy, esthetics, emotions, and perceptions, while OTE(i) reflects engagement with semantic and abstract information (DeYoung et al., 2012). Overall, individuals high on OTE are often described as flexible, independent thinkers, who can more easily access a wide range of thoughts, feelings, and perspectives. Consequently, they are more able and willing to suggest and develop new ideas that challenge conventional methods. In the workplace, such individuals typically demonstrate originality, open-mindedness, imagination, and intellectual curiosity—all crucial traits for creativity (George & Zhou, 2001). Not surprisingly, individual-level OTE has been shown to be consistently associated with divergent thinking, imaginative interests (Costa et al., 1984), as well as creativity (McCrae, 1987). Extrapolating these findings to the team level, it would appear, at first blush, that teams composed of individuals who are all high on OTE should generate higher levels of team creativity (Moneta et al., 2010). Such assumptions reflect the aggregation of individual inputs perspective, which posits that team innovation[1] is directly derived from the creativity of team members (van Knippenberg, 2017). Taking a more nuanced view, trait-oriented theories suggest that team personality composition can be understood through the lens of person-environment fit (Muchinsky & Monahan, 1987). Supplementary fit refers to attributes where elevation or high average levels of a given trait is most desirable in a team (i.e., higher team mean; see Prewett et al., 2018; Kramer et al., 2014; Zhou et al., 2017). Complementary fit refers to attributes where heterogeneity on a given trait is preferred (i.e., higher team variance; see Humphrey et al., 2007; LePine et al., 2011). In relation to team OTE composition specifically, while evidence is notably limited, existing findings lend general support to a positive effect of team mean OTE on team performance (e.g., Homan et al., 2008; LePine, 2003). However, there is no clear evidence showing either positive or negative effects of team OTE variance (Peeters et al., 2006). With regards to the output of team creativity in particular, experimental

[1]While team creativity and team innovation are conceptualized as independent constructs, with the former concerned with the generation of ideas and the latter on their implementation, their measures typically overlap to the extent that research in both fields becomes part of the same body of evidence (van Knippenberg, 2017).

studies have reported that team mean OTE is positively associated with quality and quantity of ideas generated (Bolin & Neuman, 2006). Similarly, Baer et al. (2008) found that for teams high in creative confidence, team mean OTE was positively associated with subsequent team creativity. However, Schilpzand et al. (2011) found no significant relationship between team mean OTE and team creativity, instead finding evidence for team OTE variance. While not examining team creativity per se, Zhang et al. (2019) also reported differential effects of team OTE heterogeneity on idea generation and idea development. Overall, while limited theorizing on team personality composition points to the positive effects of team mean OTE, the role of team variance in OTE cannot be ruled out and warrants further exploratory examination. Furthermore, adding to this inconsistent and complex picture, existing studies have failed to identify the underlying mediating mechanisms through which team composition effects unfold, leaving our understanding of what actually happens in such teams incomplete.

2.2 | The mediating role of team psychological safety

If team mean OTE lays the foundational inputs for enabling team creativity, what mechanism can explain *how* team OTE composition enables more novel and useful team outputs? Based upon IPO heuristics, this relationship can be better understood by examining the indirect effects of how team members interact together as a consequence of their collective personality composition. Such insights can be gleaned by examining the role played by team emergent states—cognitive, affective, and motivation states of teams that are "*dynamic in nature a vary as a function of team context, inputs, processes, and outcomes*" (Marks et al., 2001, 357). Here we focus on the specific affective team emergent state of team psychological safety.

Team psychological safety is defined as the collective belief that the team is a safe place for interpersonal risk-taking (Edmondson, 1999). Psychologically safe team climates enable freedom of expression and encourage team members to employ their authentic selves without fear of negative interpersonal consequences (Kahn, 1990). Conversely, in teams with a low climate for psychological safety, team members feel afraid to speak up, challenge conventional practice, or express divergent perspectives, out of fear of embarrassment, shame, or isolation. Given that team psychological safety has been consistently associated with team learning and performance (e.g., Bunderson & Boumgarden, 2010; Edmondson, 1999), researchers have increasingly turned their attention to its antecedents (Frazier et al., 2017). The emergence of team psychological safety has been attributed to structural and goal-focused properties of a team (Hu et al., 2018), as well as the wider organizational context (Edmondson, 2002, 2003). However, it can also develop according to the characteristics of team members themselves, and how team member traits combine at the group level (Edmondson & Lei, 2014; Kahn, 1990). Climate scholars have long argued that "*the people make the place*" (Schneider, 1987), suggesting that a climate for team psychological safety is likely to, in part, emerge from the characteristics and attributes of team members. At the individual level, sensemaking theory (Schneider & Reichers, 1983) implies that due to their predisposed curiosity about the world, individuals high on OTE are more likely to expose their vulnerabilities in the workplace and show an orientation toward risk-taking, thus, increasing the likelihood that they will experience psychological safety at work (Edmondson & Mogelof, 2005). Hence, while being conceptually distinct, OTE and psychological safety are aligned in their focus on openness to risk taking; the former in relation to an orientation toward ideas and information, the latter in relation to perceptions that the team is a safe place to take interpersonal risks (McCrae & Sutin, 2009). Accordingly, there are theoretical grounds to posit that an elevated team mean OTE (i.e., supplementary fit in higher OTE) is likely to facilitate the emergence of collective beliefs regarding team psychological safety.

First, according to theories of social and group norms (Brown, 2000; Taggar & Ellis, 2007), personality reflects an individual's tendency to engage in specific behaviors according to their personal norms, which, in the context of teamwork, have been shown to drive the emergence of shared beliefs and expected standards of behavior in a team (Bettenhausen & Murnighan, 1991; Gonzalez-Mulé et al., 2014). Teams with a higher mean level of OTE will be comprised of a number of individuals with a disposition toward curiosity, novel information, complex problem solving, and cognitive flexibility (Judge et al., 2002). In such teams, typical interactions are expected to reflect team member personal norms (i.e., individual beliefs regarding appropriate behaviors in situations; Allen & Meyer, 1990) toward OTE. Team members will likely share collective norms that endorse curiosity, ideas, and alternative perspectives (DeYoung et al., 2012). Indeed, team researchers have found that dispositions and orientations that are shared by team members are particularly powerful in shaping team dynamics, with similar team member behaviors becoming self-reinforcing and exerting a strong influence on the resulting team norms and climate (Harvey et al., 2019). For instance, an individual who expresses intellectual curiosity regarding different

ways to solve a complex problem will communicate a personal norm of intellect (a major sub-dimension of OTE, as introduced earlier). In a team comprised of higher OTE individuals, team member recipients will more likely share this individual's personal norm for intellect—endorsing this norm by signaling their approval, and/or legitimizing the behavior by mirroring intellectual curiosity themselves. Consequently, in teams with high levels of team mean OTE, we posit that team member interactions will facilitate the emergence of a team climate for psychological safety, in which team members perceive that the team affords a safe environment for interpersonal risk-taking.

On the other hand, in teams with low levels of team mean OTE, typical team member personal norms will reflect an orientation toward risk-aversion and closed attitudes regarding change, curiosity, and novelty. The greater prevalence of such personal norms in low mean OTE teams will again emerge to shape team interactions, reflecting shared group norms that value routine and the status quo, and suggesting that such teams would be uncomfortable with risk-seeking or risk-taking behaviors. Indeed, uncertainty reduction theory (Lind & van den Bos, 2002; Tangirala & Alge, 2006) would posit that in teams with a low mean OTE, team members are likely to avoid interpersonal risks associated with self-expression, as this will threaten one's sense of control. As such, low team mean OTE is unlikely to encourage or endorse interpersonal risk-taking, due to team member uncertainty regarding the potential negative consequences (Anderson & West, 1998). Low team mean OTE, is thus, unlikely to facilitate the development of team psychological safety. In summary, we argue that when team members collectively have a dispositional orientation toward OTE, the alignment in their personal norms, attitudes, and behaviors reflecting intellectual curiosity, aesthetic sensitivity, and the appreciation of novelty will converge during team interactions. This convergence will inform a clear set of expectations for collective working, reflecting a tacit shared belief that the team provides a safe climate for interpersonal risk-taking.

