The Leadership Game

The effect of vertical versus shared leadership on team performance, group development and engagement.

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ABSTRACT

This study investigated the influence of vertical and shared leadership on team success. Team success consisted of team performance, group development and engagement. Vertical leadership is leadership that stems from an appointed leader, whereas shared leadership emanates from within the group. Research was conducted in a laboratory setting. Participants were divided into a vertical or shared team each consisting of four members. Teams played a computer game focused on collaboration and communication and had to solve five puzzles. In total 80 participants were used for this study. Results show that the manipulation had failed and that none of the teams met the required vertical leadership team definitions. However, informal vertical leadership was compared to shared leadership and yielded no significant difference on team success. Closer examination of leader behaviors and communication patterns reveal that leader assignment is questionable.

Keywords: leadership, group development, engagement, performance, team success

INTRODUCTION

The rise of empowered teams and concomitant flattening of organizational structures increases the need for a better understanding of team dynamics (Pearce & Sims, 2002). Research has shown that teams have better decision making (Gruenefeld, Mannix, Williams, & Neale, 1996), cope better with change (Scott & Tiessen, 1999) and have more knowledge (Langan-Fox, 2005) compared to when workers are working on their own. However, in practice a relatively large amount of teams are not able to use their potential (Campion, Medsker, & Higgs, 1993) because of ineffective use of conflicts (Rau, 2005), low levels of trust (Langfred, 2004) and ineffective ways of collaboration (Coen, 2006). Some researchers argue that this might be caused due to low investment in the development of the group, and thus low levels of group matureness (Levine & Moreland, 1990; Wheelan, 1994, 2010). In this group developmental process leaders are often seen as the crucial element (cf. Strang, 2007; Wang, Chou, & Jiang, 2005). However, lately researchers are becoming less accepting of the notion that leadership in organizations only stems from one individual, in a top down, hierarchical process (Ensley, Hmieleski, & Pearce, 2006; Mohrman, Cohen, & Mohrman, 1995; Pearce & Sims, 2002). Thus, questions are arising what the role is of leadership in teams. Scholars, for example Yukl (1998), Pearce and Sims (2002) and Carson, Tesluk and Marrone (2007), suggest that shared leadership, a form where leadership emanates from the members of the group, not from an appointed vertical leader, may pose as an answer.

Research on shared leadership has just begun to emerge, only a few studies have been done so far on this topic (e.g. Carson et al, 2007; Ensley et al, 2006; Pearce & Sims, 2002; Pearce, 2004). Most research has focused on the theoretical development and practical application (Ensley et al, 2006). The aim of the current study is to investigate team success of vertical versus shared leadership teams in an experimental laboratory setting. We suggest that shared leadership teams have higher levels of team success. Team success consists of team performance, high levels of group development (good communication, social support, psychological safety and cohesion) and engagement (a positive, fulfilling, work-related state of mind). Team success has been constructed in this manner, because successful teams are able to manage the direction, motivation and support from each other towards a certain goal (Yukl, 1989 in Carson, Tesluk & Marrone, 2007). By doing so we seek to validate earlier findings of Pearce and Sims (2002) who found that shared leadership is a better predictor of team performance. We also expand current research on the influence of leadership in regard to group development and engagement (Bakker, 2011; Zaccaro, Rittman, & Marks, 2001). Thus, the leading research question for this article is: *What are the effects of vertical versus shared leadership on team success, consisting of performance, group development and work engagement?*

To answer the above stated research question, the current article will begin with a review of shared leadership to forms the basis of this study. Next literature related to group development and engagement are discussed.

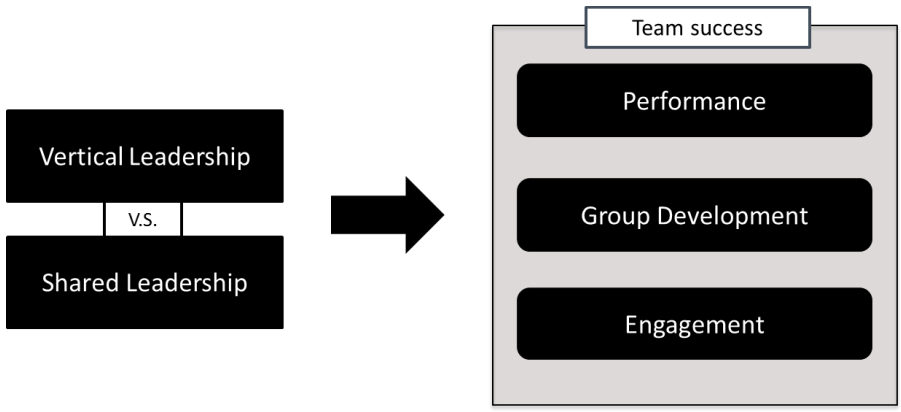

Figure 1. Expected influence of shared and vertical leadership on engagement, group development and team performance.

We offer several hypotheses (as suggested, and presented in Figure 1) regarding the constructs of team success. Subsequently the methods used for this research are presented, followed by a presentation of the results. We end this article with a discussion and a conclusion.

THEORETICAL FRAMEWORK & HYPOTHESES

SHARED LEADERSHIP: AN ALTERNATIVE APPROACH TO LEADING

Research regarding leadership has typically focused on one individual who is appointed or selected as the leader for a group or organization, the vertical leader (cf. Bass, 1990; Pearce & Sims, 2002). However, due to organizational flattening and the increasing use of teams, traditional models of leadership come into

question. A possible alternative is shared leadership – leadership that emanates from the members within the team. The reason for this is previous research on high performing groups shows that these groups often do not have formal leadership structures (Manz & Sims, 1984 in Ensley et al, 2006). In these teams, leadership is distributed so that the one with the proper knowledge, skill or abilities offers its views. The group itself then collaborates on these suggestions and acts upon them (Ensley et al, 2006).

The concept of shared leadership is deeply rooted in the organizational literature, where it is said that the first one to write about it is Mary Parker Follet. She wrote that team members should not just focus on the designated leader for guidance. They should logically focus on the one who has the most knowledge and expertise in the area of the situation at hand (Follet, 1924, in Pearce & Sims, 2002). According to Pearce and Sims (2002) the concept of shared leadership might be thought of as 'serial emergence' of multiple leaders within the team. These authors suggest that "certain conditions such as highly routinized work or professional standards may serve as substitutes for social sources of leadership" (Pearce & Sims, 2002, p. 176). Shared leadership is thus a process of influence focused on multiple sources of influence within a team. In these teams the source of leadership is distributed among team members, and is not focused on a single individual. Within shared leadership teams members are both leaders and followers, and thus provide leadership for certain aspects of the teams functioning. The members within these teams respond to the leadership that is provided by other members. Therefore, in teams with high shared leadership, actual leadership may rotate over time so that in different points of the team's life cycle, different team members provide leadership (to other team members). This thus creates a pattern of reciprocal influence that reinforces and develops relationships and allows team members to influence the support, direction and motivation. Here leadership is conceptualized to the strength of the influence (quality and effectiveness) or the source of influence (one or more individuals) (Carson et al, 2007).

SHARED LEADERSHIP AND PERFORMANCE

Shared leadership is a rather new construct and has yet received little empirical attention (Ensley, Hmieleski & Pearce, 2006; Pearce & Sims, 2002). However, research that has been conducted shows positive outcomes. For example, scientific work on self-managing work teams suggests that shared leadership (Hooker & Csikszentmihalyai, 2003; Pearce, 1997; Pearce & Sims, 2002; Pearce et al., 2004) or group self-leadership (Manz & Sims, 1993), team self-leadership (Steward & Barrick, 2000) or distributed leadership, is associated with effective teams. Note that these terms have been used interchangeably in literature. Studies that confirm previous results are, for example, from Kazenbach and Smith (1993). They concluded that teams that actively engaged in shared leadership perform better compared to those who did not. Also Pearce and Sims (2002) conducted a longitudinal study and found that shared leadership, compared to vertical leadership, is a better predictor of manager, customer and team self-ratings of effectiveness (Ensley, Hmieleski & Pearce, 2006). Not just quantitative studies have confirmed the positive effects, also qualitative studies, for example from Hooker and Csikszenthihalyai (2003), have suggested that shared leadership is related to team effectiveness. Based on earlier findings of shared leadership, the first hypothesis suggests that shared leadership leads to higher performance in teams, especially when one compares it with vertical leadership teams:

Hypothesis 1 - Shared leadership leads to higher performance compared to vertical leadership.

The second factor of team success is group development. Research on group development has started since mid-previous century. However, group development is a rather complex concept because it consists of more than just one theory. For example, Chang, Duck and Bordia (2006) have concluded, after conducting a large literature study that there are more than 100 group development theories. Among these theories, they have identified that a certain pattern exists. Generally speaking, there are several stages through which a group develops. Groups go through these stages either linear or cyclical. A specific path refers to certain stages through which the group develops over time (called path dependent group development). In linear processes the path is stable, however, when cyclical, groups can move up in stage, or fall back. Theories that focus on linear processes are based on psychological components such as psychological safety and cohesion within the group, and behavioral components such as communication and social support (Rijnbergen & Demerouti, 2007). For this research the focus is on two behavioral and two psychological factors because they are underlying themes in the group development theory of Wheelan (1994). This theory is suggested to be generalizable and comprehensive with path dependent as well as non-path dependent descriptions. The factors have also been chosen because they have a strong link with team performance (Rijnbergen & Demerouti, 2007). The behavioral factors are communication and social support. Hoegl and Gemuenden (2001) define communication as the most essential aspect of teamwork, and is a means for exchanging information among team members (Pinto & Pinto, 1990). The quality of communication in a team can be described by the frequency, structure, formalization and openness of the way the team members exchange information. Frequency refers to how much time the team members spend on communicating with each other, whereas the degree of formalization describes the how enthusiastic and spontaneous the team members talk with each other. Within communication there are two types of communication; formal and informal. Formal communication requires a rather large amount of preparation, such as meetings. Informal communication is spontaneously initiated (such as quick phone calls, talks in the hallway, etc.). The latter is shown to be crucial to teams that work on innovative projects, because the ideas and contributions can be immediately shared, discussed and evaluated, which allows for effective collaboration (Gladstein, 1984; Pinto & Pinto, 1990).

