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Assessing Team Flow and Its Outcomes in Work Teams: Validation of the Team Flow Monitor and Quick Scan

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ABSTRACT

Research has shown that flow experiences among groups, such as sports teams and music groups, can positively affect group processes and outcomes. However, there has been limited research on the effects of team flow in the workplace, and existing studies have mainly employed a 37-item questionnaire, namely the Team Flow Monitor (TFM), as a basis for measuring team climates and coaching the teams to achieve higher-level performances. Recognizing the need for a more concise instrument, the scientific community seeks a tool that can be easily integrated with other research scales, while practitioners prefer a shorter measure for frequent and convenient assessment. To address this, the present study introduces an 11-item measure of team flow called the Team Flow Quick Scan (TFQS). In addition to validating this measure against the established TFM, this study seeks to replicate the established findings of team flow. While the TFQS measured team flow using a slightly different model from the TFM, the results are consistent with theory and the slightly restricted ability of an 11-item measure to have the sensitivity of a 37-item measure. Ultimately, results replicated the efficacy of the TFM and introduced the TFQS as a viable tool for measuring flow in teams, which can be a powerful aid in helping teams hit their highest performance levels.

1 | Introduction

Successful team collaborations and inter-team alignments are critical to organizational performance today (McChrystal et al. 2015). The problems to be solved in the modern workplace are often highly complex and occur in a world where rapid change is inevitable. To ensure that professionals can respond optimally—with a combination of talent, creativity, and adaptability—companies need to cultivate an organizational culture in which employees know how to work together in a cohesive network where teams can be formed in response to situational demands. Building that network, however, is increasingly challenging in the current labor market, and ensuring that it is high-performing adds an additional layer of complexity. To address these challenges, companies have

shifted toward a greater focus on employee well-being, which is correlated with the attraction and retention of talent as well as performance (Kun and Gadanecz 2022; Keith et al. 2014; Rothausen et al. 2017; Sawyer 2006; van den Hout et al. 2018).

Among the key promoters of employee well-being, and its correlate of higher performance, is flow experiences, in which a person is fully absorbed in an activity and intrinsically motivated to engage in it (Csikszentmihalyi 1990, 1997). Regularly experiencing flow at work tends to increase feelings of fulfillment and happiness and improve work quality, which makes flow an essential part of employee experience (Ilies et al. 2017). Flow, however, is not relegated to individual experience and can indeed be a delightful addition to teamwork that fosters higher team performance. Such *team flow* experiences occur

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when team members experience flow together while performing mutually dependent tasks for team benefit (van den Hout et al. 2019), and research has indeed shown concomitant improvements in the team's performance and its members' well-being (van den Hout et al. 2019). As such, measuring team flow can be highly valuable, especially because it is possible to use measures of team flow to intervene in team dynamics over the course of a project to increase the likelihood of team flow's emerging (van den Hout et al. 2016). That said, the current instrument for measuring team flow, the Team Flow Monitor (TFM; van den Hout et al. 2019), has 37 questions, and users reported that it was too long for intervention protocols that involved repeated use of the tool (van den Hout et al. 2024). Furthermore, many academic researchers prefer shorter instruments to reduce participant fatigue, especially when trying to integrate results from multiple surveys, and are willing to accept the slight reduction in accuracy. To that end, this study is introducing a new, shorter assessment of team flow, the Team Flow Quick Scan (TFQS), in addition to buttressing the validity of the TFM and replicating prior positive effects of flow on teamwork and team members' well-being.

2 | Theoretical Background and Hypotheses

2.1 | The Individual Flow Experiences

Flow, often known colloquially as *being in the zone*, is considered one of the most rewarding psychological states. It is often experienced as a feeling of self-efficacy that arises from a deep engagement and absorption in a rewarding, challenging activity. Such activities, be they work or leisure, are often pursued for their own sakes and, during flow, feel like they are being performed naturally or effortlessly (Nakamura and Csikszentmihalyi 2009).

Csikszentmihalyi (1996) identified nine conditions that characterize the flow experience. Six of them tend to serve as preconditions at the individual level since they are easier to develop (van den Hout and Davis 2022): (1) autotelicity (i.e., the quality of doing something for its own purpose); (2) challenge-skill balance; (3) proximate and clear goals; (4) direct and clear feedback; (5) total concentration; and (6) a sense of control.

The following three additional experience conditions are more likely to arise at the individual level when these preconditions are present: (7) the merging of awareness and action, either automatic or spontaneous; (8) the loss of the reflective self (i.e., being one with the activity); and (9) a distorted perception of time.

2.2 | The Team Flow Experience

Extending the construct of individual flow, team flow refers to the shared experience of flow that occurs when individuals work together to complete interdependent tasks for the team's purpose. This involves three key aspects (outlined in detail in van den Hout et al. 2019, and van den Hout et al. 2018): (1) Team members are part of a *team dynamic* that is structured by seven prerequisites at the team level (i.e., collective ambition, common goal, aligned personal goals, high skill integration, open communication, safety, and mutual commitment); (2) The

seven prerequisites enable all team members to experience flow individually while performing their respective tasks/roles; (3) Everyone involved experience flow individually and simultaneously share four experiential characteristics at the team level (i.e., sense of unity, joint progress, mutual trust, and holistic focus) that together create a *collective sense of flow*, as if the team process is "flowing."

A detailed discussion of the underlying theoretical foundation of flow, a full explanation of the team flow elements, and the psychometric validity of the TFM are beyond the scope of this study, but all three are discussed extensively in van den Hout and Davis (2019; 2022) and van den Hout et al. (2018; 2019; 2024). We present below a brief summary of the research to provide working definitions for all key terms and concepts.

2.3 | The Team Flow Dynamic

During experiences of team flow, team members are part of a team dynamic characterized by seven prerequisites and four experiential characteristics. Each of these prerequisites has its underlying characteristics that define the precondition in a more concise way and guide team members to develop them in their own team environment (cf. van den Hout et al. 2018). From the perspective of Input-Process-Output models, the prerequisites of team flow could be seen as input variables, the experiential characteristics as process variables, and the benefits as increased team performance or increased team creativity as output variables. The following section briefly presents (a) the seven prerequisites of team flow, (b) the experiential characteristics of team flow, and (c) the expected positive outcomes of team flow experiences.

2.3.1 | The Prerequisites of Team Flow

The first prerequisite of team flow is (1) collective ambition: a shared intrinsic motivation to form a team and strive for a common purpose. It refers to the shared aspirations, goals, and desires of a group or community. Once the collective ambition is established, the team needs to develop the remaining prerequisites, which often begins with using the collective ambition to derive a set of team goals/milestones that form the (2) *common goal*, which optimally tend to be single-focused, clear, present, proximal, and challenging.

With this *common goal* established, team members can align their personal goals, roles, and tasks to it, along with how they can contribute their personal strengths and skill sets. These clearly defined (3) *aligned personal goals* provide structure and direction, allowing team members to focus their energy and efforts effectively. Each member should understand their responsibilities and how their work contributes to the current team goal and the overarching collective ambition. When aligning personal goals among team members, it is important to assign roles and tasks that play to each individual's strengths, talents, knowledge, and skills. This (4) *integration of high skills* ensures that all members can fully contribute their unique strengths to team performance when needed.

Another prerequisite to establish (and one that facilitates the skill integration) is an (5) *open communication* system

comprised of positive, direct, and constructive interactions that enables each team member and the team as a whole to access the feedback needed to make joint progress on all relevant goals. Along with free-flowing communication and feedback, team members need a physically, psychologically, and socially (6) *safe climate*, one that fosters learning and success through risk-taking and even failure. A safe environment allows members to engage fully without fear of negative consequences.