Given that the aforementioned theorizing reflects the supplementary fit perspective on team OTE composition, it is important to contrast this with the potential role of complementary fit. However, theorizing about the effects of team OTE variance on team psychological safety is far from clear cut. On the one hand, it might be argued that team OTE variance would imply that divergent personal norms for openness and intellect are prevalent in a team, potentially signaling to team members that different orientations and perspectives (including those reflective of low OTE) are accepted. As a consequence, this may serve to enhance perceptions of psychological safety. On the other hand, simultaneous expressions of both high and low OTE are likely to create higher levels of uncertainty and potential discord in the team. Given that individuals tend to feel safer in environments where they perceive similarity with others (Schulte et al., 2010), team OTE variance might, therefore, hinder team psychological safety. Overall, given these conflicting theoretical expectations, combined with a lack of empirical evidence for the role of team OTE variance more generally (e.g., den Hartog et al., 2020), we do not hypothesize for an association between team OTE variance and team psychological safety. Instead, we account for its potential influence by both controlling for team OTE variance in all three studies, as well as conducting exploratory analysis to explore the potential theoretical assertations above.

Following the theorized positive association between team mean OTE and team psychological safety, we anticipate that team psychological safety will provide a key affective emergent state for transmitting the effects of team personality composition onto team creativity. Team creativity necessitates the combining of, elaboration upon, and critical improvement of team member ideas through unconstrained team member interactions (Lee et al., 2018). When teams are tasked with creative work, which, in itself, is characterized by risk and uncertainty (Madjar et al., 2011), the primary function of team psychological safety is to minimize team member perceptions of the uncertainty associated with engaging in creativity-relevant behaviors (Nembhard & Edmondson., 2006). When teams have a climate characterized by high psychological safety, team members feel comfortable to take risks, tackle obstacles, and deal with uncertainty, without fear of punishment, embarrassment, or rejection from the team (Edmondson, 1999). Accordingly, team psychological safety has been associated with creativity-relevant behaviors, including challenging conventional wisdom, proposing different ways of doing things, voicing concerns, and expressing personal points of view in a non-judgmental environment (Bradley et al., 2012; Hu et al., 2018). A psychologically safe climate also frees team members from worrying about face-saving concerns, thus, reducing the effort and resources required for managing interpersonal relations and regulating social dynamics in the team. Instead, such resources can be channeled toward addressing the creative imperative of the task at hand. Accordingly, a large body of research has found support for a positive relationship between team psychological safety and team creativity and innovation (e.g., Frazier et al., 2017; Hülsheger et al., 2009; Peng et al., 2019; Post, 2012).

In summary, the above theorizing implies that team mean OTE will be indirectly associated with team

creativity via team psychological safety, as reflected in our overarching hypothesis:

> **Hypothesis 1.** Team psychological safety mediates the positive association between team mean OTE and team creativity.

3 | METHODOLOGY, DATA ANALYSIS AND RESULTS

3.1 | Study 1

3.1.1 | Sample and procedure

The first study (study 1) involved graduate students attending an organizational behavior module as part of their MSc degree at a U.K. University. As a requirement for their assessment, students worked together in teams over a 10-week period to analyze a case study and produce a written group report along with an associated five-minute video presentation examining ways to improve motivation in a specific job. The video presentation required teams to deliver a professional pitch to a fictitious director of the case study organization, presenting a persuasive evidence-based plan for improving employee motivation as creatively as possible. All team members were equally responsible for producing the video. In week one of the module, students were grouped into teams and informed about the assessment requirements. Students then completed two separate questionnaires capturing individual characteristics (T1, week two) and team dynamics (T2, week six), in exchange for a feedback report, which supported their learning on the module.

One-hundred and fifty-one participants distributed across 38 teams completed the questionnaire at T1. Two students left the module so their data was deleted. One-hundred and fifteen participants completed the questionnaire at T2. Three teams were eliminated due to non-response, resulting in a total sample of 143 participants in 35 teams. The average age was 24.7 years, and 58.7% of the sample was female. Team size ranged from three to six members, with the average size being 4.94.

3.1.2 | Measures

Openness to experience: OTE was measured using the four-item scale from the mini-ipip (Donnellan et al., 2006), which used a five-point Likert scale (*1 = strongly disagree*, 5 = *strongly agree*). Example items include "*Have a vivid imagination*" and "*Am not interested in abstract ideas*" (reverse coded; $\alpha = 0.697$).

Team psychological safety: Team psychological safety was measured using Edmondson's (1999) seven-item scale which used a seven-point Likert scale (*1 = strongly disagree*, 7 = *strongly agree*). Example items include "*It is safe to take a risk in this group*," and "*Members of this group are able to bring up problems and tough issues*" ($\alpha = 0.664$).

Team creativity: In addition to a written report analyzing the case study using relevant theory, all teams were also asked to prepare a five-minute video presentation summarizing their recommendations to the case study and were informed that the creativity of their presentation would be assessed. This video presentation enabled us to capture a knowledge-independent and isolated measure of team creativity, as teams were asked to focus on the creative delivery of their case study analysis. The extent to which each team was more or less creative in their delivery varied considerably. One example of a video judged very low for team creativity consisted of one team member reading out the proposed actions to the camera, while a video rated very high in team creativity consisted of an interactive role-play involving different stakeholders in the case study. Three independent raters attended two 1-h training sessions in which the concept of team creativity and how this could be demonstrated during a team presentation was discussed, with different examples being considered. Between training sessions, the raters independently rated five randomly selected videos on a five-point scale (*1 = not at all creative*, *5 = very creative*) in terms of "overall team creativity of presentation." Once discrepancies were discussed, and initial inter-rater reliability was established, all raters proceeded to rate all remaining videos. The final ratings demonstrated good inter-rater reliability (ICC = 0.939) and the ratings of the three assessors were averaged to create a measure of team creativity.

Control variables: We controlled for team size in all analyses as larger teams might have more resources to draw upon when generating ideas. We also included team OTE variance, operationalized as team OTE standard deviation, in order to account for the effects of team variability in OTE. In addition, to strengthen our confidence in the role of team psychological safety as a mediating mechanism, we controlled for an alternative motivational team emergent state that has been associated with team creativity, team promotion focus (Shin et al., 2016), defined as a collective motivation toward achieving positive outcomes, adopting riskier strategies and pursuing promotion related goals that become part of a teams identity (Higgins, 1998). Team promotion focus was measured with a five-item scale (Sacramento et al., 2013) rated using a seven-point Likert scale (*1 = strongly disagree*, 7 = *strongly agree*). An example item is "*We were focused on the success we hope to achieve at the end of the project*" ($\alpha = 0.907$).

3.1.3 | Data aggregation

First, to test whether aggregation of team psychological safety was appropriate we calculated the average *Rwg* (j) statistic, which is a measure of interrater agreement (James et al., 1984), the ICC(1), which indicates the amount of lower-level variance accounted for by group membership, and the ICC(2), which indicates the reliability of the group level means (Shrout & Fleiss, 1979). These values were 0.848, 0.255, and 0.525, respectively. We acknowledge that while the ICC(2) value was below the typical recommended 0.70, this is a measure of reliability and is, thus, likely to be affected by the relatively small number of members per team (Bliese, 1998, 2000). Given that team psychological safety is a well-established group-level construct, along with the relatively high *Rwg*(j) value, we proceeded with data aggregation. Second, although OTE is a personality variable and is, therefore, a configurational team property not expected to coalesce and converge in teams, in contrast with a shared unit property (Klein & Kozlowski, 2000), we checked these statistics for the sake of completion—*Rwg*(j) = 0.754, ICC(1) = 0.007; ICC(2) = 0.027. Finally, in relation to the control variable of team promotion focus, although the aggregation statistics were superior to those for OTE, *Rwg*(j) = 0.900, ICC(1) = 0.113; ICC(2) = 0.290, the ICC values were still below levels typically considered acceptable, which again may be explained by the generally small team sizes. Given the adequate *Rwg*(j) statistics, we proceeded with aggregation, noting this as a limitation.

