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Abstract

An important question in teamwork research is how to maximize performance and the aspects of the team's dynamics and collaboration process that underpin it. Prior research has shown that when team members who are collaborating towards a common purpose experience flow together (*team flow; optimal experiences that occur simultaneously at the individual and team levels, entailing deep focus and intrinsic motivation to perform an activity*), the team significantly improves its performance and team members experience many positive results at both the individual and team levels. Further advances have built a model of team flow and a means for measuring the construct, as well as qualitative results in business teams to confirm how the elements of team flow interact to generate the positive experiences and higher performance. This study adds practical value to the research by providing proof-of-concept for an intervention that promotes team flow in business teams. This cross-case-study of 15 teams across five different organizations uses the Team Flow Monitor as a barometer of team health and dynamics, which in turn serves as the centerpiece of an iterative intervention protocol for leading/guiding teams in targeted self-reflection that can generate virtuous cycles of improving dynamics and performance. In addition to a significant amount of qualitative data confirming the efficacy of the intervention in enabling teams to overcome obstacles and experience more team flow, quantitative analysis of Team Flow Monitor scores showed an increase on average team flow scores across the teams over the course of the intervention (Cohen's $d = 0.6$). Implications for translating team flow research to field situations are discussed, along with further potential uses of the Team Flow Monitor.

KEYWORDS

intervention, longitudinal study, measurement, team flow, work teams

1 | INTRODUCTION

Even decades ago, the literature was rife with discussions about how critical teams will be in the knowledge era (e.g., Katzenbach & Smith, 1993), and research has thoroughly borne this out (e.g., Hackman, 2011). The literature on the importance and value of teams is extensive, and likewise the literature on the characteristics of a team that can make it more or less effective (cf. Humphrey & Aime, 2014). But, there is a gap between knowing these elements and knowing how to actively develop a team so that it exhibits these traits and high performance (Shuffler et al., 2011). Despite this gap between theory and practice, there is less research about

interventions that directly promote/develop the efficacy of a team (Shuffler et al., 2018), and this especially holds true for relatively nascent concepts like "flow" being applied to teams (while research on flow began in the 1960s, there has been little research conducted on flow in teams before 2000; cf. Sawyer, 2003). Flow experiences, which are considered to be among the most enjoyable, rewarding, and engaging, are characterized by deep absorption and a sense of control over one's own performance while performing an activity that one is intrinsically motivated to do that often requires the application of a relatively high degree of skill to a high-level challenge (Csikszentmihalyi, 1996, 1997).

The importance of studying flow in teams stems from the established relationships between flow, high performance, creativity, and positive wellbeing at both the individual and team levels (Csikszentmihalyi, 1997; van den Hout et al., 2019; Landhäußer & Keller, 2012; Nakamura & Csikszentmihalyi, 2002; Sawyer, 2006). Prior research on flow in teams has provided clear definitions of the construct of team flow (van den Hout et al., 2018), measurements that have been validated both through psychometrics (van den Hout et al., 2019) and through qualitative analysis (van den Hout & Davis, 2021), and potential pitfalls for teams wanting to experience team flow and its attendant benefits (van den Hout et al., 2017). While these findings provide plenty of guidance and tools for teams that want to maximize their performance and experience (van den Hout et al., 2019), they do not delineate, or confirm the efficacy of, any particular interventions. To that end, the present study assesses a proof-of-concept intervention in which teams receive coaching on the nature and practice of team flow and then use a psychometrically validated measure of team flow (Team Flow Monitor; van den Hout et al., 2019) as a basis for team development initiatives (cf. Shuffler et al., 2018). Below is a brief overview of the team flow construct, followed by the design and analysis of the study.

2 | THEORETICAL BACKGROUND

2.1 | Team flow: Definition, prerequisites, and experiential characteristics

Team flow is a complex and multifaceted shared experience of flow while engaging in interdependent personal tasks that serve the interests of the team. There are three core aspects of the experience (cf. van den Hout & Davis, 2021): (a) individuals sharing the flow experience through the execution of their (typically interdependent) tasks; (b) team members deriving a flow experience from the team's dynamic (structured by the prerequisites of team flow—see below); (c) a team dynamic that includes a collective experience of flow that is punctuated by a sense of unity, a sense of joint progress, mutual trust, and holistic focus (van den Hout et al., 2018, 2019; cf. Pels et al. [2018] for additional theoretical discussions). The latter four constructs comprise the *experiential characteristics* of team flow, which are the key indicators of the presence of a team flow experience (van den Hout et al., 2019). The sense of unity reflects a shared feeling that team is actually working as a unit to achieve its goals such that there is a sense of cohesion (which Sawyer [2007] calls *a blending of egos*; cf. Widmeyer et al., 1985), and a loss of reflective self-consciousness relative to fellow team members (cf. Sawyer, 2006; Snow, 2010). The mutual trust is likewise a shared feeling in which team members are capable of being vulnerable to the effects of their teammates' actions so that there can be synergistic coordination of tasks (cf. Gully et al., 2002; Mayer et al., 1995). Separately, but relatedly, the sense of joint progress highlights the headway made towards achieving the team's goals through cooperation (cf. Amabile & Kramer, 2011). Fourth, the holistic focus is comprised of a cognizance of a collective consciousness/will that is aimed at interdependently acting to achieve the team's goal (cf. Hamilton & Hurford, 2007; Isaksen & Lauer, 2002). Consistent with the potential for these four characteristics to vary in their degree of presence over the course of the team's activities, the team flow experience can vary in its intensity and duration, but the optimum of "full team flow" involves consistent maintenance of the four characteristics through the team's dynamic.

Prior research on team flow (e.g., van den Hout et al., 2016, 2018, 2020; van den Hout & Davis, 2019) has elucidated seven prerequisites that are necessary for a team dynamic that is conducive to the emergence of the four aforementioned experiential characteristics (for a detailed exposition of the relationships between the prerequisites and experiential characteristics of team flow, as well as how the prerequisites and characteristics are related to flow experiences, see van den Hout et al., 2019). The core of the prerequisites is the *collective ambition*, which is the team's unifying purpose (and the foundation underpinning the latter six prerequisites) that allows the team to establish a clear, meaningful, and challenging *common goal* that every team member buys into (Sawyer, 2007). In so doing, team members are able to create *aligned personal goals* that dovetail with the team's common goal, which in turn promotes a meaningful division of labor in which team members select tasks that fit their preferences, talents, knowledge, and/or skills (*high skill integration*) to ensure synergistic collaboration (Locke & Latham, 2006; Nakamura et al., 2009; O'Leary-Kelly et al., 1994; Salas et al., 2008). *Open communication* is another critical prerequisite of team flow (Aust et al., 2023), and involves ensuring that there is clear, encouraging, and constructive feedback on both the collaboration process and tasks at the individual and team levels so that there is efficient coordination of task efforts (cf. Guzzo & Salas, 1995; Sawyer, 2007). As Edmondson (1999) demonstrated, a critical facet of any effective team experience is the psychological *safety* to perform tasks and take risks as one sees fit without fear of undue responses to failure. A key correlate of this safety is the trust that teammates will interact with one another in ways that are reflective of the team's dedication and devotion to the team's common goal and collective ambition. Such *mutual commitment* entails maintaining accountability at the individual, interpersonal, and team levels for relevant actions, coaching one another, and acting in ways that integrate one's own activities with those of team members (for more extensive discussion on this point; see van den Hout et al., 2018). These seven prerequisites interact with one another to unleash the four experiential characteristics of team flow (see Figure 1).

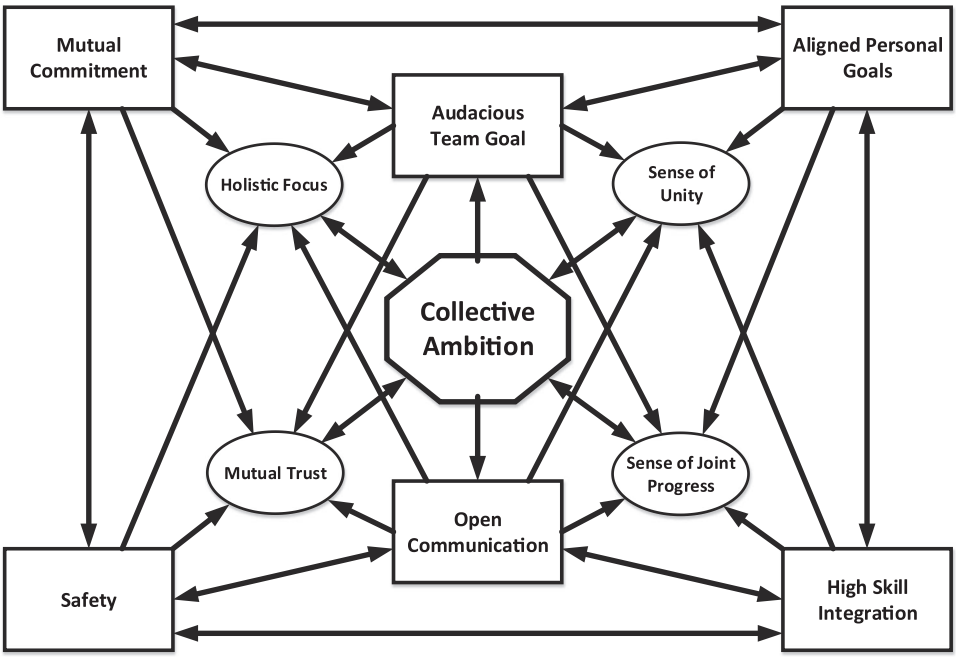

FIGURE 1 The Team Flow Model (van den Hout et al., 2019). The six prerequisites (rectangles) emerge over two stages from the prerequisite of collective ambition (octagon). Once the prerequisites are established, the four characteristics of team flow (ovals) emerge, thus instantiating team flow. This, in turn, fuels collective ambition. Although all relationships are bidirectional, and all 11 elements are connected, this figure indicates only the most important relationships (van den Hout et al., 2019).