The second behavioral factor, social support, is defined as “team members’ efforts to provide emotional and psychological strength to one another. Team members support one another through encouraging and recognizing individual and team contributions and accomplishments” (Marks, Mathieu, & Zaccaro, 2001 in Carson et al, 2007, p. 1222). Social support helps to create a working environment in which team members feel that the input they provide is valued and appreciated by their other team members. Team members are more likely to cooperate and work effectively when individuals actively participate in teamwork. This helps to develop a feeling of shared responsibility for team outcomes (Kirkman & Rosen, 1999).

The selected psychological factor are cohesion and psychological safety. Literature states that cohesion is, just like communication, one of the essential elements of group development (Cartwright, 1968 in Dion, 2000). Team cohesion refers to the degree that a team member wants to remain a member of the team (Cartwright, 1968). Mullen and Copper (1994) distinguish between three forces of cohesion, which are: (1) interpersonal attraction of the members within the team, (2) commitment to the team task and (3) the group pride-team spirit. When individuals lack a sense of belonging and togetherness and if the team members have little desire to keep the team going, it is highly unlikely that (effective) collaboration will occur. Therefore a certain level of cohesion is needed to keep the team together, to engage team members in collaboration, and therefore build a basis for teamwork (Hoegl & Gemuenden, 2001). The influence of

cohesion is, among others, therefore strongly related to team performance, whereby one can say that the more cohesive a group is, the more the team members will comply to behavioral norms created by the group and the more they will focus on achieving the shared goal. A team with high cohesion will therefore experience better communication and will also be better equipped to deal with conflict.

The second psychological factor, and the last construct of group development, is the psychological safety team members experience within a team. Edmondson defines a teams' psychological safety as "a shared belief that the team is safe for interpersonal risk taking" (Edmondson, 1999, p.354). This psychological safety belief is a taken for granted belief, and is not given direct attention by either the individual or the team. However, the team can sometimes discuss these topics, but it does not influence the essence of the teams' psychological safety. When individuals perceive their environment to be psychologically safe they have a sense of confidence that the team will not reject, punish or embarrass someone for speaking up. This level of confidence is rooted in mutual respect and trust among the members of the team.

Together these behavioral and psychological factors constitute the definition of group development for this article. With this it is sought to provide a first look on the influence of vertical versus shared leadership on group development.

SHARED LEADERSHIP AND GROUP DEVELOPMENT

Research on how leaders create successful, mature and well-developed teams is still limited (Zaccaro, Rittman, & Marks, 2001), even though leaders are often seen as the crucial element in this process (cf. Strang, 2007; Wang, Chou, & Jiang, 2005). On top, both the behavioral and psychological factors mentioned in previous section, are shown to be strongly related to team effectiveness (Kuipers, 2005; West, Tjosvold & Smith, 2005). However, in times where researchers are less accepting of the notion that leadership in organizations only stems from one individual, in a top down, hierarchical process (Ensley, Hmieleski, & Pearce, 2006; Mohrman, Cohen, & Mohrman, 1995; Pearce & Sims, 2002), more research is needed on the influence of shared leadership on group development. By doing so, more insight in how organizations can create successful, mature and well-developed teams will be given. Though to our knowledge, no research to date has examined the effect of shared leadership on these constructs of group development. To illustrate, research of Carson and scholars (2007) revealed that internal team environment consisting of shared purpose, social support and voice is positively related to the level of shared leadership in a team. This means that when team members support each other, and members feel free to communicate and express their opinions (similar to psychological safety), it has a positive influence on shared leadership. We suggest that it is also the other way around, that shared leadership leads to a positive climate because no hierarchical levels that might influence the teams climate, exist (Haslam, Reicher, & Platow, 2011). However, to our knowledge no research to date has examined this effect. We thus hypothesize that:

Hypothesis 2 - Shared leadership leads to more group development - consisting of psychological safety, cohesion communication and social support - compared to vertical leadership.

HIGH ENGAGEMENT TEAMS

In this paper, the focus is on examining the effect of vertical versus shared leadership on team success. In team success, engagement is the third construct. Kahn (1990) was the first to write about work engagement. He defined that employees who were engaged were fully physically, emotionally and

cognitively connected with their work. Engagement thus refers to one's energy that is focused towards organizational goals (Macey, Schneider, Barbera, & Young, 2009). Workers who are engaged are more likely to work harder through increased levels of discretionary effort compared to those who are not engaged (Bakker, 2011). Currently, scientific research shows that four relevant themes are emerging; personal engagement, burnout vs. engagement, employee engagement and work engagement (for a full overview, see Albrecht, 2010; Bakker & Leiter, 2010; Macey & Schneider, 2008). For this research the definition of Schaufeli and Bakker (2004) will be used because this is arguably the most often used definition of engagement (Bakker, 2011). Schaufeli and Bakker (2004) define work engagement as a "positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption" (p.295). Vigor is a motivational state that is characterized by high levels of energy and mental resilience during the work or activity. Workers who are vigorous have a willingness to invest a certain amount of effort in the work, and have a sense of persistence when faced with difficulties. Dedication refers to a strong involvement in the work or task while experiencing a sense of significance and meaning. Absorption is characterized by one being fully concentrated and being happily engrossed in the activity, which results in time passing quickly. The word 'happily' does not necessarily have to mean that the person is happily 'engaged' in the work. When people are absorbed in their work, they find it hard to detach themselves from the activity, this often happens when work is difficult and emotionally demanding (Bakker, 2011; Bakker, Albrecht, & Leiter, 2011, 2011b; Gonzales-Roma, Schaufeli, Bakker & Lloret, 2006).

People become engaged when they have sufficient personal and job resources at their disposal. Both these resources are shown to have a large motivational potential. Personal resources are positive self-evaluations that are linked to resiliency (the ability to cope with change and the effectiveness of being able to adapt to new environments, (Bakker, 2009)) and ones sense of having the ability to control and impact the environment (Hobfoll, Johnson, Ennis, & Jackson, 2003). Examples are self-esteem, self-efficacy, the ability to control emotions, locus of control and resilience. Job resources on the other hand are referred to "physical, social, or organizational aspects of the job that may (a) reduce job demands and the associated physiological and psychological costs; (b) be functional in achieving work goals; or (c) stimulate personal growth, learning, and development" (Bakker, 2011, p.266). Examples of job resources are social support from colleagues, skill variety, learning opportunities, autonomy, responsibility, transformational leadership, teamwork and performance feedback (Albrecht, 2010; Bakker, 2009; Bakker & Demerouti, 2008; Schaufeli & Bakker, 2004; Schaufeli & Salanova, 2007).

SHARED LEADERSHIP AND ENGAGEMENT

Research in the field of engagement is flourishing and has gained momentum because of its predictive value for job performance (Bakker, 2009; Schaufeli & Salanova, 2007; Tims, Bakker, & Xanthopoulou, 2011). However, scholars are asking for more research about the influence of leadership on work engagement. Bakker (2011) notes that "not much is known about how leaders influence their followers' engagement and the mechanisms that explain this influence" (p.268). To date, only a handful of studies have investigated the relationship between leadership and work engagement (Breevaart, Bakker, Hetland, Demerouti, Olsen, & Espevik, 2013; Tims, Bakker, & Xanthopoulou, 2011; Tuckey, Bakker, & Dollard, 2012), however, these scholars have focused their research on the vertical variant of leadership. To our knowledge, no research has yet been conducted that investigated whether there is a difference between vertical and shared leadership on engagement. It seems plausible that shared leadership teams do lead to higher levels of engagement compared to vertical leadership teams because of several reasons. First, transformational and empowering leadership have shown to be positively related to work engagement

(Tims, Bakker, & Xantopoulou, 2011; Tuckey et al., 2012). According to Pearce (2004) and Pearce and Sims (2002) effective shared leadership teams generally use the empowering or transformational leadership style. These styles are suggested to stimulate team effectiveness. Since shared leadership is leadership that emanates from the members of the team, and is leadership that can rotate over time, one would suggest that when shared leadership teams predominantly use both these styles, these teams will have higher levels of engagement compared to vertical leadership teams. The reason for this lies in the fact that in a vertical leadership team there is just one individual leader who *might* use this leadership style. Second, previous research on work engagement indicated that there is a positive influence between autonomy and work engagement (Bakker, 2011). In shared leadership teams, members are autonomously regulated and thus have a high sense of autonomy, when compared to vertical leadership teams (Pearce & Sims, 2002; Pearce, 2004). One would assume that shared leadership teams, due to their high levels of autonomy, have higher levels of engagement compared to vertical leadership teams. Finally, since shared leadership is a team based perspective of leading, and because teamwork itself is positively related to work engagement, it can be suggested that shared leadership teams do have higher levels of engagement compared to vertical leadership teams. Thus, based on the crosslinks described earlier, we believe it is highly plausible that shared leadership teams have higher levels of engagement, compared to vertical leadership teams. The hypothesis is thus:

Hypothesis 3 - Shared leadership leads to more engagement – consisting of vigor dedication and absorption - compared to vertical leadership.

