

Peer reviewed article

Teams that are creatively productive: Exploring the exploitable and exploiting the explorable

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Abstract

The present study examines team processes of exploring and exploiting in innovation teams, to understand important connections with team development. 51 innovation teams invented a business idea (related to explore), which was to be developed into a viable business plan (related to exploit). The business plans were assessed and divided in a) excellent; b) (mediocre); and c) (poor). Teams' internal interactions were evaluated accordingly using qualitative and quantitative studies, in both explore and exploit phase. The top performing teams were found to be highly adaptable to situational demands, continuously challenging each other and demanding a lot from each team member through a disciplined and task-oriented approach. The poorer performers were oriented towards social well-being of the group, creating a supportive atmosphere as a group norm. It is argued that this norm inhibited team innovation performance. This study contributes with knowledge on how to achieve psychological safety in teams to obtain the kind of creativity that is workable – exploring the exploitable and exploiting the explorable.

Keywords: Explore/exploit, team development, team creativity, psychological safety

BACKGROUND

A major intention with this study is to investigate the relationship of team processes and team learning, related to the concepts of exploring and exploiting learning activities. Research on exploration and exploitation is burgeoning (for a recent review, see Lavie, Stettner, and Tushman (2010)), but the current understanding of these constructs at the level of the team is very limited (Kostopoulos & Bozionelos, 2011). Although our knowledge of how the concepts of explore/exploit relate to team processes still seems limited (Marks, Mathieu, & Zaccaro, 2001), Kostopoulos and Bozionelos (2011) presents a significant study into how these concepts relate to team learning. Team learning and team development share some characteristics with regards to team processes, such as, for instance, the ability to entertain different ideas, to constantly seek to renew work practices and to explore novel possibilities for task completion (Chia, 2002; Gilson & Shalley, 2004). In investigating the explore/exploit contention at the team level, we will therefore focus on elements found to be important for team learning (Kostopoulos & Bozionelos, 2011), such as task conflict (e.g. Jehn, 1995), process development and psychological safety (e.g. A. C. Edmondson & Lei, 2014)), relating these to relevant team processes. In the article, we will with team processes intend internal group interactions (e.g. Sjøvold (2007)) related to these activities. In doing so, this study contributes to what we know about team development, performance and learning in several ways. First, we offer more knowledge on the team processes related to the explore/exploit contention. Second, by adopting a longitudinal research model, we provide much-needed insight into how team develop over time (see, for instance, the call of Anderson, Potočník, and Zhou (2014) and of Shin and Zhou (2007)). Finally, a better theoretical understanding of these dynamics should help practitioners in designing interventions to foster team learning that is related to team performance – exploiting the explorable.

THEORETICAL BACKGROUND: TEAM DEVELOPMENT - EXPLORE AND EXPLOIT

Learning is at the core of development (Klev & Levin, 2009). As such, team learning and team development are two if not entirely equal similar factors. Generic types of learning are represented by exploitation and exploration (Argyris & Schön, 1996; James G. March, Olsen, & Christensen, 1976). Exploratory learning refers to those learning activities that develop new capabilities whereas exploitative learning refers to those activities that refine existing knowledge and skills. Exploration involves activities related to searching, experimentation, discovery and innovation. Exploitation entails refinement, efficiency, implementation and execution (Li, Vanhaverbeke, & Schoenmakers, 2008; J. G. March, 1991). The research on how these factors interplay is however scarce (Kostopoulos & Bozionelos, 2011), and we know little for instance if they impede each other when they occur together (A. Edmondson, 1999), and little of how they relate to key team processes that develop over time (Kostopoulos & Bozionelos, 2011; Mathieu, Heffner, Goodwin, Cannon-Bowers, & Salas, 2000). These pivotal types of learning may relate differentially

to key team processes and psychological characteristics, such as task conflict and psychological safety, respectively (Mathieu et al., 2000).

Explore and exploit

Associated team processes with explore as learning activity are searching, experimenting, developing new ideas and discovering. Team exploration is often linked to team creativity. Although team creativity intuitively is dependent on creative individuals, team processes (e.g., internal communication, team cohesion and vision) have been shown to be more important (Hülshager, Anderson, & Salgado, 2009). Rodríguez-Sánchez, Devloo, Rico, Salanova, and Anseel (2017) emphasize the importance of social integration processes (such as team cohesion) in these regards. The underlying rationale is that they stimulate positive team member interactions (Hülshager, Anderson, & Salgado, 2009). Previous research advocate the importance of a supportive and non-threatening atmosphere (Hülshager et al., 2009), as to stimulate members to interact with each other and facilitate the exchange of ideas. Others point to the fact that cooperative norms and a collective goal contribute to creative success, through constructively discussing and building on each others ideas (Anderson, De Dreu, & Nijstad, 2004). Similar research such as Anderson et al. (2014) report that aggregated individual-level creativity is supported at the team-level when groups display cooperative behavior. The psychological safety notion of A. C. Edmondson and Lei (2014) builds on this argument in the same way; that group relations need to be trustful and supportive; as to avoid fear of condemning behaviors (Cheung, Gong, Wang, Zhou, & Shi, 2016).

The other important dimension of team learning is exploitation, or also the ability to produce outputs, be efficient and obtain results (Li et al., 2008). The associated processes are efficiency, task-orientation, implementation, focus on authority and discipline (Dyer, Gregersen, & Christensen, 2011; James G. March, Simon, & Guetzkow, 1958). J. G. March (1991) noted the importance of exploitation for innovation, as an imbalanced exploration may result in more variance than was desired, as well as a significant amount of work without attaining results. Exploitation on the team level entails team members that engage in variance-reducing activities in an effort to exploit their current knowledge and expertise and, thereby, improve their performance. In many team-based projects, there is motivation to implement exploitation practices to minimize ambiguity and manage multiple task requirements (Gilson & Shalley, 2004). There is also evidence that teams need a focus to coordinate efforts. Persistent team vigour, dedication and absorption are crucial characteristics needed by teams in order to stay focused on their efforts (David, Kim, Farh, Lin, & Zhou, 2018).