Prior research on team flow (e.g., van den Hout et al., 2019) has indicated a number of outcomes that are enhanced by team flow, including higher team efficacy and performance, greater efficiency and creativity, and greater satisfaction with the experience of working on the team (along with a desire to reconvene as a team in the future [cf. Sawyer, 2007]). There are reports of many different types of positive experiences, as well as reports of experiencing positive affect as a function of the teamwork and a feeling of being energized to continue the work (van den Hout & Davis, 2021).

As van den Hout et al. (2019) have theorized, the presented team flow theory could be used to serve as a roadmap for teams trying to create a team dynamic and work environment conducive to team flow, as well as an intervention protocol for teams wanting to develop their capacity for team flow (cf. van den Hout & Davis, 2021). Obviously, the Team Flow Model is a simplified representation of reality and, as prior research has shown (van den Hout et al., 2017), there are many pitfalls that lie between the conception of a team and the team's experiencing team flow and its concomitant benefits. But, as these impediments are often the inverse of the elements of team flow (ibid.), it is possible that a team and/or a team's coach can use assessments of the team flow elements to identify challenges that a team is facing and facilitate the [re]building of any elements that may be missing (be they missing from the start or lost along the way; cf. Mäkikangas et al., 2017). To date, however, the authors are not aware of any studies in which team flow has been used in an intervention to foster more positive team experiences in which flow was reliably and validly measured at the team level. Likewise, the authors are not aware of any studies in which team flow has been used as an intervention to promote stronger collaboration and team-based measures of task progress, which are measured (respectively) by the team flow prerequisites and characteristics. To that end, this paper essays a proof of concept for an intervention protocol and cyclical roadmap that can be used by future teams and practitioners to improve teams' efficacy, collaboration, and tactical progress.

The challenges of creating such an intervention, however, are manifold. For research purposes, the optimum would be to create a standardized procedure that can be followed like a recipe and thus replicated exactly. For better or worse, human dynamics, especially in groups, are inconsistent over the long term, and any intervention to bolster team cohesion and efficacy would necessarily require the discretion and skill to turn the data from any team flow assessment into actionable insights. Thus, the approach used here is the creation of a cross-case-study that can show consistent qualitative and quantitative results based on an intervention whose general scheme is standardized but whose details are left to the discretion of the team/coach. In so doing, this study provides proof-of-concept for using the construct of team flow as an iterative cyclical roadmap for fostering high team performance, and establishes an intervention framework for course correction as teams follow the roadmap, both are which are explicated in the next sections.

2.2 | An iterative cyclical roadmap to foster team flow

To help teams in organizations create an environment together in which team flow occurs more readily, the authors built an iterative

cyclical roadmap (*Team Flow Cycle*) derived from established findings on the emergence of team flow (especially van den Hout et al., 2019) and from existing theories on team development (e.g., Tuckman, 1965; Tuckman & Jensen, 1977; cf. Konradt et al., 2015; Shuffler et al., 2018). Given that a team that has entrenched the seven prerequisites of team flow into their dynamic is more likely to experience team flow and its concomitant benefits, and that the experiential characteristics of team flow tend to be emergent (see above), a cyclical roadmap would primarily be focused on promoting the elements of team flow that are most readily affected by action, namely the prerequisites. Thus, this Team Flow Cycle is designed to help teams develop the seven prerequisites of team flow, and focuses on systematically creating/reinforcing the prerequisites, which it does over the course of four phases: Connect, Construct, Flow, and Glow (see Figure 2).

Connect: In this phase, the team comes together to look for shared values and complementary skills (Morgeson & Humphrey, 2008). Many teams' members harbor opposing interests that can cause frequent conflict. But, if each team member acknowledges and shows appreciation for others' interests as they look for values they have in common and skills that can complement their own, the team as a collective can use these shared values and complementary skills as a basis for a shared intrinsic motivation to cooperate in a specific activity, which in turn gives rise to the team's collective ambition (Wageman & Gordon, 2005). Based on this collective ambition, the team can start looking for a concrete common goal (often a means to fulfilling the collective ambition) that would be challenging for them to achieve (cf. Csikszentmihalyi, 1997; Sawyer, 2007). The two vital steps everyone takes together in this phase are:

a. Identifying the underlying motivations, shared values, and unifying strengths that bind the members into a team and allow for formulating a *collective ambition* based on those commonalities.

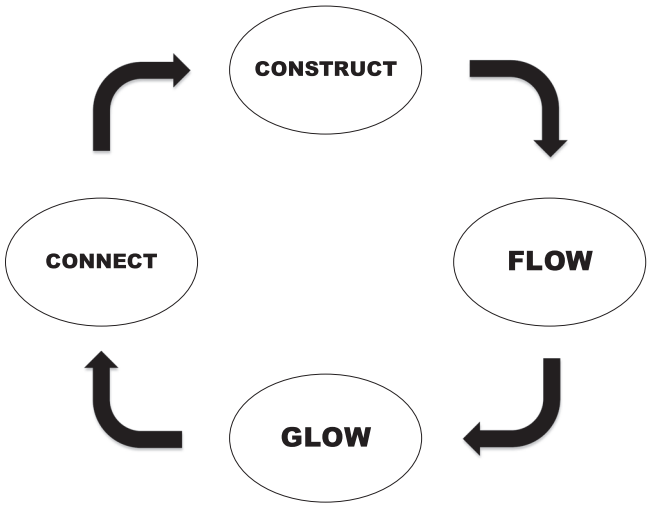

FIGURE 2 The four phases of the Team Flow Cycle (adapted from van den Hout [2016], van den Hout et al. [2019]).

b. Aligning a strategic *action plan* to the collective ambition that consists of clear and challenging team goals (*milestones*) that are achievable, challenging, and can be achieved in a reasonable period of time (cf. Locke & Latham, 2006).

As noted above, a long-term collective ambition is a useful guide and motivator for the team, but to foster experiences of team flow more immediate proximal common goals (optimally, clear and challenging ones) are needed as milestones (cf. Csikszentmihalyi, 1990). These proximal common goals are often derived from the long-term collective ambition (whether in an improvised or planned fashion) and are therefore closely aligned to it, but they are specifically tailored to the situation facing the team at the current moment. This keeps team members focused in the here-and-now and sets up feedback loops that promote task engagement and support experiences of both individual and team flow (cf. Hülsheger et al., 2009).

Construct: This second phase is where roles and tasks are distributed in a way that ensures everyone contributes from their personal strengths and knows exactly what they are expected to do. That means it is essential for proper task distribution that the team has both aligned personal goals and high skill integration, otherwise, people are likely to choose tasks that are focused primarily on their personal endeavors rather than what the team needs them to do (cf. van den Hout et al., 2017; Morgeson & Humphrey, 2008). The two vital steps everyone takes collaboratively in this phase are:

a. Each member of the team sets up [a] personal goal[s] that are directly aligned with the team's most proximal/relevant common goal[s], and more implicitly aligned with the collective ambition so that the personal goal[s] are effective, meaningful, intrinsically motivating, and lead to growth opportunities.
b. Creating a strategically clear and challenging task and role division plan, in which each individual derives their tasks, roles, and responsibilities from the team's common goals and their underlying personal intrinsic motivations. This empowers each team member to play to their personal strengths, which in turn bundles those strengths into a unified force (high skill integration; Hollenbeck & Spitzmuller, 2012; van den Hout et al., 2019).