METHODOLOGY

To answer the research question stated earlier in this paper, experimental research has been conducted in a laboratory setting where it was sought to manipulate leadership. To replicate a teamwork setting, a group of four participants played a serious game. A serious game is a game that can be used for learning and behavior change (Connolly, Boyle, MacArthur, Hainey, & Boyle, 2012). For this research, the game TeamUp has been used. TeamUp is a multiplayer simulation game that is developed to allow four players to play at the same time. Players need to "to self-organize, communicate, collaborate and arrange teams and use leadership in order to solve five levels of puzzle/team challenges that require team communication and coordinated action" (Mayer, Van Dierendonck, Van Ruijven, & Wenzler, 2013, p.4). Due to the underlying themes, this game was considered to be a good fit to replicate an environment for collaboration and feedback. Each session was separately conducted. At the start of the game, we tried to manipulate the setting so that the group could be categorized into either one of the two leadership teams. The influence of shared versus vertical leadership on team success have been analyzed via questionnaires (see Appendix A) and video observations (for coding scheme, see Appendix B).

PROCEDURE

Each session was conducted in a meeting room with a table, so that four participants could be seated. Fifteen minutes before the participants arrived, four laptops were placed at each side of the table - positioned in a cross figure so that the players would face each other and were not able to look at the others their screen. The facilitator laptop was placed on a different table, away from the participants. To gather material for video observations, a camera was located in a fixed place in the room, overlooking all

four players to capture as much as is ethically possible: naturalistic leadership behavior. Our experiences correspond with Mead's (1995) findings, that after the participants entered the room, the camera blended into the background.

When participants took place behind one of the four laptops, they received the following instruction, orally:

> *"You will be playing the game TeamUp. This game is developed by University of Delft and is being researched by University of Twente and Accenture. The session will be video-taped, and data will be processed anonymously. I will first give you a player number, before you start the game. This number must be used when selecting a player. From [now] on you may start the game. During the game you are not allowed to look at each other's' screen or to use a pen and paper. The average time for completion is 35 minutes. It is up to you to see whether you can be faster. The purpose of the game is to collaborate and reach the end of the game. I am not part of the game, thus you are not allowed to ask me any questions."*

To increase a sense of competition, we used social comparison by informing the average time other teams needed to complete the game. The average time was based on previous experiences with the game (Mayer et al, 2013). During the game, players were not allowed to look at the other players' screen or to use a paper and pen. This increased the difficulty of puzzle two and five, because players had to communicate the correct route / pattern via verbal and non-verbal communication, instead of just writing the answers down, or sharing ones screen. The oral instruction was followed up by one of the two leadership manipulations. Before players could actually start playing the game, the participants had to indicate their player number (assigned by the researcher) and think of a player name. Once this had been done, they could start the game.

When the participants had finished the game, the questionnaire was given. Once they had completed the questionnaire, the participants received a semi structured debriefing focus group which was designed to discuss how the participants had collaborated during the game. This debriefing was not part of our research, but was added for marketing purposes to gather participants. An overview of the debriefing has been added in Appendix D. The entire process used for the experiment can be found in Appendix E.

GAME DESIGN

The game was designed for players to move through five puzzles. In order to complete the game players may have used different forms of leadership and self-organization (Mayer et al, 2013). When the game started, the four personas were located on a arrival dock. By moving the computer mouse, players could look around and see the other team members' personas. The five levels were designed as followed:

1. In the first puzzle, the players had to navigate their personas from their dock towards a closed door. Two buttons were located in front of the door and two buttons on the other side. Players had to stand on the first two buttons in order for the door to open. Once two players moved through the door and stood on the other two buttons, the remaining two players were able to move through the door.

2. Next, the players had to stand on three buttons to open a door, so the remaining player could move through the door. This player had to find the correct path across an 8 x 8 tile maze. When the player stepped on a wrong tile he fell through the floor. The door would then open again so this player, or someone else, could try again.

3. In the third puzzle, the four players had to stand on four buttons. Three players were lowered into a maze, while the other stood on a high platform, overlooking a maze. This person had to direct the other three team members who were inside the maze, towards the exit.

4. Fourth, the players had to break into subgroups in order open the gate by solving two smaller puzzles. In one of the two sub puzzles, two players had to move to a dark ruin designed as a small maze. Here one team member led the other through the maze with a torch. Both of the players had to stand on a button and wait for the other team members to do the same. In the other sub puzzle, the two other players had to divide their weight and balance a bridge which allowed them to climb onto a platform. On this platform one button was located. This player had to stand on this button and then wait for the final player to stand on the remaining button which was located on a tower. The button could be reached by walking a stairs. When all four players were standing on the buttons, the bridge would be lowered.

5. In the final puzzle, the players had to alternate in leadership. Three team members were able to see several buttons with icons. The other player could see the correct pattern of icons. Here players had to discover that one player had the correct pattern. Once one puzzle was solved, the players moved over a small bridge towards a new platform. Here the pattern was changed, along with the one who was able to see the correct pattern (Mayer et al, 2013).

Once all the five puzzles were completed, players had to move towards a platform with a large square. Here they had to stand on four buttons. Once all players were standing on the four buttons, a large tree was shown and the players had finished the game.

MANIPULATION

A manipulation was used in order to categorize teams into either the vertical leadership (where leadership emanated from the appointed leader) or shared leadership group (where leadership emanated from the members in the team). To create a shared leadership team players were given a button with "scout" written on it, which meant that they all had the same 'job title' and responsibilities. Next, the players received an instruction that determined the teams' goal, and clarified the roles:

> *"From you I expect perfect collaboration. Basically, within the game you are all scouts, and if you think you have found the right way, or know how to solve the puzzle, share your expertise with your team members and help the team to achieve its goal. This means that you have a shared responsibility to achieve the goal, and that you are all responsible for what happens."*

In order to create a vertical leadership, three players were given a button with "scout" written on it, however, one individual received a tie. The person with the tie was the one who was responsible for the teams' results. Next, the team received an instruction that clarified the team goal and individual roles:

> *"You are all scouts, and you all search for solutions on how the puzzles can be solved. However, you (random someone) are responsible for the results the team delivers. This means that you, the scouts, search for solutions and that you (points to leader) are responsible for the direction the team is moving in. You are also responsible for achieving the goal."*

These manipulations were used right after the main instruction, but before the game started. The use of role descriptions was chosen because as the Stanford Prison Experiment confirmed; participants' behavior is determined by the roles they have received (Haney & Zimbardo, 1998). Once the group had received their instruction, they were allowed to start up the game.

SAMPLE

Research was conducted among consulting teams of a large consultancy agency in The Netherlands. Participants were collected through email and networking. A senior manager of the change management team sent an email written by the researcher to the change management department and asked whether the individuals who would want to participate could gather three others from their project team. Their team could then subscribe on an online excel on a specific date and time that would suit them. Participants received another email after one month with a status update on how many teams participated, and how many were still needed for the research. In this email, also sent out by the senior manager, the participants could, again, follow a link and subscribe on an online excel on a date and time that would suit them and their team. Only a few participants were asked face-to-face to join. These participants received an email with the subscription link right after contact. In total 80 people participated in the research, of which 70.00% were men. Average age of the entire group was 29.85 years, (SD = 6.040) and most of them were Dutch (91.3%) either had a degree from University (73.8%) or University of Applied Sciences (25.00%). All participants were professionals in the field of consulting. and were mostly at the level of analyst (27.5%), consultant (43.8%) or manager (11.3%). The remaining participants were either associate (3.8%), associate manager (3.8%), programmer (1.3%), business analyst (2.5%), senior business analyst (1.3%). Only 2.5% of the participants did not want to specify their profession. Most of the participants had a rather short experience in their field (M = 5.91 years, SD = 5.992). In regard to their experience with gaming, most of the participants varied between having never played a game (22.5%) and having played games a couple of times a year (32.5%) to monthly (13.8%), weekly (22.5%), daily (7.5%) and others didn't know how often they played games (1.3%). The 80 participants were divided into 20 teams, however, only one team was researched per timeslot.

MEASURES

MANIPULATION CHECK

The aim of the manipulation was to create two leadership groups; a shared leadership group (leadership emanated from the members in the team, according to the definition of Pearce and Sims (2002) and Carson and scholars (2007)) and a vertical leadership group (leadership emanated from the appointed leader (Pearce & Sims, 2002). To measure whether the manipulation had any effect on vertical and shared leadership teams, two statistical manipulation checks have been done. First it was sought to identify to what extent each person was seen as a source of influence (leader). It was expected that participants in shared leadership teams were more often scored higher on having a sense of influence because leadership (thus influence) should emanated from within the members of the team (Pearce & Sims, 2002). Second, the overall strength of the influence within a team was measured (Carson et al, 2007). It was expected that shared leadership teams had a higher team level average scores on overall strength of influence compared to vertical leadership teams, because there was one dominant source of influence.