Finally, it is crucial to establish (7) *mutual commitment*, which refers to a shared dedication and responsibility among team members toward achieving common goals. This serves as a strong basis for setting goals, dividing tasks and roles, agreeing on communication patterns, and implementing safety measures. Mutual commitment involves a strong sense of accountability and reliability, such that each team member deliberately and actively contributes to the success of the team and its objectives.

2.3.2 | The Experiential Characteristics of Team Flow

These seven prerequisites enable team members to experience flow at the individual level while performing tasks for the team's purpose. If all members are experiencing flow at the individual level, four experiential characteristics can emerge at the team level. First, (8) *a sense of unity*, which is a shared feeling that the team has merged into a unit through the expression of its collective ambition (cf. Sawyer 2007). Second, team members experience (9) *a sense of making joint progress*, which refers to the feeling of building effortlessly on one another's contributions, resulting in sustained momentum and a sense of soaring together with continually renewing momentum and performing beyond their individual capabilities. Third, (10) *mutual trust* develops, which entails an implicit conviction that the joint task will be accomplished successfully. This trust involves a willingness to be vulnerable to the actions of other team members based on the expectation that the others will perform a particular action that benefits the team's purpose (cf. Mayer et al. 1995; Robinson 1996). Fourth, team members have the feeling of carrying out the joint task with a holistic, (11) *shared focus*, meaning that all team members perform their personal tasks with a concentration that fully fits in with the harmony and the (higher) goal(s) of the team.

Research has shown that the team flow prerequisites combine to promote a team dynamic that tends to yield better team performance and a more positive atmosphere. Specifically, collective ambition, professional autonomy, and open communication must be deliberately and carefully cultivated, as they help establish the foundation for the remaining prerequisites and support the emergence of team flow. Moreover, previous studies also demonstrated that the experiential characteristics of team flow are associated with increased individual happiness and higher instances of individual flow experiences during the execution of personal tasks or roles (van den Hout et al. 2018, 2019, 2022).

Building on this body of work, van den Hout et al. conceptualized team flow as a second-order model (ibid., see Figure 1), a perspective that we adopt in this study. Accordingly, we operationalize team flow as a shared flow experience in which all team members are completely involved in a gratifying and positively challenging common task. The term *shared*

indicates that team members simultaneously experience flow individually and collectively as they perform their personal tasks for the team's purpose. Accordingly, each team member also experiences the nine conditions for individual flow. The term *positively challenging* refers to a task that is challenging yet achievable, relative to the skill level of the individuals involved (cf. "balanced group action"; Pels and Kleinert 2022). In these moments, team members perceive that they have sufficient capacity to cope with the challenging situation and feel that their cooperation runs fluently, meaning that collective awareness is merging with their coordinated, synergistic actions.

2.4 | Study Aims and Hypotheses

As the construct described above is quite complex, a full-scope measurement like the TFM may be overkill and/or too unwieldy to provide effective insights that a team can use to adjust their dynamic in real time. To that end, we have adapted the 37-question TFM into a shorter survey, the TFQS, which we are validating in this study. The adaptation process involved creating a single item for each of the 11 team flow elements. This was achieved by carefully reviewing the underlying definitions of each individual element, as well as examining the existing items for each element within the original TFM. The goal was to encapsulate the essence of each element in a general sense, ensuring that the new, condensed items remained true to the comprehensive theoretical foundation of the TFM while significantly reducing the survey length. No specific hypotheses were formulated for the factor structure of the TFQS, as it was explored through data-driven factor analysis.

In addition, we replicate several findings from past research, making the following hypotheses:

Hypothesis 1. *The eleven elements of team flow form a second-order factor model with two factors representing the seven prerequisites and four characteristics of team flow assessed with the 37 items of the TFM. (Replication)*

Hypothesis 2. *The prerequisites for team flow correlate positively with the characteristics of team flow assessed with the 37 items of the TFM. (Replication)*

Hypothesis 3. *The 11 items of the TFQS will correlate positively with the corresponding aggregated items from the TFM.*

Once the underlying structure of the TFQS has been identified and tested, we will turn to ascertaining the ability of the TFQS to show a relationship between team flow and the set of positive outcomes that have been established by using the TFM.

2.4.1 | Expected Positive Outcomes of Team Flow Experiences

The shared flow experience is considered to be highly conducive to team effectiveness as it enables teams to perform at the peak of their abilities (Keith et al. 2014; Sawyer 2006; Weggeman et al. 2007; van den Hout et al. 2018). van den Hout et al. (2019, 2022) have detailed the positive benefits of team flow. These benefits include increased (a) team efficacy (the degree to which the team achieves intended outcomes); (b) team efficiency (the relative expenditure of energy and resources to the outcome); (c) team productivity; (d) team quality; (e) punctual deliverables; (f) team innovativeness; (g)

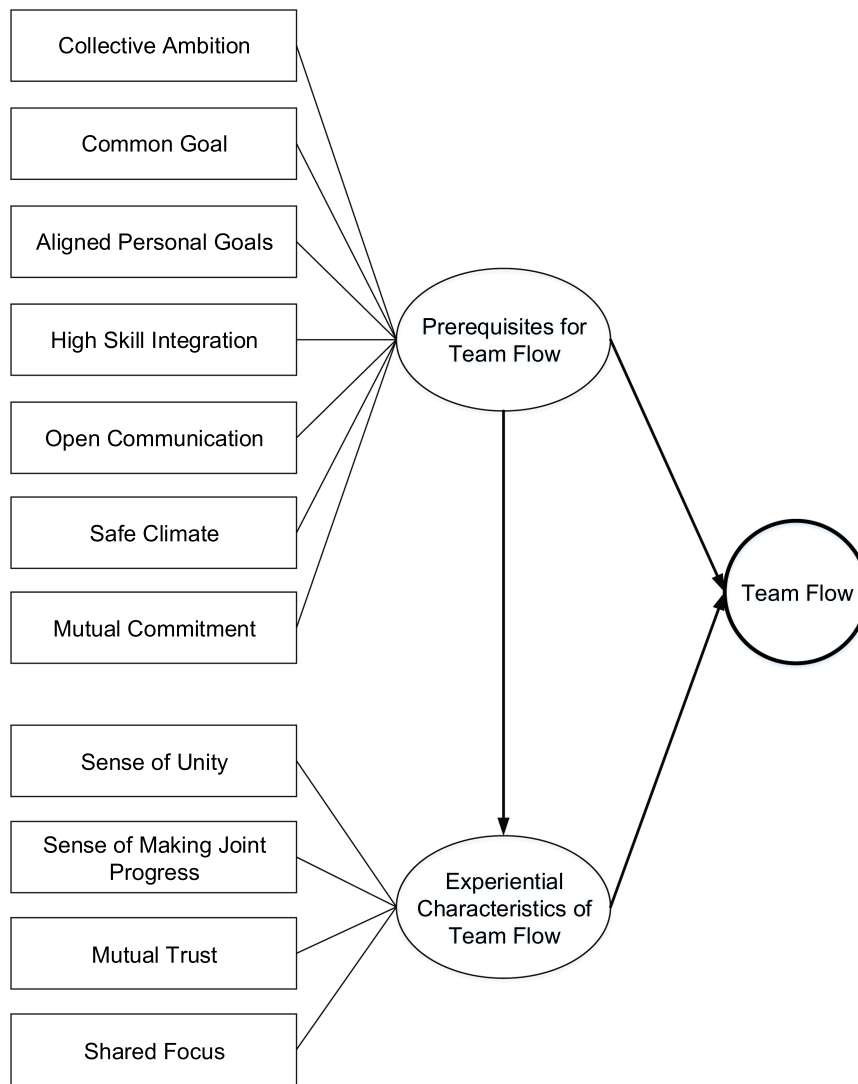


FIGURE 1 | Second-order model of team flow.

aesthetic quality of deliverables; (h) aesthetic experience of collaborative process; (i) overall team performance; and (j) positive team atmosphere. At the individual level, we expect that team flow will have a positive effect on the amount of time team members experience individual flow and their level of individual happiness.