3.1.4 | Analytical approach and results

The descriptive statistics and correlations between study 1 variables are presented in Table 1.

In order to test the proposed model we employed Hayes' PROCESS macro (Hayes, 2017), which enables the testing of all mediation conditions simultaneously, thus, providing a superior approach to conducting piece-meal analysis (Edwards & Lambert, 2007). For all tests (including those in studies 2 and 3) 95% confidence bootstrapped confidence intervals based on 5000 samples were provided. For ease of comparison, within and across all three studies, all variables were standardized and, thus, we present standardized coefficients. As given in Table 2, team mean OTE had a significant effect on team psychological safety ($b = 0.328$, $SE = 0.135$, $p = 0.022$, 95% CI [0.051, 0.604]), and team psychological safety was positively associated to team creativity ($b = 0.425$, $SE = 0.156$, $p = 0.011$, 95% CI [0.106, 0.743]). The indirect effect of team mean OTE on team creativity via team psychological safety was significant (effect = 0.139, $SE = 0.087$, 95%, CI [0.018, 0.383]), supporting Hypothesis 1. The direct effect was not significant (effect = 0.204, $SE = 0.126$, 95% CI [−0.054, 0.463]). In addition, we also examined an alternative model in which instead of controlling for the effects of team promotion focus, we simultaneously tested team psychological safety and team promotion focus as competitive mediators. The mediating effect of team psychological safety remained significant (effect = 0.213, $SE = 0.104$, 95%, CI [0.068, 0.508]), while the indirect effect via team promotion focus was not significant (effect = 0.047, $SE = 0.073$, 95%, CI [−0.056, 0.217]).

Finally, we examined team OTE variance as an alternative predictor of team creativity via team psychological safety. The results also demonstrated a positive effect of team OTE variance on team psychological safety ($b = 0.435$, $SE = 0.120$, CI [191, 0.679]) and team creativity ($b = 0.306$ $SE = 0.122$ CI [0.056, 0.556]). The indirect effect was also significant (effect = 0.185, $SE = 0.079$, 95%, CI [0.072, 0.415]). Taking an exploratory approach and inspired by the climate strength perspective (Schneider et al., 2002), we also tested whether the interaction between team mean OTE and team OTE variance would predict team creativity via team psychological safety. However, there was no support for the moderated mediation (index moderated mediation = 0.000, SE = 0.100, 95% CI [−0.168, 0.253]).

3.1.5 | Study 1 discussion

The above results lend support to the idea that team mean OTE can foster team creativity and that this effect is due to an increase in team psychological safety. However, given that these effects were tested in a student sample, it was important to examine whether they could be replicated in an organizational field context. Another limitation of study 1 pertained to the reliability of the team psychological safety measure, which was slightly below the recommended 0.70 level. Moreover, we used a short, albeit validated, measure of OTE (Donnellan et al., 2006), begging the question as to whether a more comprehensive scale would yield the same findings. Study 2, therefore, aimed to address these shortcomings. Furthermore, a surprising finding of study 1 was the significant indirect effect of team OTE variance on team creativity via team psychological safety. As we had not drawn specific hypotheses regarding the role of team OTE variance due to limited and conflicting theoretical perspectives, it was, therefore, important to further explore the role played by team OTE variance in the context of real-world organizational teams.

TABLE 1 Study 1 descriptive statistics, correlations, and reliabilities.

Study variables	M	MIN	MAX	SD	1	2	3	4	5
1. Team mean OTE	3.558	2.938	4.500	0.393	(0.697)				
2. Team psychological safety	5.014	4.000	6.048	0.615	434**	(0.664)			
3. Team creativity	3.229	1.000	5.000	1.145	0.369*	0.775**	(0.939)		
4. Team OTE variance	0.637	0.000	1.155	0.280	−0.048	0.489**	0.521**		
5. Team promotion focus	5.631	4.00	6.583	0.632	0.418*	0.620**	0.583**	0.199	(0.907)
6. Team size	4.942	3.000	6.000	0.906	−0.160	0.184	0.353*	−0.010	0.268

Note: $N = 35$.
Abbreviation: OTE, openness to experience.
*$p < 0.050$; **$p < 0.010$.

TABLE 2 Study 1 estimation of direct and indirect effects.

Team psychological safety				Team creativity		
Variables	**Coefficient**	**SE**	**95% [LLCI ULCI]**	**Coefficient**	**SE**	**95% [LLCI ULCI]**
Direct effects						
Team mean OTE	0.328*	0.135	[0.051 0.604]	0.204	0.126	[−0.054 0.463]
Team OTE variance	0.435**	0.120	[0.191 0.679]	0.306*	0.122	[0.056 0.556]
Team promotion focus	0.358*	0.142	[0.068 0.647]	0.097	0.133	[−0.176 0.369]
Team size	0.144	0.127	[−0.114 0.403]	0.285*	0.110	[0.059 0.510]
Team psychological safety				0.425*	0.156	[0.106 0.743]
Indirect effect						
Team mean OTE → Team psychological safety → Team creativity				0.139*	0.087	[0.018 0.383]

Note: $N = 35$.
Abbreviations: LLCI, lower level confidence interval; OTE, openness to experience; ULCI, upper-level confidence interval.
*$p < 0.050$; **$p \leq 0.010$.

3.2 | Study 2

3.2.1 | Sample and procedure

The second study (study 2) was conducted in the automotive sector, an industry characterized by introducing innovative work processes. The sample organization was a medium-sized global company of 5000 employees, with headquarters in Europe, Asia-Pacific, China, Middle East, South Africa, Latin America, and North America. The teams sampled all worked in the United Kingdom across a number of automotive aftersales and purchase service projects ranging from customer services to analytical work. Their work required varying degrees of creativity and innovative thinking including solving customer problems, addressing technical issues, rolling out new processes, and improving client capabilities.

In coordination with the Global Head of HR, 34 teams and their respective leaders were invited to participate. Team leaders provided ratings of team creativity, while all other measures were collected from team members. Completed questionnaires were received from 109 team members and 28 team leaders from 28 teams. Team size ranged from 2 and 11 members, with an average size of 3.89. The percentage of team members under 30 years of age was 26.6%, 21.1% were between 30 and 39, 32.1% were between 40 and 49, and 20.2% were 50 or above. Regarding team leaders, 7.1% were under 30 years of age, 28.6% were between 30 and 39, 28.6% were between 40 and 49, and 35.7% were 50 or above. In terms of gender, 24.8% of team members and 25% of team leaders were female. Teams that had been working together for 1 year or less constituted 39.3% of the sample, 35.7% had worked together between 1 and 5 years, 10.7% between 5 and 10 years, and 14.3% for more than 10 years.

3.2.2 | Measures

Openness to experience: In order to test whether the effects of team mean OTE were independent of the instrument employed, we used DeYoung et al.'s

(2007) ten-item intellect facet, with responses ranging from 1 "*Not very accurate of me*" to 7 "*Very accurate of me*." Example items include "*Have a rich vocabulary*," and "*Learn things slowly*" (reverse coded; $\alpha = 0.851$).