Psychological safety

The psychological safety notion developed by A. Edmondson (1999) is about a relationship that is safe enough that you dare to say things without being afraid to step on your toes. Make mistakes without being punished. That one is confident of being able to show oneself, ie «my real self», without fear of negative

consequences (Kahn, 1990). It's about trust. Ancona claims in its book «X-teams» (2007) that building trust within the team is useful and necessary, but something you should spend little time on at the beginning of a collaboration. Sjøvold (2014) goes even further and claims that the opposition dimension in SPGR, i.e. saying no, disagreeing, is something that should be implemented as soon as possible. Put another way: the forming phase of Tuckman is something you should spend very little time on. It is about the ability of taking interpersonal risks in a particular context such as a workplace (e.g., Edmondson 1999), through a willingness to contribute ideas and actions to a joint task. For example, psychological safety helps to explain why employees share knowledge and information, take initiative in new product development, and, speak up with suggestions for organizational improvements (A. C. Edmondson & Lei, 2014). Psychological safety may influence team learning activities because team members tend to choose their actions on the basis of the level of risk they attach to them (Edmondson, 2003; Yagil & Luria, 2010). In this sense, it follows that a natural consequence is that psychological safety promotes exploratory learning – in that people feel safe to adopt new views and express them. However, (Kostopoulos & Bozionelos, 2011) find that it also promotes exploitative learning, and then in a non-linear way.

Exploring the exploitable

Exploration and exploitation are often presented as antithetical – as a paradox – and researchers have emphasized that although they are important, they are extremely difficult to employ together. Exploration and exploitation are therefore traditionally thought of as something that involves development, and it has been suggested that creative ideas have to be invented and explored before they are apt for production and exploitation (Heldal, Sacramento, & Wennes, 2017). Regarding literature on team development, this attests that teams should seek out exploration processes in the early phase with exploitation in the later phase. This can be associated with the punctuated equilibrium model developed by Gersick (1989), the forming, storming, norming and performing model developed by Tuckman (1965), and the model of Wheelan (2014) where early stages of development involve dependency conversations, inclusion and safety issues and more “mature” stages involve productivity. Especially stage 2 is important for Wheelan, in that groups here need to have some sort of conflict to evolve into more mature stages.

The acknowledging of opposing views may be similar to processes normally associated with task conflict. At the team level, Kostopoulos and Bozionelos (2011) suggests that exploration and exploitation are distinct but not mutually exclusive learning activities that operate at the team level, and that teams should pursue both if they are to maximize their performance. They find that task conflict enhances the ability to juggle both exploration and exploitation activities, thus ultimately enhancing performance. Chang, Bordia, and Duck (2003) notes that the commonality across these models of group development is that teams often experience conflict – which they must overcome – prior to achieving a more cohesive, mature stage of team development (Tekleab, Quigley, & Tesluk, 2009). Thus although Kostopoulos and Bozionelos (2011) acknowledge a more non-linear

model, the linear perspective of development is still eminent – forming, storming and norming is to be achieved before performance is possible. Psychological safety achieved through some sort of conflict thus enables performance in latter stages. Therefore, a climate of psychological safety should create such social relationships with the team that endorse the exploitation of available knowledge and skills, and that team learning activities intervene between team processes (ibid).

Task conflict and psychological safety

Some reason has arguably to do with traditional views on conflict. Task conflict is positively related to group outcomes like cohesion, through the exercise of voice in team decision making. An important caveat to this relationship is that the effects of relationship conflict must be minimized, as task conflict may spill over into relationship conflict (A. Edmondson, 1999; Ensley, Pearson, & Amason, 2002; Jain, Thompson, Chaudry, McKENZIE, & Schwartz, 2008; Jehn, 1995). In other words, task conflict has a positive influence on outcome variables, but only when it does not result in relationship conflict. This view asserts that relationship conflict will be negatively associated with team effectiveness (Tekleab et al., 2009). Other researchers find that while conflicts may or may not lead to more cohesion, it is of greater importance how you handle the conflict. More recently, conflict management research findings have shown that the effective handling of conflicts that arise during team interactions may produce direct benefits. Vliert, Euwema, and Huisman (1995) hypothesized and found support for the effect of conflict management on relational outcomes (e.g. mutual trust and quality of personal relationships), which are conceptually related to team cohesion (Evans & Dion, 1991). This empirical evidence suggests that teams with higher levels of conflict management may be likely to develop greater levels of cohesion than those with lower levels of conflict management.

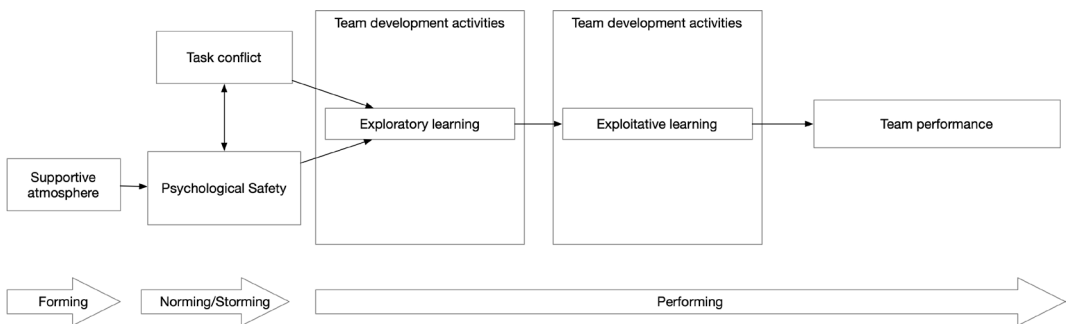


Figure 1: Traditional team development

Towards a more dynamic understanding

Certain researchers claim that teams do not develop linearly in such phases (e.g. Kayes (2003); Sjøvold (2002) (McGrath, Arrow, & Berdahl, 2000)), and even

more contemporary views on the explore/exploit dilemma see it as a dialectic to be performed simultaneously, mutually reinforcing each other (Luscher & Lewis, 2008). More recent theoretical (e.g. Lavie et al. (2010); Raisch, Birkinshaw, Probst, and Tushman (2009) and empirical work (e.g. Gibson and Birkinshaw (2004); Jansen, Tempelaar, Van den Bosch, and Volberda (2009)) conceptualizes and tests exploration and exploitation not only as distinct activities, but also as activities that can be accomplished concurrently, such that high levels of exploration can coexist with high levels of exploitation within an organizational unit. Performance is about acknowledging these tensions and opposing views, so as to either accept them or resolve them (Poole & Van de Ven, 1989). At the team level, Kostopoulos and Bozionelos (2011) argue that although they are distinct activities, exploration and exploitation should be performed continuously in a recurring fashion (i.e. non-linearly). The suggestion that teams' performance is built around paradoxes is also suggested by Silva et al. (2014), who present the paradox of conflict as one of four paradoxes. They argue that there is a cognitive version of this paradox, that nurture a positive team environment; and that there is an affective version, that have the potential to damage team spirit. The former can be associated with task conflict, while the latter may be associated with team conflict.