In Figure 2, we present the expected positive correlations for team flow. We will also assess this with the TFM, as with the TFQS, via the following hypotheses:

Hypothesis 4a. *Team flow (prerequisites and characteristics taken together, tested with the 37 items of the TFM) will correlate positively with individual-level work outcomes (individual happiness and individual flow).*

Hypothesis 4b. *Team flow (assessed with the 11 items of the TFQS) will correlate positively with individual-level work outcomes (individual happiness and individual flow).*

Hypothesis 5a. *Team flow (the combination of prerequisites and characteristics assessed with the 37 items of the TFM) will correlate positively with the 10 team-level outcomes (e.g., team efficacy, team efficiency, aesthetic quality of deliverables, team performance, etc.).*

Hypothesis 5b. *Team flow (assessed with the 11 items of the TFQS) will correlate positively with team-level outcomes (i.e., team efficacy, team efficiency, aesthetic quality of deliverables, team performance, etc.).*

In addition to the presence of team flow being a moderator for the individual- and team-level outcomes, van den Hout et al. (2019) found that the team flow prerequisites have a direct effect upon the team-level outcomes and also that the team flow characteristics have a direct effect upon individual-level outcomes (illustrated in Figure 3). They also found that the prerequisites did not have a significant direct effect upon individual-level outcomes and that the team flow characteristics did not have a significant direct effect upon team-level outcomes. We seek to replicate all of these findings using the TFM. To wit:

Hypothesis 6. *The team flow prerequisites taken together (assessed with the corresponding items of the TFM) will correlate positively with individual-level outcomes (individual happiness and individual flow).*

Hypothesis 7. *The team flow prerequisites taken together (assessed with the corresponding items of the TFM) will correlate*

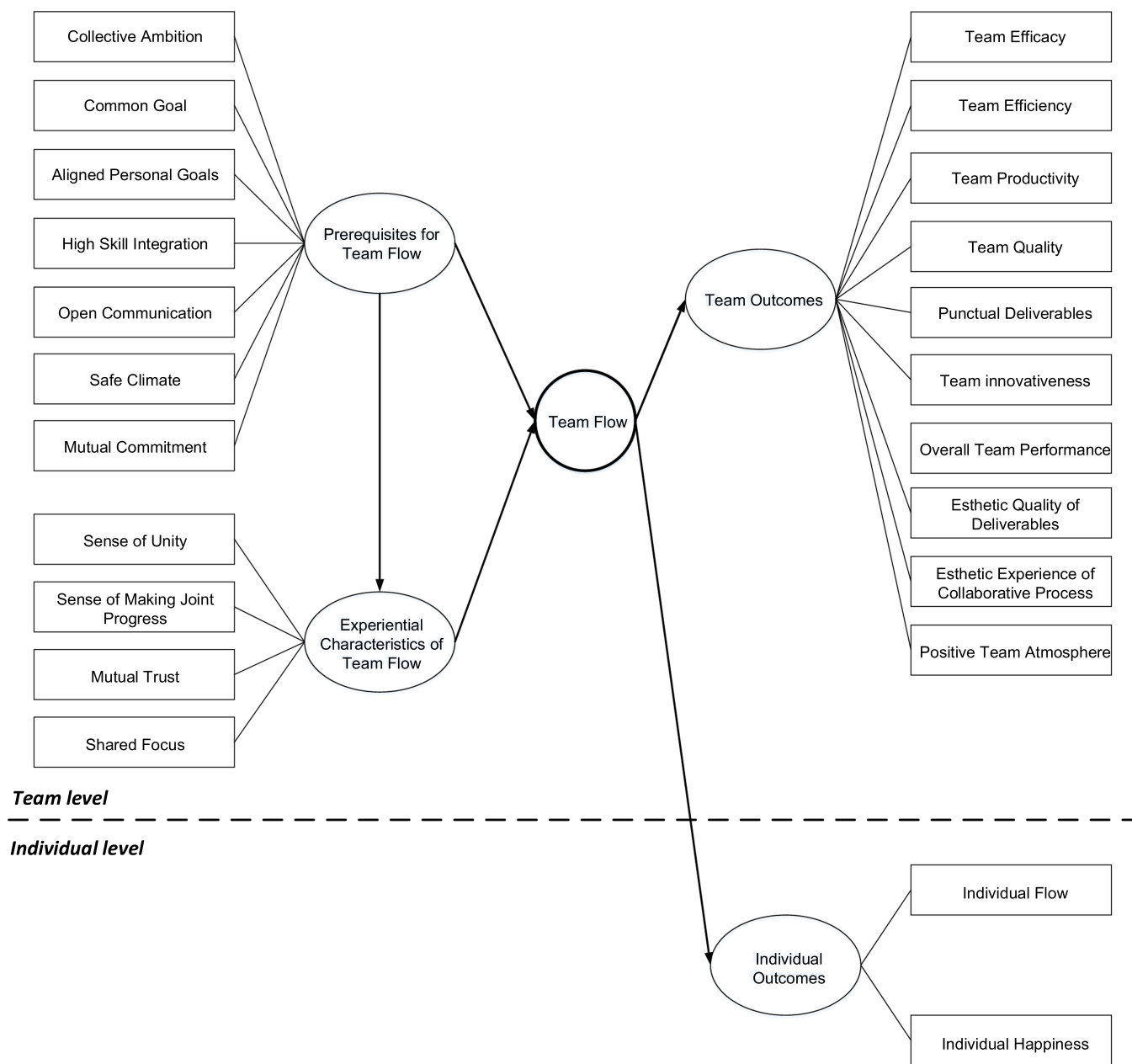


FIGURE 2 | The relationships between team flow and individual and team outcomes.

positively with team-level outcomes (e.g., team efficacy, team efficiency, aesthetic quality of deliverables, etc.).

Hypothesis 8. The team flow experiential characteristics taken together (assessed with the corresponding items of the TFM) will correlate positively with individual-level outcomes (individual happiness and individual flow).

Hypothesis 9. The team flow experiential characteristics taken together (assessed with the corresponding items of the TFM) will correlate positively with team-level outcomes (e.g., team efficacy, team efficiency, and aesthetic quality of deliverables).

As team flow is a very effective gauge of a team’s functioning, an effective and short assessment of flow in teams can be an invaluable barometer that can guide teams, managers, and leaders alike in ensuring top-level performance. This replication study and validation of a shorter tool will allow for a stronger business case for promoting team flow and more efficient ways of measuring it.

3 | Methods

An anonymized dataset and the R code supporting our analyses are available for review via this link: https://osf.io/7ebg4/?view_only=4470e61f0b28464781a4de5758e5f407.

3.1 | Data Collection

Data collection was done using two samples. The first sample included 838 Dutch-speaking professionals from 71 teams representing diverse institutions and companies. These teams encompassed a range of fields, such as education, consulting, management, communications, finance, human resources, research and development, and others. After data collection, we applied filtering criteria. Following recommendations from previous research (e.g., Höhne and Schlosser 2018), we excluded participants whose response



FIGURE 3 | The relationships of the prerequisites and characteristics of team flow with individual and team outcomes.

times were outliers on the long or short ends ($N=74$). Ultimately, we built a first dataset of 764 respondents from 71 teams. The average team size was approximately 11 members ($M = 10.76$; $SD = 6.92$), with a minimum of 2 and a maximum of 37 members per team.

The second sample, sharing similar characteristics as the first sample, comprised 406 participants across 52 teams, with an average team size of 7.81 members ($SD = 5.71$).

3.2 | Measures

The measurement framework for this study involved several assessments across two samples. In the first sample, the TFM was used to evaluate team flow, along with measures of team-level outcomes and individual-level outcomes related to happiness and flow. The TFQS was administered in both

samples. In what follows, we elaborate on each of the instruments.