Team psychological safety: As in study 1, team psychological safety was measured using Edmondson's (1999) scale ($\alpha = 0.766$).

Team creativity: Team creativity was assessed using Jia et al.'s (2014) six-item scale, which used a five-point Likert scale (*1 = strongly disagree*, *5 = strongly agree*). Example items include "*This team seeks new ideas and ways to solve problems*" and "*This team generates new applications*" ($\alpha = 0.675$).

Control variables: Consistent with study 1, we controlled for team size, team OTE variance, and team promotion focus ($\alpha = 0.849$). Given the small team-level sample size we aimed to maximize power by reducing the number of predictors in the model. Thus, we examined whether aggregated team members' organizational tenure, aggregated team members' tenure in the team, or leaders' tenure in the team were significantly related to team creativity. As this was not the case, we excluded them from further analysis (Bernerth & Aguinis, 2016).

3.2.3 | Data aggregation

For team psychological safety, the *R*wg(j) was 0.843, ICC(1) was 0.131, and ICC(2) was 0.367; for team promotion focus, the *Rwg*(j) was 0.915, ICC(1) was 0.171, and ICC(2) was 0.445. Following the same rationale as study 1, we proceeded with data aggregation. For the sake of completion, the *Rwg*(j), ICC(1), and ICC(2) values for OTE were 0.938, 0.047, and 0.161, respectively.

3.2.4 | Analytical approach and results

The descriptive statistics and correlations between the study 2 variables are presented in Table 3.

We ran a series of confirmatory factor analyses in MPLUS 8 (Muthén & Muthén, 1998–2017) to ensure the distinctiveness of the variables that were collected from the same source at the same time, namely, OTE, team psychological safety, and team promotion focus. In order to improve the item-respondent ratio we used item parceling (Marsh et al., 1998; Thompson & Melancon, 1996) and followed the recommendation to generate three parcels per scale (Nasser & Wisenbaker, 2003) for OTE and team psychological safety as these were the longer scales. The team psychological safety items were randomly grouped into two parcels of three items and one parcel of two items, and the OTE items were randomly grouped into two parcels of three items and one parcel of four items. The proposed three-factor model showed a good model fit, $\chi^2 = 56.388$, $df = 41$, $p = 0.055$, with the comparative fit index (CFI = 0.967) being greater than the recommended level of 0.95 (Hu & Bentler, 1999), and the root-mean-square error of approximation (RMSEA = 0.059) being lower than the recommended level of 0.08 (Browne & Cudeck, 1993). Furthermore, this model showed a better fit than other plausible alternative solutions, such as a two-factor model combining OTE and team psychological safety, $\chi^2 = 192.810$, $df = 43$, $p = 0.000$, CFI = 0.675, RMSEA = 0.180, a two-factor model combining team psychological safety and team promotion focus, $\chi^2 = 176.951$ $df = 43$, $p = 0.000$, CFI = 0.709, RMSEA = 0.171, a two-factor model combining OTE and team promotion focus, $\chi^2 = 185.966$, $df = 43$, $p = 0.000$, CFI = 0.689, RMSEA = 0.176, and a one-factor model, $\chi^2 = 306.248$, $df = 44$, $p = 0.000$, CFI = 0.430, RMSEA = 0.236. To further establish the discriminant validity of significantly correlated same-source model variables, we followed Rönkkö and Cho's (2022) recent recommendation and examined the 95% upper limit interval of the factor correlation (with values below 0.8 indicating *no problem of discriminant validity*), and compared the original model with an alternative model in which the correlation was fixed to 0.8. The 95% upper CI for factor correlation between OTE and team psychological safety was 0.671, and the model in which the factor correlation was fixed to 0.8 was significantly worse ($\chi^2 = 258.562$, $df = 121$) than the original model ($\chi^2 = 237.741$, $df = 120$), offering support of discriminant validity.

As in study 1, the hypothesis was tested using the PROCESS macro (2017), model 4, with Table 4 showing the results. Team mean OTE had a significant positive effect on team psychological safety ($b = 0.495$, *SE = 0.191*, $p = 0.017$, 95% CI [0.099, 0.891]), which in turn was positively associated with team creativity ($b = 0.679$, *SE = 0.193*, $p = 0.002$, 95% CI [0.278, 1.080]). The indirect effect of team mean OTE on team creativity via team psychological safety was significant (effect = 0.336, *SE* = 0.225, 95% CI [0.020, 0.927]), thus supporting Hypothesis 1. Surprisingly, the direct effect between team mean OTE and team creativity was also significant but negative ($b = -0.436$, $SE = 0.202$, $p = 0.042$, 95% CI [−0.854, −0.018]). We also examined an alternative model including team promotion focus as a competing mediating mechanism. The mediating effect of team psychological safety remained significant ($b = 0.335$, $SE = 0.198$, 95%, CI [0.051, 0.836]), while the indirect effect via team promotion focus was not significant (effect = −0.001, *SE* = 0.065, 95%, CI [−0.152, 0.107]).

In contrast with study 1, we did not find effects of team OTE variance on team psychological safety

TABLE 3 Study 2 descriptive statistics, correlations, and reliabilities.

Study variables	M	MIN	MAX	SD	1	2	3	4	5
1. Team mean OTE	5.475	4.450	6.450	0.492	(0.851)				
2. Team psychological safety	3.911	3.000	4.786	0.463	0.486**	(0.766)			
3. Team creativity	3.482	2.670	4.500	0.434	−0.088	0.485**	(0.675)		
4. Team variance OTE	0.649	0.058	1.480	0.364	−0.383*	−0.159	−0.002		
5. Team promotion focus	4.052	3.100	5.000	0.461	0.095	0.224	0.245	−0.253	(0.849)
6. Team size	3.893	2.000	11.000	2.233	−0.122	0.043	−0.066	0.409*	−0.066

Note: $N = 28$.
Abbreviation: OTE, openness to experience.
*$p < 0.050$; **$p < 0.010$.

TABLE 4 Study 2 estimation of direct and indirect effects.

Team psychological safety				Team creativity		
Variables	**Coefficient**	**SE**	**95% [LLCI ULCI]**	**Coefficient**	**SE**	**95% [LLCI ULCI]**
Direct effects						
Team mean OTE	0.495*	0.191	[0.099 0.891]	−0.436*	0.202	[−0.854–0.018]
Team variance OTE	0.038	0.214	[−0.405 0.481]	0.036	0.199	[−0.376 0.448]
Team promotion focus	0.194	0.183	[−0.184 0.572]	0.133	0.174	[−0.227 0.492]
Team size	0.100	0.194	[−0.300 0.502]	−0.154	−0.181	[−0.529 0.221]
Team psychological safety				0.679**	0.193	[0.278 1.080]
Indirect effect						
Team mean OTE → Team psychological safety → Team creativity				0.336*	0.225	[0.020 0.927]

Note: $N = 28$.
Abbreviations: LLCI, lower level confidence interval; OTE, openness to experience; ULCI, upper-level confidence interval.
*$p < 0.050$; **$p \leq 0.010$.

($b = 0.038$, $SE = 0.214$, CI [−0.405, 0.481]) or team creativity ($b = 0.036$ $SE = 0.199$ CI [−0.376, 0.448]), and the indirect effect was also not significant (effect = 0.026, $SE = 0.216$, 95%, CI [−0.314, 0.591]). Replicating study 1, we found no support for the interaction between team mean OTE and team OTE variance in predicting team creativity via team psychological safety (index moderated mediation = −0.127, $SE = 0.173$, 95% CI [−0.585, 0.061]).

