

An Exploratory Study of Group Development and Team Learning

Elisabeth Raes, Eva Kyndt, Stefan Decuyper, Piet Van den Bossche, Filip Dochy

Teams need to pass through a series of development stages before they can operate effectively, and, in a changing context, it has also been demonstrated that teams need to continue learning in order to remain effective. This article aims to explore the relationship between team development and team learning. In particular, it focuses on when and why basic team learning processes such as sharing information, co-construction, and constructive conflict occur during different phases of development. It can be hypothesized that although each stage of team development is characterized by specific learning tasks, team learning processes occur more in certain stages than in others. The results from a model-based cluster analysis and ANOVA analyses on a sample of 44 professional teams show that team learning occurs more in the later phases of group development due to higher levels of team psychological safety and group potency.

Key Words: team learning, group development, group potency, psychological safety

Introduction

Group development can be defined as the maturation of a collection of individuals into an effective functioning group (Wheelan, 2005). London and Sessa (2007) stated that due to the importance of team and group work within organizations, “group development and facilitation are an important part of human resource development” (p. 353). Another important focus in the research in this area is on team learning, which is also found to be associated with effective team functioning (Decuyper, Dochy, & Van den Bossche, 2010). Both team learning and group development research start from the premise that teams or groups will not be effective unless they collaboratively learn to overcome barriers such as team dictators (West & Markiewicz, 2004),

free riding (Wagner, 1995), social loafing (Karau & Williams, 1993; West, 2004), ego-trippers (Lencioni, 2002), and a lack of team psychological safety (Edmondson, 1999). However, although both streams of literature have the same starting point, their focus seems to be different. The team learning literatures focus on how behaviors such as giving feedback, sharing information, boundary crossing, team reflexivity, and experimentation affect the construction of shared mental models and team effectiveness (e.g., De Dreu, 2007; Edmondson, Bohmer, & Pisano, 2001; Savelsbergh, Storm, & Kuipers, 2008; Van den Bossche, Gijssels, Segers, & Kirschner, 2006; Zellmer-Bruhn & Gibson, 2006). These authors theorize that due to a growing emphasis on knowledge, a changing environment, and increasing knowledge inflation, there is an increasing importance on team learning to predict team effectiveness. The group development literature similarly addresses the question of how groups become effective over time in terms of their readiness to exert team-level processes like team learning behaviors (Tuckman & Jensen, 1977; Wheelan, 2009). However, the difference is that the emphasis in team learning studies is on examining whether and why certain input variables predict variance in specific team learning processes and outcomes, whereas group development studies focus on describing how and why groups mature over time.

Despite the different focus of team learning and group development literature, it is surprising to see that there is virtually no empirical research that bridges the gap between these two distinct fields of research (Decuyper et al., 2010). After all, boundary-crossing questions such as “To what extent does group development also serve units to be capable of *learning* effectively as a team?” or “How do different development stages relate to team learning behavior?” are gaining importance in the light of an increasing emphasis on knowledge, creativity, and innovation. On this topic, Kasl, Marsick, and Dechant (1997) suggest that group development does not guarantee collective learning. They state that “teams can work their way through the developmental stages of forming, storming, norming and performing (Tuckman, 1965), yet never challenge dysfunctional assumptions or create new knowledge through strategies such as framing or perspective integration” (1997, p. 231). Therefore, in addition to research that empirically studies the link between group dynamics and *teamwork*, there is also a necessity for empirical research that links group development to team *learning* (Ilgen, Hollenbeck, Johnson, & Jundt, 2005).

Noteworthy in this context is the conceptual confusion between *team* learning and *group* development. Even though the terms *team* and *group* are often used interchangeably (Cohen & Bailey, 1997), they can also refer to something different. Research on team learning is mainly focused on teams that comply with the definition of Cohen and Bailey (1997, p. 242):

A team is a collection of individuals who are interdependent in their tasks, who share responsibility for outcomes, who see themselves and who are seen by others as an intact social entity embedded in one or more larger

social systems (for example, business unit or the corporation), and who manage their relationships across organizational boundaries.

A group can be defined as a collection of individuals who perform similar or complementary tasks as different individuals (Gilley & Kerno, 2010). However, research on group development can be applied to a wide range of groups (e.g., therapy groups, sport groups), but still seems to focus on a smaller niche of groups than the ones defined by Gilley and Kerno (2010), namely, groups that have a common goal. That is why the theory of group development is generalized to teams in this study. In this study, the focus is on teams, as defined above. Only when references are made to the group development model of Wheelan (2005), is the term *group* is used.

The objective of this study is to explore the relationship between group development and team learning in work teams by combining the group development model of Wheelan (2005) with the team learning development model of Dechant, Marsick, and Kasl (1993). It is theorized that due to the dynamic nature of teamwork and the growing maturity of teams during group development, team learning behaviors evolve over different stages of group development (Van der Haar, Segers, & Jehn, 2013). The first research question is:

RESEARCH QUESTION 1: Do teams in later phases of development exert more team learning behaviors than teams in earlier phases of development?

It is generally accepted that social conditions for team learning evolve over the different development phases (e.g., Arrow & Cook, 2008; Sweet & Michaelsen, 2007); however, little empirical research exist that confirms this statement. In this study, the focus will be on two catalyst emergent states: *team psychological safety*, which is the shared belief that the team is safe for interpersonal risk-taking (Edmondson, 1999), and *group potency*, which is the collective belief of team members that the team can be effective (Shea & Guzzo, 1987). Both are social conditions that have been modeled as influencing factors for effective teamwork and effective team learning (Boon, Raes, Kyndt, & Dochy, 2013; Edmondson, 2003; Van den Bossche et al., 2006). This leads to the second research question that will be answered in this study:

RESEARCH QUESTION 2: Are psychological safety and social cohesion mediators for the relationship between group development and team learning?

Based on theory, it is hypothesized that the state of these social conditions evolves over time; thus, it is important to explain the relationships between group development and team learning. In particular, the question of whether psychological safety and group potency are higher when the group is situated in the later stages of group development will be explored in this study. If this is the case, it can be expected that team learning behaviors will also be higher

(e.g., Brousseau, 1997; Edmondson, 2002; Van den Bossche et al., 2006) and that psychological safety and group potency explain the relationship between group development and team learning. This study aims to shed an exploratory light on these processes and the relationships between these constructs.