Previous research thus seems to agree on the hypothesis that task-related conflict processes are linked to team development, and that they may bridge the exploration and exploitation dilemma, thus also being important for team performance. Conflict is associated with team processes like voicing up, acknowledging opposing views and conflict management. Voicing up at the team level has proven to be positive for the acceptance of group decisions (Greenberg, Ashton-James, & Ashkanasy, 2007), and thus also group cohesion (Evans & Dion, 1991). Cohesion and a supportive atmosphere seem important for the ability to obtain a performance-related conflict, however, the link to development is debated. Some research proposes a kind of transition-oriented approach towards development with supportive processes as initial bases (e.g. Gersick (1989); Tuckman (1965)), with such processes enabling the transition between exploration and exploitation. Wheelan (2014) may be the strongest proponent here in claiming that conflict needs to be experienced before performance may be achieved. Others (e.g. Evans and Dion (1991); Vliert et al. (1995)) propose the opposing view: that team cohesion is not an enabler but follows from other activities (i.e. task resolving and exercise of voice). Yet more scholars again question the linearity of such developments. Recent innovation literature suggests that such activities should be performed simultaneously, which would translate to conflict interactions promoted at the very start of group life in the form of recurring processes. According to the group interactive stance adopted in this paper, team development is not linear or phase-dependent (Sjøvold, 1995), which leads us to the following research question:

| *How do team processes associated with conflict (e.g. voicing up; showing opposing views) correlate with team development to achieve team learning?*

METHODOLOGY

We employed a mixed methods approach in the study, both qualitative and quantitative. We will first describe the quantitative instrument.

The groups

Investigation was performed on a sample of management students with different engineering backgrounds, similar to an MBA programme. These students were randomly assigned to teams, consisting of groups of 3–5 students. They did not know each other on beforehand and were randomly distributed with regards to gender and age. There are admittance requirements to the programme, with students in general needing a general grade level of B or higher. We also performed a check on the students' overall ratings during the programme, with no significant differences appearing between the groups. We thus have reason to believe that students were evenly dispersed within the groups, in order that we may contribute differences in performance to team processes. All groups were explicitly performance-oriented aiming for a top level grad. Students were asked for consent to use the results in our research and informed on which data are gathered and how it was used, that participation is voluntary, and that they can withdraw from the study without any consequences and have the collected data deleted at any point.

Table 1: Overview of respondents

	Number of persons	Number of groups	Number of ratings
A-groups	79	19	350
B-groups	96	23	415
C-groups	39	9	171
Total	211	51	936

The setup

The task was to: 1) come up with an innovative business idea; and 2) develop a business plan for this idea. The ideas were developed according to the framework of Osterwalder and Pigneur (2010). All teams were encouraged to work iteratively with potential customers and clients, as the core idea of design thinking (Head & Alford, 2013). This work was performed during a course in business development, while the team measurements were performed in a course on team development. The business plans were assessed by one or two professional business developers and the course administrator according to the following criteria, in line with the framework of Sørheim and Botelho (2016): is the business idea sufficiently new and innovative? Is there a market/customer need for the idea? Do we possess the

right resources in our team? Is the financial plan thoroughly worked through? Each of these were rated on a scale, with the options being: A (excellent); B (good with some flaws); and C (mediocre). Plans were, as a total, subsequently rated as follows: (A): the business idea and corresponding business plan are good enough to be further continued/developed; (B): the business idea and corresponding plan have some merit, but need some work or changes; and (C): Do not invest in this plan. The level of the A's approached levels of "real" business ideas – and some later turned into business ventures. Teams were as such given a task that both contained explore (invent an idea) and exploit (deliver a pitch).

Team measurements

The teams were all measured with the SPGR instrument (as described below) one week after the start of the study (in the exploration phase) and two weeks before the presentation of the plan (exploit phase). The survey was distributed electronically. The time span of the process was 8 weeks. After the first test, teams were informed of the results and asked to reflect on possible measures. In the second session, the groups were encouraged to reflect on the effect of their chosen actions and resulting dynamics. Teams were also required to hand in reflection notes at the end of the process. Quantitative findings are based on the SPGR instruments, while qualitative assessments are based on observations, notes from the coaching sessions and analyses of the reflection notes.

The instrument and data analysis

The Systematizing Person-Group Relations Instrument (SPGR) was used for data gathering and investigation (Hare, 2003; Sjøvold, 2007). The SPGR process is based on the semantic differential scaling technique established by Osgood, Suci, and Tannenbaum (1957). Earlier studies (Koenigs, 2000; Sjøvold, 2007) have described the validity and reliability of the SPGR tool, and the instrument has been used in different settings (Andre & Sjøvold, 2017; Heldal, Sjøvold, & Heldal, 2004; Schultz Joseph, 2017). The subsequent detailed appearance of the SPGR tool is presented similarly to the methodological descriptions in an earlier study (Snider & Osgood, 1969). The SPGR scale consists of 24 items describing team interactions/team behaviors. Each item is rated on a scale of the interaction, described as occurring never or seldom (1), sometimes (2) or often (3), where each group member rates each person within the group accordingly. This results in a profile of each group member's interactions within the group. The 24 items are, for analytical purposes, synthesized into 12 functions. These are described in Table 2, with links to previously presented theories. The Cronbach's alpha for the questionnaire in this study varies from 0.78 to 0.92, dependent on the subject in question.