SOURCE OF INFLUENCE

To measure the sources of influence within a team each of the four team members rated his / her peers (on a scale from 1 "not at all" to 5 "to a very great extent") on the question "*To what extent did you influence your team members and were you influenced by your team members in understanding what needed to be done, and how it must be done, to accomplish the shared objective*". We took the definition of Yukl (1989) and rephrased it into a question because we agree with his definition of leadership. Before the participants answered the question, the researcher explained the meaning of the question, to make sure they answered it correctly. They received the following oral instruction *"You have to fill in to what extent you think you, and your team members influenced the direction of team, on how to accomplished the shared goal. Thus who do you think influenced most gets a 5, and who influenced the least, receives a 1."*

To calculate the source(s) of influence in shared and vertical leadership, the four scores of each player were summed up and then divided by four. It was suggested that shared leadership teams were perceived to be shared if at least three out of four participants scored a four (4) or higher. Vertical teams were suggested to be vertical whenever the official leader scored a four (4) or higher, and had an average score that was scored .5 higher compared to the other team members.

STRENGTH OF INFLUENCE

To measure the strength of influence within the shared and vertical leadership teams, the scores that have been measured in the source of influence have been used. The four individual scores from each player within the team were summed up and divided by four, to calculate a team average score. All the average team scores of the vertical leadership teams were compared with the shared leadership teams.

TEAM PERFORMANCE

Team performance was measured based on the time teams needed to complete the game and how many errors they made in solving the puzzles. These scores were collected through the game. On the facilitator laptop, a the game created a data-file that saved both scores of all teams. Z-scores were computed for both variables. Cronbach's alpha for the overall team performance construct is .86.

GROUP DEVELOPMENT

Group development was measured using two behavioral scales (communication and social support) and two psychological scales (psychological safety and cohesion). Communication was measured using five communication items from the Teamwork Quality scale developed by Hoegl and Gemuenden (2001). An example item is *"The team members communicated mostly directly and personally with each other".* Social support was measured using the scale developed by Carson, Tesluk and Marrone (2007) and consisted of three items. An example item is *"the members of my team talked enthusiastically about our team's progress"*. Cohesion was measured using eight cohesion items from the Teamwork Quality scale developed by Hoegl and Gemuenden (2001). An example item is *"The members of our team felt proud to be part of the team"*. Psychological Safety was measured using seven items from the psychological safety scale developed by Edmonson (1999). An example item is *"Working with members of this team, my unique skills and talents were valued and utilized"*. Each scale was measured on a 7-point Likert scale ranging from 1, "strongly disagree" to 7, "strongly agree". These scales have been combined into the Group Development

Scale and have not been analyzed individually, because cronbach's alpha of cohesion and social support was lower than .70. The entire scale had an overall score of .74

ENGAGEMENT

Engagement was measured by using the Work Engagement scale from Schaufeli, Bakker and Salanova (2006). The scale consisted of six (6) items for vigor, five (5) for dedication and six (6) for absorption and was measured by using a 7-point Likert scale with answers ranging from 1 (never) to 7 (always). Items have been adjusted to constitute the Game Engagement scale. In most of the items, the word "work" has been replaced by "game" or "play". Example items are "*While playing, I felt bursting with energy*" (vigor) "*The game inspired me*" (dedication), and "*I was immersed while playing*" (absorption). Cronbach's alpha for the overall engagement scale was .81, for vigor .59, dedication, .71 and absorption .75.

VIDEO OBSERVATIONS

Video observations were used to identify differences between leadership behavior on vertical and shared leadership teams as means for triangulation, and thus increase the validity of the manipulation. It was expected that leader typical behaviors were more dominant among the assigned leader and were less shown by the 'followers', because leadership should emanate from the assigned vertical leader (Pearce & Sims, 2002). In shared leadership teams it was expected that leadership behaviors were more distributed, because leadership emanated from the members in the team (Pearce & Sims, 2002; Carson et al., 2007). Leader typical behaviors are structuring the conversation, informing, visioning, intellectual stimulation, and individualized consideration (Weenink, 2012).

All videos were coded with the behavioral transcription software 'The Observer' (Noldus, Trienes, Hendriksen, Jansen, & Jansen, 2000). This software allows users to assign codes to behaviors of the people acting in the video. Each video was separately coded using the coding scheme, and was coded by the researcher. However, to assess the researcher reliability, a video tape was coded by a second coder. The second coder participated on a voluntary basis, was a student in business administration and was highly motivated to participate in the coding. The coder received a small coding workshop that consisted of reading through the coding scheme, and the coding rulebook. He also received a small training on how to use the software and how to code video's. After analyzing the video, the researcher calculated the interrater-reliability. First, Cohen's Kappa of 0.58 was found. However after discussing their findings, adjusting according to the coding rule book, and conducting a new analysis, Kappa increased to 0.98. A Cohen's Kappa of 0.60 or higher is said to be sufficient (substantial) for valid coding (Dooley, 2000).

The videos were analyzed by frequency (how often a certain behavior occurs). A sentence (1), several sentences (2), words (3) or certain moments (4) were coded as a behavior. Non-verbal behavior (such as 'putting ones hands up in the air for celebration') was also taken in account. The time on how long a behavior occurred was not measured because interest was in the frequencies of leadership behaviors, not in how long the behaviors lasted.

Out of the 20 teams, 11 teams have been recorded, with a total 362.59 minutes of video footage that was collected. Out of these video's, six videos of high performing teams (three vertical, and three shared leadership teams) consisting of 157.57 minutes of video footage, have been selected for video analysis. Other videos have been discarded due to corrupted data or have not been used due to time limitation.

CODING SCHEME

In order to identify these leadership behaviors, the behavioral coding scheme of Hoogeboom (2011) was used. This coding scheme consists of twelve behaviors that are found to be relevant to identify the behavioral pattern of leaders. The coding scheme from Hoogeboom is based on Van Der Weide's video coding scheme (Van der Weide, 2007) and has been validated in a large range of video-observation studies (Nijhuis, 2007; Van der Weide & Wilderom, 2004, 2006; Van Dun, 2010). The behaviors used in the observation scale originate from transformational and transactional leadership behaviors, and are from extant behavioral observation schemes such as Bales (1950) and Borgotta, (1964). The scheme itself consists of three categories, namely: (1) 'steering', (2) 'supporting' and (3) 'self-defending'. The supporting category is mainly derived from the transformational leadership behaviors. This observation scheme was used to identify leadership behaviors in team members, even if they were not assigned to be the official leader. This is consistent to the definition for shared leadership that was chosen for this research where leadership emanates from the members in the team and not simply from the designated leader (Pearce & Sims, 2002; Carson et al, 2007). The initial state behavior was characterized as 'gaming', since all players were playing a game. From there on, the leadership behaviors have been identified. The entire behavioral coding scheme can be found in Appendix B.

RESULTS

In this section, the analysis of the influence of vertical versus shared leadership teams on the constructs of team success are discussed. First, the strength and sources of influence within a team were examined to identify whether the manipulation had any effect. Second, both shared and vertical leadership teams were compared on performance, group development and engagement to see whether a difference existed. Third, video analysis was used to confirm whether the intervention had worked. To see whether the manipulation had any effect, it leadership behaviors of the players were examined in the vertical and shared leadership teams. Finally, conversation analysis have been used to identify what happened with the vertical leader in vertical leadership teams.

MANIPULATION CHECK

The aim of the manipulation was to create two leadership groups; a shared and vertical leadership group. To measure whether the manipulation divided the teams into two groups, two statistical manipulation checks have been done. First it was examined to what extent each person was seen as a source of influence (leader). Second, the overall strength of the influence within a team was measured (Carson et al, 2007).

SOURCE OF INFLUENCE

The first approach was to test the sources of influence. For the manipulation to succeed, it was expected that in shared leadership teams participants received a higher score on having influence in the team. This is because according to the definition used in this paper, leadership should have emanated from the members of the team, and influence should come from multiple team members (Carson et al., 2007; Pearce & Sims, 2002). In vertical leadership teams it was expected that there was one source of influence,

the vertical leader. For the manipulation to have any effect, influence should mainly have emanated from the vertical leader.

Results in Table 5 and 6 in Appendix C show that none of the vertical teams met the requirements of a real vertical leadership team. None of the official leaders scored an average of 4.00 or higher, and had an average score that was 0.5 points or higher compared to the other team members. Of the shared leadership teams, only 4 teams met the criteria where at least three out of the four team members had an average score of 4.0 or higher (Team 1, 2, 8 and 10, see Appendix C). These results show that the manipulation had little (only four shared leadership teams) to no (no vertical leadership team) effect, and that assigning an official leader does not automatically make this person the main source of influence.

STRENGTH OF INFLUENCE

The second approach was to test the strength of influence of vertical versus shared leadership teams. Shared leadership teams were expected to have a higher team level average score of the strength of influence compared to vertical leadership teams. The reason for this is that if the manipulation succeeded, in vertical leadership teams there was one dominant source of influence, whereas in shared leadership teams there were more sources of influence. Thus the averages of shared leadership teams should be higher compared to the averages of vertical leadership teams. The team scores have been compared and are added in Appendix C in Table 5 and Table 6.