3.2.5 | Study 2 discussion

While study 2 established the mediating effect of team psychological safety using a sample of organizational teams, it was unable to provide a complete insight into the role of OTE based on the measurement scale adopted, which only captured OTE(i). As discussed earlier, personality researchers have recently identified the importance of examining facet-level effects of OTE (DeYoung et al., 2012). Given that OTE(o) has been argued to encompass interest in art, whereas OTE(i) has been argued to encompass interest in ideas, researchers have started to explore whether each facet may have a unique relationship with individual creativity (e.g., Kaufman & Paul, 2014; Nusbaum & Silvia, 2011). However, to our knowledge, the relative impact of OTE(o) and OTE(i) has yet to be examined in team research, including studies of team creativity. Given the stronger association between OTE(i) and interest in ideas (as opposed to art), it seemed relevant to explore whether in conventional, non-artistic, work environments, OTE(i) might play a more dominant role in driving the emergence of team psychological safety than OTE(o). We examine this research question in study 3.

In contrast with study 1, but as expected, we did not find any effects of team OTE variance on team psychological safety or team creativity. Yet, we did find that team mean OTE had a negative direct effect on team creativity, so we sought to further examine this relationship in study 3. Study 3 also provided an opportunity to test team psychological safety against a further alternative mediator,

team exploration climate. Team exploration climate is a cognitive team emergent state defined as the shared perception of the extent to which a team encourages broad search and discovery through trying new techniques, experimenting, and considering new or different ways of solving applied problems (Lubatkin et al., 2006). Furthermore, we also accounted for the effects of empowering leadership. Empowering leadership involves highlighting the significance of work, showing confidence in high performance, enabling participation in decision making, and removing bureaucratic barriers (Ahearne et al., 2005), and has been associated with team creativity (Zhang & Bartol, 2010). Finally, given that team membership change has been shown to influence open discussion and team performance (Hirst, 2009), and team tenure is likely to impact the development of team emergent states (Choi & Thompson, 2005), in study 3, we also accounted for team membership churn (see Slotegraaf & Atuahene-Gima, 2011).

3.3 | Study 3

3.3.1 | Sample and procedure

Study 3 was conducted in a large healthcare organization within the Portuguese National Health Service (PNHS)—a sector that has been experiencing intense change in recent years, requiring organizations to rethink the way they operate (e.g., new administration models, new collaborations, and new timelines). This study sample comprised healthcare teams from a large hospital that is integrated in the Lisbon district of the PNHS. Participants worked primarily in nursing and medical hospital teams, diagnostic and therapeutic technicians' teams, and teams that operate in the pre-hospital emergency context as first responders. Their work required varied degrees of innovative thinking for solving health problems, addressing health issues during a pandemic, adopting new processes and technologies, embracing creative partnerships and collaborations, and improving in-person and remote patient care. Team leaders provided ratings of team creativity as well as self-evaluations of empowering leadership, while all other measures were collected from team members.

In coordination with two administrators, 30 teams and their respective leaders were invited to participate. Data were received from 115 team members distributed across 27 teams and their leaders. However, for three teams only one respondent completed the questionnaire, resulting in a sample of 112 team members in 24 teams, with 24 leaders. Team size ranged from 2 to 12 members, with an average size of 5.87. Team lifespan was, on average, 12.71 years, with team tenure ranging from 2 to 26 years. Average age of team members was 38.32 years, and average age of leaders was 50.75 years. Regarding gender, 83% of team members and 79.2% of team leaders were female. Average organizational tenure for team members and team leaders was 10.37 and 20.83 years, respectively.

3.3.2 | Measures

To administer the questionnaires in the participants' native language (Portuguese) we followed the recommended procedures of back translation by Brislin (1970). The same scales were used as in study 2 (OTE(i), $\alpha = 0.634$; team psychological safety, $\alpha = 0.796$; and team creativity, $\alpha = 0.910$) with the addition of the following measures, which were all rated using a five-point scale, 1 "*completely disagree*" to 5 "*completely agree*."

Openness to experience: In order to test the effects of both major facets of OTE, in addition to OTE(i) used in study 2, we also added DeYoung et al.'s (2007) ten-item OTE(o) subscale, capturing openness. Example items include "*Enjoy the beauty of nature*" and "*Seldom daydream*" (reverse coded; $\alpha = 0.664$).

Control variables: Consistent with study 2, we controlled for team size and team OTE variance in all analyses. In addition, we controlled for team exploration climate and empowering leadership. Team exploration climate was measured using Hirst et al.'s (2018) four-item scale, with example items including [The team] "*places importance in learning from each other*" and "*sees experimentation and the use of experimental techniques as very important*" ($\alpha = 0.904$). Due to organizational concerns regarding questionnaire length, following previous research (e.g., Tang et al., 2020), we asked leaders to self-rate their empowering leadership behavior using an 11-item version of Arnold et al.'s (2000) scale. Example items are "*I teach work group members how to solve problems on their own*" and "*I encourage work group members to express ideas/suggestions*" ($\alpha = 0.906$). Finally, we controlled for team membership churn by asking team leaders for the number of new members joining the team over the last 6 months. Based on the same rationale study 2, we examined whether aggregated team members' organizational tenure, aggregated team members' tenure in the team, or leaders' tenure in the team were significantly related to team creativity. As this was not the case, we excluded them from further analysis.

3.3.3 | Data aggregation

For team psychological safety, the *R*wg(j) was 0.893, ICC(1) was 0.200, and ICC(2) was 0.594; for team

exploration climate, the *Rwg*(j) was 0.896, ICC(1) was 0.202, and ICC(2) was 0.597. Following the same rationale as in the previous studies, we proceeded with data aggregation. In relation to OTE(o) and OTE(i), the *Rwg* (j) was 0.937 and 0.939, ICC(1) was 0.012 and 0.034, and ICC(2) was 0.066 and 0.171, respectively.

3.3.4 | Analytical approach and results

The descriptive statistics and correlations between the study 3 variables are presented in Table 5.

We ran a series of confirmatory factor analysis in MPLUS 8 (Muthén & Muthén, 1998–2017) to ensure the distinctiveness of the constructs that were collected from the same source at the same time: OTE(i), OTE(o), team psychological safety and team exploration climate. Following the approach in study 2, the team psychological safety items were randomly grouped into two parcels of two items and one parcel of three items, and the OTE(i) and OTE(o) items were randomly grouped into two parcels of three items and one parcel of four items. Team exploration climate was not parceled as the scale only included four items. The proposed four-factor model showed a good model fit, $\chi^2 = 80.232$, $df = 59$, $p = 0.034$, with the comparative fit index (CFI = 0.962) exceeding the recommended level of 0.95 (Hu & Bentler, 1999) and the root-mean-square error of approximation (RMSEA = 0.057) being lower than 0.06 (Browne & Cudeck, 1993). Furthermore, this model showed a better fit than other plausible alternative solutions, such as a three-factor model combining OTE(i) and OTE(o) $\chi^2 = 105.287$, $df = 62$, $p = 0.000$, CFI = 0.922, RMSEA = 0.079, a three-factor model combining team psychological safety and team exploration climate, $\chi^2 = 155.165$, $df = 62$, $p = 0.000$, CFI = 0.832, RMSEA = 0.116, a two-factor model combining OTE(i) and OTE(o), and team psychological safety and team exploration climate, $\chi^2 = 179.443$, $df = 64$, $p = 0.000$, CFI = 0.792, RMSEA = 0.127, and a one-factor model, $\chi^2 = 236.315$, $df = 65$, $p = 0.000$, CFI = 0.691, RMSEA = 0.153. As in study 2, we examined the upper 95% CI for the factor correlation between OTE(I) and team psychological safety (0.784, below 0.80) and found that the model in which the correlation was fixed to 0.8 was significantly worse ($\chi^2 = 245.508$, $df = 121$) than the original model ($\chi^2 = 238.916$, $df = 120$), offering support of discriminant validity (Rönkkö & Cho, 2022).