Table 2: Overview of SPGR functions and theoretical connections

SPGR function name	Associated team processes (internal interactions)	Theoretical relations
C1 Task-orientation	Analytic, structured, logical, task-oriented, time-oriented, neutral, punctual	Exploit (James G. March, Simon, & Guetzkow, 1958)
D1 Loyalty	Willingly working, following norms, trustworthy, precise	Task cohesion (Rodríguez-Sánchez, Devloo, Rico, Salanova, & Anseel, 2017)
S1 Engagement	Inspiring, motivated, lively, involving other opinions, solution-oriented, positive	Task engagement, task cohesion (Costa, Passos, & Bakker, 2014; Rodríguez-Sánchez et al., 2017)
S2 Empathy	Open, involving others, smiling/laughing, actively listening, encouraging others, interested in others	Constructive group supportive (Hülshager, Anderson, & Salgado, 2009), group cohesion (Costa et al., 2014)
D2 Accept	Accepting group norms, listening, recognizing others, giving into others, grateful, asks for help	Group cohesion (Rodríguez-Sánchez et al., 2017), conformity (McGrath, 1991)
N1 Nurture	Openly attentive to other's needs, supporting others, offering help, offering trust, offering a snack	Supportive, non-threatening environment (Anderson, De Dreu, & Nijstad, 2004), trust-building, cohesion (Rodríguez-Sánchez et al., 2017)
N2 Creativity	Intuitive, dramatic, spontaneous, looking for absurdity, experimenting, breaking norms	Explore (James G. March et al., 1958); team creativity (Anderson, Potočnik, & Zhou, 2014; Rodríguez-Sánchez et al., 2017)
O1 Critique	Openly disagreeing, doubtful, attentive to aberrations, challenging norms, questioning authority	Task conflict (Tekleab, Quigley, & Tesluk, 2009), voicing up (Edmondson & Lei, 2014)
W1 Resignation	Non-talkative, not participating, non-responsive, passive, low confidence	Fear of condemning (Pescosolido, 2003), free-riding (Sjøvold & Park, 2007)
W2 Self-pity	Sad, complaining, expresses sorrow and disbelief, self-pitying	Fear of condemning (Pescosolido, 2003), free-riding (Sjøvold & Park, 2007)
O2 Self-promotion	Demanding attention, rough, rigid, aggressive, tough, individualistic, blunt, brusque, stepping on others	Voicing up (Edmondson & Lei, 2014), relational conflict (Tekleab et al., 2009),
C1 Control	Steering, controlling, authoritarian, rule managing, agenda setting, time-limit-oriented	Exploit (Dyer, Gregersen, & Christensen, 2011; J. G. March, 1991), systematic cognitive leader style (Busenitz & Lau, 1996)

FINDINGS

Qualitative descriptions will be presented first. Quantitative findings will be supplemented with qualitative findings when appropriate.

Qualitative description of the groups

Although the groups worked in similar fashions with regards to the task of explore and exploit, there were visible differences between the groups.

C-Groups: The happy-go lucky

Many had from the start an emphasis on social activities, making it fun, bringing in snacks. Half of these groups had such activities, self-reflecting on these activities as «building the team» and creating a more cohesive group. With regards to perceived performance, these groups were on the whole very content with their group. Not clear if they reflect on the group experience or the performance factor, but it seems that the group experience either way was more important (to be happy with the group). One of these groups even had their own social-responsible, being responsible for «satisfaction». Few of these groups report challenges or conflicts. Many of these groups had problems in selecting the one idea to be developed. In the beginning new ideas were continuously launched, and seemingly because all were supported further on it resulted in a stalemate and resignation.

Some contentions were observed, but these we're not responded actively to by the groups. One conflict was observed and reported also by the group themselves in the reflection notes. It was not attended actively too. The conflict originated with a very challenging, ruling and authoritative team member - that despite not being the appointed leader made most of the decisions. The others withdrew, resulting in passivity as a whole. With regards to leadership, these groups had an «happy go lucky» approach, with rotating leadership roles (as suggested by teacher), but an almost passive approach towards the leadership function. It was either being responsible for buying snacks, or nothing at all (they were content, and reflecting in their reports that they did not need a leadership function, wanting a flat structure). As a whole, these groups were characterized by a rather low level of energy, leaning backwards, speaking with low voices, turn-taking waiting for others, passivity and unclear decision making.

B-groups - the wanderers

As a whole, the B-groups were forward-leaning and active. However, they were often characterized by not being able to find a common ground, apparently not bringing them somewhere (although this appeared in different ways). Many of the groups experienced misunderstandings, spending a lot of time wondering what the others meant. Some reported challenges with their group work, and worked with it - but not systematically. When trying to challenge each other, they often ended up with a perception of this as not constructive and either returned to being

conform or too polarized. While these groups could seem to employ some of the behavioral characteristics of the A-groups, they were not whole-hearted and plan-less. Some groups here could have a one-sided focus on the plan, others were too drifting. With regards to leadership, these groups seemed more attentive to the role than the C-groups, but not much. Also here were there reports of wanting a flat hierarchy, and leaders were expected to be if anything task-oriented, nothing else. Some of these groups were very satisfied with their achievements, others were more indifferent. None of them voiced an eagerness, impatience or mis-satisfaction that could result in putting in an effort to improve

A-groups: The impatient, systematic and challenging groups

This batch all worked in different manners. One group had to split up because one of the members was ill and had to work from his home (the whole period). Another group consisting of three members, came to the conclusion after the coaching session (half-time) that they would be better of working together but not as a team. They split up, with two of the members working together while the third member worked alone - coming together only to decide on deliverances and future tasks. The other groups would work along the whole specter from splitting the group, towards being together most of the time. Only one of these groups had an espoused emphasis on social well-being within the group. Characteristically all these groups worked systematically and disciplined with both task-orientation but also with team relationships. For instance would many of these, in confront of the B- and C-groups, fixate team roles early (only two of the groups did not) and employ more formal roles than the other groups. The A-groups would employ a leader (as also some of the others), but also a secretary and some even a devil's advocate role. A clear structure appeared in how they rotated on these roles. Leaders were firm and authoritative. As a confront to the C-groups, these groups were quickly to decide on the business idea to be developed. This necessarily involved firmness and the discarding of some ideas. They worked with challenging each others, both with tasks (e.g. deliverances) and team relations (e.g. performing the role) - from the very start. Approximately half of the groups was by coincidences subjected to adversity they had to overcome. Common for these, was that they dialogued and communicated through the adversity, employing honest feedbacks. The other half did not experience adversity, but still in much the same manner communicated and dialogued with honest feedbacks. Findings are summarized in table 3.