Results of a Mann Whitney-U test show that there is no significant difference between the means of the strength of influence in vertical and shared leadership teams (U = 28,50, p = .10). The mean of the ranks in shared leadership teams was 12.65 whereas the mean of the ranks in vertical leadership teams was 8.35. This means, that in both teams, team members had approximately the same amount of influence. The vertical leader in the vertical leadership teams was thus not the most dominant source of influence. Both teams were also approximately shared leadership teams, because the vertical and shared leadership teams had approximately the same strength of influence.

TESTING THE HYPOTHESIS

In the manipulation check section results showed that the manipulation did not seem to have any effect. Thus both vertical and shared leadership teams were approximately shared, which means that the hypotheses stated earlier in this paper cannot be tested. However, in the source of influence section it became clear that in some vertical teams there were players other than the vertical –official- leader who were perceived to have influenced the direction of the team and were thus, according to the definition used in this article, seen as the vertical leader (taking the same leader criteria into account). This leader was, however, not an assigned leader. We therefore suggest that this is informal vertical leadership and . In the vertical teams results show that four teams (Team 11, 14, 19 and 21, see Appendix C) had one informal leader who did have a higher score (4.0 and 0.5 higher compared to other team member). These groups have been compared in relation to the three components of team success by using the same hypotheses stated earlier in this paper, however, vertical leadership was is now replaced with informal vertical leadership, since there is still one individual who was seen to influence the team.

INFORMAL VERSUS OFFICAL SHARED LEADERSHIP ON PERFORMANCE

In relation to the hypothesis stated earlier in this paper, it was suggested that shared leadership teams would lead to higher performance compared to informal vertical leadership teams. Performance was measured in time (minutes and seconds) and how many errors teams made in solving the puzzles. It was predicted that shared leadership teams would make less errors and needed less gameplay time compared to informal vertical leadership teams because earlier research has shown that shared leadership is a better predictor of performance (Pearce & Sims, 2002). Table 1 shows the mean scores of shared and informal vertical leadership on performance consisting of time and errors in game..

Table 1. Team level mean scores of shared and informal vertical leadership on Performance (N = 8)

	Leadership			
	Shared n = 4		Vertical n = 4	
	M	SD	*M*	SD
Time	30.65	6.18	37.16	11.80
Errors in Game	12.50	8.02	17.00	6.68

Note: Groups were compared by Mann-Whitney U at α = .05.

To compare informal vertical leadership teams with the official shared leadership teams on performance, the scores of time and errors in game have been standardized by creating Z-scores. Results of a Mann Whitney-U test show that there is no significant difference between the means of official shared and informal vertical leadership teams on performance ($U = 3$, $p = .15$). The mean of the ranks in shared leadership teams was 3.25, while in informal vertical leadership teams the mean of the ranks was 5.75.

When examining performance in regard to each underlying construct, results of a Mann Whitney-U test show that there was neither in time ($U = 5$, $p = .39$) nor errors in game ($U = 4$, $p = .25$) a significant difference between informal vertical versus official shared leadership teams. The mean of the ranks for shared leadership teams was for time 3.75 and for errors in game 3.50, while for informal vertical leadership teams the mean of the ranks for time 5.25, and errors in game 5.50. This means that informal vertical leadership versus official shared leadership does not significantly differ from each other in regard to performance.

INFORMAL VERSUS OFFICAL SHARED LEADERSHIP ON GROUP DEVELOPMENT

In relation to the hypothesis of group development stated earlier in this paper, it is proposed that shared leadership leads to more group development compared to informal vertical leadership. Group development was measured by combining two behavioral and two psychological constructs namely psychological safety, cohesion, communication and social support. Due to low cronbach's alpha of the individual constructs psychological safety, cohesion, communication and social support, it was decided to leave out those analysis'. Table 2 shows the mean scores of shared and informal vertical leadership on group development.

Table 2. Mean scores of shared and informal vertical leadership on Engagement and Group Development (N = 32)

	Leadership			
	Shared n = 16		Vertical n = 16	
	M	SD	*M*	SD
Group Development	5.88	.65	5.59	.77
Engagement	5.14	.53	5.18	.62

Note: $^*p < .05$

When comparing the informal vertical leadership teams with the official shared leadership teams on group development, results of an independent sample *t* test show that there is no significant difference in the means of official shared and informal vertical leadership teams on group development ($t(30) = 1.15$ $p = .26$). This means that informal vertical leadership versus official shared leadership does not significantly differ from each other in regard to group development.

INFORMAL VERSUS OFFICAL SHARED LEADERSHIP ON ENGAGEMENT

Similar to the hypothesis stated earlier in this paper about engagement, now it is hypothesized that shared leadership leads to more engagement compared to informal vertical leadership. Engagement was measured by measuring the levels of vigor, dedication and absorption from the Utrecht Work Engagement Scale (Schaufeli et al., 2006). Due to relatively low cronbach's alpha, no analysis' have been done on the individual constructs of vigor, dedication and absorption. Table 2 shows the mean scores of shared and informal vertical leadership on engagement.

Results of an independent sample *t* test show that there is no significant difference in the means of official shared and informal vertical leadership teams on engagement ($t(30) = -.21$, $p = .83$). This means that informal vertical leadership versus official shared leadership does not significantly differ from each other in regard to engagement.

These results suggests that in this small sample, having one dominant source of influence versus multiple sources of influences does not have any difference on either of the three constructs of team success.

VIDEO ANALYSIS

DISTRIBUTION OF LEADER-SPECIFIC BEHAVIORS

In vertical leadership teams, leader typical behaviors were expected to be higher compared to the leader-typical behaviors of the 'followers'. In shared leadership teams, it was expected that leader typical behaviors were relatively even distributed.

Results displayed in Appendix F and G indicate that leader behaviors were indeed relatively evenly distributed among shared leadership teams. The word relatively is being used, because most of the times it were two or three members who showed most leader-typical behaviors. However, in vertical leadership teams, the same pattern occurred, where team members showed a large amount of leader typical behavior. Noteworthy is that in all of the observed vertical leadership teams, the assigned leader showed even *less* leader typical behaviors compared to the team members. There was only one team, where the leader showed two leadership behaviors more often than the team members (Team 2; 'supporting' behaviors, 'Asking for Idea's' and 'Encouraging'). The expectation is thus not confirmed, which means that both teams were indeed relatively shared.

THE DARK SIDE OF VERTICAL LEADERSHIP

In all three teams the vertical leader did not show more leader typical behavior compared to the other team members. It is thus noteworthy to question why that happened, and what actually happened in these teams. To get an idea, the perception of influence has been analyzed, several video moments of the three

vertical leadership teams have been observed and the communication that occurred in puzzle 1 has been transcribed.

First, in Appendix C, results show that in five out of ten vertical leadership teams, the leader had the lowest influence score. This is surprising because the leader was thought to have the most influence due to the assignment. Second, conversations in Appendix H reveal that the followers take the lead in the game, often to examine the puzzle. This leads to them behaving autonomously and collaborating about solutions together. In this process the followers did not involve the leader, unless the puzzle stimulated shared involvement (pattern is especially clear in vertical leadership team 3, see Table 3). It also became clear that among the scouts, the one who knew how to solve the puzzle was 'granted' leadership. This pattern was especially obvious in puzzle two, three, and four and occurred in all three vertical leadership games over the entire gaming period, however the pattern was strongest in vertical leadership team 3.

Table 3. Team conversation of vertical leadership team 3

Player3:	"so me and Leader are here, where are you Player2? Who is the red one?"
Player2:	"Right behind you"
Leader:	"the-the-there is another one of those platforms over here." (no one listened)
Player2:	"I'm blue".
Player4:	"And I'm a scout, so I'll stand here".
Player2:	"so you are red Player4?"
Leader:	"The other two can go through then" (no one moved)
Player2:	"And you are green"? (to Player 2)
Player3:	"No, Yellow".
Player4:	"So there is a door open. What did happen in the middle?" (looking at the leader)
Leader:	"The door opens, so two other people can go through"
Player2:	"Which door opens?"
Leader:	"The one in the middle, in between the two platforms."
Player3:	"Oh yeah. Follow me."

From this, it is suggested that assigning a leader in a team leads to the leader taking on a more 'external' role (coordinating role such as an external manager) where the team decides when and if they need the 'leaders'' input. Under this assumption, the assigned leader thus does not have a significant amount of influence because this person is perceived as an out-group member (Haslam, Reicher & Platow, 2011; Linville, Fischer, & Salovey, 1989). Noteworthy is that in the video's it was surprising to see that it looked as if the followers (scouts) took care of the 'leader'.

These findings provide a first explanation of what happened in the vertical team, why the leader had shown less leader typical behavior and why the leader was often rated relatively low compared to the team members as a source of influence (see manipulation and Appendix C). Mainly because this person was not part of the 'scouts' team and was thus possibly perceived as an out-group member, who in only one team, coordinated just a little.

On the contrary, the communication patterns that occurred in the first minute of the shared leadership team, differed. Here, leadership seemed to switched more often between individuals who knew how to solve the puzzle (as illustrated in Table 4, entire conversation can be found in Appendix H). This became especially clear in shared leadership team one and two, and occurred to be a rather general pattern. In these teams, some were slightly more socially active than others.

Table 4. Team conversation of shared leadership team 2

Player3:	we are all heading in the same direction.
Player4:	Oh I think that we all have to… I am standing on one of the circles, if someone stands on the other one..