The same analytical approach was followed as in studies 1 and 2. Table 6 shows the results of the test of the hypothesis. OTE(i) was significantly related to team psychological safety, ($b = 0.419$, $SE = 0.182$, $p = 0.036$, 95% CI [0.031, 0.807]) but OTE(o) was not ($b = 0.015$, $SE = 0.188$, ns, 95% CI [−0.387, 0.416]), thus, replicating

TABLE 5 Study 3 descriptive statistics, correlations, and reliabilities.

Study variables	M	MIN	MAX	SD	1	2	3	4	5	6	7	8	9
1. Team mean OTE(i)	3.607	3.280	3.950	0.189	(0.634)								
2. Team psychological safety	3.750	2.571	4.500	0.470	0.445*	(0.796)							
3. Team creativity	3.743	2.330	4.500	0.538	0.326	0.512*	(0.910)						
4. Team size	5.87	2.000	12.000	2.818	−0.064	−0.142	0.188						
5. Team variance OTE(i)	0.338	0.000	0.632	0.177	0.052	0.073	0.283	0.102					
6. Team mean OTE(o)	3.732	3.300	4.133	0.222	0.087	−0.115	0.105	0.287	−0.085	(0.634)			
7. Team variance OTE(o)	0.365	0.071	0.700	0.154	−0.155	0.182	0.121	0.433*	0.010	0.211			
8. Membership churn	1.330	0.000	6.000	1.857	0.145	−0.250	0.220	0.274	−0.002	0.222	0.330		
9. Team exploration climate	4.100	2.750	4.800	0.515	0.095	0.543**	0.139	−0.197	−0.233	−0.188	−0.017	−0.087	(0.904)
10. Empowering leadership	4.375	2.909	5.000	0.492	−0.015	0.032	0.260	−0.047	−0.273	−0.011	0.069	0.126	0.234 (0.906)

Note: $N = 24$.

Abbreviation: OTE, openness to experience.

*$p < 0.050$; **$p < 0.010$.

TABLE 6 Study 3 estimation of direct and indirect effects.

Team psychological safety				Team creativity		
Variables	**Coefficient**	**SE**	**95% [LLCI ULCI]**	**Coefficient**	**SE**	**95% [LLCI ULCI]**
Direct effects						
Team mean OTE(i)	0.419*	0.182	[0.031 0.807]	0.003	0.212	[−0.452 0.458]
Team variance OTE(i)	0.170	0.186	[−0.225 0.566]	0.272	0.191	[−0.137 0.682]
Team mean OTE(o)	0.015	0.188	[−0.387 0.416]	0.070	0.189	[−0.335 0.475]
Team variance OTE(o)	−0.052	0.203	[−0.486 0.381]	0.065	0.204	[−0.373 0.504]
Team size	−0.065	0.202	[−0.365 0.495]	0.115	0.203	[−0.320 0.551]
Membership churn	−0.268	0.193	[−0.679 0.143]	0.266	0.205	[−0.175 0.706]
Team exploration climate	0.534*	0.189	[0.131 0.937]	−0.185	0.235	[−0.688 0.318]
Empowering leadership	−0.000	0.185	[−0.394 0.394]	0.325	0.185	[−0.072 0.722]
Team psychological safety				0.684*	0.259	[0.129 1.239]
Indirect effect						
Team mean OTE(i) → Team psychological safety → Team creativity				0.286	0.302	[0.011 1.593]
Team mean OTE(o) → Team psychological safety → Team creativity				0.010	0.222	[−0.439 0.436]

Note: $N = 24$.

Abbreviations: LLCI, lower level confidence interval; OTE(i), openness to experience (intellect); OTE(o), openness to experience (openness); ULCI, upper-level confidence interval.

*$p < 0.050$.

the findings from study 2 in relation to OTE(i). Team psychological safety was also positively associated with team creativity ($b = 0.684$, $SE = 0.259$, $p = 0.019$, 95% CI [0.129, 1.239]). In relation to the mediation effect, the indirect effect of team mean OTE(i) on team creativity via team psychological safety was significant (effect = 0.286, $SE = 0.302$, 95% CI [0.011, 1.593]), thus, supporting Hypothesis 1. The direct effect was not significant (effect = 0.003, $SE = 0.212$, *ns*, CI [−0.452, 0.458]). In relation to OTE(o), neither the indirect (effect = 0.010, $SE = 0.221$, CI [−0.434, 0.436]) nor direct effects were significant (effect = 0.070, $SE = 0.189$ *ns*, CI [−0.335, 0.475]). We also examined an alternative model including team exploration climate as a competing mediating mechanism. The mediating effect via team psychological safety remained significant (effect = 0.340, $SE = 0.307$, 95%, CI [0.002, 1.587]), while the indirect effect via team exploration climate was not significant (effect = −0.027, $SE = 0.228$, 95%, CI [−1.019, 0.115]).

Similarly, consistent with the findings of study 2, the effects of team OTE(i) variance on team psychological safety ($b = 0.170$, $SE = 0.186$, *ns*, 95% CI [−0.225, 566]) and team creativity ($b = 0.272$, $SE = 0.191$, *ns*, 95% CI [−0.137, 0.682]) were non-significant, as was the indirect effect (*effect* = 0.116, $SE = 0.207$, 95% CI [−0.135, 0.711]). The same was the case for the effects of team OTE(o) variance on team psychological safety ($b = -0.052$, $SE = 0.203$, *ns*, 95% CI [−0.486, 381]) and team creativity ($b = 0.065$, $SE = 0.204$, *ns*, 95% CI [−0.373, 0.504]), as well as its indirect effect (*effect* = −0.036, $SE = 0.255$, 95% CI [−0.533, 0.273]). The indirect effects of the interaction between mean and variance components for OTE(i) (index moderated mediation = 0.292, $SE = 0.444$, 95% CI [−0.050, 1.826]) and OTE(o) (index moderated mediation = 0.256, $SE = 0.224$, 95% CI [−0.074, 0.805]) to predict team creativity via team psychological safety were also not significant.

3.3.5 | Study 3 discussion

Study 3 goes beyond the findings of studies 1 and 2 by replicating the indirect effect of team mean OTE, specifically OTE(i), on team creativity via team psychological safety, while at the same time accounting for empowering leadership (Arnold et al., 2000) and the alternative mediating mechanism of team exploration climate (Hirst et al., 2018; Lubatkin et al., 2006) both of which have previously been shown to influence team creativity. Furthermore, the potential confounding effects associated with team membership churn were also controlled for. Study 3 was also able to more closely examine the differential effects of the two separate facets of OTE, namely OTE(i) (already established in study 2) and OTE(o), showing that the indirect effect on team creativity is

driven by the intellect facet only. This exploratory finding not only adds nuance to our overall results but also poses interesting questions for future research on team personality composition more generally, which has typically focused on the overall dimensions of the Big Five.

4 | GENERAL DISCUSSION

Based on calls to better understand the impact of team composition on team creativity and how such effects might unfold (see Gilson et al., 2015), the key objective of this research was to examine how team composition in OTE, the strongest predictor of individual creativity in the most established framework of personality, the Big Five (McCrae & Costa, 1987), indirectly shapes the output of team creativity. Departing from the direct effects approach that has dominated research to date, we drew upon theories of social norms, uncertainty management, and team climate, to posit that supplementary fit in team mean OTE (i.e., higher team mean OTE) facilitates the emergence of team psychological safety, in turn, driving higher levels of team creativity.

Results from three separate studies in two country contexts found overall support for our hypothesized model, showing that team psychological safety mediates the effects of team mean OTE on team creativity. We thereby extend understanding on the distal, yet significant, effects of personality-based attributes for laying the compositional foundations for team creativity, specifically team composition in OTE. Across all three studies, we both controlled for and tested the effects of team OTE variance, thus, directly accounting for alternative theoretical explanations based on complementary fit, thereby adding weight to the consistent and independent effects of team mean OTE. We not only provide evidence to advance a supplementary fit perspective on team OTE composition for predicting team creativity but also provide new insights into facet-level effects of OTE at the team level. Furthermore, based on IPO principles, we specify how such effects unfold via the emergence of a creativity-relevant mediator of team psychological safety. In doing so, we highlight the important role played by affective team dynamics in transmitting the influence of team personality composition onto team creativity.