Theoretical Background

In this section, the initial focus will be on the theories of group development and team learning. Next, the link between them, based on a model of Dechant et al. (1993), is highlighted. Finally, the literature on psychological safety and group potency is discussed.

Group Development

Since the pioneering work of Bennis and Shepard (1956), researchers have exerted increasing efforts to modeling group development over time. Group development has been defined as changes that occur in groups over time (Tuckman, 1965). Depending on the theory that models development, the focus is on changes in different aspects of group dynamics (e.g., task process, interpersonal process, decision making). In their literature review Chidambaram and Bostrom (1996) showed how researchers of group development tend to describe the development of groups as either sequential (e.g., Bennis & Shepard, 1956; Hill & Gruner, 1973; Kaplan & Roman, 1963; Tuckman, 1965; Tuckman & Jensen, 1977) or nonsequential (e.g., Gersick, 1991; McGrath, 1991). Researchers who follow the sequential tradition describe the unitary sequences of development that groups follow during the course of their lives, whereas researchers from the nonsequential tradition focus on explaining the underlying factors that cause shifts in group development.

The model developed by Wheelan (2005) is used to operationalize group development in the study presented in the article. The model describes the maturation of groups through four stages: dependency and inclusion, counter-dependency and fight, trust and structure, and work and termination. Although, essentially, it is a life cycle model, it integrates elements from both sequential and non-sequential theories (Sweet & Michaels, 2007; Wheelan, 2005). This integration was an important reason to select this model as a heuristic framework for this study. Another of its strengths can be found in the fact that, in contrast to other development models, this model has been validated empirically in a number of studies using different methods and with teams from different organizational contexts (Wheelan, 2005, 2009; Wheelan, Davidson, & Tilin, 2003; Wheelan & Hochberger, 1996; Wheelan & McKeage, 1993). This model describes group development as observed in teams that evolve to become an organized unit capable of working effectively as a team (Wheelan, 2005).

- *Phase 1: Dependency and inclusion.* This phase is marked by the presence of high anxiety, uncertainty, and politeness among team members. Team members

are concerned with issues such as being accepted, reducing uncertainty, and setting boundaries, and will therefore tend to defer to a “leader.”

- *Phase 2: Counterdependency and fight.* This phase is marked by the presence of conflict, power struggles, search for identity, and definition of roles among team members. The team is still working on the development of an appropriate social structure. Due to this, the full resources for application of the task are not yet available.
- *Phase 3: Trust and structure.* This phase is marked by more mature negotiation processes among team members, presence of team goals, structure within the team, procedures, roles, and division of labor among team members. Consequently, information is shared more freely and many more opportunities to learn arise.
- *Phase 4: Work and termination.* This phase is marked by team members feeling comfortable with the habitual sharing of information among team members. There is a good sense of where the knowledge and expertise lies within the group.

When using this model of Wheelan (2005), it is important to keep Homan's (2001) criticism in mind that group development models create the illusion that group development follows fixed patterns, while in fact it is a highly unpredictable, complex, and chaotic process. However, although Wheelan's (2005) model clearly assumes a sequential pattern, it acknowledges the complexity and unpredictability of group development: “Groups, like people, seem to advance and retreat, sometimes taking one step forward and two steps backward. Other groups may remain in a stage for extended periods of time. Again, like people, not all groups reach maturity” (Wheelan, 2005, p. 15).

Team Learning Behavior

Recently, team learning has received increasing attention from a small group of researchers (Edmondson, Dillon, & Roloff, 2007; Sessa & London, 2008; Van den Bossche et al., 2006; Wilson, Goodman, & Cronin, 2007). In a recent review, it was argued that any integrative conceptualization of the “team learning” construct should include both team learning processes and team learning outcomes (Decuyper et al., 2010). Consequently, team learning is defined as

a compilation of team-level processes that circularly generates change or improvement, primarily at the level of the team, and secondary at the level of individuals or the organisation. Being a compilation, it consists of changing combinations of different types of processes (sharing, co-construction, constructive conflict, team reflexivity, boundary crossing, team activity, storage and retrieval). Working circularly, it dynamically translates a complex body of influences from multiple levels (e.g. team, organisation) into different types of outputs at multiple levels, which in turn influence team learning. (Decuyper et al., 2010, p. 128).

There is sufficient empirical evidence that team learning behaviors lead to the building of mutually shared cognition and to increased team effectiveness (e.g., Edmondson, 1999; Edmondson et al., 2001; De Dreu, 2007; Savelsbergh et al., 2008; Van den Bossche et al., 2006; Van Offenberg, 2001; Van Woerkom & Croon, 2009; Zellmer-Bruhn & Gibson, 2006).

In this study, the focus will be on three basic team learning behaviors as defined by Decuyper et al. (2010): sharing, co-construction and constructive conflict. These processes are considered “basic team learning processes because they describe what happens when teams learn” (Decuyper et al., 2010, p. 117). They result in change and are responsible for the power of team learning (Decuyper et al., 2010). First, by means of *sharing* information, knowledge, and proposals, teams enlarge their level of shared knowledge and their awareness of “who knows what” within the team (Wilson et al., 2007). Second, *co-construction* entails team members listening to each other and mutually refining, building on, or modifying each original offer (Baker, 1994; Van den Bossche et al., 2006). Finally, *constructive conflicts* are elaborated discussions that are triggered by expressed diversity by one or different team members. Constructive conflicts start from open communication and lead to further communication and some kind of temporary agreement (Van den Bossche et al., 2006).