3.2.1 | The TFQS

In both samples, the TFQS was assessed on a 5-point Likert scale (see Appendix A for the items used in the TFQS).

3.2.2 | The TFM

In the first sample, the TFM was employed to assess team flow, as reported earlier in research by van den Hout et al. (2018, 2019). In contrast to the prior validated studies of the TFM, a 5-point Likert scale format was used for the current data collection instead of a 7-point Likert scale format, as this facilitates respondent comprehension and ease of completion (e.g., Dawes 2008). See Appendix B for the items used in the TFM.

3.2.3 | Team-Level Outcomes

Team-level outcomes were evaluated in the first sample. To assess the team-level outcomes, respondents were asked to rate nine items on a 5-point Likert scale, pertaining to the outcomes indicated in the literature review (see Appendix C). A separate question inquiring about the atmosphere within the team was measured on a 1–5 scale from “very negative” to “very positive”. As a face-validity question, we also asked directly about the team flow experience:

Given description of the flow experience: Team flow is the moment when all team members jointly experience flow during the execution of their personal tasks for the team. They also have the feeling that the team as a whole is also in a flow. The collaboration runs smoothly, the team performs at its best, and afterwards, they all feel extremely satisfied. How often do you experience team flow with your team?

This latter question was measured on a Likert scale of 1 (“never”) to 5 (“very often”).

3.2.4 | Individual-Level Outcomes: Happiness and Flow

In the first sample, we used two questions to assess respondents' happiness levels: “How happy are you today?” and “How happy have you felt in the past month?” Participants rated their happiness for the current day and their happiness over the past month on a scale from 1 (“low”) to 10 (“high”). Our choice for these two questions was driven by their complementary nature; the first primarily assesses a person's current mood, which allows the second to serve as a gauge of their overall happiness (Veenhoven 2017).

As a face-validity question, we asked directly about the individual flow experience:

Given description of the flow experience: Flow is the experience in which you are completely absorbed in an activity (task or role). You experience the performance of the activity as challenging, but you do have the feeling that you can handle this task or role. You perform at your best, and you are very alert. You know exactly how you are doing and what the next step should be. The notion of time disappears because you are so absorbed in it, and afterwards you enjoy intensely. You feel satisfied. You want to experience this moment more often! How often do you experience flow during the execution of your personal tasks or roles for your team?

This latter question was measured on a Likert scale of 1 (“never”) to 5 (“very often”).

3.3 | Data Analysis

Data analysis was conducted using R (version 4.1.1) and involved the use of several methods and packages described in what follows.

3.3.1 | Preliminary Data Screening

Initially, in the first sample, the normality of the TFM and TFQS items was evaluated by calculating skewness and kurtosis measures, as suggested by DeCarlo (1997). These calculations were performed using the moments package (version 0.14.1; Komsta and Novomestky 2022). Additionally, the multivariate normality of the TFM and TFQS data was examined using the Henze–Zirkler test (Henze and Zirkler 1990) from the MVN package (version 5.9; Korkmaz et al. 2021).

3.3.2 | Factor Structure and Reliability Analysis for the TFQS

To identify the optimal number of factors for the TFQS in the first sample, an eigenvalue decomposition and parallel analyses were performed on the item correlation matrix. The nScree function from the nFactores package (version 2.4.1.1; Raiche and Magis 2022) was then used to compare observed eigenvalues with those from the parallel analysis, incorporating multiple criteria for factor retention (e.g., Kaiser's criterion and optimal coordinates).

Following this, an exploratory factor analysis (EFA) was conducted on the TFQS items in the first sample using the psych (version 2.4.1; Revelle 2024) package. This analysis used weighted least squares extraction, appropriate for handling ordinal data, and oblique rotation.

In the second sample, a confirmatory factor analysis (CFA) was conducted using the lavaan package (version 0.6–12; Rosseel 2012) with the weighted least square mean and variance adjusted (WLSMV) estimator (Muth en et al. 1997), which is suitable for handling ordinal data (Brauer et al. 2023) to validate the structure of the TFQS. The analysis followed established guidelines for CFA (Hu and Bentler 1999), and the reported fit indices included the χ^2 statistic, the root mean squared error of approximation (RMSEA; Steiger 1990), the Comparative Fit Index (CFI; Bentler and Bonett 1980), and the standardized root mean squared residual (SRMR; Hu and Bentler 1998). To test the internal consistency reliability of the items, Cronbach's α (Cronbach 1951) was calculated. Although Cronbach's α is a widely used and dominant measure of reliability (Dunn et al. 2014), several researchers (e.g., Dunn et al. 2014; Hayes and Coutts 2020; Sijtsma 2009) have raised concerns regarding this measure, because of the assumptions of τ -equivalence and unidimensionality that are difficult to meet. To address these concerns, we also employed McDonald's ω (McDonald 1999), as suggested by several researchers, as it is considered to provide more accurate estimates of reliability compared to Cronbach's α (e.g., B eland et al. 2018). By using both measures, we aimed to ensure a comprehensive assessment of the internal consistency reliability of the items.

3.3.3 | Factor Structure and Reliability Analysis for the TFM

To assess the factor structure of the TFM, a CFA was conducted following the same guidelines and specifications described above. Based on the theoretical model, a two-factor hierarchical structure was specified, comprising two second-order latent factors: prerequisites and characteristics. Internal consistency reliability was evaluated similarly, using both Cronbach's α and McDonald's ω .

3.3.4 | Assessment of Interrelation at the Team Level

To assess the magnitude of intraclass correlations of the measures within the TFM and the TFQS at the team level, intraclass correlations were calculated using the *psychometric* package (version 2.3; Fletcher 2023). More specifically, the intraclass correlation coefficient ICC(1) and ICC(2) measures (Bartko 1976), based on the one-way random effects model, were used. According to Shieh (2016), these are the most frequently used ICC measures within the context of multilevel modelling. ICC(1) represents the “extent to which individual ratings are attributable to group membership” (Shieh 2016, 995), for example, the effect of organizational membership of employees on their individual ratings of the organizational climate (LeBreton and Senter 2008). ICC(2), also referred to as ICC(*K*) and ICC(1,*K*), is a measure of the reliability of group mean ratings (Shieh 2016).

3.3.5 | Correlation Analysis of Team and Individual-Level Variables

Single-level and multilevel correlations were calculated to assess the relationship between the variables of the TFM and the TFQS. Similarly, the relationships between these measures and (a) the individual-level outcomes (individual happiness and individual flow) and (b) the team-level outcomes (e.g., team efficacy, team efficiency, aesthetic quality of deliverables, team performance, etc.) were also assessed using single-level and multilevel correlations.

4 | Results

4.1 | Validation of the TFQS

4.1.1 | Item Evaluation

Table 1 provides an overview of the descriptive statistics for the test items of the TFQS. The results indicate adherence to univariate normality for the items. However, the results of the multivariate normality tests reveal that the TFQS data deviate from a multivariate normal distribution ($HZ = 2.240, p < 0.001$).

4.1.2 | EFA and CFA

As illustrated in Figure 4, Kaiser's criterion, parallel analysis, and optimal coordinates all indicated a one-factor model.

The results of the EFA can be found in Table 2. Factor loadings for all indicators on the single factor ranged from 0.680 to 0.772, indicating moderate to strong associations with the underlying construct. The measures presented suggest that all items effectively measure a single latent variable.

A CFA was conducted on the second sample to validate the one-factor structure. Model fit indices indicated that the one-factor model provided a good fit to the data ($\chi^2_{244} = 182.27, p < 0.001$). The robust CFI was 0.996, exceeding the recommended threshold of 0.95, suggesting a good fit. The robust RMSEA was 0.053, which is within the acceptable range for good model fit. Additionally, the SRMR was 0.058, falling below the recommended cutoff of 0.08.