It is also important for all team members to continually be able to make progress together (Amabile & Kramer, 2011). For that to be possible, it is vital for each team member to know exactly how they are doing and how the team as a whole is doing. The team needs to be free from worrying about either its performance or whether everyone is contributing as they should (and when excessive risk is incurred due to a team member not performing their task correctly, prompt action is called for). It is important in the context of team cooperation, however, that team members be allowed to make mistakes and that mistakes, when they occur, be treated as growth opportunities for the individual and the team. Open communication and safety are obviously essential elements in that process (Aust et al., 2023; van den Hout & Davis, 2021). The two vital steps everyone takes together in this phase are:

c. Optimizing mutual feedback on processes and outcomes so that everyone knows how they are doing and how the team as a whole is doing (open communication).
d. Creating an environment in which team members feel safe to act by eliminating unacceptable risks and supporting each other with positive and encouraging feedback (safety).

Flow: Now that six of the seven prerequisites for team flow are in place, it is time for the team to take action and work towards its common goal. It is important for everyone to stay on task, honor whichever agreements were made, and maintain the prerequisites for team flow (i.e., mutual commitment; cf. Hackman & Wageman, 2005). The team is now gradually approaching an actual team flow experience. Once that happens, the experience will grow increasingly intense until someone or something in the team's environment pulls everyone out of the moment (at which point there is potential for feedback to return the team to a flow experience [see below]; Csikszentmihalyi, 1990). The two critical steps everyone takes together in this phase are:

e. Holding each other accountable for dedicating their efforts to achieving personal goals and accomplishing personal tasks, and keeping each other on track by: (i) coaching each other on the tasks or roles being performed (constructive feedback; cf. Sawyer, 2007); (ii) living up to the mutual commitment to maintain the extant prerequisites of team flow as long as needed (van den Hout et al., 2019).
f. Allowing team members to function autonomously with respect to their own task[s] and role responsibilities and sharing experiences of unity, trust, focus, and progress that enable the emergence of a team flow experience (van den Hout & Davis, 2021).

Glow: The experience of team flow has emerged and faded, and perhaps work has continued for a while, but the salience of the experience will instigate a desire to maintain the experience in memory and to reflect upon the experience. In turn, this will serve as an inspiration to attempt ambitious goals in the future as part of a foundational step in creating another team flow experience (whether with the same group of people of with a new group). So, an important step they must take together is:

g. Evaluating, reflecting, and celebrating the recent experience of team flow, and using that positive energy to set and consequently pursue a new, clear, and challenging team goal. This means that after a profound evaluation, reflection, and celebration (debrief), the team members together recalibrate their collective ambition and strategic action plan of clear and challenging team goals (milestones). As such, this also means that they are back at the "connect" step of the Team Flow Cycle.

While this Team Flow Cycle is especially well-suited to newly formed teams, existing teams can certainly benefit from it. Teams that have already been formed effectively (cf. van den Hout et al., 2019), and especially teams that have already had a team flow experience, will already have some of the prerequisites in place. Using this Team Flow Cycle can further entrench those prerequisites and remind the team of the elements that still need development and/or reinforcement. What teams in a business environment often lack, however, is a climate that is conducive to team flow, and the goal of this Team Flow Cycle is to give leaders, managers, coaches, facilitators, and teams a path to actively construct that climate. But, there is a difference between having a delineated path, and actually traversing it, and thus it was necessary also to develop an intervention protocol that provides more detailed and actionable steps for getting from point to point on this Team Flow Cycle. Ultimately, we expect that during team flow, individual members will experience high degrees of flow during the performance of tasks together, the team's mood will be positive, and its members' scores for happiness that month will be high.

2.3 | Intervention protocol to spark and maintain team flow over time

Building on the Team Flow Cycle and on extant research on team-based interventions (cf. Shuffler et al., 2018) and team flow (van den Hout et al., 2019, 2021), this intervention protocol (Figure 3) was developed to guide teams towards more team flow experiences. The protocol includes: (a) the Team Flow Model; van den Hout et al., 2019), which should help team members understand how team flow emerges through its elements (prerequisites and experiential characteristics); (b) the Team Flow Cycle (above), which should help team members understand the order in which the team flow prerequisites are best created, and (c) an iterative reflection process (cf. McIntyre & Dickinson, 1997) by which teams work (either independently or with a coach/facilitator) to create the prerequisites for team flow, guided by the results of the Team Flow Monitor (cf. Junker et al., 2023).

In accordance with extant research on the efficacy of team-building interventions (Morgeson et al., 2010; Shuffler et al., 2018), the intervention protocol for sparking team flow is multifaceted and contains six different phases, each of which is directly related to theory-based team-building interventions that involves one or more of setting goals, clarifying roles, problem-solving, or interpersonal relationships. Each is described below from the perspective of a team coach (While a coach is not required, research shows significant benefits to having one [e.g., Weer et al., 2016]).

(1) *Intake interview*: The first thing a facilitator or team coach does is meet people in the organization, usually the business and/or team leaders and some/all of the team members, to familiarize themselves with the team's current situation and responsibilities. The next step is reading relevant documents and asking clarifying questions of the business leaders, the team leader (if there is one), and a few team members. Based on those conversations, the coach will decide whether to start with a Team Flow Monitor pretest or conduct a team flow inspiration session first (see below). A clear benefit of the latter approach is that the team will be more willing to take part in a measurement whose purpose and value have been elucidated. It also provides the team coach with an opportunity to

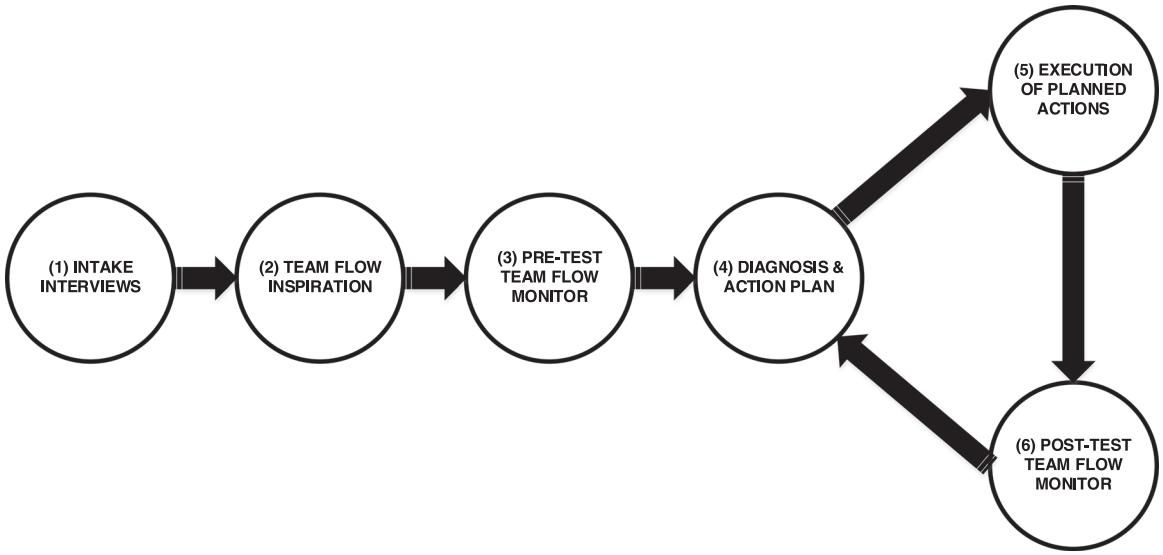

FIGURE 3 Intervention protocol to spark and maintain team flow over time.

explain the Team Flow Monitor's purpose and significance, which is to assist the team in creating a climate that is conducive to team flow. The downside of conducting a measurement after the inspiration session is that it may skew the results. It is imperative that the coach explain before the first measurement that the results are neither good nor bad, but merely a reflection of the team's current situation. As such, the measurement is only effective if everyone involved answers the questions as honestly as possible.

(2) *Inspiration session*: This is when the team coach introduces the team to flow and team flow theory. The participants will learn about all the elements of flow and team flow, as well as which of those elements they can deliberately create together (the authors recommend including media that reflect the value of team flow and synergy that can serve as a basis for explanation/discussion). This makes team flow a more accessible construct for the team members and can inspire them to take action for their own team (cf. van den Hout et al., 2019, 2021). These sessions usually conclude with a team-based activity/game in which teams can readily experience team flow to give the team a benchmark and/or sense of what they are aiming for and to promote a small win that highlights the team's capability for current and future success with team flow (cf. Reay et al., 2006; Salas et al., 2008). Examples of such activities include playing Brazilian percussion instruments, cooking workshops, physical team sports activities, graffiti, and business games (not online). It is important that the activity be fun for everyone and that each team member can be assigned a challenge that contributes to the greater whole (like the prerequisites for team flow require). The team will take away from the workshop a fair idea of what team flow feels like and how it might feel when experienced in the context of their work.