Team Learning During the Development of the Team

To our knowledge, there are currently no existing studies that focus on team learning over time with an empirical approach. Existing research on this topic focuses on theoretical models that combine the concepts of team learning and team development (Ellis, Porter, & Wolverson, 2008; Hall, 2007; Kozlowski & Bell, 2008; London & Sessa, 2007; Marquardt et al., 2010). A good example is the model of Dechant, Marsick and Kasl (1993). They argue that emergence of team learning develops over four stages. Dechant et al. (1993) describe the development of team learning as a process that starts with the fragmented learning stage, at which point learning takes place only at the individual level. Every team member is learning individually and building an individual mental model. This first stage is typically followed by the pooled learning stage in which little groups within the team learn together. During this stage, sharing of interests and knowledge starts within subgroups. During the next stage, the synergetic learning stage, team members start to learn as a team, share, and build shared knowledge based on their individual knowledge and on mutual knowledge of the team. In the last stage, or continuous learning stage, this form of learning as a team becomes a normal process.

On a conceptual level, these four stages can be linked to the four development phases of Wheelan (2005). During the *dependency and inclusion phase* (1) the behaviors of the team members are based on vague assumptions concerning group goals and stereotypes about how other team members will respond. Due to their focus on inclusion issues, team members will not be inclined to engage in socially risky team learning behaviors since sharing information,

asking questions, co-construction, and constructive conflicts pose a significant threat to one's social inclusion or group membership (Edmondson, 1999, 2002). Consequently, decisions just seem to occur; they are not discussed at all and are frequently made without the awareness of any of the group members. The first development phase seems to blend well with the *fragmented learning stage*, where team members do not learn as a team but as individuals. Each individual has his or her own opinion, and the concern for individual acceptance exceeds the concern for team success.

The main themes in the *counterdependency and fight phase* (2) are struggle for power, quest for identity, the definition of roles, and the first signs of specialization. Team members begin to know each other better and start to express their ideas and opinions in a less subtle way. As a consequence, conflicts emerge, but are either seen as a personal rejection instead of a difference in interpretation, or taken as a paradox where one or more elements need to be ignored in order to solve the conflict. In both cases, conflicts are destructive (De Dreu & Weingart, 2003). Members share frustrations concerning each other's behavior, and subgroups based on these frustrations can react oppositely and emotionally toward other subgroups (De Dreu & Weingart, 2003). Similarly, Dechant et al. (1993) suggest that in a second *pooled learning stage*, individuals share information and perspectives with other individuals on the team. However, only parts of the team learn together in subgroups of team members, but the team as a whole still does not learn. Before teams can engage in constructive conflicts as teams, they need to be able to combine confrontation with listening and consider each other's point of view (Kasl et al., 1997).

During the *trust and structure phase* (3) team members start to trust each other and increasingly succeed in negotiating and organizing at the level of the team. Trust is described as one of the basic ingredients for team learning (Lee, Gillespie, Mann, & Wearing, 2010; Songkram, 2008). Hanpanich (2003) suggests that trust leads to collaborative learning and knowledge sharing. Welch (2004) adds that trust also leads to improved creativity, conflict management, teamwork, and leadership. Also, Wu, Yeh, and Huang (2007) suggest that trust is the basic condition for effective knowledge sharing and team learning. When team members start to trust each other, expressed disagreements are no longer taken as personal rejections. Rather, such socially risky expressions are taken as signs of concern for the benefit of the collective and taken up as issues that need further attention. At this point, overt disagreement is no longer causing the end but rather the beginning of greater and deeper team-level communication (Hogan & Tudge, 1999). In line with the model of Wheelan (2005), Dechant et al. (1993) state that in a third *synergistic learning stage*, the team as a whole learns. Team knowledge is integrated into individual meaning schemes, and individual knowledge is integrated in shared norms.

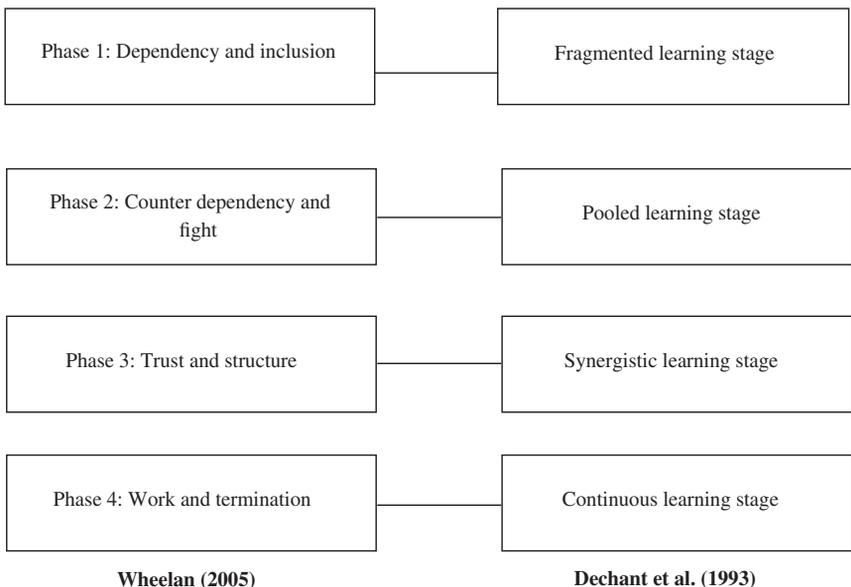
Finally, the *work and termination phase* (4) is characterized by performance, productivity, decision making and solving problems. Throughout time, social boundaries are relatively fixed, relational consternations occur less frequently,

and there is some kind of established equilibrium. The group is used to, and capable of, dealing with conflicts and engaging in team learning behaviors. It has an open communication structure in which all members participate and task-related deviance is tolerated. The team receives, gives, and utilizes feedback about its effectiveness and productivity. It encourages innovation, and it spends enough time discussing the problems and decisions it faces (Wheelan, 2005). This state blends in with the *continuous learning stage*, where team learning is implemented. All team members will engage in behaviors such as sharing and co-construction of information, which contributes to teamwork, and the shared cognition of the team members (Van den Bossche et al., 2006).

A schematic overview of this theoretical emergence of the two models can be found in Figure 1. This theoretical link between both models suggests that the team will learn more and more as a team when it passes through the different stages of group development. At this point, no validated questionnaire of the team learning development model of Dechant et al. (1993) exists. In this study, the development of team learning is operationalized by measuring the presence of the basic team learning behaviors (Decuyper et al., 2010). The occurrence of more basic team learning behaviors means that the team is learning more as a team. Considering the frameworks outlined earlier, the following hypothesis is stated:

HYPOTHESIS 1: Teams situated in phases 3 and 4 will display more learning behaviors than teams situated in phases 1 and 2.