4.1.3 | Aggregation Justification

The aggregation justification analysis was conducted to assess the agreement among raters. The ICC(1) value was 0.39, indicating that 39% of the total variance in the measured team flow can be explained by differences between teams. This suggests a moderate level of consistency within teams. Furthermore, the ICC(2) value was 0.76, indicating good reliability in the aggregated team-level measure. Overall, these ICC values support the appropriateness of aggregating TFQS scores at the team level.

4.1.4 | Reliability Testing

The internal consistency of the TFQS was assessed using Cronbach's α and McDonald's ω coefficients. Both Cronbach's α and McDonald's ω were high ($\alpha = 0.93; \omega = 0.93$). This means the items on the TFQS are highly consistent with each other, suggesting they measure the same underlying construct.

TABLE 1 | Descriptive statistics of the TFQS items.

TFQS Item number	<i>M</i>	<i>SD</i>	Skewness	Kurtosis	Correlation with TFM	Multilevel correlation
					composite item	with TFM composite item
1	3.85	0.85	−0.58	0.15	0.63	0.52
2	3.60	0.86	−0.45	0.10	0.58	0.49
3	3.24	0.87	−0.16	−0.15	0.54	0.48
4	3.38	0.87	−0.32	0.01	0.63	0.56
5	3.54	0.94	−0.43	−0.16	0.58	0.50
6	3.72	0.88	−0.41	−0.15	0.70	0.65
7	3.58	0.83	−0.31	−0.02	0.55	0.50
8	3.60	0.92	−0.37	−0.35	0.71	0.63
9	3.64	0.84	−0.39	−0.09	0.66	0.57
10	3.79	0.84	−0.51	0.10	0.73	0.67
11	3.55	0.85	−0.35	0.13	0.60	0.52

Note: An overview of the items for the TFQS is provided in Appendix A.

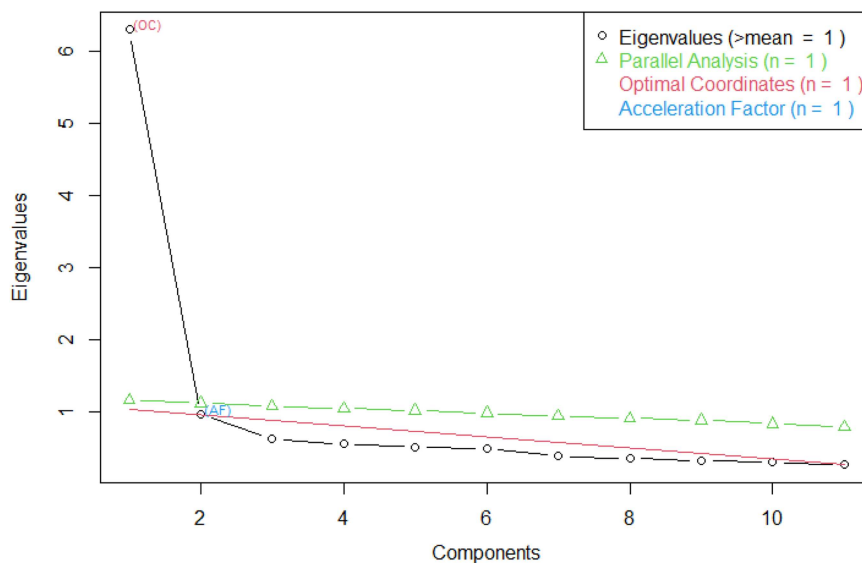


FIGURE 4 | Non-graphical solutions to the scree test.

TABLE 2 | Results of the EFA ordered by factor loading.

TFQS Item	Factor 1	Communality	Uniqueness
9	0.77	0.60	0.40
11	0.76	0.58	0.42
5	0.76	0.58	0.42
8	0.74	0.54	0.46
10	0.73	0.53	0.47
7	0.73	0.53	0.47
1	0.72	0.51	0.49
6	0.72	0.51	0.49
4	0.71	0.51	0.49
2	0.70	0.49	0.51
3	0.68	0.46	0.54

4.2 | Validation of the TFM

4.2.1 | Item Evaluation

An overview of the descriptive statistics of the test items of the TFM is shown in Table 3. Notably, all absolute values for kurtosis and skewness fall within the range of 0–2, aligning with the criteria set forth by George and Mallery (2019), indicating that they exhibit univariate normality. However, when examining the multivariate normality of the TFM items as a group, the results of the multivariate normality tests indicate that they do not adhere to a multivariate normal distribution ($HZ = 1.136; p < 0.001$).

4.2.2 | Factor Analysis

For the CFA of the TFM, two models were examined: one model with a single factor representing team flow and another model distinguishing between Team Flow Prerequisites and Team Flow Characteristics (see Figure 1). To account for non-multivariate normality, analyses were conducted using maximum likelihood estimation with robust standard errors, along with the Satorra–

Bentler scaled test statistic (Satorra and Bentler 1994). The results of the CFA (presented in Table 4) align with general cutoff values for good fit delineated in previous research (Hu and Bentler 1999; Reinecke and Pöge 2020): close to or above 0.95 for CFI, 0.06 or below for RMSEA, and 0.08 or below for SRMR. Our findings demonstrate good fit for both models, with the second model showing a superior fit compared to the first model.

4.2.3 | Reliability Testing

The results of the internal consistency reliability analyses are displayed in Table 5. Consistent with the criteria outlined in literature (Béland et al. 2018; Cortina 1993) of 0.70 or higher, our analysis confirms the internal consistency of the various scales within the TFM.

4.2.4 | Aggregation Justification

The results of the interclass correlation (ICC) analyses are presented in Table 6. According to the literature (e.g., LeBreton and Senter 2008), scores for ICC(1) are ideally expected to exceed the threshold of 0.10, while scores for ICC(2) should ideally be above 0.70, in line with guidelines described in previous studies (e.g., LeBreton and Senter 2008). In our analysis, all dimensions met the criterion for ICC(1). However, some dimensions did not meet the criterion for ICC(2). It is important to note that different thresholds are used in practice (Lance et al. 2006). For instance, other researchers suggest that scores ranging between 0.40 and 0.75 can be considered as fair to good (Fleiss 1986). As such, our results are consistent with estimates reported in the literature (cf. Woehr et al. 2015).

4.3 | Relationship Between TFM and TFQS Factors

To assess the relationship between the factors of the TFM and the TFQS, both single-level and multilevel correlation coefficients were calculated. Results show high correlations between the overall team flow measure of the TFQS and TFM, with a single-level Pearson correlation of $r = 0.88$ and a

TABLE 3 | Descriptive statistics of the TFM items.

Dimensions	Item number	<i>M</i>	<i>SD</i>	Skewness	Kurtosis
Collective ambition	1	3.81	0.77	-0.56	0.63
	2	3.64	0.80	-0.47	0.30
	3	3.45	0.80	-0.21	0.10
Common goal	1	3.78	0.74	-0.34	0.07
	2	3.59	0.86	-0.44	0.18
	3	3.67	0.80	-0.41	0.34
Aligned personal goals	1	3.53	0.86	-0.34	-0.18
	2	3.35	0.88	-0.26	-0.12
	3	3.41	0.85	-0.23	-0.23
	4	3.49	0.80	-0.34	0.02
High skill integration	1	3.37	0.83	-0.28	-0.15
	2	3.44	0.97	-0.21	-0.59
	3	3.24	0.90	-0.18	-0.27
Open communication	1	3.37	0.95	-0.09	-0.56
	2	3.28	0.94	-0.02	-0.58
	3	3.08	0.93	0.13	-0.40
Safety	1	3.96	0.77	-0.67	0.70
	2	3.97	0.78	-0.68	0.86
	3	3.71	0.83	-0.49	0.13
	4	3.93	0.77	-0.59	0.58
Mutual commitment	1	3.62	0.84	-0.25	-0.44
	2	3.35	0.92	-0.27	-0.37
	3	3.56	0.86	-0.31	-0.15
Sense of unity	1	3.57	0.92	-0.37	-0.32
	2	3.55	0.90	-0.32	-0.35
	3	3.29	0.93	-0.13	-0.38
	4	3.58	0.92	-0.34	-0.28
Sense of joint progress	1	3.67	0.79	-0.51	0.48
	2	3.76	0.82	-0.57	0.42
	3	3.89	0.81	-0.65	0.67
	4	3.45	0.86	-0.19	-0.15
Mutual trust	1	3.86	0.74	-0.44	0.27
	2	3.78	0.85	-0.51	0.17
	3	3.88	0.76	-0.47	0.38
Holistic focus	1	3.29	0.84	-0.25	-0.04
	2	3.29	0.84	-0.18	-0.13
	3	3.50	0.8	-0.22	-0.06

Note: An overview of the items for the TFM is provided in Appendix B

multilevel correlation of $r = 0.83$, indicating strong convergence across both levels of analysis. Similarly, correlations for the TFQS and the TFM factors are presented in Table 7.