What is particularly important from our findings is that the indirect effects via team psychological safety remained significant even when controlling for alternative team emergent states shown to be important for team creativity, namely team promotion focus and team exploration climate, as well as empowering leadership. Thus, our findings contribute to the growing literature on team emergent states (see Rapp et al., 2021), emphasizing the unique role played by team psychological safety—a specific affective emergent state, above and beyond established cognitive and motivation mechanisms. In other words, the indirect influence of team OTE composition on team creativity is best understood according to how this makes a team *feel*, rather than how it makes a team *think*.

We established these effects using different methodologies, including a time-lagged research design and independent ratings of team creativity (study 1). We also accounted for the role of team OTE variance (as well as testing it as an alternative predictor), alternative mediating mechanisms, as well as the influence of different measures and facet-level dimensions of the OTE construct. Each study had notable strengths. In study 1, we collected measures of team members' personality and perceptions of team psychological safety at separate points in time, and team creativity was independently assessed at the end of the project, thus, strengthening our confidence in the direction of the effects. In studies 2 and 3, we obtained external ratings of team creativity, reducing the possibility of common method bias (Podsakoff et al., 2003). Our multi-study, multi-method approach, thus, adds to the overall rigor and generalizability of the findings, as well as providing some assurance on issues concerning common method variance and endogeneity.

4.1 | Theoretical implications

Our findings make several noteworthy contributions to the literature on team personality, team psychological safety, and team creativity. First, we extend the growing body of research on the antecedents of team creativity drawing attention to the role of team-level OTE as an important team input and theorizing its indirect effects according to the IPO model of team effectiveness. Given the predominance of the Big Five model (Barrick et al., 2001) and the role of OTE in predicting individual creativity (Feist, 1998, 1999), we know surprisingly little about if, and how, team composition in OTE affects the output of team-level creativity. While a handful of existing studies lend tentative support to the positive direct effects of team mean OTE (Baer et al., 2008; Bolin & Neuman, 2006), findings remain inconsistent (den Hartog et al., 2020; Schilpzand et al., 2011; Zhang et al., 2019). In addition, researchers have yet to establish through what mechanisms team OTE composition effects unfold—leaving the important question of "how" unanswered. Such insight is crucial if organizations are able to capitalize on intentional team design efforts (i.e., composing high OTE teams) and understand the role that creativity-conducive team climates, namely team psychological

safety, play in transmitting such effects. We theorized for and found support that these effects unfold via the influence that high OTE team member personal norms have on shaping, endorsing, and reinforcing collective norms in teams with a number of high OTE members (Brown, 2000; Gonzalez-Mulé et al., 2014; Taggar & Ellis, 2007). Exploring these indirect effects enabled a closer examination of the precise mechanism through which team personality composition facilitates heightened team creativity. In doing so, we extend current theoretical understanding beyond the established mechanisms of cognitive (e.g., team exploration climate) and motivational (e.g., team promotion focus) team emergent states, drawing attention to the unique importance of affective explanations, specifically team psychological safety.

Second, our research brings clarity to the current complex and inconsistent findings regarding the nature of team OTE composition, and specifically the differential role of complementary versus supplementary fit (Muchinsky & Monahan, 1987). While there were insufficient theoretical and empirical grounds for hypothesizing the indirect effects of team OTE variance, our results allow us to rule out, with relative confidence, alternative explanations based on notions of complementary fit. Indeed, while existing studies lend tentative support to the influence of team mean OTE, in which team members supplement each other's general disposition toward higher OTE, researchers have also argued for the importance of complementary fit on certain personality traits (LePine et al., 2011). In addition, while not considering mediating mechanisms, Schilpzand et al. (2011) found evidence for a positive direct effect of team OTE variance on team creativity. However, by both controlling for team OTE variance across all studies, as well as testing for its indirect effects (while controlling for team mean OTE), results from studies 2 and 3, in particular, provide support to the supplementary fit perspective on team OTE composition, highlighting the importance of team mean OTE. Furthermore, following the climate strength perspective (Schneider et al., 2002), we also tested whether team OTE variance would moderate the role of team mean OTE in predicting team creativity via team psychological safety but found no support across the three studies, thus, adding further weight to the unique role played by team mean OTE. Put simply, our findings suggest that organizational teams will more likely develop a climate for psychological safety, and subsequently demonstrate higher team creativity, when team members, on average, have a higher level of OTE—as opposed to a varying mix of both high and low levels.

However, a notable exception to this was found in our study 1 results, in which there was a positive effect of team OTE variance on team psychological safety and team creativity. We suspect that this might have to do with the different nature of the samples in study 1 (a student sample) as compared to studies 2 and 3 (professional samples), in which this effect was not found. It may be plausible that in an educational context, in which team performance-related outcomes, including that of team creativity, are generally deemed less critical and "high-stake," student team members may have perceived variability in team member OTE as signaling that personality diversity is endorsed by the team. This could shape collective norms of acceptance and consequently shared perceptions of psychological safety. However, it should also be noted that the contrast between student and field sample results is not unprecedented in the creativity literature. For instance, Kurtzberg (2005) found that diversity in cognitive style facilitated creativity in an experimental context but led to worse assessments of creative performance in a field context. This would imply that team creativity in a field setting is a more complex process as factors that are largely constant (or less fluctuating) in a student context likely play a far greater role in shaping team dynamics in real-world organizational teams.

Third, our findings contribute to the psychological safety literature by identifying OTE as a specific group-level antecedent of team psychological safety. While existing studies have identified trait-based predictors of psychological safety, such as proactive personality and learning orientation (Chan, 2006; Chiu et al., 2011; Detert & Burris, 2007), to our knowledge, none have examined OTE specifically, despite the intuitive association with psychological safety. Furthermore, the existing literature often treats team psychological safety as a climate-like moderator (Newman et al., 2017) in examining the antecedents of team performance, learning, and creativity (for exceptions, see Harvey et al., 2019; Tu et al., 2019). However, as suggested by Edmondson and Mogelof (2005), our findings confirm that team psychological safety is directly shaped by the personality composition of a team.

Finally, beyond establishing the trait-level effects of team mean OTE, our research also contributes to the growing literature on the more discrete influence of facet-level personality dimensions. In studies 2 and 3, we were able to conduct exploratory analysis into the facet-level effects of OTE(i) and OTE(o). Personality research suggests that there are both conceptual and empirical grounds to do so (DeYoung et al., 2014; Oleynick et al., 2017), with evidence at the individual level pointing to unique facet-level effects on creativity (Nusbaum & Silvia, 2011). Our findings suggest that team mean OTE(i), but not OTE(o), appears to play a key role in facilitating the emergence of team psychological safety. This makes theoretical sense, given that in professional contexts such as the automotive (study 2) and healthcare (study 3) sectors, the dimension

of OTE(i) closely aligns with the norms of prototypical work behavior—such as showing a preference for semantic and abstract information. Expressions of OTE(i) in such contexts will, thus, more likely be accepted, endorsed, and reinforced through group norms, explaining why it may play a more prominent role in shaping team climate perceptions. Conversely, the dimension of OTE(o) reflects an orientation toward fantasy, esthetics, and emotions, and is represented by descriptors such as "get deeply immersed in music," "see beauty in things that others might not notice," or "seldom daydream (reversed)." The expression of such characteristics in a professional context might suggest a degree of aloofness or withdrawal in team members scoring high on OET(o). For instance, team members who daydream and get lost in thought may signal to others that they are not paying attention and cannot be relied on. Consequently, team psychological safety is less likely to emerge due to a reluctance to take interpersonal risks in the team. These exploratory findings point to interesting avenues for future research, specifically the value of examining facet-level effects of team composition in OTE. In particular, the relative importance of OTE(i) should be further examined across different organizational contexts, specifically in less traditional creative industries such as, for example, the performing arts or computer gaming, in which there could be a far greater emphasis on the role of team member OTE(o).