Figure 1. Team Learning and Group Development



Group Development and Social Conditions for Team Learning

Social conditions are important defining elements in the description of most group development models (e.g., trust in the model of Wheelan). Similarly, they play an important role in the current team learning models because they are associated with higher team learning processes and outcomes (e.g., the model of Van den Bossche et al., 2006). Different researchers refer to these social conditions as catalyst emergent states (Decuyper et al., 2010) or team emergent states (Du Chantener, Versteegen, Biemans, Mulder & Omta, 2009; Marks, Mathieu, & Zaccaro, 2001). These states are “cognitive, motivational, and affective states of teams [that are] . . . dynamic in nature and vary as function of team context, inputs, processes, and outcomes” (Marks et al., 2001, p. 357). Although it is generally accepted that social conditions for team learning evolve over time, and are seen as descriptive processes for different developmental stages, there is little if any empirical research in authentic situations to confirm this statement (Arrow & Cook, 2008; McGrath, Arrow, & Berdahl, 2000; Sweet & Michaelsen, 2007). That is why two important team emergent states are included in this study: team psychological safety and group potency. It is hypothesized that psychological safety and group potency will increase as teams go through different development stages.

Team psychological safety is defined by Edmondson (2004, p. 241) as “a team-level concept describing individuals’ perceptions about the consequences of interpersonal risks in their work environment. It consists of taken-for-granted beliefs about how others will respond when one puts oneself on the line, such as by asking questions, seeking feedback, reporting a mistake, or proposing a new idea.” Team psychological safety is one of the most important predictors of team learning behaviour: every study examining its effect on team learning showed a positive and significant relationship (e.g., Brousseau, 1997; Day, Gronn, & Salas, 2004; Edmondson, 1999, 2002; Edmondson et al., 2001; Knapp, 2010; Van den Bossche et al., 2006). Moreover, the importance of psychological safety is stressed in almost every group development model (Chidambaram & Bostrom, 1996). Wheelan (2005, p. 61) emphasizes how, in the dependency and inclusion phase, team members are “concerned with personal safety, acceptance and inclusion, and they fear rejection” (Wheelan, 2005, p. 61). Team members are preoccupied with being accepted by other team members, and this could lead to a lack of team psychological safety and a low occurrence of team learning behavior. Phase 2 is predominantly characterized by “hostility” (Wheelan, 2005, p. 62) and “tension” (p. 63). Reduced anxiety and concern for inclusion elicited the surfacing of existing latent differences. Due to a lack of trust at that stage, these differences lead to destructive conflicts, overt power twists, and dissatisfaction, which are likely to be associated with low levels of team psychological safety and team learning behavior. In phase 3, team members start to trust each other and respect is restored (Wheelan, 2005). The presence of trust leads to an increase in psychological safety, since psychological safety stems from the

presence of trust in the team (Edmondson, 1999). Finally, the main focuses of phase 4 are solving problems, making decisions, and being a productive team. Several authors show that this is not possible without an atmosphere of team psychological safety (Edmondson, 1999; Van den Bossche et al., 2006). Group development models focus on the development of trust, but even though trust and team psychological safety are two distinct concepts (see Edmondson, 2002, for a more elaborate discussion of the difference between them) they also have a lot in common; both involve “perceptions of risk or vulnerability and making choices to minimise negative consequences, and both have potential positive consequences for work groups and organisations” (Edmondson, 2004, p. 243). It is therefore hypothesized that phase 4 will be associated with high levels of team psychological safety.

HYPOTHESIS 2: Team psychological safety will be higher in teams situated in phases 3 and 4 than in teams situated in phases 1 and 2.

Besides psychological safety, prior research has shown the importance of group potency for team learning (Van den Bossche et al., 2006). Group potency is defined by Shea and Guzzo (1987, p. 26) as “the collective belief of group members that the group can be effective.” It refers to a more general level of shared confidence about the abilities of the team. Sundström, McIntyre, Halfhill, and Richards (2000), and Shelton, Waite, and Makela (2010) state that group potency is one of the most important predictors of team effectiveness. Previous research has demonstrated that group potency is a good predictor for team learning behavior, even when team psychological safety is taken into account (Van den Bossche et al., 2006). Moreover, the construct is used in this study to explain the relationship between group development and team learning, since group potency is also a social state that evolves during group development (Jung & Sosik, 2003).

In line with our hypotheses about team psychological safety, it is expected that teams will only start to share a positive belief in the capabilities of the team in phase 3. In phases 1 and 2 team members tend to have unexpressed doubts at first, followed by expressed doubts concerning the capabilities of fellow team members and/or the team. This results respectively in testing-the-water behavior and overt deconstructive conflicts. When trust, shared norms for further interaction and shared plans emerge, team members also start to develop a shared belief in the potency of the team (Jung & Sosik, 2003).

HYPOTHESIS 3: Group potency will be higher in teams situated in phases 3 and 4 than in teams situated in phases 1 and 2.

The focus of this article is to explore the existence of the hypothesized differential effect of multiple development phases on team learning behavior. Moreover, the concepts of team psychological safety and group potency are

used to explain these relationships. Based on the preceding theoretical explanation, it can be stated that the more a team is developed, the stronger the presence of psychological safety and group potency, and the more team learning behaviors are exerted. It will be investigated if the relationship between the development phases and team learning behaviors remains when psychological safety and group potency are introduced as covariates. The arguments provided earlier lead us to hypothesize the following:

HYPOTHESIS 4: Psychological safety and group potency will mediate the relationship between development phases and team learning behaviors.

Methodology

Sample

A first step in data collection consisted of contacting directors or human resource managers of different Belgian organizations by e-mail. If they agreed to participate, they provided us with contact details of a team leader. The team leader was approached and in collaboration with him/her we determined whether the characteristics of his or her team matched our definition of team: “A team is a collection of individuals who are interdependent in their tasks, who share responsibility for outcomes, who see themselves and are seen by others as a social entity embedded in one or more larger social systems, ... and who manage their relationships across organizational boundaries” (Cohen & Bailey, 1997, p. 241). If the requirements were met, team members received a link to our online questionnaire via e-mail, together with a personal team number.