Player2:	Yeah, well then it still won't work.
Player3:.	Yeah then we still have to do two others Player4
Player4:	Then there must be something in the middle.
Player2:	yeah or..
Player4:	yes, the door is opening now! *points at his screen*
Player2:	Oh yes.
Player3:	And then we have to stand on the circles here again.
	[player 3 now leads]
Player2:	oh my character is being squashed.
Player3:	You must go to your right *looks at player1* and move onto the circle so they can get through.
Player1:	yeah? Can we go now?
Player3:	yeah I think so.

To conclude, the results thus suggest that assigning a leader in an ad hoc team is questionable, especially in a complex and rather creative setting where the assignment (how to solve the puzzle) is not clear, since the leader is seen as an external individual in the team and has thus little influence.

DISCUSSION

Teams and team leadership have become an important area for research (Ensley et al., 2006). Especially now, due to organizational flattening and the use of teams, alternative models of leadership are being researched. In response, the goal of this paper was to examine the effect of vertical versus shared leadership on team success, where team success consisted of team performance, group development and engagement. It was hypothesized that shared leadership will lead to better performance, more group development and engagement. On top, we expected the leader to show more leader typical behavior compared to the team members in vertical leadership teams. Also, in shared leadership teams it was expected that leadership behavior were relatively shared.

The most important finding of our research is that the effectiveness of the assignment of a vertical leader is questionable, especially in a laboratory ad hoc team setting. Shared leadership might thus indeed be a suitable alternative. To elaborate on this, we first examined whether the manipulation had any effect, to see whether teams were indeed divided into two teams; a vertical and shared leadership team. It was expected that in vertical leadership teams, there was one source of influence and because of this, these teams would have lower overall strength of influence on team level. Surprisingly, no vertical teams met our vertical leadership criteria. Only four teams met the shared leadership criteria, which means that the intervention seemed to have failed. Hypotheses stated in this paper could thus not be tested. Noteworthy is that in four vertical teams there was one individual who did meet our leader criteria, and we noted these as informal vertical leaders. These four 'vertical' and four shared teams have been examined whether there was any effect in shared versus informal vertical leadership on performance, group development and engagement. Here, no difference has been found, which is surprising because, for example, Pearce and Sims (2002) have shown that shared leadership is a better predictor of performance compared to vertical leadership. Also, Carson and scholars (2007) suggest that shared leadership is a critical factor that can improve performance. Previous research with the game has also shown that team

cohesion and psychological safety (two psychological construct of group development in this research) are important factors that influence team performance (Mayer et al., 2013).

Next it was sought to identify whether the official vertical leader behaved as predicted by showing more leader typical behavior compared to the team members. Video analysis revealed surprising results that were in contrast to our expectations: in vertical leadership teams, the leader did not show more leader typical behavior compared to the team members. On the contrary, the leader showed even *less* leader typical behavior. Via conversation analysis we suggest that this was caused by the leader being perceived as an out-group member, leading this individual to exert 'power over' the group (telling others what you want them to do), instead of 'power through' (harnessing what people want to do, and use this as a motor for action) (Turner, 2005). This form of 'power over' led followers to increase private rejection and do the very opposite of what the leader wanted them to do. Followers formed 'their own team' and rotated leadership when necessary. They involved the leader, only when they thought it was necessary, or when the game stimulated this. There were even moments when the leader was completely ignored and had thus no influence over the team. When out-group members try to exert power over others, it typically invokes resistance and drains energy (Reynolds & Platow, 2003). This explains why the leader showed little leader typical behavior, why the intervention seemed to have failed, and why the leader was not seen as the source of influence. As a result, lower behaviors have been shown because of reduced participation. Leader effectiveness is thus questioned, which is similar to earlier research of Muzafer Sherif (Sherif 1956, 1966) where it is shown that having leaders who are set or seen apart of the group appear to be features of group that fail.

Other explanations on why the leader did not show more leader typical behavior could lie in, for example, personality issues. Due to the random assignment of a vertical leader, it could have been possible that less socially dominant types of people have been selected as a vertical leader. Other players could have emerged as 'leaders' and showed more leader behavior. This is consistent with emergent leadership literature where it is shown that dominance, extraversion, sociability, ambition or achievement, integrity, self-confidence, mood, responsibility were all positively related to emergent leadership (Stogdill, 1948). Because of the short monitoring time we had in our research, it could have been possible that only a few members have emerged as leaders in shared leadership teams. However these suggestions do not explain why the assigned leader did not have any influence in the team, and why he or she was sometimes ignored and thus suggest that the leader as out-group member better explains what happened.

Thus our findings suggests that it might be questionable whether one should assign a leader in an experimental laboratory setting that is rather complex, stimulates creativity and in which the participants have a fairly unclear assignment. The main reason for this is that even though there seems to be no difference on the short term and within this sample in regard to performance, group development and engagement, we argue that in these settings, in the long term, team success, leader effectiveness and cohesion will be influenced, since external leadership invokes resistance, drains energy and is seen to be bad for leader and group effectiveness (Reynolds & Platow, 2003).

SCIENTIFIC IMPLICATIONS

Team leadership theory has mainly focused on the role of external leaders (Carson et al, 2007). The findings presented in this article shed more light on the difference between vertical and shared leadership in the context of an ad hoc laboratory setting. It provides a first answer to the question opposed by Pearce and Sims (2002) whether one should assign a designated leader in the measurement of shared leadership.

The results suggest that shared leadership that assigning a leader affects the relationship of the leader and the group, and the leaders effectiveness, right from the start. More research can explain what the effect is on the long term. We suggest that this assignment will negatively impact the relationship, which is consistent with earlier research from for example Reynolds and Platow (2003) and Sherif (1959, 1966). Our research also sheds more light on team dynamics in shared and vertical leadership setting, where in vertical leadership teams, it seems that the leader is not seen as the leader, nor does he or she have a sense of influence in or over the team. The leader shows less leader typical behavior and is suggested to be an out-group member. In shared leadership teams, leadership rotates more often, suggested towards expertise. This research thus provides an alternative approach to the investigation of shared and vertical leadership. To our knowledge this research is the first to examine the effect of vertical versus shared leadership in the context of a laboratory setting. More research is needed to determine the differences between laboratory and field setting, and the generalizability of these. Also, it can help to determine behavioral patterns and effectiveness of these types of teams in shared and vertical setting. Finally, our findings support the need for further research development of game-based environment for team research (Mayer et al, 2013).

PRACTICAL IMPLICATIONS

This research yields several practical implications. It suggests that in situations that have little to no clarity in assignment, that are complex and require creativity, it may not be effective to assign a vertical leader who is responsible for the teams results. To elaborate on this finding, the work of Pearce (2004) confirms these findings, and explains that shared leadership is a rather time consuming process that should only be developed for work that needs a team-based approach. Knowledge work that particularly requires shared leadership includes work that is (1) interdependent, (2) complex, and (3) creative. We add to this that in ad hoc settings, where these three characteristics are also present, one may not need to assign a vertical leader, since leadership via expertise allows leadership to emerge and rotate when necessary.

From an alternative point of view, the findings of this research suggest that shared leadership is a more effective form of leadership from team perspective. When one assigns a leader in the setting described earlier, followers tend to 'do their own thing' instead of listening. This is suggested to be a response because external leadership can evoke resistance (Reynolds & Platow, 2003), especially, when followers have the feeling that they are working for someone else, rather than for themselves. Here, motivation is extrinsic, and the followers use their energy to tire themselves down (disengagement), instead of using it for what they want to do (intrinsic motivation, engagement) (Ellemers, Gilders & Haslam, 2004). Thus, for practice, this means that would one want to use the intrinsic motivation of people, they should be managed on what they, the followers, want to do, instead of what others want them to do. Shared leadership then, may propose an answer to this due to the leadership rotation.

LIMITATIONS AND FUTURE RESEARCH

This research does not come without certain limitations. The first limitation of this study is the failed manipulation. Because of this, we were not able to examine whether there were differences between vertical versus shared leadership on the constructs of team success. Oral instructions, combined with visual outings do not cause a significant effect so that teams are divided into two groups. Other approaches should be examined, for example, by allowing the group to select the leader and make this

leader responsible for the decisions the group has to make (Haslam et al., 2011) or use a "leader skills inventory" where participants rated their own talents on a range that has been claimed to be good predictors of managerial success (Ritchie & Moses, 1983). The second limitation of this study is the sample size. For this research we were only able to examine twenty teams, test the effect of vertical versus shared leadership on ten versus ten teams and analyze only six (three per team) video's, which is a fairly small sample to make robust statements. A third limitation is that in both the leadership behavior analysis and the shared leadership perception, it could be that something other than leadership is measured, because especially in the shared leadership perception question, it did not specifically state what behaviors respondents should have identified. It is thus possible that participation or engagement in the game is measured. Fourth, the research has been conducted in a laboratory setting among high educated workers. This sample, along with the laboratory setting, may thus not be generalizable towards organizations and their teams. In the laboratory setting participants may behave differently compared to real life situations. Finally, it could have been that the researcher was seen as a vertical leader in both settings, since the leader gave oral instructions. Future research should examine other manners of research, such as providing instructions via cards which are attached to the players' laptops.

A different avenue for future study that arises from this research is the should focus on the effect of vertical versus shared leadership taking cultural differences into account. For example, what is the effect of vertical versus shared leadership, when using the TeamUp game, in high versus low power distance cultures on team performance, group development and engagement? Or what happens in high and low power distance cultures when, in an organizational setting, one assigns someone else as the vertical leader versus when one does assign the official organizational leader as the vertical team leader?