Table 3: Qualitative assessment of the groups

	C-groups	B-groups	A-groups
	"happy-go-lucky". Oriented towards well-being	Wanderers, try "everything". Impatient and motivated, but without discipline	Disciplined, impatient and never content. Highly development-oriented. Adaptable.
Focus of loci	Focusing on a positive attitude, supporting each other, establish-ing cohesion within the group.	Active approach, highly spontaneous, drifting focus	Systematic, disciplined, eager. Cohesion within the group not ac-tively attended to.
Coach-relation	Relationship with coach: not understanding or wanting; pas-sively attending to advice.	Actively attending to advice, interested and cooperative. Varying levels of implementing measures.	Actively attending to advice, interested, questioning, challenging. Disciplined in the implementation of measures.
Group climate	Dedicated social-oriented measures (bringing cakes to group meetings); actively attend-ing to well-being of everyone.	Highly variable. One group conflict; one group in a state of group-thinking; one group isolating a free rider.	Challenging each other, critical climate, high temperatures, numer-ous disagreements.
Measures	Measures aimed at supporting the group, being friends, having fun, democracy and agreement.	Different and variable measures, adapted to the situation and task at hand.	Similarly to B-groups, but even more attention to being honest in communicating with each other and being disciplined in the task.
Own perception of performance	Highly satisfied with their own group and performance.	Groups avoiding adversity were content. Groups experiencing adversity expressed res-ignation.	As a total, not happy with their own performance (pointing to all the things they could have developed or done better).

Quantitative findings

Figure 2 refers to a general overview of Round 1, to demonstrate a comprehensive picture of the groups. We see that interactions S1, S2, D1, D2, C2 and N1 score, in general, higher than the others (all differences here are significant). This spectrum is expected for normal-functioning performance groups (Sjøvold, 2006). Note also the relatively little amount of creativity (N2). We start out with this picture to demonstrate that all in all, the groups are similar, performing relatively well (we will subsequently depict the differences that are relatively small, albeit significant, but that may affect performance).

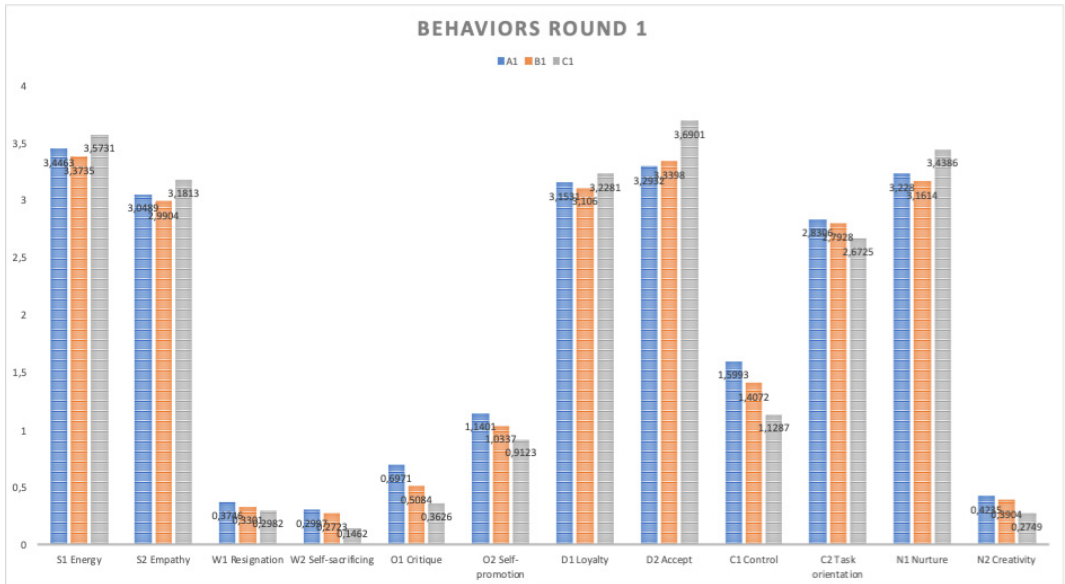
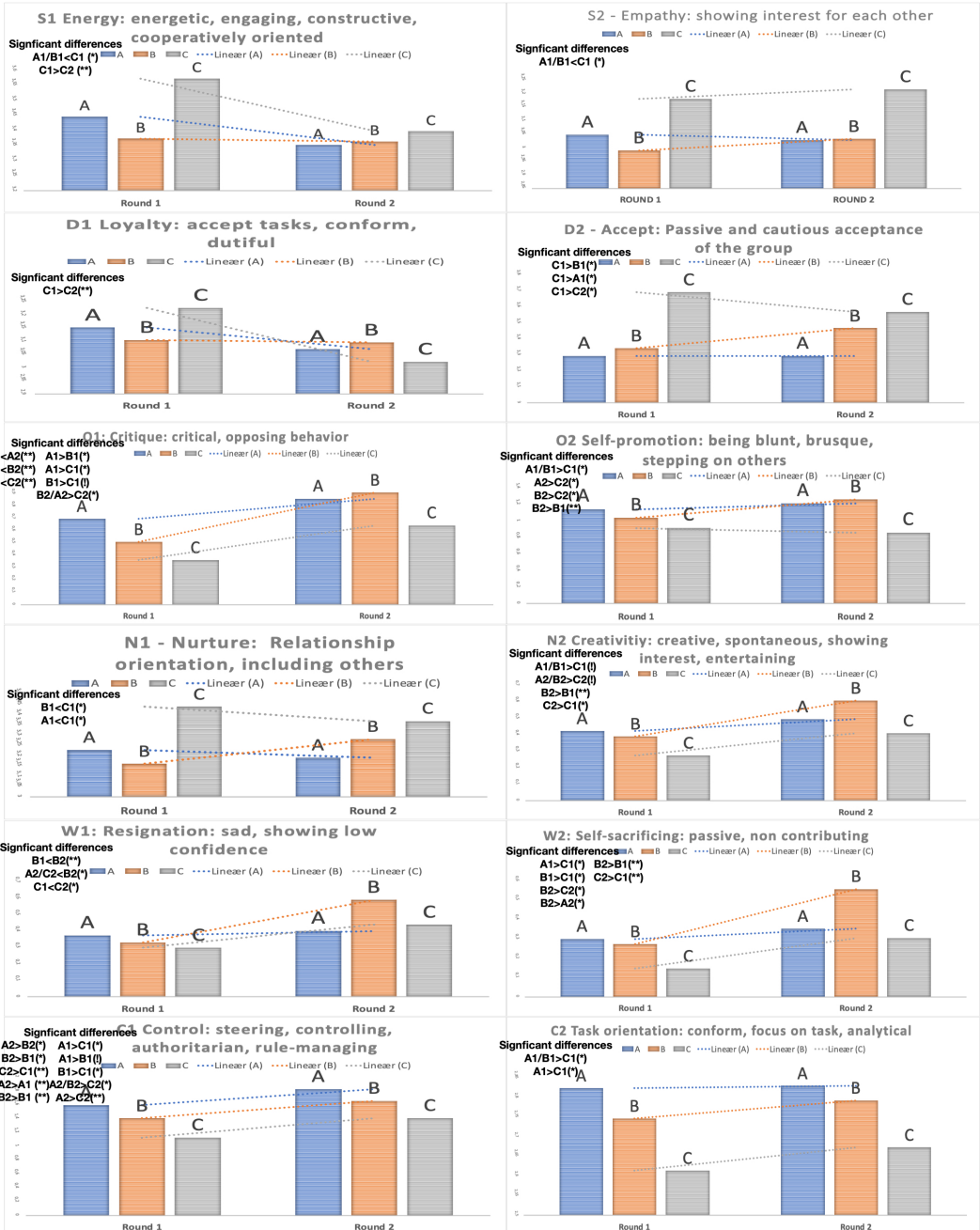