In total, data were collected from 168 individuals (n_i) working in 44 teams (n_t), active in different professional contexts (e.g., animal nutrition, oil supply, hospital, high school) and working on specific tasks (board of directors, service team, management team, sales team, etc.). The average total team size was 8.5, and all teams in the dataset consisted of three or more members. For all participating teams, at least 20% of the team members—with a minimum of two team members per team—filled out the questionnaire. This was possible as team-level constructs were measured, in which different individuals on the teams can be seen as repeated measures (Van den Bossche et al., 2006, p. 503). All of the participating teams consisted of more than two team members. The average response rate within the teams was 61%. Finally, the average age of participating team members was 46, team members had been active in their team for an average of five years ($SD = 5$), and 81% of team members who completed the questionnaire were female.

Instruments

Psychological safety, group potency, and team learning behaviors are measured using scales from the Team Learning Beliefs & Behaviours–Questionnaire (TLB&B-Q; Van den Bossche et al., 2006). The four different development

phases were measured using items derived from a tool for assessing group processes and development provided by Wheelan (2005). All scales were administered in the native language of the participants (Dutch) using a 7-point Likert scale. The TLB&B-Q has been developed in Dutch (Van den Bossche et al., 2006). The items from Wheelan's (2005) tool to assess group processes and development were translated according to the guidelines of the International Test Commission (Hambleton, 1994). An English translation of all the items can be found in the appendix to this article.

- *Team learning behavior.* Our conception of basic team learning behaviors mainly focuses on conversational actions that allow team members to become partners in the collaborative construction of mutually shared cognition (Roschelle, 1992). These conversational actions refer to the three aforementioned aspects of the learning behavior (sharing information or construction, co-construction, and constructive conflict), which were measured using nine items from the TLB&B-Q (based on questionnaires of Edmondson, 1999; Van Offenbeek, 2001; Visschers-Pleijers, Dolmans, Wolfhagen, & van der Vleuten, 2005). For example, the items included: "Team members elaborate on each other's information and ideas" and "If something is not clear, we ask each other questions." The internal consistency of the according scale equals .89.
- *Team psychological safety.* To measure team psychological safety, a scale with the seven items of Edmondson (1999) was used, which is also included in the TLB&B-Q (Van den Bossche et al., 2006) (e.g., It is safe to take a risk on this team). The Cronbach's alpha of this scale equals .79.
- *Group potency.* Group potency was measured with a scale of six items that was previously used by Sargent and Sue-Chan (2001); Gibson, Randel, and Earley (2000), and Van den Bossche et al. (2006) (e.g., This team believes it can be very effective). The Cronbach's alpha of this scale equals .84.
- *Group development.* To measure the different group development phases as conceptualized by Wheelan's (2005) integrating group development model, a selection of items was made from the Group Development Questionnaire (Wheelan & Hochberger, 1996). Items were selected by means of a content analysis based on the core characteristics of the different dimensions in our theoretical framework. The resulting questionnaire counted 20 items instead of the original 60 items in the Group Development Questionnaire (Wheelan & Hochberger, 1996).
- *Phase 1: Dependency and inclusion.* The five items measuring phase 1 focused on the amount of energy a team spends in dealing with issues of dependency and inclusion (e.g., We haven't discussed our goals very much in this team).
- *Phase 2: Counterdependency and fight:* The four items measuring phase 2 focused on conflict, counterdependency, and other characteristics

associated with this phase of group development (e.g., Team members seem to have very different views about how things should be done in this group).

- *Phase 3: Trust and structure.* The five items measuring phase 3 focused on the extent to which the team is structured (e.g., This team is able to form subgroups, or subcommittees, to work on specific tasks).
- *Phase 4: Work and termination.* Groups who pass through the previous three phases constructively reach the fourth “performing, work and termination phase.” These six items focus on the fact that teams act effectively on their decision in a way all members agree upon (e.g., This team acts on its decisions). Termination is not addressed in the questionnaire since it is not the main focus of this stage. The teams that were investigated were not at the end of their process.

The internal consistency of this scale equals .80

Aggregation

The measured constructs in this study are meaningful only at the team level, and this required aggregating the scores of the individuals to the level of the team. Moreover, one of the criteria for using parametric data analysis techniques, such as correlation and analyses of variance, is that the elements are conceptually independent. When team members are asked to score, for example, the occurrence of constructive conflict in their team, the individual scores per team are not independent. In order to aggregate individual responses to team-level constructs, it is necessary to check whether the responses of the different team members are related to each other to a sufficient degree. Therefore, the multiple item estimator of the within-group agreement (R_{wg}) was calculated. According to James, Demaree, & Wolf (1984), if an R_{wg} score is larger than .70, it is acceptable to consider the constructs measured to be situated at the level of the team and to aggregate the responses of the individual team members (James et al., 1984). However, Brown & Hauenstein (2005) consider an R_{wg} score larger than .80 as high agreement between team members about the construct. They consider only constructs with an R_{wg} score higher than .80 as suitable for aggregation. Thus, our analyses showed a mean R_{wg} of .79 for team psychological safety, .90 for group potency, .95 for team learning behavior, .85 for phases 1 and 2, and .96 for phases 3 and 4. These mean R_{wg} 's justify the creation of a group-level data set.

Data Analyses

Since items were translated and selected from multiple questionnaires, several exploratory factor analyses (maximum likelihood–varimax rotation) were conducted to assess the underlying structure of the data. A first factor analysis was performed on the items measuring the dependent variable team learning behaviors. A determinant of .006, a Kaiser–Meyer–Olkin (KMO) measure of

sampling adequacy equaling .895, and a significant Bartlett's test of sphericity ($p < .001$) show that the used data are suited for this type of analysis. The second factor analysis was performed on the instrument measuring the four development phases of Wheelan's (2005) model. For this second factor analysis, data were also suitable (determinant = .000, KMO = .891, Bartlett's: $p < .001$). The third and final exploratory factor analysis was performed on the items measuring group potency and psychological safety. The adequacy of the data was shown by a determinant of .020, a KMO measure of .853, and a significant Bartlett's test ($p < .001$). The internal consistencies of the scales were checked by calculating the Cronbach's alpha coefficients of the scales. All psychometric analyses were executed with the individual participants' responses (Nunnally & Bernstein, 1994).