4.4 | Relationship Between Outcome Variables and Both the TFM Prerequisites and Characteristics and the TFQS Factor

In addition to replicating a validation of the TFM, this study sought to replicate the confirmation that the TFM relates to

positive outcomes for team members at the individual and team levels. Moreover, in order to further validate the TFQS, the factors would need to correlate with the individual outcomes at a comparable level to the TFM.

For the individual level, the outcomes are current and recent happiness and individual flow experiences. While the correlations between the TFM items and the individual outcomes are low to medium, a similar pattern is found with the TFQS factors (Table 8). One would not expect such complex constructs as current/recent happiness and individual flow to be highly

TABLE 4 | Results of CFA for the TFM.

	CFA (1 factor)	CFA (2 factors)
Df	618	617
χ^2	1485.25*	1444.76*
Robust RMSEA	0.033	0.032
Robust CFI	0.994	0.994
SRMR	0.042	0.041

* $p < 0.001$.**TABLE 5** | Internal consistency reliability.

	Cronbach's α	McDonald's ω
Prerequisites of team flow		
1 Collective ambition	0.79	0.80
2 Common goal	0.84	0.84
3 Aligned personal goals	0.88	0.88
4 High skill integration	0.83	0.84
5 Open communication	0.93	0.93
6 Safety	0.91	0.91
7 Mutual commitment	0.82	0.82
Characteristics of team flow		
8 Sense of unity	0.92	0.92
9 Sense of joint progress	0.89	0.89
10 Mutual trust	0.89	0.89
11 Holistic focus	0.87	0.87

correlated with any single item. But it is notable that all items in both instruments do have moderate correlations with individual flow, as one might expect.

For the team level, the outcomes are (a) Team efficacy (degree to which the team achieves intended outcomes); (b) Team efficiency (relative expenditure of energy and resources to the outcome); (c) Team productivity; (d) Team quality; (e) Punctual deliverables; (f) Team innovativeness; (g) Aesthetic quality of deliverables; (h) Aesthetic Experience of Collaborative Process; (i) Overall team performance; (j) Positive team atmosphere; and, of course, (k) team flow. As expected, the individual- (Table 9) and multi-level (Table 10) correlations between the TFM items and the team-level outcomes are high, and a similar pattern is found with the TFQS factors.

5 | Discussion

The aims of this study were to introduce and validate a new measure of team flow (i.e., the TFQS) and replicate the validity of the TFM. The replication of the TFM validation required not only showing that the 37 items of the TFM hold together as a

TABLE 6 | Convergence tests for TFM constructs.

	ICC (1)	ICC (2)
Team flow prerequisites	0.29	0.75
Collective ambition	0.24	0.71
Common goal	0.19	0.65
Aligned personal goals	0.18	0.63
High skill integration	0.22	0.68
Open communication	0.21	0.67
Safe climate	0.20	0.66
Mutual commitment	0.23	0.69
Team flow characteristics	0.29	0.75
Sense of unity	0.30	0.76
Sense of joint progress	0.28	0.74
Mutual trust	0.22	0.68
Shared focus	0.22	0.68

measure of team flow via an aggregation into seven prerequisites and four characteristics, but that these part and whole measures of team flow also correlate with positive outcomes at the individual and team level. While comprehensive, the 37-item survey proved somewhat impractical. Its length posed a barrier for researchers aiming to combine it with other measures and for practitioners seeking a more streamlined way to assess team flow regularly. This led to the development of a shorter assessment, which, as previous research by van den Hout et al. (see above) has shown, can still effectively gauge team flow and serve as an indicator of team health.

5.1 | Discussion of the Results: Validation and Correlation Findings

In this study, we employed EFA to identify an appropriate structure for the TFQS. Our findings revealed a one-factor structure in which each item of the TFQS represents a distinct dimension of the team flow framework. This structure was subsequently confirmed with a second sample using CFA, demonstrating a good fit. Validating this new instrument also required demonstrating a strong correlation between the TFQS and each of the individual- and team-level outcomes. The results did indeed show that the individual items of the TFQS correlated positively with their aggregated counterparts in the TFM (Hypothesis 3 confirmed).

Furthermore, as expected, the aggregate measure of team flow, as measured by the TFQS, correlated positively with both the individual- and team-level outcomes (Hypotheses 4b and 5b, respectively, confirmed).

The replication of the TFM validation went as expected. The 11 elements of team flow (as measured by the TFM) formed a second-order factor model that reflected the established prerequisites and characteristics of team flow (i.e., in line with Hypothesis 1), with the prerequisites correlating positively with the characteristics of team flow (i.e., conforming Hypothesis 2). The prerequisites, characteristics, and the resultant team flow that emerged from them did indeed all correlate with individual-level outcomes, in line with Hypotheses 6, 8, and 4a, respectively, and team-level outcomes (i.e., confirming

TABLE 7 | Single and multilevel correlations between TFM prerequisites, TFM characteristics, and TFQS.

		1	2	3	4	5	6	7	8	9	10	11	12
TFM													
1	Collective ambition	—	0.56	0.43	0.56	0.48	0.51	0.52	0.62	0.61	0.57	0.57	0.67
2	Common goal	0.61	—	0.54	0.48	0.44	0.47	0.42	0.49	0.55	0.49	0.56	0.60
3	Aligned personal goals	0.49	0.59	—	0.54	0.42	0.45	0.40	0.44	0.53	0.44	0.49	0.51
4	High skill integration	0.61	0.53	0.57	—	0.53	0.52	0.54	0.57	0.55	0.52	0.54	0.62
5	Open communication	0.51	0.49	0.48	0.58	—	0.50	0.50	0.50	0.48	0.51	0.46	0.59
6	Safety	0.56	0.51	0.48	0.56	0.54	—	0.48	0.57	0.59	0.68	0.47	0.66
7	Mutual commitment	0.59	0.50	0.48	0.62	0.55	0.55	—	0.67	0.59	0.57	0.56	0.63
8	Sense of unity	0.68	0.53	0.47	0.62	0.51	0.63	0.72	—	0.71	0.69	0.64	0.72
9	Sense of joint progress	0.67	0.60	0.57	0.63	0.52	0.62	0.66	0.75	—	0.68	0.63	0.68
10	Mutual trust	0.62	0.52	0.47	0.58	0.55	0.72	0.62	0.73	0.70	—	0.59	0.67
11	Holistic focus	0.62	0.61	0.53	0.60	0.51	0.52	0.62	0.68	0.68	0.62	—	0.62
TFQS													
12	Team flow	0.75	0.65	0.57	0.69	0.63	0.71	0.70	0.77	0.74	0.73	0.68	—

Note: All p values for individual correlations are lower than 0.001. All p values for multilevel correlations are lower than 0.001. Single-level correlation coefficients are shown in the bottom half of the table, and multilevel correlation coefficients are shown in the upper half of the table.