Figure 2: Overview of groups' SPGR scores

*Exploring the exploitable and exploiting the explorable:
Differences from Round 1 to Round 2*

In this section, we will examine the two rounds together. Figure 3 offers a comprehensive picture of the scores with significant values. These are also offered in table 4. This involves a special attention on how the teams develop, that is, the significant differences between Round 1 and Round 2. We will also pay specific attention to the hypothesis that conflict interaction is a mediator both for being creative (exploration) and performance (exploitation). The latter will involve a special attention on the correlation of (active) conflict interactions (O1 - critique; O2 - self promotion) and N2 (creativity) with C2 (task-orientation).

Regarding significant differences between the rounds, the C-groups show 7; the B-groups show 4; and the A-groups show 1. The only interaction factor that changes for the A-groups is O1 (critical, opposing interaction), which increases (it increases significantly for all groups). Because this is equal for all groups, it is difficult to link to differences in performance. It is notable, however, that the A-groups are the highest in Round 1, and slightly lower than the B-groups in Round 2. As this interaction denotes the challenging of one another, the all over increase could be a sign that “the going gets tough” as the groups approached the deadline. As this development is natural (i.e. situational), this then becomes a question of which groups were best adapted to handle these interactions. From the findings in Round 1, the answer seems to be that the A-groups' having started with a challenging climate made them more apt to handle the “going gets tough” situation around the deadline.



*=significance at the 0,05 level; **=significance at the 0,01 level; l=significance at the =,1 level

Figure 3: Overview of group differences and significant values.

Findings related to group motivation are energy/synergy (S1 - task oriented energy; this is similar to task engagement; and S2 - group oriented energy) and withdrawal/resignation (W1 - group oriented, and W2 - task oriented), show that A-groups are lower on group motivation than the other groups at the start (Round 1). These demonstrate the critical self-evaluation of the A-groups – that they already from the start expected more from each other, while the C-groups start out with a very positive approach towards each other, searching or striving to be satisfied. In Round 2, the differences between the A- and C-groups levelled out (S2 - empathy is still highest, but not with any statistical difference) or even reversed. The A-groups show significantly fewer resignation interactions than the B- and C-groups in this phase.

To sum up, our findings suggest that in the exploration phase, the A-groups are the most authoritative (C1), task-oriented (C2), self-promoting (O2) and critically challenging of each other (O1). The C-groups are higher on supportive relationship orientation (N1) and group loyalty/conformity (D2). All groups develop towards a lessened relationship orientation (N1) and more critique/task-oriented interactions (O1) at the end (exploitation phase). The C-groups, however, diminish their self-promoting interactions (O2), while the A/B-groups increase their self-promoting interactions (O2).

We theorize based on these findings that the C-groups' initial relationship orientation made them less able to achieve the self-promotion and critically opposition of one another that is necessary to be creative in the exploration phase, as well as the discipline and task-orientation needed to be efficient in the exploitation phase. Conflict interactions as such were enablers of the ability to exploit the explorable (we will elaborate on this in the discussion section).

Findings may be summed up as follows: It is not possible to spot any development in the form of enhancement of some behaviors in favour of others (in general). This attests to a form of non-linearity in the development. Still, it may be possible to argue that a possible difference lies in how the groups started out and how this very quickly formed norms within the groups.

DISCUSSION

In this article, we have investigated some possible and suggested factors according to previous research, from a team-processes perspective in relation to the learning concept of exploration and exploitation. Contemporary research advocates in general for the importance of supportive interactions as a basis for building trust and in-group relationships. This is normally hailed as a basis for psychological safety – the ability to openly speak up, contribute with individual ideas and handle conflicts – without fear of being condemned. In other words, team members need this comfort before they can challenge each other. Our findings suggest a cautiousness with regards to this. They indicate that an over-focus on such interactions is likely to achieve a lock-in effect of conformity interactions, disabling other interactions necessary for innovation performance, such as discipline, structure, individual voicing up, critically challenging each other and creativity. We will argue that some of the problems of previous research lie in seeing performance as a linear development.