(3) *Pretest*: This measurement with the Team Flow Monitor should take place at least a week after the inspiration session so that everyone has a chance to get back to their routines. The Team Flow Monitor involves self-rating on all the elements of team flow, some outcome measurements at the individual and team levels, and several open questions about obstacles and levers for team flow. It would also be wise to recommend ahead of time that the organization obtain some relatively objective measures of the team's performance as a basis for comparison of the assessments over time. This initial (pretest) completion of the Team Flow Monitor will determine first the extent to which team flow is already being experienced by measuring the prerequisites and experiential characteristics and using these as a basis for designing an action plan to maintain/enhance the propensity for team flow by increasing the presence of the prerequisites.

(4) *Diagnosis and design session:* The second team session after the inspiration session is the debrief and feedback phase (cf. Ellis & Davidi, 2005; Smith-Jentsch et al., 2008) in which the results are discussed and then used as a basis for designing an action plan. Based on the results of the assessment with the Team Flow Monitor, the team members themselves draft an action plan under the guidance of a professional facilitator (team flow coach) who is well-versed in team flow. The discussion should take place with the participants seated in a circle without any tables between them so that everyone can be seen clearly and their full body language is visible, and guided by the involved, facilitative, and well-versed "team flow coach." Take, for example, a team that achieves low average scores on open communication and mutual trust, but scores very highly on collective ambition and common goal. What they need to discover is how that happened and what can be done to fix it. There is often little point in trying to discover why a team scored poorly on an experiential characteristic of team flow, since that is usually caused by low scores on one or more of the prerequisites for team flow (van den Hout & Davis, 2021). So, when a team scores poorly on open communication and mutual trust, the key is to look for ways to make

communication in the team more open, constructive, and/or direct, depending on what the team decides is the specific problem with their communication. Chances are that when the prerequisite of open communication is reinforced, the team will experience more mutual trust as well (van den Hout & Davis, 2021). So, in this team session, the team has an open discussion in which they diagnose their problems and look for an action plan that will promote a stronger team flow climate. One guide to help them determine which actions are right for them is the previously introduced Team Flow Cycle, as the order in which the elements are addressed does matter (van den Hout & Davis, 2021; van den Hout et al., 2017). For instance, there is rarely any point in trying to decide upon a common goal when the collective ambition has not been clearly established. To come up with actions to spark team flow, it may be helpful to split the team up into smaller groups for brainstorming (cf. Puccio et al., 2020), and then to discuss the ideas from these subgroups as a team before agreeing on and finalizing an action plan together. Some examples of actions are: planning sessions to determine common and individual goals, carousel presentations in which team members introduce themselves and how they would like to contribute to the team, daily stand-up meetings to keep each other apprised of everyone's progress, monthly happy hours during which people share stories about flow experiences, celebrations of the team's successes, celebrations of its failures and the lessons learned, and/or any expression or ritual that conveys what the team stands for, like a song, poem, lip synch, or animation. Whatever the action plan emerges from the team's consensus, the next step is to carry it out.

(5) *Execution of planned actions*: After the team members have drawn up an action plan with interventions that promote an optimal cooperation climate, the planned improvement actions are carried out.

(6) *Posttest:* After the action plan has been executed and there has been time for its impact to be actualized, the posttest takes place with the Team Flow Monitor. This second assessment is used to evaluate the action plan's effect and whether further and/or different adjustments are required. If they are, the team goes through another cycle of the process, which continues until the team feels no further adjustments are needed. Thus, this is an iterative approach that can be maintained for as long as the intervention is needed and team's existence is considered useful.

To encourage iterative evolution of the team flow elements, we recommend having a monthly evaluation during a team session. After all, there is always something to evolve and improve, and engaging in this process stimulates a positive collaboration climate for the long term.

2.4 | Testing the proposed team flow cycle and intervention protocol

While this intervention protocol has been developed using grounded theory (cf. Lee et al., 1999; Locke, 2001; Vaughan et al., 1992), and is patterned after extant interventions (as above), the efficacy is tested and evaluated through case studies, which allows for both qualitative and quantitative results (Patton, 2014). This longitudinal cross-case-study will address the key question of how the Team Flow Model, Team Flow Cycle, and Intervention Protocol can be used to promote a positive and effective team dynamic that has the potential to lead to high performance, efficiency, a positive experience, and a desire to reconvene (consistent with extant theory, as above). In addition, feedback from business, team leaders, and teams can add insight into how to get out of the pitfalls that derail teams from team flow and how the Team Flow Cycle and Intervention Protocol can be clarified for future study and use (cf. Konradt et al., 2015).

3 | METHODS

3.1 | Procedure

To study the process of achieving team flow within a given timespan and in so doing further validate the elements (constructs) of team flow, we conducted a longitudinal study in which we followed 15 teams in five organizations (selected through a training consultancy, i.e., independent from the researchers) for a period of 6 months (see Appendix S1 for an overview). All teams were based in The Netherlands. The average team size is 8, 13% of the 147 participating team members were female and 87% male.

With the use of the Dutch version of the Team Flow Monitor (see Appendix S2 for translations) in combination with the use of the Team Flow Model, teams can gauge whether the climate is currently conducive to team flow and, if not, determine what can be done to improve it. The interventions teams perform are then monitored and their effects measured (see Figure 3, above). That approach was created based on interviews with team members and team experts in a prior study (van den Hout & Davis, 2021), and is tested in this study.

The protocol began with an "inspiration session" with each team's leaders and business leaders from their companies, in which they learned about team flow, and which included explanations of the Team Flow Model, Team Flow Cycle, and Team Flow Intervention Protocol. Team leaders were also asked to convey this information to their teammates so that the team could establish the prerequisites of team flow. Teams were then surveyed monthly with the Team Flow Monitor, which measured the degree to which the elements of team flow were present in their team. The results of these surveys were communicated to each team as feedback on their progress in the form of a report with the results of the Team Flow Monitor, an explanation of the measured variables, and how to interpret this and discuss the results together as a team.

After 3 months (and thus three assessments with the Team Flow Monitor), we organized a second session with all team and business leaders to exchange experiences about the first three measurements. At this meeting, we gave a short presentation with their overall interpretation of the first three measurements with the Team Flow Monitor, including both quantitative and qualitative results. The

qualitative results are based on a coding scheme that was established in prior research (e.g., van den Hout et al., 2017). For this study, the first author and a research assistant coded participants' responses to the open-ended questions and presented the results (consistent with the codes) in terms of impediments that the team is facing and levers that improve the potential for a team flow experience. The facilitators also provided examples of team flow experiences that were described by the respondents. During the next part of the meeting, team leaders were divided into small groups to exchange experiences with the Team Flow Monitor assessments and the action plans they used for improvement, and also troubleshoot any problems that came up (the researchers were available to address questions and help with this process). As a wrap-up, the whole group reconvened for a question-and-answer session with the researchers and a final round of feedback.

After this session, three more measurements with the Team Flow Monitor took place as planned. Reports were also drawn up for this and at the end the answers on the open questions were once again coded and presented to the involved team leaders to confirm their validity. At the end, all team leaders and business leaders were interviewed about the entire process by a research assistant, including questions about the team's overall performance. For each team, all six Team Flow Monitor reports were put together in an overall report. The defined codes for each open questions were also included in this report, together with the interview transcripts. The team leaders were provided with the conclusions and asked to validate them (and all were confirmed as accurate).

3.2 | Measurements

The Team Flow Monitor (see Appendix S2) contains both close- and open-ended questions and has been validated in multiple studies that confirmed the existence of the team flow construct in conjunction with the existence of the prerequisites and characteristics (for details and reliabilities, see van den Hout et al., 2019). The presence of team flow elements was rated on either a 7-point or 10-point scale.[1] The close-ended questions measure the presence of the prerequisites and characteristics of team flow as well as some individual-level outcome variables (i.e., individual happiness, individual flow, and balance between positive and negative emotions in the team). To assess happiness, participants were asked to indicate on a 10-point scale how happy they felt. Individual flow was measured by asking participants to indicate the percentage of time they experience flow while performing a task for the team; this percentage was then converted to a 10-point scale. To evaluate team positivity, participants assessed the extent of negative expressions compared to positive expressions for the team on a 10-point scale, ranging from very negative to very positive. The scores on the aforementioned outcome variables also provide an extra check for the participants. We expect that, in the presence of team flow, teams will also have high scores on these outcome variables (cf. Csikszentmihalyi, 1990, 1996; Fredrickson, 2009; van den Hout et al., 2019; Seligman, 2011; Walker, 2010). The open questions on the survey address possible obstacles to the achievement of team flow and what kinds of interventions might be used to achieve more team flow. Teams can use the answers to the open questions in the Team Flow Monitor (van den Hout et al., 2019) as input for coming up with specific ways to improve the team flow climate in their own working environments.