To answer our research questions, several analyses will be performed with the aggregated data. After calculating the descriptive statistics for the data at the team level, correlational analyses will be performed to explore the relationships between the different variables. Since this study examines group development at a given point in time by using a development questionnaire with multiple underlying factors, each group received a score on every group development phase. It will be examined if teams can be situated within a certain development phase, and a model-based cluster analysis will be performed by means of the Mclust package designed for the R software (Pinheiro et al., 2012). Analysis of variance (ANOVA) will be performed to determine whether the teams situated in different phases differ from each other in terms of team learning behaviour, group potency, and psychological safety. Finally, an analysis of covariance (ANCOVA) was performed to investigate the difference in team learning behaviors between the clusters when psychological safety and group potency are considered covariates.

Results

Structure and Reliability of the Data

The first exploratory factor analyses focused on the dependent variable team learning behaviors. Results of the analysis show that all nine items load significantly on one factor, which explains 52.77% of the variance (see also appendix).

The exploratory factor analysis on the 20 items measuring the group development phases of Wheelan (2005) resulted into two factors that together explain 40.65% of the variance. The first factor explains 23.59% of the variance and contains all items pertaining to phases 3 and 4. The internal consistency of the scale including these 11 items equals .88. The second factor explains 17.06% of the variance and contains 8 items that refer to phase 1 or phase 2 of the model. One item was not included since it did not load above .35 on either factor (see also appendix).

The final exploratory factor analysis also yielded two factors. These factors explain 49.61% of the variance. The first factor represents group

potency and explains 26.68% of the variance. The second factor explains 22.93% of the variance and contains five items measuring psychological safety. One item measuring group potency and two items measuring psychological safety were not included due to loadings below .35 or cross-loadings. It can be concluded that these analyses show that our data represent the theoretical constructs adopted in this study in a valid and reliable way.

Team Learning and Group Development

The analyses to answer the actual research questions began with the calculation of the descriptive statistics of the constructs at the team level (Table 1). Next, the correlations between the variables were analyzed (Table 1). The results show that phases 1 and 2 correlate negatively with phases 3 and 4, group potency, psychological safety, and team learning behaviors. The correlations among phases 3 and 4, group potency, psychological safety, and team learning behaviours were all significant, positive, and relatively strong.

Table 1. Descriptive Statistics and Correlations

	N	M	SD	V	1	2	3	4	5
1. Phases 1 & 2	44	3.00	.74	.54	1	-.70**	-.32*	-.70**	-.59**
2. Phases 3 & 4	44	5.45	.64	.41	.70**	1	.59**	.81**	.81**
3. Group potency	43	5.28	.64	.41	-.32*	.59**	1	.50**	.68**
4. Psychological safety	44	5.50	.89	.79	-.70**	.81**	.50**	1	.78**
5. TLB	44	5.58	.62	.39	-.59**	.81**	.68**	.78**	1

Note: * $p < .05$; ** $p < .01$.

To examine whether it was possible to assign teams to the measured development phases, a model-based cluster analysis was conducted. The analysis showed that a spherical equal-volume model with two clusters is the best solution, as that is the model with the lowest Bayesian Information Criterion. The first cluster was characterized by a higher mean score on phases 1 and 2, and a lower mean score on phases 3 and 4, in comparison with the second cluster (Table 2). However, it is important to note that both clusters score higher on phases 3 and 4 in comparison with phases 1 and 2. It can be concluded that cluster 2 is more outspoken, situated in the final phases of group development, while cluster 1 also leans toward phases 3 and 4, but has, in the meantime, more characteristics relating to the first two phases of group development.

Table 2. Clusters: Mean Scores and Standard Deviations

	Cluster 1		Cluster 2		Total	
	M	SD	M	SD	M	SD
Phases 1 & 2	3.75	.36	2.48	.40	3.00	.74
Phases 3 & 4	4.89	.45	5.84	.42	5.45	.64

To investigate hypotheses 1, 2, and 3, ANOVA analyses were performed in which the clusters were compared for the presence of team learning behaviors, psychological safety, and group potency (Table 3). The results showed that cluster 2 ($M = 5.88$, $SD = .61$) was characterized by high scores on phases 3 and 4, and scored higher on team learning behaviors than cluster 1 ($M = 5.14$, $SD = .42$). These results support our first hypothesis. The second hypothesis was also confirmed, since cluster 2 ($M = 6.07$, $SD = .46$) also scored higher than cluster 1 ($M = 4.68$, $SD = .68$) for psychological safety. Analyses also confirmed our third hypothesis: cluster 2 ($M = 5.01$, $SD = .69$) scored higher for group potency than cluster 1 ($M = 5.47$, $SD = .53$).

Table 3. Results of ANOVA Analyses

	<i>Df</i>	<i>F</i>	<i>Sig.</i>	η^2
Team learning behaviors	1,42	23.16	.000	.36
Psychological safety	1,42	66.70	.000	.61
Group potency	1,41	6.34	.000	.13

Note: Dependent variable: Team learning behaviors.

Finally, it was investigated whether a difference in team learning behaviors could still be attributed to the difference in the two clusters when group potency and psychological safety were introduced as covariates in the analyses. Results show that psychological safety ($M = 5.50$, $SD = .89$) is a significant predictor ($F(1,39) = 16.37$, $p = .00$) and group potency ($M = 5.28$, $SD = .64$) is a significant predictor ($F(1,39) = 24.91$, $p = .00$) for the presence of team learning behaviors in the teams (see Table 4). However, the clusters are not significant predictors ($F(1,39) = .25$, $p = .623$) for team learning behaviors, indicating that psychological safety and group potency partial out the difference between the clusters (see Table 4).