Table 4: Statistical data (continue on the next page)

Team interactions		A-groups (M)	B-groups (M)	C-groups (M)	Significant differences
Empathy	S2_1	3,05	2,93	3,14	A1/B1<C1 (*)
	S2_2	3,04	2,97	3,16	
Accept	D2_1	3,30	3,36	3,65	C1>B1 (*); C1>A1(*); C2/B2>A2 (**); C1>C2(*)
	D2_2	3,34	3,42	3,49	
Nurture	N1_1	3,23	3,08	3,38	B1<C1 (*); A1<C1 (*)
	N1_2	3,23	3,19	3,31	
Creativity	N2_1	0,43	0,40	0,25	A1/B1>C1 (!); B2>B1 (**); C2>C1 (*)
	N2_2	0,51	0,71	0,45	
Critique	O1_1	0,70	0,56	0,36	A1>B1 (*); A1>C1 (*); B1>C1 (**); B2/A2>C2(*); A1<A2 (**); B1<B2 (**); C1<C2 (**)
	O1_2	0,84	1,04	0,62	
Resignation	W1_1	0,38	0,33	0,30	B1<B2 (**); C1<C2 (*); A2/C2<B2 (*)
	W1_2	0,40	0,71	0,43	

Team interactions		A-groups (M)	B-groups (M)	C-groups (M)	Significant differences
Selfpity	W2_1	0,30	0,31	0,14	A1>C1 (*); B1>C1 (*); B2>A2 (*); B2>C2 (*); B2>B1 (**); C2>C1 (**)
	W2_2	0,35	0,69	0,33	
Self-promotion	O2_1	1,21	1,10	1,00	A1/B1>C1 (*); A2>C2 (*); B2>C2 (*); B2>B1 (**)
	O2_2	1,21	1,45	0,96	
Control	C1_1	1,61	1,45	1,26	A1>B1 (!); A1>C1 (*); B1>C1 (*); A2/B2>C2 (*); A2>C2 (**); A1<A2 (**); B1<B2 (**); C1<C2 (**)
	C1_2	1,84	1,75	1,47	
Task orientation	C2_1	2,80	2,77	2,58	A1/B1>C1 (*); A1>C1 (*)
	C2_2	2,81	2,86	2,62	
Loyalty	D1_1	3,22	3,11	3,34	C1>C2 (**)
	D1_2	3,15	3,11	3,15	
Engagement	S1_1	3,44	3,37	3,55	A1/B1<C1 (*); C1>C2 (*)
	S1_2	3,37	3,32	3,36	

** Significance at the 0.01 level; * Significance at the 0.05 level; ! Significance at the 0.1 level
A1=A round 1 (n (ratings)=350); A2 = A round 2 (n=343); B1 = B round 1 (n=415); B2 = B round 2 (n=415); C1 = C round 1 (n=151); C2 = C round 2 (n=151)

Theoretical implications

Our data suggest firstly that supportive interactions in the exploration phase (getting to know each other, supporting each other, being group-oriented) weakened the ability of individuals to express their own views and challenge each others' views, which is an important component of psychological safety (A. C. Edmondson, Bohmer, & Pisano, 2001). The A-groups were, as such, similar to a state of being psychologically safe (A. Edmondson, 1999), while the C-groups were paradoxically closer to a state of fear, as described with harsher group climates (Pescosolido, 2003) (paradoxically because they had an open attention to avoid this). We argue that a reason may be found in the A-groups' ability to be disciplined, together with their task-orientation, from the very start. The C-groups started out with an attention to fun and joy (and in a weaker fashion, the same is true for the B-groups). The latter may have been a troublesome restriction for the C-groups, with the data suggesting that they simply were not able to develop other team interactions. Langfred (2004) argues that for groups that do not place a high, controlling value on productivity, high levels of cohesion can actually be counterproductive being formed as a group norm. On the other hand, Rodríguez-Sánchez et al. (2017) argue that the collective engagement around a task enhances intrinsic motivation. Hackman and Wageman (2005) also notes the potential positive effect for cohesion, highlighting, however, the importance of compliance to an accepted authority in the group.

Let us now turn to the hypothesis that conflict interaction may serve as a catalyst for switching between exploration and exploitation, and that this is not a stage that can be reached nor surpassed (they are recurrent parts of the team's life, and thus are also needed from the very start). First of all, the A-groups were significantly higher than the other groups from the very start on interactions associated with conflict (being in opposition, critical and individualistic), and importantly, these interactions were not seen as detrimental to the group climate. Seen from the outside, these groups were direct and challenging in a constructive fashion. This is in line with previous researchers' arguments on the value of task conflict: that it enhances performance as long as it does not evolve into a relationship conflict. Voicing up at the team level has proven to be positive for the acceptance of group decisions (Greenberg et al., 2007) and thus also group cohesion (Evans & Dion, 1991). It is, however, possible that conflict per se was not the important factor for the A-groups, but rather, how they worked together (in line with the argument of Jehn (1994), who states that conflict *management* is the important element). We would in this case put forward the similarity of working to achieve a shared mental model (SMM). An SMM may enhance the team members' coordination and effectiveness in performing tasks that are complex, unpredictable, urgent and/or novel (Marks et al., 2001), which is similar to the business idea task of this project. From our results, it may be suggested that conflict for some teams (the A-groups) enabled group conversations from which emerged an SMM; the other A-groups achieved, however, the same through a conscious and disciplined attention to engaging each other with honest feedback (in line with the psychological safety concept of A. C. Edmondson et al. (2001)). It may thus be suggested that the promotion of conflict interactions enabled both exploring and exploiting learning activities.

The second issue we will address is how this developed over time. Our findings suggest that teams that perform are able to juggle exploring and exploiting together. Neither groups showed any linear developments that may be attributed to these learning activities. We will argue that it may be a sign that performing groups reach a kind of stability through being flexible. We have postulated that the A-groups were highly enabled to meet situational demands, yet results indicate that they changed group interactions the least from Round 1 to Round 2. This may be a methodological issue: that the quantitative data are measured only twice through a cross-sectional setup. The qualitative analysis suggests, however, that the A-groups were swift and forward-leaning in responding to situational demands, while the B- and C-groups responded only when needed (and then only with the weakest alternative). According to linear development perspectives in the line of Tuckman (1965), exploration activities related to psychological safety follow only after cohesion building, and exploitation activities are possible only after the conflict stage. Our data are more in line with that of researchers emphasizing the non-linearity of group development (e.g. Kostopoulos and Bozionelos (2011); Sjøvold (2007) – however with the important accentuation of being cautious with starting a development process with supportive team processes. We will stress again that the C-groups, with their attention to supportive interactions and seeking team cohesion, neither reached a conflict level they could work through, nor planned to challenge each other in open discussion. The findings of the exploitation phase indicate an even stronger nuance: that the C-groups experienced, as did the other groups, a more stressful and tougher climate approaching the deadline, but that they were not able to make the switch from being supportive to being challenging with each other because of their established norm of cohesion-seeking interactions (i.e. not acknowledging or recognizing conflict interactions). The A-groups' ability to cope with stress and a challenging atmosphere enabled the kind of stability and collaboration needed to pull the group in the right (and same) directions so as to perform together. This suggests that team development is linked to a more dynamic group development than linear phases, and this is in line with researchers such as Kostopoulos and Bozionelos (2011), arguing that exploration and exploitation are distinguishable activities that effective teams excel at without sacrificing one for the other.