3.3 | Cross case study analysis

The data analysis follows Eisenhardt's (1989) approach, which integrates qualitative methods (e.g., Miles et al., 2013), grounded theory building (e.g., Glaser & Strauss, 1967), and case study research (e.g., Yin, 1994). The data collected for analysis consists of survey data from the Team Flow Monitor, which includes closed-ended self-rating scales and open-ended questions, notes from the feedback sessions with the team coaches, and transcripts of postintervention telephone interviews to evaluate the entire project. Additionally, the teams in one of the organizations were visited and their team meetings discussing the results from the Team Flow Monitor observed. In line with grounded theory (Glaser & Strauss, 1967), the researcher kept detailed personal notes throughout the process on all matters relevant to the research questions. Case study reports were drafted for each participating team (see Appendix S1 for an overview) to facilitate the evaluation of the entire project, both for developments within teams and for differences and commonalities between the teams. To that end, the answers to the open-ended questions on the Team Flow Monitor were collated by the research team and were coded for team flow elements so they could be related to the quantitative scores, interpreted, and validated against the team leader's/manager's assessment of the team's performance and cross-validated with qualitative data. Yin's (1994) case-comparison approach was used to analyze the case study reports. This requires the cases to be described, analyzed, and reported separately. That is why separate case study reports were drafted for each organization and team to arrive at a cross-case-study report that will allow us to explore how team flow emerges via its prerequisites, experiential characteristics, and interventions. During the period of study, the first author stayed in close contact with the participating teams and any team leaders, coaches, or upper management involved and worked with them to validate the results of the qualitative data to ensure accuracy. Through the feedback sessions, we discovered which changes took place at the team level within each of the organizations. When the project was concluded, we investigated how much value the protocol added through interviews by telephone with all involved team and business leaders by a research assistant. The research assistant, who had a background in psychology, was instructed to be

[1]Feedback to the teams was provided exclusively on a 10-point scale to make interpreting the scores easier for the team members and to prevent misinterpretation. Scores were converted from the 7-point to a 10-point scale through the following calculation: $Y = 1.5 \times (X - 1) + 1$. where X is the original score on the 7-point scale and Y is the corrected value. As a result, all scores on the reports range from 1 to 10, where the closer a condition scores to 10, the more pronounced its presence in that team at that time.

objective and critical about the followed procedures that were provided by the Team Flow Cycle and Team Flow Intervention Protocol. This critical mien was requested to discourage respondents from providing only socially desirable answers. All interviews were transcribed, with an average transcription length of two pages for interviews that were roughly 25 min on average.

The interview transcript is added in Appendix S3. The quantitative output from the Team Flow Monitor was collated and used to plot each team's scores on the prerequisites and characteristics of team flow over time. Those graphs are included in Appendix S4: Team trajectories.

4 | RESULTS

Fifteen teams were selected from five different organizations (see Appendix S1 for an overview of the selected teams). Considering the study's goal, this is sufficient for drawing conclusions (cf. Yin, 1994). The case studies contain brief background descriptions on each of the companies, examples of team flow experiences taken from the monthly surveys, reflection on interesting developments within the teams over the course of the project, and quotations from the interviews with business leaders and team leaders conducted for evaluation purposes at the study's conclusion. This section describes the overall results from the cross-case analysis, which evaluates the protocol's effectiveness at creating a climate conducive to team flow in the limited time available. In doing so, it addresses the following four subquestions: (1) Are the teams able to eliminate obstacles to team flow using the protocol and, if so, what were these obstacles and how were they removed? (2) How do team members experience team flow over time? (3) Which prerequisites can be used for interventions that result in team flow? (4) Is the Team Flow Intervention Protocol a practical and effective way of promoting team flow? Below, the research questions are addressed with both qualitative and quantitative data.

We begin by confirming the success of the overall intervention using the reliable change index (RCI; cf. Guhn et al., 2014), which is a measure of difference scores relative to error and is evaluated by comparing to the *z*-score needed to reject a null hypothesis at a given threshold. Following Guhn et al. (2014), 1.96 is used as a threshold for RCI, adhering to the convention of using 5% as the threshold for statistical significance. Fourteen teams provided a full data set over the course of the study, one of which was an outlier (Team 14, which admitted in interviews that they provided overly optimistic data that did not reflect the realities of the team). Across all teams, the average RCI for total team flow scores (based on average scores per team at Meeting Time 1 and Meeting Time 6) is 1.71, which falls a bit shy of the threshold but still indicates a solid change given the flexibility required for an intervention of this type). Comparing each team's average Team Flow Monitor score at the first and last meetings, the intervention increased scores by 0.47 for a moderate effect (t [12] = 2.24, p = .045; d = 0.6; see Table 1). For a more detailed analysis, we ran a hierarchical linear model with meeting number as a fixed effect, person as a random effect, and team number as a covariate. In the full model, the coefficient for the total team flow score at Meeting Time 6 relative to Meeting Time 1 was 0.28 (SE = 0.08; p< .05). The overall statistics for the models are presented in Table 2.

In addition to these key, team-level metrics, we also assessed individual happiness, individual flow, and the balance of positive and negative expressions on the team using hierarchical linear modeling (see Table 3). While individual flow and balance of positive and negative expressions did not have significant coefficients in the model between Meeting Time 1 and Meeting Time 6 (0.25 [SE = 0.20; n.s.] and 31 [SE = 0.16; n.s.], respectively), the overall models were significant and imply a general main effect of increase over time. For happiness, however, the coefficient was not significant (0.28 [SE = 0.18; n.s.]) and only the random effects model was significant, suggesting an incomplete effect over time.

4.1 | Research Question 1: Examples of how teams eliminate obstacles to team flow

As concluded in the overall case study reports (which are available upon request by contacting the corresponding author) the respondents considered the following to be obstacles to team flow: delays, negativity, meetings that involve too many workers, endless discussions, slow decision-making, broken promises, co-workers' lack of knowledge, and failure to acknowledge contributions to shared goals. Notably, most of these are either the inverses of the prerequisites of team flow, or are directly related to those inverses. Below, we provide a few detailed examples that address the four research questions and demonstrate how teams can use the Team Flow Monitor and coaching to overcome some of the impediments to team flow.

Team size: As in prior studies (e.g., van den Hout & Davis, 2021), the case-study findings illustrate that overlarge teams are considered an obstacle, which is supported by previous studies that have indicated that excessive team size leads to problems with coordination and communication (Blau, 1970; Katzenbach & Smith, 1992; Shaw et al., 1981) or process losses (Steiner, 1972). One of the teams in the study (Team 1) was split up into smaller teams, which drastically reduced frustrations. The split led to increased efficiency and better coordination and communication, which in turn led to faster progress.

Using the data to start the discussion: For Team 10, ElectroCorp Team M (Appendix S4), disruptions and planning changes impeded team flow. Using the data provided by the Team Flow Monitor allowed the team to see how these challenges are affecting their team's dynamic, which in turn allowed them to open these problems up to discussion and eventual resolution. This not only solved the problem, but also increased the team's self-efficacy for resolving issues and thus built trust and team morale (cf. Hackman & Wageman, 2005) and improved their experience of team flow. Over the course of the study, this team made great strides in the area of communication. They now have very constructive discussions about how to work together to prevent new obstacles from cropping up in

TABLE 1 Average Meeting 1 (M1) and Meeting 6 (M6) Team Flow Monitor scores.