Table 4. Results of ANCOVA Analyses

	<i>Type III Sum of Squares</i>	<i>Df</i>	<i>Mean Square</i>	<i>F</i>	<i>Sig.</i>	η^2
Intercept	.32	1, 39.35	.318	3.16	.083	.07
Group potency	1.67	1, 39	.102	16.37	.000	.30
Psychological safety	2.54	1, 39	.102	24.91	.000	.39
Clusters	.03	1, 39	.102	.25	.623	.01

Note: Dependent variable: Team learning behaviors.

Conclusions and Discussion

The goal of this study was to investigate how group development and team learning behavior are related in order to develop our understanding

of both concepts simultaneously. Within the literature of human resource development, only theoretical and conceptual studies, which explored the integration of group development and (team) learning (Hall, 2007; London & Sessa, 2007; Marquardt, Seng, & Goodson, 2010), were identified. The current study contributes to the literature as it explores this integration empirically for the first time. More specifically, it examined to what extent teams exert team-level learning within the different development phases, and how the different levels of psychological safety and group potency in the development phases relate to the occurrence of team learning behavior.

A first important conclusion from this study is that the link between group development and team learning behavior was confirmed for a large part as hypothesized. The results showed that teams foremost characterized by the *trust and structure phase* and *work and termination phase* showed more team learning behaviors than teams with higher scores on the *dependency and inclusion phase* and *counterdependency and fight phase*. This indicates that teams do not yet learn as a team, but rather as fragmented individuals in the first two stages of their group development, as our definition of team learning requires cooperation among team members. This does not contradict the possibility that team members engage in pooled learning, where they share information and collaboratively construct knowledge and the like, in dyads or subgroups (Dechant et al., 1993). However, teams situated in the first two phases demonstrate fewer learning processes at the level of the team in comparison with teams situated in the later phases. In addition, results showed that team members demonstrate more team learning behaviors in the third *trust and structure phase* and the fourth *work and termination development phase*. In the latter phases, teams indeed demonstrate both a synergistic learning stage, where they take their first steps of learning at the level of the team, and a continuous learning stage, where these team learning behaviors have become the normal way of dealing with each other (Dechant et al., 1993).

A second conclusion is that both team psychological safety and group potency are important in understanding how groups develop through time, and which social conditions are related to increased engagement in team learning behavior. This conclusion is derived from the fact that when psychological safety and group potency are introduced as covariates, the difference in team learning behaviors based on the clustering in phases is no longer significant. This suggests that team learning behaviors are higher in the latter phases of group development, because these latter phases are also characterized by higher psychological safety and group potency, and which research has shown that they are important predictors for team learning behaviors. More learning could occur in the *trust and structure phase* and *work and termination phase* due to the development of a shared belief that the team is safe for interpersonal risk taking and because they believe they are able to achieve their planned goals. However, further research

is needed in order to demonstrate a causal relationship and confirm this statement. Generally, our results show that team psychological safety and group potency are important in understanding both how groups develop over time and why teams learn increasingly in phases 3 and 4, in comparison with phases 1 and 2.

Based on these results, it is relevant to discuss the implications for human resource development in terms of facilitating team learning and group development. Taking into account that every team process is unique and unpredictable, some suggestions are made to create greater awareness of the possible processes. Our empirical study adds to the knowledge about the processes present in teams during their development. For team facilitators such as team leaders, team coaches, and managers, it is important to understand these processes. Wheelan (2005) already states that teams, who are aware of the multiple development phases when they start working together, are able to navigate more quickly to phase 4. In line with the statement of Wheelan (2005), and the results of the current study, Hall (2007) states it is important that team leaders explicitly discuss the stages of development with team members, as this may help advancement through the different development stages, which in turn enhances team learning.

London and Sessa (2007) also state that a competent human resource development professional can play an important role when teams or groups are not ready to learn yet. Trained professionals can lead the group in setting their goals and planning and highlighting opportunities. The current study seems to suggest that the ability to learn is not yet present in the first phases of group development. Therefore, the above-suggested interventions might be most beneficial in the first stages of the group's development. In different development phases, facilitators can enhance team learning behavior by focusing on supporting team psychological safety. The previous research of Edmondson (1999, 2002) shows, on the one hand, that they can do this by being aware that people instinctively try to avoid being seen as ignorant, incompetent, negative, or disturbing. On the other hand, because team members are particularly aware of and influenced by the behaviour and expectations of the leader (Tyler & Lind, 1992), facilitators should exemplify the desired behavior. They should be accessible and open to questions, show commitment to the team, ask questions themselves, admit mistakes (exert a "fallibility model"), demonstrate criticism and self-criticism, and engage in the behavior of giving and asking for feedback. Group potency is also important for team learning and team development. Previous research has shown that in order to generate high levels of group potency, facilitators should give realistic feedback about the current situation and optimistic feedback about the possibility of achieving the envisioned future. The importance of differentiating the facilitation of teamwork and team learning along the lines of group development has previously been theorized (Zaccaro, Ely, & Shuffler, 2008).

Limitations and Future Research

The fact that the exploratory factor analyses of the group development phases were not able to distinguish between the four phases described by Wheelan (2005), but instead separated phases 1 and 2 and phases 3 and 4 into two factors, can be considered a first limitation of this study. However, since the same tendencies were expected for those phases, it does not limit the interpretation of our results. The fact that the factor analyses collapsed both phases indicates that the participants in this study scored the items belonging to both phases in a similar manner. One possible explanation for this is that it is very difficult to distinguish between phases 1 and 2 and between phases 3 and 4 in a complex team situation.

A second limitation of this study is the fact that although cluster 1 had higher scores on phases 1 and 2 and lower scores on phases 3 and 4 in comparison with cluster 2, they still had higher scores on phases 3 and 4 than on phases 1 and 2. In other words, no profile was obtained that was clearly situated within phases 1 and 2. A possible explanation for this is the fact that on average team members had been working for about seven years in the team, which makes it likely that the majority of teams had moved beyond the first phases at the point of the study. It is suggested that future research would work with a stratified sample in which a balance can be obtained between teams in the first phases of group development and teams in the later phases of group development.