TABLE 8 | Correlations between individual affective variables and the TFM prerequisites, TFM characteristics, and TFQS.

	Happiness today		Happiness past month		Individual flow	
	r_{single}	$r_{\text{multilevel}}$	r_{single}	$r_{\text{multilevel}}$	r_{single}	$r_{\text{multilevel}}$
TFM						
Team flow	0.24	0.24	0.27	0.27	0.35	0.36
Team flow prerequisites	0.24	0.23	0.27	0.27	0.35	0.36
Collective ambition	0.20	0.18	0.19	0.17	0.30	0.30
Common goal	0.17	0.15	0.19	0.18	0.26	0.26
Aligned personal goals	0.15	0.15	0.17	0.15	0.26	0.27
High skill integration	0.16	0.16	0.22	0.23	0.26	0.26
Open communication	0.11	0.11	0.15	0.16	0.25	0.26
Safe climate	0.29	0.27	0.29	0.29	0.32	0.33
Mutual commitment	0.22	0.21	0.25	0.23	0.26	0.24
Team flow characteristics	0.23	0.23	0.25	0.25	0.33	0.33
Sense of unity	0.22	0.20	0.23	0.21	0.33	0.32
Sense of joint progress	0.22	0.22	0.25	0.24	0.32	0.33
Mutual trust	0.23	0.23	0.22	0.22	0.26	0.25
Shared focus	0.15	0.15	0.19	0.19	0.24	0.24
TFQS						
Team flow	0.23	0.22	0.25	0.25	0.34	0.36

Note: All p values for individual correlations are lower than 0.001. All p values for multilevel correlations are lower than 0.001. Italicized items are aggregated.

Hypotheses 7, 9, and 5a, respectively). With all eight of the TFM-related hypotheses confirmed, this study provided a solid replication of the validity of the TFM.

5.2 | Limitations and Directions for Future Research

As with many field studies, the present investigation faced inherent challenges that highlight both its limitations and directions for future research. A primary concern is the high

variability of work contexts, which makes it difficult to control for factors like organizational politics, incentive structures, and work–life balance. These variables can impact the precision of findings, as evidenced by occasional outliers in response times and deviations between individual and team-level data, likely due to exceptional circumstances or clerical errors. Future research should include teams in a more controlled setting, such as structured interventions or in programs where team composition and task structure are predefined, as this could help mitigate contextual confounds and allow for tighter control over extraneous variables.

TABLE 9 | Correlations between perceived team outcome variables and the TFM prerequisites, TFM characteristics, and TFQS.

	1	2	3	4	5	6	7	8	9	10	11
TFM											
Team flow	0.60	0.62	0.58	0.59	0.52	0.58	0.61	0.76	0.70	0.61	0.61
Team flow prerequisites	0.58	0.61	0.56	0.57	0.51	0.59	0.60	0.73	0.69	0.58	0.59
Collective ambition	0.50	0.52	0.50	0.49	0.43	0.54	0.53	0.64	0.59	0.48	0.54
Common goal	0.52	0.52	0.44	0.46	0.41	0.48	0.47	0.52	0.56	0.36	0.42
Aligned personal goals	0.43	0.45	0.40	0.40	0.38	0.46	0.46	0.50	0.53	0.33	0.37
High skill integration	0.46	0.49	0.43	0.43	0.41	0.48	0.48	0.59	0.52	0.44	0.47
Open communication	0.38	0.44	0.40	0.44	0.39	0.40	0.42	0.56	0.49	0.47	0.47
Safety	0.41	0.43	0.41	0.46	0.36	0.42	0.46	0.59	0.53	0.57	0.43
Mutual commitment	0.47	0.49	0.49	0.45	0.41	0.44	0.48	0.62	0.54	0.48	0.51
Team flow characteristics	0.57	0.59	0.55	0.55	0.49	0.53	0.57	0.72	0.67	0.61	0.59
Sense of unity	0.48	0.51	0.48	0.45	0.39	0.46	0.49	0.66	0.57	0.56	0.59
Sense of joint progress	0.55	0.56	0.51	0.54	0.46	0.53	0.55	0.64	0.66	0.52	0.52
Mutual trust	0.46	0.47	0.48	0.50	0.42	0.43	0.49	0.63	0.57	0.58	0.46
Holistic focus	0.51	0.51	0.47	0.46	0.44	0.45	0.46	0.59	0.55	0.48	0.50
TFQS											
Team flow	0.59	0.62	0.58	0.58	0.52	0.57	0.58	0.76	0.70	0.62	0.61

Note: (1) Team efficacy, (2) Team efficiency, (3) Team productivity, (4) Team quality, (5) Punctual deliverables, (6) Team innovativeness, (7) Aesthetic quality of deliverables, (8) Aesthetic Experience of Collaborative Process, (9) Overall team performance, (10) Positive team atmosphere, and (11) Team flow. All *p* values for individual correlations are lower than 0.001.

TABLE 10 | Multilevel correlations between perceived team outcome variables and the TFM prerequisites, TFM characteristics, and TFQS.

	1	2	3	4	5	6	7	8	9	10	11
TFM											
Team flow	0.56	0.56	0.53	0.58	0.50	0.54	0.58	0.70	0.65	0.54	0.54
Team flow prerequisites	0.54	0.55	0.51	0.57	0.50	0.54	0.57	0.68	0.64	0.50	0.52
Collective ambition	0.46	0.47	0.45	0.48	0.42	0.49	0.48	0.55	0.52	0.40	0.45
Common goal	0.49	0.47	0.39	0.45	0.40	0.42	0.43	0.47	0.52	0.29	0.36
Aligned personal goals	0.38	0.40	0.35	0.37	0.36	0.40	0.43	0.44	0.47	0.25	0.31
High skill integration	0.39	0.40	0.37	0.40	0.36	0.43	0.43	0.53	0.45	0.35	0.40
Open communication	0.34	0.36	0.35	0.42	0.35	0.37	0.39	0.53	0.44	0.41	0.44
Safety	0.39	0.38	0.38	0.47	0.35	0.39	0.44	0.54	0.50	0.49	0.37
Mutual commitment	0.42	0.42	0.44	0.43	0.39	0.38	0.44	0.55	0.47	0.41	0.40
Team flow characteristics	0.53	0.53	0.51	0.54	0.46	0.48	0.52	0.65	0.61	0.54	0.51
Sense of unity	0.45	0.47	0.43	0.44	0.36	0.40	0.44	0.59	0.52	0.49	0.51
Sense of joint progress	0.49	0.50	0.46	0.53	0.43	0.47	0.51	0.58	0.60	0.46	0.46
Mutual trust	0.43	0.44	0.44	0.49	0.40	0.40	0.47	0.57	0.52	0.50	0.37
Holistic focus	0.44	0.43	0.42	0.42	0.38	0.38	0.40	0.52	0.48	0.43	0.41
TFQS											
Team flow	0.56	0.58	0.54	0.59	0.52	0.53	0.56	0.71	0.65	0.54	0.57

Note: (1) Team efficacy, (2) Team efficiency, (3) Team productivity, (4) Team quality, (5) Punctual deliverables, (6) Team innovativeness, (7) Aesthetic quality of deliverables, (8) Aesthetic Experience of Collaborative Process, (9) Overall team performance, (10) Positive team atmosphere, and (11) Team flow. All *p* values for individual correlations are lower than 0.001.

Another limitation is the sole reliance on self-report instruments administered within a single questionnaire, which may introduce common method bias (Podsakoff et al. 2003). To avoid this issue, future research could strengthen the construct and criterion-related validity of the TFQS by triangulating it with other data

sources, such as assessments of team processes using verbal data (e.g., Buseyne et al. 2024) or other multimodal data sources (Peifer et al. 2021). But, it is important to note that research on such alternative and multimodal measurements of team flow is still in its early stages and requires further development.