	Team 2		Team 3		Team 4		Team 5		Team 6		Team 7		Team 8		Team 9		Team 10		Team 11		Team 12		Team 13		Team 15	
Team flow elements	**M1**	**M6**	**M1**	**M6**	**M1**	**M6**	**M1**	**M6**	**M1**	**M6**	**M1**	**M6**	**M1**	**M6**	**M1**	**M6**	**M1**	**M6**	**M1**	**M6**	**M1**	**M6**	**M1**	**M6**	**M1**	**M6**
Collective ambition	7.4	8.2	7.4	8.1	7.4	6.5	7.4	6.6	6.1	8.3	7.3	8.2	8.0	7.8	7.1	7.6	7.2	8.1	7.0	7.1	8.5	8.4	7.1	7.0	7.5	7.7
Sense of unity	7.5	8.4	7.5	8.1	7.5	6.2	7.5	6.6	5.5	8.7	7.2	8.3	8.2	8.1	6.8	7.6	6.6	8.3	6.5	7.3	8.7	8.8	7.8	6.9	7.6	8.1
Sense of joint progress	7.7	8.6	7.7	8.5	7.7	7.4	7.7	7.4	6.4	8.5	8.0	8.3	8.1	7.9	6.6	7.4	7.2	8.7	6.7	7.4	8.7	8.2	6.9	6.9	7.4	7.8
Holistic focus	7.1	7.8	7.1	8.7	7.1	6.3	7.1	7.8	6.1	8.5	7.6	7.8	8.1	7.8	6.5	7.8	7.0	8.2	6.8	6.9	8.5	8.6	8.0	7.4	7.4	7.1
Mutual trust	8.3	8.7	8.3	9.2	8.3	7.1	8.3	8.9	6.1	8.5	8.0	8.5	8.2	8.3	8.1	8.3	7.8	8.5	7.4	7.5	8.9	8.5	8.2	8.3	7.6	7.6
Audacious team goal	7.5	7.8	7.5	7.4	7.5	7.3	7.5	7.0	6.9	8.4	8.0	8.5	8.2	8.1	7.2	8.7	7.8	8.3	7.1	6.9	8.6	8.5	7.6	7.2	7.6	6.9
Aligned personal goals	7.7	7.5	7.7	7.5	7.7	7.0	7.7	7.4	6.7	8.4	7.6	8.5	8.2	7.8	6.3	8.1	7.1	8.6	6.1	6.4	8.3	8.8	5.9	7.2	7.2	6.9
High skill integration	6.9	7.9	6.9	8.4	6.9	6.3	6.9	6.6	7.1	8.4	7.2	8.3	8.3	7.8	6.6	7.3	6.8	7.9	6.7	6.6	8.4	8.2	6.3	7.2	6.8	7.2
Open communication	7.8	8.0	7.8	8.1	7.8	6.5	7.8	7.0	6.0	8.5	6.8	8.3	8.0	7.5	6.9	8.0	6.9	8.5	6.6	7.6	8.6	7.8	7.3	6.9	7.0	7.9
Mutual commitment	7.0	8.3	7.0	8.6	7.0	5.8	7.0	8.1	6.1	8.5	6.7	8.2	8.0	8.1	7.1	7.9	6.5	8.0	6.4	7.0	7.7	8.4	7.2	7.0	6.9	7.0
Safety	8.3	8.4	8.3	8.8	8.3	7.9	8.3	8.5	6.1	8.2	7.1	8.5	8.4	8.2	7.6	8.5	7.1	8.5	6.6	7.5	7.4	8.5	7.5	8.3	7.1	8.1
Average	7.6	8.1	7.6	8.3	7.6	6.8	7.6	7.4	6.3	8.4	7.4	8.3	8.2	7.9	7.0	7.9	7.1	8.3	6.7	7.1	8.4	8.4	7.3	7.3	7.3	7.5

Note: M = Meeting; Team 1 was later split into Teams 2–5; Team 14 was an outlier and was not included in the analysis.

the workflow and turning challenges into positive resolutions that boost the team's morale. The team members started helping each other and started calling each other out on things that were not going well, which is nicely illustrated by the following quotation from one team member:

> Open communication and a safe environment are important and as a team, you should work to maintain them. We spent a lot of time on that in our team sessions. We started talking to each other instead of about each other. Trust grew and the team's mood improved. Low scores were openly discussed. That allowed us to focus our efforts and attention on them. Knowing what was going on, you could intervene and decide to do things differently.

Over the course of the study, this team went through similar developments in the area of dealing with and removing obstacles by discussing the monthly results of the Team Flow Monitor in their team meetings (see Appendix S4).

These are but two examples of a pattern that was visible in the qualitative and quantitative data (see Appendix S4) from all of the teams. We may conclude that the obstacles to team flow are often the counterparts of its prerequisites. Following the intervention protocol facilitates open discussion of the obstacles, which often naturally evolves into discussion of the required prerequisites. In fact, it is a very effective tool for achieving exactly that.

4.2 | Research Question 2: How teams experience team flow over time

Using the protocol, several teams managed to realize a better team flow climate in which the prerequisites for team flow were more in evidence and where team flow was more fully experienced (bringing their average overall score on team flow characteristics to more than 8/10).

Going from good to great: As illustrated in Appendix S4, Team 7 (GableCorp Sales) scored highly on the presence of team flow elements from the start and their scores still increased over time, even though some members of this team reported frequent irritation at delays, negativity, or people prioritizing their personal interests (a deviation from the prerequisite of aligned personal goals). That development showed the most detrimental effects in the elements of open communication, safety, and mutual commitment. Through dialog during the intervention, this team discovered that customer success was a strong motivator for the team, and thus bringing in new business together and adding value for the customers brought positive energy and team cohesion. Building on this, the team took their solid starting team flow experience to higher levels, going from an initial Team Flow Monitor score of 7.4 (averaged across all elements) to a final score of 8.3 (their monthly progression being Month [M]1: 7.4, M2: 7.8, M3: 7.8, M4: 8.1, M5: 8.5, M6: 8.3). This shows

TABLE 2 Comparison of HLM models of total team flow score across teams (random) and meeting times (fixed).

	AIC	BIC	log (likelihood deviance)	$\Delta\chi^2$	*p* Value
Intercept only	1318.5	1327.5	−657.27		
Random effects	1112.7	1125.6	−553.37	207.8	<2.2e−16
Full model	1045.9	1170.1	−493.93	118.9	7.8e−14

Abbreviations: AIC, Akaike information criterion; BIC, Bayesian information criterion; HLM, hierarchical linear modeling.

TABLE 3 Comparison of HLM models of positive individual outcomes across teams (random) and meeting times (fixed).

	AIC	BIC	log (likelihood deviance)	$\Delta\chi^2$	*p* Value
Individual flow					
Intercept only	2006.9	2015.4	−1001.4		
Random effects	1883.6	1896.4	−938.8	125.3	<2.2e−16
Full model	1882.8	2006.5	−912.4	52.78	0.001
Individual happiness					
Intercept only	1848.9	1857.4	−922.5		
Random effects	1736.4	1749.1	−865.2	114.6	<2.2e−16
Full model	1766.7	1890.0	−854.3	21.7	0.7
Balance between positive and negative expressions in the team					
Intercept only	1641.7	1650.2	−818.9		
Random effects	1602.3	1615.1	−798.1	41.4	<1.3e−10
Full model	1586.6	1710.3	−764.3	67.6	<1.5e−05

Abbreviations: AIC, Akaike information criterion; BIC, Bayesian information criterion; HLM, hierarchical linear modeling.

that even high performing teams can use this intervention to make improvements and go from good to great.

Starting the necessary conversations to overcome obstacles: Team 6 (FloorCorp MT) does not experience team flow regularly (average overall score on team flow characteristics <6.0, see Appendix S4), as their answers to the open questions clearly showed. In this team, the results from the Team Flow Monitor confirmed what everyone on the team had known for a while, but usually chose not to discuss. The following quotation illustrates that:

> The fourth and fifth measurements on Team 6 (FloorCorp MT) showed that what we have here is not so much a team as a collection of individuals. Of course, we knew that, but the report supported our suspicions and opened the subject up for discussion. We had sensed that something wasn't right with the team, but the report changed that subjective feeling into fact. Once the numbers reveal something there's no avoiding it.

With the data from the Team Flow Monitor making clear to Team 6 where some of the issues were, the team was able to sit down at the conference table with a more objective way to start the discussion about what the challenges were instead of starting with feelings and opinions that may be hard or even hazardous to venture. Team 6's later scores on the Team Flow Monitor (going from a mean score of 6.3–8.4 by the end) reflected their ability to resolve some of the issues and start working together more effectively.

Team flow often coincides with the meaning inherent in collective ambition: Across the study, we found that moments of team flow are regularly experienced at work, and teams provided many wonderful examples of how flow experiences are born out of cooperation in creating value for stakeholders, like this one from someone who works in education: "Being able to get up on stage to tell people the 'Learn story' and being 100% absorbed in doing that because everything about that training was completely taken care of."

Another person at an installation company said "Every time a few of us take something on, finish it quickly, and can all stand behind what we've done, as well." Employees in a design-and-build team at a

medium-sized construction company described "the enormous motivation during a planning session that made everyone forget about the time and want to complete the planning."

What stands out in these descriptions is that, during team flow experiences, team members are often adding value for a client, making progress as a team in their collective performance, or making a difference for a colleague. This supports our theory that team flow expresses the collective ambition and that people experience a sense of unity and joint progress and can rely on mutual support because of that.

4.3 | Research Question 3: Identifying prerequisites that can used for interventions that promote team flow

In a number of cases, the team was able to use the Team Flow Monitor results on a specific prerequisite of team flow to establish an action plan that could promote team flow. This section provides a few examples.

Intervening with a collective ambition: For Team 1 (LearnCorp Complete), their poor score on the element of high skill integration and the analysis of their answers to the open questions prompted a decision to regroup into four smaller teams. As we followed these new, smaller teams, a few things stood out. One of the teams initially floundered and had to reinvent itself to become an actual team, which they did by formulating a collective ambition and a common goal so that they could have a foundation for viewing themselves as a team. In turn, their average overall team flow score jumped from 4.8 to a 7.4 (see Appendix S4 for the full trend). Team members' percentage of time spent in flow during task performance also massively increased from 30% to 70%. Another splinter team experienced a less dramatic improvement, but they already had a clear collective ambition. That meant they were an effective team from the start and developed over time by building on the prerequisites for team flow. Consequently, their overall team flow score rose from a 6.3 average to a 6.8 and the amount of time team members experienced flow in the performance of their tasks rose from 43% to 51%.