Third, given the cross-sectional nature of the data, no causal influences about the explored relationships can be made. This research should be considered as the first step in exploring team learning over the development of a group. In addition, a longitudinal design would be an interesting approach, since it would allow the actual development of the teams to be followed from the start until the end of the existence of the team. Therefore, it could be possible to analyze how different teams evolve and regress through multiple development phases over time. However, the present study focused on the relationship between the group development model (Wheelan, 2005) and the team learning model (Van den Bossche et al., 2006) to function as a precursor for further longitudinal research on this topic. Also, because a team has worked together for a longer period of time, it does not necessarily mean it has achieved a higher level of group development. Therefore, the use of internal observers (e.g., team members as used in this study) and/or external observers will remain indispensable.

A fourth limitation is the fact that the teams consisted of more women than men. Even though the results from research about the effects of gender composition on team research seem conflicting, there is a tendency to state that gender diversity is positive for teamwork. This was not taken into account in this study.

A further limitation concerns the fact that our study did not take into account the full complexity in team development and team learning. On the one hand, complexity issues of team learning, such as the dynamic

relationship between team and individual learning, and issues of reversed causality were not addressed. Future research would benefit from gathering longitudinal data using mixed methods and multiple sources in order to grasp the complexity of the dynamics between different influencing processes within team functioning. On the other hand, complexity issues in group development, such as termination and dynamic membership change, may have been insufficiently addressed. The “termination element” was insufficiently dealt with in our design. Nevertheless, it is likely that team learning behaviors would occur differently in a termination or adjourning phase. Moreover, on some teams, members had left and others had joined. Research confirms that for many modern teams, membership continuously changes. This could suggest the necessity to add a transforming” phase between the performing and adjourning phases. Within this transforming phase, teams start a new but shorter sequence of forming, storming, and norming. Future research could increase our understanding of how the forming, transforming, and adjourning phases relate to trust and team learning.

In the theoretical background of the study, it was described that although group development is potentially a very important variable in team learning, until now it has generally been ignored in empirical research (Sweet & Michaelsen, 2007). This study further supports theories of how team learning develops (Dechant et al., 2003) and warrants the continued attention for the development of groups and teams within practice and academic research (Bonebright, 2010). Moreover, it showed that team development relates to team learning mainly due to the development of team psychological safety and group potency.

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Elisabeth Raes is with the Centre for Research on Professional Learning & Development, and Lifelong Learning, University of Leuven, Belgium.

Eva Kyndt is with the Centre for Research on Professional Learning & Development, and Lifelong Learning, University of Leuven, Belgium.

Stefan Decuyper is with the Centre for Research on Professional Learning & Development, and Lifelong Learning, University of Leuven, Belgium.

Piet Van den Bossche is with the Institute of Education and Information Sciences, University of Antwerp, Belgium, and the Department of Educational Research & Educational Development, Maastricht University, the Netherlands.

Filip Dochy is with the Centre for Research on Professional Learning & Development, and Lifelong Learning, University of Leuven, Belgium.

Corresponding author:

Elisabeth Raes can be contacted at elisabeth.raes@ppw.kuleuven.be.



Appendix: Items and Factor Loadings

Team Learning Behaviors

<i>Items</i>	<i>Factor Loading</i>
Team members draw conclusions from the ideas that are discussed in the team.	.837
Team members elaborate on each other's information and ideas.	.810
Comments on ideas are acted upon.	.805
Team members listen actively to each other.	.792
If something is not clear, we ask each other questions.	.782
Information from team members is complemented with information from other team members.	.781
This team tends to handle differences of opinions by addressing them directly.	.634
In this team I share all the relevant information and ideas I have.	.555
Opinions and ideas of team members are verified by asking each other critical questions.	.434

Development Phases

<i>Items</i>	<i>Factor Loadings</i>	
	1	2
Phase 4: This team acts on its decisions.	.737	
Phase 4: This team encourages high performance and quality work.	.727	
Phase 3: We can rely on each other. We work as a team.	.668	-.410
Phase 4: This team spends time planning how it will solve problems and make decisions.	.658	
Phase 3: This team is spending its time planning how it will get its work done.	.639	
Phase 4: Team members want to work within this team again in the future.	.628	-.339
Phase 3: This team is able to form subgroups, or subcommittees, to work on specific tasks.	.586	
Phase 4: This team has effective conflict management strategies.	.536	
Phase 3: Roles are becoming clearer in this team.	.485	
Phase 3: The content of our communication is task oriented.	.479	
Phase 4: This team completes tasks in a way all members agree upon.	.470	
Phase 2: Team members seem to have very different views about how things should be done in this group.		.760
Phase 2: Disagreement about goals and tasks emerge in this team.		.733
Phase 2: There is quite a bit of tension in the team at this time.		.709
Phase 1: There is a lack of group structure and organization in this team.		.583

Appendix: Items and Factor Loadings (*Continued*)

Development Phases

<i>Items</i>	<i>Factor Loadings</i>	
	1	2
Phase 1: Team members are concerned with personal acceptance of the team.		.442
Phase 1: We haven't discussed our goals very much in this team.		.432
Phase 2: Team members challenge the leader's ideas.		.362
Phase 1: There is very little conflict expressed in this team.		-.357

Note: Rotated factor matrix: Varimax rotation. Loadings below .35 omitted.

Excluded item: Team members tend to go along with whatever the leader suggests.

Group Potency and Psychological Safety

<i>Items</i>	<i>Loadings</i>	
	1	2
This team believes it can become exceptionally good and successfully accomplishing each assignment.	.856	
This team believes it can be very effective.	.733	
This team expects to be known as a highly performing group.	.647	
This team believes that no assignment is too tough.	.642	
This team can get a lot done when it works hard.	.611	
If you make a mistake in this team, it is often held against you. (R)		-.730
Members of this team are able to discuss problems and tough issues.	.674	
It is difficult to ask other members of this team for help. (R)	.656	
People in this team sometimes reject other team members for being different. (R)		-.641
It is safe to take a risk on this team.		.474

Note: Rotated factor matrix: Varimax rotation. Loadings below .35 omitted.

(R) Reversed item.

Excluded items:

This team has confidence in its own capacities.

Working with members of this team, my unique skills and talents are valued and utilized.

No one in this team would deliberately act in a way that undermines my efforts.