The effect of team composition should also be examined in relation to team performance. For example, what is the role of age and gender in shared and vertical leadership teams, or, what is the role of personality and communication style on group cohesion and what is the influence of this on team performance? In regard to leader behavior, future work should examine the difference in leader typical behavior and performance in high versus low performance teams. Due to the limited amount of video's low performing teams have not been measured. Differences between shared and vertical leadership teams in regard to leader typical behavior and the relation with performance could help to identify behaviors that explain what is it that makes teams effective.

CONCLUSION

It has become clear that the traditional conceptualization of leadership must be broadened by alternative models of leadership, ones that surpass the old top-down heroic leadership (Ensley et al, 2007; Yukl, 2002). This study suggests that it is questionable whether a leader should be assigned in a complex work setting, that stimulates creativity and where the participants have a fairly unclear assignment. Vertical leadership is suggested to be bad for leader and group effectiveness. Shared leadership is thus indeed a possible answer for these settings. Though this is not yet a final statement on the topic of vertical versus shared leadership, this study does adds to the evidence that teams do well when they rely on leadership that emanates from the members of the team, instead of looking to a single individual for direction.

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APPENDIX

APPENDIX A – QUESTIONNAIRE

XXXX	Date of the session	_____
XXXX	Session Number	_____

Respondent Number	1 / 2 / 3 / 4		
Gender	Male / Female		
Age	_____		
Education	MBO	HBO	University
Occupation *(i.e. consultant, manager, etc)*	_____		
Work experience in years	_____		
Email address (*used for feedback e-mail*)	_____		
Nationality	_____		

How often do you play computer games?	Never A couple of times per year Monthly Weekly Daily Don't know

How would you describe your personality in general? Please indicate on the scales below.

Analytical	1	2	3	4	5	6	7	Creative
Traditional	1	2	3	4	5	6	7	Innovative
Orderly	1	2	3	4	5	6	7	Chaotic
Perfectionistic	1	2	3	4	5	6	7	Pragmatic
Spontaneous	1	2	3	4	5	6	7	Cautious
Modest	1	2	3	4	5	6	7	Assertive
Stressful	1	2	3	4	5	6	7	Relaxed

If you think of recent situations in your professional life where you operated in a team. How would you describe your competence (role in a team and way of operating)? Please indicate on the scales below.

Competitive	1	2	3	4	5	6	7	Cooperative
Hierarchical	1	2	3	4	5	6	7	Egalisatiran
Task oriented	1	2	3	4	5	6	7	Relation oriented
Specialist	1	2	3	4	5	6	7	Generalist
Enterprising	1	2	3	4	5	6	7	Wait and see
Conflict oriented	1	2	3	4	5	6	7	Consensus oriented
Systematic	1	2	3	4	5	6	7	Intuitive

The following statements are about how you feel at work. Please read each statement carefully and decide if you ever feel this way about your job. If you have never had this feeling, cross the '1' (one) in the space after the statement. If you have had this feeling, indicate how often you feel it by crossing the number (from 2 to 7) that best describes how frequently you feel that way.

VI	At my work, I feel bursting with energy	Never	1	2	3	4	5	6	7	Always
DE	I find the work that I do full of meaning and purpose	Never	1	2	3	4	5	6	7	Always
AB	Time flies when I'm working	Never	1	2	3	4	5	6	7	Always
VI	At my job, I feel strong and vigorous	Never	1	2	3	4	5	6	7	Always
DE	I am enthusiastic about my job	Never	1	2	3	4	5	6	7	Always
AB	When I am working, I forget everything else around me	Never	1	2	3	4	5	6	7	Always

DE	My job inspires me	Never	1	2	3	4	5	6	7	Always
VI	When I get up in the morning, I feel like going to work	Never	1	2	3	4	5	6	7	Always
AB	I feel happy when I am working intensely	Never	1	2	3	4	5	6	7	Always
DE	I am proud on the work that I do	Never	1	2	3	4	5	6	7	Always
AB	I am immersed in my work	Never	1	2	3	4	5	6	7	Always
VI	I can continue working for very long periods at a time	Never	1	2	3	4	5	6	7	Always

DE	To me, my job is challenging	Never	1	2	3	4	5	6	7	Always
AB	I get carried away when I'm working	Never	1	2	3	4	5	6	7	Always
VI	At my job, I am very resilient, mentally	Never	1	2	3	4	5	6	7	Always
AB	It is difficult to detach myself from my job	Never	1	2	3	4	5	6	7	Always
VI	At my work I always persevere, even when things do not go well	Never	1	2	3	4	5	6	7	Always

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XXXX	Date of the session	_____
XXXX	Session Number	_____

(To be filled out by the participant)

Respondent Number	1 / 2 / 3 / 4

The following statements are about how you felt while playing the game. Please read each statement carefully and decide if you felt this way during the game. If you did not experience the feeling, cross the '1' (one) in the space after the statement. If you have had this feeling, indicate how often you felt it by crossing the number (from 2 to 7) that best describes how frequently you felt that way.

VI	While playing, I felt bursting with energy	Never	1	2	3	4	5	6	7	Always
DE	I found the game that I played full of meaning and purpose	Never	1	2	3	4	5	6	7	Always
AB	Time flew by while playing	Never	1	2	3	4	5	6	7	Always
VI	While playing, I felt strong and vigorous	Never	1	2	3	4	5	6	7	Always
DE	I am enthusiastic about the game	Never	1	2	3	4	5	6	7	Always
AB	When I was playing, I forgot everything else around me	Never	1	2	3	4	5	6	7	Always

DE	The game inspired me	Never	1	2	3	4	5	6	7	Always
VI	When I got up in the morning, I felt like playing the game	Never	1	2	3	4	5	6	7	Always
AB	I felt happy while playing intensely	Never	1	2	3	4	5	6	7	Always
DE	I am proud on the game that I played	Never	1	2	3	4	5	6	7	Always
AB	I was immersed in the game	Never	1	2	3	4	5	6	7	Always
VI	I could continue playing for very long periods at a time	Never	1	2	3	4	5	6	7	Always

DE	To me, the game was challenging	Never	1	2	3	4	5	6	7	Always
AB	I got carried away by the game	Never	1	2	3	4	5	6	7	Always
VI	While gaming, I was very resilient, mentally	Never	1	2	3	4	5	6	7	Always
AB	It was difficult to detach myself from the game	Never	1	2	3	4	5	6	7	Always
VI	While gaming, I always persevered, even when things did not go well	Never	1	2	3	4	5	6	7	Always

The following statements are about how you experienced teamwork while playing the game. Please read each statement carefully and decide if you felt or experienced it this way during the game.

PS	If you made a mistake, it was often held against you	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
PS	Members of this team were able to bring up problems and tough issuses	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
PS	People on this team sometimes rejected others for being different	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
PS	It was safe to take a risk on this team	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
PS	It was difficult to ask other members of this team for help	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
PS	No one on this team deliberately acted in a way that undermined my effort	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
PS	Working with members of this team, my unique skills and talents were valued and utilized	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
CH	The team members were strongly attached to the game	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
CH	The game was important to our team	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
CH	All members were fully integrated in our team	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
CHR	There were many personal conflicts in our team	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
CH	There was personal attraction between the members of our team.	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
CH	Our team was sticking together	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
CH	The members of our team felt proud to be part of the team	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
CH	Every team member felt responsible for maintaining and protecting the team	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
COM	There was frequent communication within the team	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
COM	The team members communicated mostly directly and personally with each other.	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
COM	Game-relevant information was shared openly and by all team members	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
COM	Important information was kept away from other team members in certain situations	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
COM	In our team there were conflicts regarding the openness of the information flow	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
	The members of my team….									
SSPT	Talked enthusiastically about our team's progress	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
SSPT	Recognized each other's accomplishments and hard work	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
SSPT	Gave encouragement to team members who seemed frustrated	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
CV	During the game, my group felt full of energy.	Never	1	2	3	4	5	6	7	Always
CV	My group could continue to play for very long periods at a time.	Never	1	2	3	4	5	6	7	Always

CV	My group kept on playing, even when things did not go well.	Never	1	2	3	4	5	6	7	Always
CV	Hard work was not much of an effort for my group.	Never	1	2	3	4	5	6	7	Always
CV	My group felt very resilient during the game	Never	1	2	3	4	5	6	7	Always
CV	My group felt strong and vigorous during the game.	Never	1	2	3	4	5	6	7	Always
CV	When the game was finished, my group had quite some energy left for other activities.	Never	1	2	3	4	5	6	7	Always

To what extent did you influence your team members and were you influenced by your team members in understanding what needed to be done, and how it must be done, to accomplish the shared objective?

	Name	Respondent Number							
LD	Myself	1 / 2 / 3 / 4	Not at all	1	2	3	4	5	Very great extent
LD	_____	1 / 2 / 3 / 4	Not at all	1	2	3	4	5	Very great extent
LD	_____	1 / 2 / 3 / 4	Not at all	1	2	3	4	5	Very great extent
LD	_____	1 / 2 / 3 / 4	Not at all	1	2	3	4	5	Very great extent

The following statements are about how you experienced teamwork while playing the game. Please read each statement carefully and decide if you felt or experienced it this way during the game.