Improving upon established mutual trust: As the team flow literature has discussed (e.g., van den Hout et al., 2019), the prerequisites of team flow interact with one another in a complex system, and improvements to any element can reinforce the others. As such, a team can start with the prerequisites that come naturally and use them as a basis for establishing the others. For instance, an existing team may have established mutual trust even before they become an effectively performing unit and then use the intervention protocol to add team flow prerequisites to promote the team's experience of team flow. We found this in three different teams (2, 6, and 7) that scored very highly (>7.5) on open communication, safety, and mutual trust even though they were not experiencing team flow early on. Deliberate interventions built upon these established elements by facilitating conversations and activities that would generate the remaining prerequisites (a collective ambition, common goals, aligned personal goals, high skill integration, and mutual commitment). Once these additional prerequisites were in place, these teams started experiencing more of the team flow characteristics *sense of unity* and *joint progress*, as reflected by higher aggregate scores (>8.0) on subsequent measurements (see Appendix S4 for a clearer view of the trends). After they created the prerequisites of team flow, the team became an effective, high-performing unit. Clearly, to perform at the highest level as a team, it is vital for all (and not just some) of the prerequisites for team flow to be present in the team's immediate working environment.

Interventions involving the common goal: As we saw with several teams (e.g., 2, 3, 4, 5 [see Appendix S4]), the fact of individual team member's having clear goals on their own workstreams is different from having a common goal that can energize team members. This was clearest in a quotation from the business leader of LearnCorp:

> We scored highest on "safe environment" and "open communication." Makes sense. That's something we train others in and are highly trained in ourselves. Those high scores were easily explained. The personal goals and the collective ambition were pretty clear too. But we didn't score as highly on the common goals. We could sharpen those up, and work on that. There's a need for that, as well. We had the sense of it, but the team flow measurement definitely confirmed it.

Another commercial team (Team 7) was highly stable, experienced, and maintained team flow early in the study, and increased their scores on open communication and mutual commitment by developing a safe climate. As key to their success strategy, they, too, acknowledged how important it is to have clear *common* goals:

> We set out clear goals and created tasks to work on them. Because this is a sales department, goals are easily translated into numbers. I used to be the one to turn the goals into numbers, but we did it together this time. The team members set the goals higher than I would have done. They have faith in their abilities. The same goes for writing tenders. People work on that much more autonomously, they're much more involved. (Team member)

> What this clearly shows is that setting common goals should be a common process, and that acceptance and involvement markedly increase when it is. Discussing, deciding upon, and agreeing to the common goal(s) increases involvement, trust, and unity. "These teams accept their responsibilities together and will confidently get down to business both autonomously and jointly." (Team leader)

Once the teams added common goals, they started to see higher performance and team flow (see quotes above and Appendix S4).

Intervening on high skill integration: The importance of strength through skill synergy (high skill integration) was revealed more than once in the case study research. One such occasion was the following quotation:

> Team 6 (FloorCorp MT) was lacking team cooperation. Everyone did their own thing. Now that we're aware of that, we do things differently. We make our subjects smaller now, more specific. Everybody speaks based on their own specific knowledge and skills. On that basis we provide input, offer feedback, everyone provides information about their own specialties (previously, everyone stuck their nose in everywhere).

This team scored very poorly in the third month's measurement on unity (5.0) and progress (3.8) but achieved high scores for both (8.3 and 8.5, respectively) on the last one, which reflects how the intervention on high skill integration (moving from 4.9 to 8.3) and open communication (moving from 4.3 to 8.5) can contribute to achieving team flow. The importance of mutual autonomy can be seen here as well: everyone is assigned tasks and roles according to their specific strengths, and each team member is afforded the autonomy to make the most of those strengths as long as they are doing so in ways that contribute to the team's overall objectives.

Intervening on open communication: Team 6 (FloorCorp MT) transformed itself dramatically over the course of the project. Initially barely functional, after the third Team Flow Monitor revealed dismal scores (<4.0 aggregate) the team realized that it needed to enter into an open dialog about what their collective ambition should be. That dialog eventually led to a very positive and constructive team atmosphere, as reflected in their much higher scores on all team flow elements in the final two measurements (>7.0).

The analysis of their answers to the open questions describes the process. Answers from the earlier measurements showed that people were very much in each other's ways, and big egos and grandstanding were constantly irritating other team members. As the data showed the effects of this and the team started engaging in more dialog, this behavior became less common and the team started taking steps together. They became aware, over the course of the project, of what they stood for and that they needed to stand for these things as a team. Since the team actually wanted to perform effectively, the team members showed themselves willing to redefine their situation when the Team Flow Monitor showed results that merited strong action, and thus they committed to taking the necessary steps to establish a healthy team dynamic in which egos could work together again (cf. blending of egos; Sawyer, 2007). Highlighting the general role of how the team flow monitor data can be used, another struggling management team described a similar process in detail:

> We were on the rocks during the initial measurements. In part because those scores were so poor, we contracted someone in to look at them and talk about it. There was too much strife to keep going and those measurements supported our assessment that something was wrong … Once you know where the problems are and start dealing with them, things start happening at a very rapid pace. Once you know where the sore points are and how to deal with them, how to resolve them, you will. If you regularly discuss the common goals, focus improves. Once you're able to focus on a solution, that's where your efforts will be directed and things will shift. If you deal with the things that aren't right, and you can be clear about what those are, clear about what is right and why, then you'll automatically develop a lot more focus and confidence.

Here, too, a willingness to let the data start a conversation enabled a team to transcend the interpersonal issues and come together because they really did all have something they wanted to achieve that they could only accomplish together.

4.4 | Research Question 4: Practical evaluation of Team Flow Model and related tools

The intervention protocol outlined in this paper comprises multiple phases that are each designed to give teams a basis for working together to improve their dynamic and experience the levels of team flow that are concomitant with higher performance. The intervention begins with an inspiration session designed to make the team members more aware of the conditions under which team flow occurs. This awareness is a first step on the path to improving the team flow climate and establishes a foundational structure for later discussion. In the next step, the elements of team flow are measured with the Team Flow Monitor, which enables team members to be keenly aware of what is working effectively and what needs improvement. As one team noted, "The measurements made us aware of what our challenges were. Now we know what we need to work on." Another team's response to the intervention highlighted the use of the Team Flow Model as a foundation:

> People became more aware as the project progressed. The influence of the collective ambition increased and goal-setting increased. At the start of the project we didn't really understand how important all this stuff was for the team. Collective ambition, more mutual respect, better mutual understanding, we've started working on these things consciously and that has had a very positive effect.

For many business teams, it can be challenging to have an open and honest discussion about performance, in part because it is not clear which of the many behaviors, interactions, and aspects of the team warrant conversation. The Team Flow Model, when used in discussions that are conducted in the spirit of cooperation and from a

desire for improvement, can offer a structure for analyzing both the positive and negative aspects of a team's current situation. As one of the study's many skeptics put it:

> We went from distrusting the measurements to trusting them completely. The measurements are very interesting. It's wonderful that this tool exists for objectively considering such subjective ideas.

Indeed, participant responses indicated that the measurements provide realistic descriptions of the situations teams find themselves in:

> For the six months during which measurements were being taken, a number of the goals we set for our team were not achieved. We realized that during the measurement. Objectives had slipped through our hands, there was no undoing that. Things weren't running smoothly. We expected growth and got a loss instead. That is frustrating. There are reasons that happened and not all of those are down to the team. Things outside our sphere of influence were determining the team's mood. Expectations went unrealized. Things didn't go as expected. That progression is clearly recognizable in the results from the measurements.

That said, it is not enough simply to measure team flow; teams must engage in productive dialog about the findings. As one team reported:

> After the first three measurements, we came to the conclusion that these numbers, these results are completely meaningless, that you have to do something with them. We then worked on this intensively up until the summer holidays. We settled on our collective ambition, common goals and personal goals. Because we were working on this very deliberately, we started making some progress. Just sitting down together opened everything up to discussion. Our collective ambition had never been stated, never clearly defined. That changed, which was educational and extremely useful. We put up a Flow Board as a way to organize our goals and ambitions. Because the goals were clearer, our focus improved. We're at the point now where we can call each other out on what we're doing.

Thus, the Team Flow Monitor is a helpful tool for working on these issues to improve a team's dynamic and its chances of experiencing flow. The participating organizations all felt that going through the Team Flow intervention protocol was a very positive experience for them, and each of the teams benefited from their participation. The involved team leaders/coaches and business leaders agreed upon by consensus that the team flow constructs should preferably score in aggregate above an 8.0 to have a climate for optimal collaboration.