One final interesting finding that emerged from this research was the inconsistent direct effects of team mean OTE on team creativity across studies. We did not hypothesize for a main effect given the failure to identify this relationship in previous research (Schilpzand et al., 2011) and extant theory suggesting that this relationship is likely to be more distal in nature (Ilgen et al., 2005). This assertion is supported by the results of studies 1 and 3, where no significant direct effects were detected. Yet, in study 2, the direct effect was negative. While the correlation between the two variables was not significant, the direct effect became significant when removing the role played by team psychological safety. Therefore, it might be that if most, or all, team members are high in OTE (i.e., a high team mean), each member will have their own ideas that they wish to pursue and, when ruling out the pathway via team psychological safety, what is left is a set of creative, yet unintegrated ideas that do not coalesce into team-level creativity. This is, of course, a speculative interpretation of the results and future research should examine this possibility in greater detail.

4.2 | Practical implications

Our findings directly inform several practical implications for creativity and innovation management. First, with the noted exceptions, our results largely point to the strategic advantage of having teams composed primarily of high OTE individuals when creative team outputs are vital. As such, leaders and managers responsible for team design should consider assessing and selecting potential new team members at the point of recruitment using established psychometric instruments based on the Big Five model. While psychometric assessment should not be relied upon in isolation, decision-makers may explore personality attributes as part of the interview process, examining to what extent a candidate demonstrates an orientation toward OTE. Our findings imply that individuals low on OTE would not be conducive to the emergence of team psychological safety, and instead high OTE members would provide a better fit. Wherever feasible, leaders and managers should make efforts to increase the overall prevalence of OTE within teams, reducing, as much as possible, the presence of very low OTE members. Individual OTE, particularly the dimension of OTE(i), is also a crucial factor to consider when re-shuffling existing team memberships or redeploying team members across different organizational teams. The emphasis on OTE more generally also shifts practitioner attention beyond the personality traits most typically linked to team performance, namely conscientiousness and agreeableness (Peeters et al., 2006), highlighting the importance of other major dimensions in driving key work outcomes.

Beyond the direct practical implications for team design and composition, our findings also illuminate the specific mechanism through which team creativity is subsequently realized—namely, team psychological safety. While the consequences of team psychological safety are well-established in practice (see Frazier et al., 2017), insights into how to create conditions for its emergence are relatively lacking. Our findings suggest that not only should leaders and managers purposefully design teams with a high team mean OTE, but that they should also create enabling conditions in which the expression of team member OTE is more likely to be encouraged, endorsed, and reinforced. At the most basic level, this means ensuring that team members have regular opportunities to meet, interact, and reflect on their collective team performance (West, 1996). Such regular contact and time for reflexivity should increase the opportunity for personal norms toward OTE to be expressed, thus, enabling the emergence of collective norms facilitating team psychological safety. Leaders and managers themselves can also strengthen team psychological safety by role modeling interpersonal risk-taking, signaling that this is a safe and legitimate behavior to engage in.

4.3 | Limitations and future research

This research is not without its limitations. First, the sample size in each study was relatively small at the team level. Despite this, the fact that the mediation effects were still significant even when controlling for alternative mechanisms and potential confounding variables speaks to the strength of the effects. Future research should, however, aim to replicate these effects in a larger field sample, including in less traditional organizational sectors, as discussed. A second limitation was the relatively low ICC(2) values for team psychological safety, suggesting that individual group means were less reliable than they could have been. This is, however, not uncommon in other studies with small team samples (Hofmann & Jones, 2005) and given that the other indices were within recommended levels, aggregation was sufficiently justified. Furthermore, the lower reliability of the group means likely attenuates relationships at the group level (Bliese, 1998), suggesting that our results should be seen as conservative. Third, although we collected data at separate time points in study 1, this was not possible in studies 2 and 3. We, therefore, cannot directly infer causality or rule out reverse causality due to survey design. While personality is largely understood to be stable throughout adulthood (Bleidorn et al., 2022) there is also evidence to suggest that it has a malleable component and can change over time (Damian et al., 2019). It is, therefore, possible that the relationship between team OTE composition and team psychological safety is reciprocal, with higher levels of team psychological safety activating or facilitating increased team member OTE (Tett et al., 2021). Accordingly, future experimental research could seek manipulate team member OTE when initially forming teams and then measure subsequent team psychological safety and team creativity over time, as well as under different task conditions. Longitudinal studies are particularly important given recent meta-analytical evidence highlighting the curvilinear (U-shaped) relationship between team tenure and team creativity and innovation (Byron et al., 2023). While we controlled for team membership churn in study 3, it could be that the influence of team OTE composition is dynamic and changes over time, as a team matures. Only through such efforts can researchers make more precise causal inferences about the relationships between these variables.

Accordingly, our findings prompt several interesting avenues for future research, not least a deeper examination of the facet-level effects of team OTE(i) and OTE(o). It could be that the relative effects of each of these dimensions depends on situational variables, particularly those relating to the task context, and how these interact with team dynamics to predict creative outcomes (Woodman et al., 1993). A second suggestion pertains to the potential interaction between team mean OTE and other personality traits in predicting team psychological safety. For example, the presence of team members high in conscientiousness, characterized as responsible, goal directed, and diligent (McCrae & Costa, 1987), may heighten a sense of competence, professionalism, and reliance among team members. In turn, this could strengthen the positive effect between team mean OTE and team psychological safety. Conversely, a team characterized by high levels of neuroticism might weaken this relationship, given the heightened potential for reduced cohesion and greater interpersonal conflict (Barrick et al., 2001). Future research should investigate the interactive effects of personality traits at the team level, specifically how they influence team creativity indirectly, via different team emergent states.

Third, given the important role that team psychological safety plays in transmitting the effects of team personality composition, more research is needed into the temporal dynamics and emergent nature of this climate, and how team psychological safety develops and fluctuates over time to influence team creativity at different stages of a team's project (see Fyhn et al., 2023). Furthermore, while the negative consequences of creative teamwork remain largely unexplored, the adverse repercussions of both employee (Breidenthal et al., 2020) and team (Khanagha et al., 2022) creativity are gaining traction in recent research, highlighting the potential "dark side" of creating more creative teams. Finally, and more broadly, given that real-world teams operate in much larger multi-team systems, researchers should seek to establish the value of team creativity at the organizational level, including its influence on organizational innovation, to better understand the trickle-up and trickle-down effects of psychologically safe climates.

5 | CONCLUSION

While team member personality is broadly understood to shape team dynamics and performance, the unique influence of team OTE composition and exactly how this serves to shape team creativity has been largely neglected, with a handful of extant studies providing a set of complex, incomplete, and inconsistent results. This has left organizations with contradicting recommendations on how to compose teams when there is a creative imperative. In addressing this tension, our findings lend their support to supplementary fit perspectives on team OTE composition, suggesting that simply having more team members higher on OTE (i.e., team mean OTE as opposed to team OTE variance) can enable the emergence of a psychologically safer team climate, ultimately

driving greater team creativity. Notably, our mediated model provided a superior explanation above and beyond alternative cognitive and motivational explanations, highlighting that the impact of team OTE composition is best understood according to how this makes a team feel, rather than how it makes a team think. Accordingly, our findings offer important practical implications for organizations and their leaders, as well as sparking interesting avenues for future research.

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