While our results demonstrate robustness across a variety of fields, the limited representation of teams within each specific field and the fact that certain sectors (e.g., service, non-profits, athletics, and the arts) are not represented limit the generalizability of our findings. Future research should include a broader range of domains/fields. Additionally, to fully ascertain the TFQS's utility, future research should extend its validation to a more diverse spectrum of organizational environments, including a variety of organizational structures, companies of varying sizes, and teams embedded in a range of contexts (e.g., different organizational cultures). Furthermore, as the study was conducted in a single country with limited demographic diversity, cross-cultural studies are essential to confirm the TFQS's effectiveness on a more global scale. In particular, the TFQS should also be translated and tested in different languages to ensure conceptual equivalence and measurement validity across linguistic contexts.

Another critical area for future research concerns the applicability of the TFQS to virtual teams. Our study exclusively focused on in-person teams, and the unique dynamics of virtual environments (e.g., communication visibility, time zone differences, and diverse cultural backgrounds of remote members) were not accounted for. While some research has explored flow in virtual settings (e.g., Peifer et al. 2021; Shehata et al. 2021), these studies haven't utilized validated team flow measures like the TFM or TFQS. Future work should investigate team flow in virtual contexts and assess whether the TFM/TFQS serves as an effective barometer for team climate and as a predictor of performance in these settings.

Finally, while this study validates the TFQS as a reliable measure, its ultimate value lies in its demonstrated practical impact. Subsequent research should move beyond correlational analyses to assess the direct effects of implementing the TFQS within organizations. This includes exploring how its routine use, perhaps as part of an organizational development initiative, actively contributes to positive changes in team dynamics and performance indicators. In addition, future studies should confirm the practical advantages of the shortened scale when compared to the longer one by evaluating user responses to both the TFM and TFQS.

6 | Conclusion

With the blazing speed at which the business world is now moving, there are many tradeoffs between time, accuracy, and efficacy, and teams need to navigate that reality. While there was an existing tool that serves as a barometer of team climate and effectiveness that is demonstrably usable in team coaching and the like, the length of the survey meant it could only be used on occasion. To maintain a more consistent pulse on the team, a shorter measure was needed, and we have developed a tool that has risen to this challenge: the TFQS. After validating its use in this study, we hope that future research will replicate our results and extend our findings to more types of teams. As noted, however, the TFQS does not achieve the level of nuance that the TFM has. Thus, we envision the two tools being used in tandem, with the TFM being used at longer intervals and the TFQS being used in the interim as a basic pulse on the team. We hope that future studies can confirm the efficacy of this combination over and above how either tool could perform in isolation. Most especially, we hope that the TFQS tool, especially in

combination with the TFM, will enable teams worldwide to have the wonderful experiences of team flow and that individuals, teams, and businesses alike will benefit from the higher-level performances that team flow enables.

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Ethics Statement

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Consent

Informed consent was obtained from all individual participants included in the study.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author, J.J.J. van den Hout, upon reasonable request. As requested, we have included an anonymized dataset and the R code that supports our analyses to ensure transparency in the methodological aspects of our work. The reviewers can access these documents via this link: https://osf.io/7ebg4/?view_only=4470e61f0b28464781a4de5758e5f407. The authors agree to make data and materials supporting the results or analyses presented in their paper available upon reasonable request.

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Appendix A

The TFQS

See Table A1.

TABLE A1 | Items of the TFQS.

Question items (“In the team in which I participate...”)	
1.	...there is a common ambition to do things together.
2.	...we have a concrete, challenging common goal in mind.
3.	...we align personal goals with the common goal.
4.	...are personal strengths combined into a performance unit.
5.	...there is a form of open communication so that everyone knows how we are doing.
6.	...there is a climate that is socially safe for everyone to perform challenging tasks.
7.	...there is commitment to mutual agreements (goals, tasks, rules, etc.).
8.	...there is a sense of unity
9.	...there is a sense of joint progress
10.	...there is a sense of mutual trust
11.	...there is a joint focus

Appendix B

The TFM

See Table B1.

TABLE B1 | Items of the TFM.

Prerequisites of team flow	
Elements of team flow	Question items (“In the team in which I participate.”)
<p><i>Collective ambition</i> The extent to which the same ambition is collectively shared (CA)</p>	<ol style="list-style-type: none"> 1. we share the same ambition with each other. 2. we form a team from an inner drive to accomplish things together. 3. we feel engaging in the team process as intrinsically rewarding.
<p><i>Common goal</i> A collective goal that is endorsed by everyone (CG)</p>	<ol style="list-style-type: none"> 1. ...we endorse the established goals. 2. ...we agree on clear goals. 3. ...the shared goal offers a suitable challenge.
<p><i>Aligned personal goals</i> The presence of personal goals that also contribute to the common goal (APG)</p>	<ol style="list-style-type: none"> 1. ...we are stimulated to determine a personal goal. 2. ...personal goals are derived from the common goal. 3. ...personal goals are of value to the team. 4. ...personal goals are compatible with those of the team.
<p><i>High skill integration</i> The arrangement of individual merits into a collective strength (HIS)</p>	<ol style="list-style-type: none"> 1. ...every team member takes up a suitable challenge. 2. ...we make use of each other's compatible skills. 3. ...individual skills are integrated to form a coherent unit.
<p><i>Open communication:</i> Openness in communication with one another</p>	<ol style="list-style-type: none"> 1. we receive feedback from one another that allows us to move forward. 2. we provide each other with feedback whenever we can. 3. everyone receives clear feedback.
<p><i>Safety:</i> The level of psychological safety needed to engage in action</p>	<ol style="list-style-type: none"> 1. ...we each feel that it is safe to perform our tasks. 2. ...there is a safe climate for learning. 3. ...we each feel that it is safe to take risks. 4. ...there is positive climate in which to perform.
<p><i>Mutual commitment:</i> The level of commitment towards one another</p>	<ol style="list-style-type: none"> 1. we pay attention to each other's activities. 2. we know from one another who does what. 3. we concentrate on smooth collaboration.
Experiential characteristics of team flow	
<p><i>Sense of unity:</i> The extent to which the team acts in unity</p>	<ol style="list-style-type: none"> 1. we feel as one with the team. 2. we are fully involved with the team. 3. the team acts in unity. 4. we feel a strong bond with the team.
<p><i>Sense of joint progress:</i> A collective feeling of accomplishment</p>	<ol style="list-style-type: none"> 1. we collectively make progress. 2. I feel that we make joint progress. 3. together we achieve more. 4. actions naturally flow in quick succession.
<p><i>Mutual trust:</i> The level of mutual trust in the cooperation</p>	<ol style="list-style-type: none"> 1. we have trust in each other to collectively complete our task. 2. there is an atmosphere of trust among us. 3. we, as a team, trust that we will be able to complete the task successfully.
<p><i>Holistic focus:</i> The extent to which everyone focuses on the common goal</p>	<ol style="list-style-type: none"> 1. everyone is completely focused on the shared task. 2. the team as a whole is in focus. 3. everyone is fully focused on executing his/her task for the team.

Appendix C

Outcomes

See Table C1.

TABLE C1 | Overview of the items for the team-level outcomes.

Dimension	Items How do you rate the performance of your team?
(1) Team efficacy	The extent to which the intended objectives are achieved
(2) Team efficiency	The relationship between the objectives achieved on the one hand and the resources deployed for this on the other hand
(3) Team productivity	The productivity
(4) Team quality	The quality
(5) Punctual deliverables	Deliveries according to schedule (i.e., meeting deadlines)
(6) Team innovativeness	The innovativeness
(7) Quality of deliverables	The beauty of the services or products delivered
(8) Aesthetic experience of the collaborative process	The beauty of the collaborative process
(9) Overall team performance	The performance in its entirety
(10) Positive team atmosphere	The atmosphere in the team with regard to negative and positive expressions