5 | DISCUSSION

5.1 | How to spark team flow in professional organizations

With a view to enabling teams to promote and experience team flow with greater depth and frequency, we designed and tested an intervention that would introduce teams to team flow, assess their progress, and guide them through troubleshooting the team's dynamic and performance. The initial focus of this intervention was setting the prerequisites for team flow in a team's immediate environment by informing the team about the Team Flow Model and Team Flow Cycle, and then giving them the Team Flow Monitor to assess their progress and for use as a basis for dialog and the formation of action plans for improvement. A major component of this intervention is that it can be performed by the team and its attendant stakeholders (e.g., manager, facilitator), which gives teams and team members the autonomy to make their own improvements. This is critical because autonomy also turns out to be an important foundation to the prerequisites of team flow. Individual flow, as described by Csikszentmihalyi (1990, 1996) is characterized by, among other things, autotelic activity (doing things for their own sake; intrinsic motivation) and a sense of control over one's own performance. This means that flow is more likely to occur when people are allowed to perform their personal tasks for the team with autonomy. In order for the team members to all experienced flow together, which happens during an actual team flow experience, each individual team member will need to feel free to act autonomously and in alignment with the team's objectives. Theoretically, this is also reflected in the underlying characteristics of the *collective ambition* (cf. van den Hout et al., 2018). As discussed above, the combination of autonomy and a willingness to commit to the process of improving teamwork enables this intervention to effectively establish the prerequisites for team flow experiences and incite them to blossom into full team flow.

Our cross-case-study confirmed through both qualitative and quantitative data that our six-part Intervention Protocol and Team Flow Cycle improves team experiences in a number of different ways that are conducive to team flow, and indeed improve average team flow scores over time. Using the Team Flow Monitor as a barometer of the team's health and dynamics, practitioners, teams, and leaders can use the protocols presented in this study to improve team dynamics and potentially increase performance in actual business situations (and this is over and above the benefits to individuals, such as individual flow experiences). In addition to the practical value of having science-based interventions for practitioners to use, the results of this study also provide further evidence for the validity of the Team Flow Model (Figure 1; van den Hout et al., 2019) and greater insight into overcoming obstacles to team flow and the ways

in which positive team dynamics reflect the elements of team flow in active business teams (cf. van den Hout & Davis, 2021; van den Hout et al., 2017). Among the key team flow research findings that were confirmed for the first time in the field were the critical role of setting a collective ambition and paying very careful attention to lines of communication and communication patterns. Of especial importance was how this intervention provided the requisite framework and data for starting some of the critical discussions around obstacles that can enable teams to overcome them.

6 | LIMITATIONS AND FUTURE RESEARCH

To conduct these studies, we collected qualitative data through interviews and case studies and quantitative data by means of the Team Flow Monitor. We then triangulated the data to ensure that the results of the studies are both valid and reliable, in addition to getting face value confirmation from both internal and external observers (Yin, 1994). Still, there were a number of limitations in this study that warrant improvement in future research.

First, while some teams go through the entire cycle of formation to task completion in a 6-month period, it is quite common for business teams to have longer cycles. As such, future research should collect longitudinal data over a longer time period. A longer period of observation would also allow researchers to monitor the teams through multiple cycles of striving for their common goals. Such data could provide additional insight into the long-term effects of becoming aware of team flow, especially into its effects on team performance and feelings of happiness, which need to be monitored and assessed over the full cycle of the team's existence to provide additional accuracy and validity. The larger data set would also allow for a closer quantitative analysis of the effectiveness of specific interventions, including multilevel analyses with nested data. Unfortunately, that was not practical with the data we had available, and thus we had to ground team flow theory in the qualitative analysis and use the quantitative measurements to validate the qualitative results instead of giving them enough degrees of freedom to stand on their own. Another possible consideration would be using the experience sampling method (ESM; Hektner et al., 2007), which might have allowed for more accurate descriptions of the status of the team in real time instead of using retrospectives when teams were being surveyed. In business teams, however, the need to focus on the activity at hand without being interrupted by surveys, and the financial costs of distractions, makes the ESM less viable for use.

In addition, while the analyses did allow for thick descriptions within teams, every team is different and there are always challenges that cannot be foreseen by a standardized intervention protocol (some of which are indicated in Appendices S2 and S3 and are discussed above in Section 4) and limit the potential for making detailed comparisons across teams. For instance, the need to split Team 1 partway through the intervention reduced the accuracy of the measurements on the subsidiary teams (especially for Teams 3 and 5, which were small), but the results still provided a sufficient view of the respective teams' trajectories on the team flow variables and the experiences themselves. While the intervention proved overall to be sufficiently efficacious that teams were able to use it on their own to significant effect, a limitation of the extant intervention is that greater efficacy is likely when a trained facilitator/coach is able to use the materials. Further research will hopefully create a clearer set of troubleshooting protocols that can be used to full effect by any team. That said, there are many potential impediments to team flow that may make this intervention inappropriate for some teams, such as teams that are working in parallel or teams that are not designed to have members with complementary skills sets (for a fuller treatment of this topic; see van den Hout et al., 2017, 2019). A second facet to this limitation is the challenge of comparing results across the set of teams. While our results consistently showed upward trends in team flow scores and related benefits across the teams that followed the protocol, every team had significant differences in the events that occurred (such as new team members being added/removed, implementing aspects of the protocol at different time points during the intervention period), which in turn provided too much variance across a given time point to fully aggregate data across teams. This was also reflected in the RCI's being a bit below threshold, as the limitations and challenges that affect real-world teams can sometimes lead to inconsistencies in results even on a standardized protocol (all the more so for one as new as this!). As this intervention becomes more widely tested, common events (e.g., splitting of the team) may emerge as consistent time points to compare across, which can allow for aggregating data across teams or comparing teams in more nuanced ways than before and after. A third aspect of this limitation was the fact that this was a proof-of-concept study and not a randomized controlled trial. While the results showed positive effects for the intervention for both teams and individuals, the lack of control group limits the interpretability of the success of the study, especially in terms of the magnitude of the effects and the full scope of the effects on the individual team members. Future studies should compare the effects of the intervention to teams that receive a placebo intervention and to teams that receive no intervention.

In studies like these, time is always a challenge, and there are any number of additional pieces of data that would have been great to collect given more time with the group. For instance, a focus group conducted after each performed intervention would have been a better source of information than sitting in on one team's team meeting and having feedback sessions with each of the team leaders. But, hopefully future studies will have the opportunity to conduct these focus groups for a more solid confirmation of the efficacy of each session and action plan. The other way in which time was a factor is that the current iteration of the Team Flow Monitor is a bit lengthy at 15 min. Future research will hopefully provide a faster scanning tool that teams can use more often and more easily.

Diversity, too, is a challenge in qualitative studies, and this one is no exception. While our analysis looked at teams in the business world, future research can generalize the results to teams in education, sports, and other contexts. In addition, all of the interviews and

case studies were conducted on teams in The Netherlands and were thus limited not only to the country but to its demographics and culture. In addition, the sample was mostly men, and this, too, can limit the conclusions and their generalizability. Later studies should consider a broader range of demographics, cultures, and locations to confirm the generalizability of the results.

7 | CONCLUSION

This study investigated how team flow emerges, what prevents its emergence, and what organizations can do with a specific set of instruments (Team Flow Model, Team Flow Cycle, and Team Flow Intervention Protocol) to create the kind of climate in which team flow more readily occurs. We have done this by conducting a cross-case-study analysis in which we merged quantitative and qualitative data.

The results highlight the efficacy of establishing the prerequisites for team flow. Achieving team flow is no mean feat and usually requires all of the prerequisites to be present in a team's direct working environment to a sufficient degree (preferably scoring in aggregate above an 8.0 on average). It is quite rare, though not unheard of, for a team to achieve team flow in the absence of one of the prerequisites. Typically, however, it is only when all prerequisites are in place that a team can be said to exist in an optimal team flow climate and be described as "high-functioning." A broad analysis of the cross-case study report also reveals that as a team's scores on prerequisites rise and fall, so do its scores on the experiential characteristics.

Our intervention showed that discussing the output from the Team Flow Monitor raises awareness about the health of the team's climate and dynamic and provides a basis and structure for designing action plans to improve the team's ability to experience flow and unleash its potential for maximal performance. Even when a team is off to a solid start, the intervention protocol in this study showed its ability to improve the team's dynamic and flow experiences. The study even showed that the intervention can yield improvements even if teams stagnate early on by ignoring the results of the Team Flow Monitor and then engaging in the dialog and action process partway through.

Confirming earlier findings about the impediments to team flow and how to overcome them (van den Hout & Davis, 2021; van den Hout et al., 2017), we used the knowledge established in the field about team flow to design an Team Flow Cycle and an intervention protocol that organizations can use to have their teams create for themselves a climate that is maximally conducive to team flow. When teams experience a lot of team flow, they perform better, their members are happier and more positive about their work and the organization, and team members are more motivated to tackle new challenges both individually and collectively. We hope that this study will encourage both academia and business to embrace both the Team Flow Cycle, the intervention protocol, and the Team Flow Model they are based on, to empower many more teams to work together in healthy, encouraging work environments that are conducive to high performance and the creation of great value.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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