Our findings thus corroborate previous research on the non-linearity of group development, and adds important reminders to an understanding of psychological safety: previous research seems to have an over-inclination to the importance of a supportive atmosphere to enable psychological safety (and thus in a linear fashion). Kostopoulos and Bozionelos (2011) are attentive to the non-linearity in developing psychological safety together with stimulating exploratory and exploitative learning activities, which our findings corroborate. Still, we wish to emphasize the role of discipline, authority and task orientation as important development drivers.

A very important point in the non-linearity we suggest, is also the importance of not starting with supportive team behaviors. Findings suggest that they are important, but that an overly emphasis on these behaviors from the start may have a tendency to lean towards conformity (and thus not development). We reason that a supportive atmosphere should not be an aim per se, as this may hamper development towards performance.

Our argument is summarized in figure 4. We seek to illustrate here the non-linearity in the activities. This may be understood as an important point of balance – in that you should strive for non-linear development, even if it may seem uncoordinated. Further, notice also that supportive behaviors (related to Tuckman’s forming) are omitted in the figure. We do not want to state that these are not important, but that a supportive atmosphere is something that may follow from doing other activities.

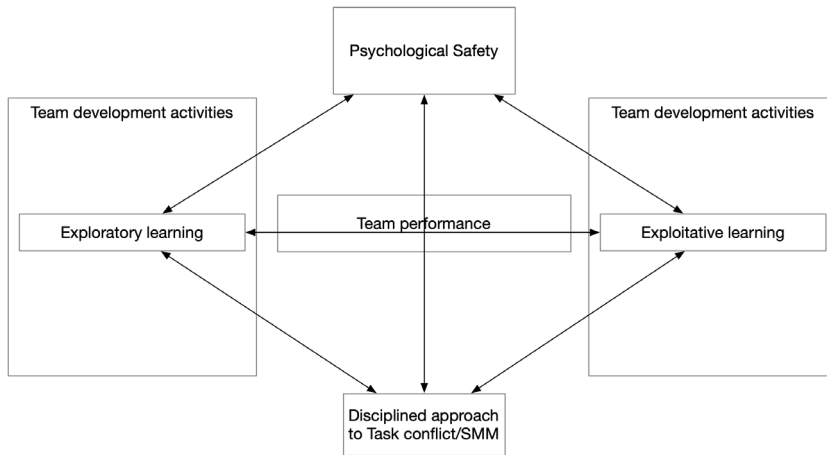


Figure 4: Team development exploring the exploitable and exploiting the explorable.

Practical implications

In discussing our findings, we want to reiterate that our arguments must be understood relatively to the context and to each group. The task at hand has been one of both creativity and efficiency, thus including both explore and exploit. Arguably, not all tasks or projects involve both in the same manner, but Kostopoulos and Bozionelos (2011) have argued that these concepts are central to team learning. One apparent implication of our findings may, for instance, be that relationship-building to achieve team cohesion is negatively associated with performance. This is not to say that this is true for all groups – some groups will probably benefit from this – but that in groups where there is some form of commonality established, other things will be more important. The main argument is important: that activities that are not task-related may not lead to performance improvements. An apparent practical consequence should, either way, be read as heightening the importance of task-orientation, discipline and opposition interactions for creative performance. Teams may very well enjoy a more relaxed atmosphere, having fun and working together in a collective – and they may think that they perform well – but starting out with these interactions will possibly diminish creativity and ruin their possibilities of meeting tougher demands. “Ordinary” team building activities that are not task-related and have a focus on fun, joy and social well-being may

therefore have an experienced value of positivity, but should not be mixed up with objective performance.

Limitations and future avenues for research

Our study has been examining innovation teams, with attention place on exploration and exploitation. Our findings may be limited to this area alone, but it may be argued that the issue of exploration and exploitation as cornerstones of every business (James G. March et al., 1958) also yields relevant results for other teamwork. Future avenues may, however, seek to extend more diversified empirical data than we have used, so as to address more closely the question of cohesion and performance and how one may enable constructive opposition interactions in teams, and more research on our suggestion of performance teams being both flexible and stable. The latter calls for a closer proximity to the data, for instance, through ethnographical studies.

This study is also limited by its empirical basis in student groups. It is possible that these groups were inclined towards being cohesive from the start (through the sharing of student life, etc.), and that other groups may indeed benefit from more cohesion-oriented interactions. Every team has different starting points. However, our main arguments may still hold true: that these interactions may be self-reinforcing when reaching a certain level, and from then on entering a group state where innovation performance is precluded.

CONCLUSION

How do teams learn and develop? The relationship between team processes and team learning is complex, but popular perceptions and some research seem to hail a picture of supportive team members having fun while spurring wild ideas in some sort of exploring learning activities. We advocate in this paper that this picture is not only wrong, but it may actually set off teams in the wrong direction. Organizations that are looking to promote development and learning in teams should instead focus on a balanced approach from the very start, where for instance creativity is seen as a task that should be worked towards in a disciplined manner. Rather than supporting each other, team members should challenge each other constructively. A focus on building a safe atmosphere with the intention to achieve a state of psychological safety may end up in the opposite: team members being afraid to ruin the comfortable climate within the group.

These arguments are not entirely controversial, as previous researchers have mentioned already them. However, they are previously mention often with little attention paid to the specific task of innovation or the process of productive creativity. Lastly, we stress the importance of relativity in our findings. All the groups in our tests were high-performing and employing supportive interactions. These are clearly necessary in performing groups and are more prominent relative to opposition interactions. Yet, from a processual perspective, we advocate that groups working towards being *more* opposing and *less* supportive will out-perform groups with the opposite intention.

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