CD	My group was involved in the game.	Never	1	2	3	4	5	6	7	Always
CD	My group felt enthusiastic about the game.	Never	1	2	3	4	5	6	7	Always
CD	My group liked doing the game.	Never	1	2	3	4	5	6	7	Always
CD	My group felt very motivated to a good job	Never	1	2	3	4	5	6	7	Always

CA	When my group was playing, we forgot everything else around us	Never	1	2	3	4	5	6	7	Always
CA	My group took new perspectives.	Never	1	2	3	4	5	6	7	Always
CA	My group was immersed in the game.	Never	1	2	3	4	5	6	7	Always
CA	Time was flying when my group was playing	Never	1	2	3	4	5	6	7	Always
CA	My group felt happy when we were engrossed in the game	Never	1	2	3	4	5	6	7	Always
CA	It was difficult for the group to detach from the game	Never	1	2	3	4	5	6	7	Always
CA	My group got “carried away” by the game	Never	1	2	3	4	5	6	7	Always

Thank you for filling in this questionnaire. We hope you enjoyed the game!

APPENDIX B - LEADERSHIP OBSERVATION SCHEME

Observation Scheme - Leadership Behaviors in Serious Gaming Teams			
	Behavior	**Definition**	**Examples**
Self-defending	Showing disinterest	- Not valueing the opinion of others by not listening, looking bored or looking away	Ignoring
	Defending one's own position	- Not allowing others to take the lead	"I am the group leader"
	Providing negative feedback	- Providing negative feedback	"You shouldn't have acted so hastily"
Steering	Directing / Correcting a. correcting b. Interrupting	- Correcting others' action or behaviors	a. "We are not allowed to.." a. "No, that does not work"
	Directing / delegating	- Dividing tasks - Giving directions	"blue, you stand on that button" "Would anyone else like to try?"
	Verifying	- Checking on the current situation	"What are you doing?" "is it working?"
	Structurizing the conversation	- Converse about task related subjects - Providing a summary of what was said	- "We are playing a game, lets focus on what we need to do" - "So you mean…"
	Informing	- Providing neutral information - Sharing information - Providing information about results	- "it took us xx.xx minutes" - "we should stand on the buttons"
	Visioning	- portraing an image of the future	"I think we should…" "what if.. [we could be the best team?!]"
	Disagreeing	- disagreeing with a team member - showing non-compliant behavior	"I don't agree with you"
	Agreeing	- Agreeing with a team member - showing compliant behavior	"That's right"
Supporting	Intelllectual stimulation a. Asking for idea's b. cooperating	- a. asking for idea's or other perspectives - b. Stimulating cooperation	a. How do you think we should solve the puzzle?". b. "we should do this together" b. "If you need help, ask."
	Individualized consideration a. Positive rewarding b. Encouraging c. Being friendly d. Showing personal interest	- a. evaluating and rewarding the team members' behavior positively - b. stimulating the behavior of the team - c. showing sympathy - d. showing interest for team members' feelings or situationListening actively	a."Good idea!" b. "we / you can do this!" c. "would anyone else like to try? d. "how is it going? You doing alright?"
	Active listening	Listening actively	Nodding Paraphrasing "ok.. Yes.."

APPENDIX C- PERCEPTION OF THE SOURCE OF INFLUENCE

Table 5. Perception of the Source of Influence in Vertical Leadership Teams.

Team	**Person**	Leader	Person 2	Person 3	Person 4	Team Average
Team 4	Leader	2	5	4	3	3.875
	Person 2	2	5	4	4	
	Person 3	5	5	5	5	
	Person 4	4	2	3	4	
	Total	**3,25**	**4,25**	**4**	**4**	

Team	**Person**	Leader	Person 2	Person 3	Person 4	Team Average
Team 6	Leader	2	2	5	5	3.568
	Person 2	3	4	5	4	
	Person 3	4	3	2	3	
	Person 4	3	5	3	4	
	Total	**3,00**	**3,5**	**3,75**	**4**	

Team	**Person**	Leader	Person 2	Person 3	Person 4	Team Average
Team 11	Leader	4	5	2	4	3.375
	Person 2	4	5	4	2	
	Person 3	4	4	4	4	
	Person 4	3	3	2	3	
	Total	**3,75**	**4,25**	**3**	**3,25**	

Team	**Person**	Leader	Person 2	Person 3	Person 4	Team Average
Team 12	Leader	4	4	4	4	3.563
	Person 2	4	3	4	4	
	Person 3	3	4	3	4	
	Person 4	3	3	3	3	
	Total	**3,50**	**3,5**	**3,5**	**3,75**	

Team	**Person**	Leader	Person 2	Person 3	Person 4	Team Average
Team 13	Leader	5	5	4	3	3.813
	Person 2	2	4	4	2	
	Person 3	5	4	3	4	
	Person 4	4	4	4	4	
	Total	**4,00**	**4,25**	**3,75**	**3,25**	

Team	**Person**	Leader	Person 2	Person 3	Person 4	Team Average
Team 14	Leader	4	4	4	4	4.125
	Person 2	4	5	4	5	
	Person 3	3	3	3	3	
	Person 4	5	5	5	5	
	Total	**4,00**	**4,25**	**4**	**4,25**	

Team	Person	Leader	Person 2	Person 3	Person 4	Team Average
Team 18	Leader	3	5	2	5	3.625
	Person 2	3	5	2	4	
	Person 3	3	4	4	4	
	Person 4	3	4	2	5	
	Total	**3,00**	**4,5**	**2,5**	**4,5**	

Team	Person	Leader	Person 2	Person 3	Person 4	Team Average
Team 19	Leader	4	3	3	4	3.563
	Person 2	3	4	4	3	
	Person 3	4	4	4	4	
	Person 4	3	2	3	5	
	Total	**3,50**	**3,25**	**3,5**	**4**	

Team	Person	Leader	Person 2	Person 3	Person 4	Team Average
Team 20	Leader	3	3	4	4	3.563
	Person 2	4	4	3	5	
	Person 3	3	5	3	3	
	Person 4	2	4	4	3	
	Total	**3,00**	**4**	**3,5**	**3,75**	

Team	Person	Leader	Person 2	Person 3	Person 4	Team Average
Team 21	Leader	4	3	3	4	3.50
	Person 2	3	4	3	5	
	Person 3	3	4	3	5	
	Person 4	3	4	5	4	
	Total	**3,25**	**3,75**	**3,5**	**4,5**	

Table 6. Perception of the Source of Influence in Shared Leadership Teams.

Team	**Person**	Person 1	Person 2	Person 3	Person 4	Team Average
Team 1	Person 1	5	5	5	5	4.75
	Person 2	5	5	5	5	
	Person 3	4	4	4	4	
	Person 4	5	5	5	5	
	Total	**4,75**	**4,75**	**4,75**	**4,75**	

Team	**Person**	Person 1	Person 2	Person 3	Person 4	Team Average
Team 2	Person 1	3	4	5	5	4.375
	Person 2	5	5	5	4	
	Person 3	4	4	4	4	
	Person 4	5	5	4	4	
	Total	**4,25**	**4,5**	**4,5**	**4,25**	

Team	**Person**	Person 1	Person 2	Person 3	Person 4	Team Average
Team 5	Person 1	4	4	4	4	3.438
	Person 2	3	3	3	3	
	Person 3	3	3	3	3	
	Person 4	3	2	5	5	
	Total	**3,25**	**3**	**3,75**	**3,75**	

Team	**Person**	Person 1	Person 2	Person 3	Person 4	Team Average
Team 8	Person 1	3	3	5	4	4.250
	Person 2	5	5	5	5	
	Person 3	4	4	4	4	
	Person 4	4	4	4	5	
	Total	**4,00**	**4**	**4,5**	**4,5**	

Team	**Person / score**	Person 1	Person 2	Person 3	Person 4	Team Average
Team 9	Person 1	2	1	4	4	3.813
	Person 2	5	3	5	4	
	Person 3	1	1	1	2	
	Person 4	4	4	4	3	
	Total	**4,00**	**4,25**	**3,75**	**3,25**	

Team	**Person**	Person 1	Person 2	Person 3	Person 4	Team Average
Team 10	Person 1	4	4	4	4	4.50
	Person 2	5	5	5	5	
	Person 3	4	4	4	4	
	Person 4	5	5	5	5	
	Total	**4,50**	**4,5**	**4,5**	**4,5**	

Team	**Person**	Person 1	Person 2	Person 3	Person 4	Team Average

Team 15	Person 1	4	4	3	3	3.625
	Person 2	4	3	4	4	
	Person 3	3	4	4	3	
	Person 4	4	4	3	4	
	Total	**3,75**	**3,75**	**3,5**	**3,5**	

Team	**Person**	Person 1	Person 2	Person 3	Person 4	Team Average
Team 16	Person 1	4	4	4	4	3.438
	Person 2	5	3	5	4	
	Person 3	3	3	4	1	
	Person 4	4	2	4	1	
	Total	**4,00**	**3**	**4,25**	**2,5**	

Team	**Person**	Person 1	Person 2	Person 3	Person 4	Team Average
Team 17	Person 1	4	4	4	4	3.750
	Person 2	4	4	4	4	
	Person 3	4	4	4	4	
	Person 4	3	4	2	3	
	Total	**3,75**	**4**	**3,5**	**3,75**	

Team	**Person**	Person 1	Person 2	Person 3	Person 4	Team Average
Team 22	Person 1	3	4	4	4	3.875
	Person 2	3	5	3	5	
	Person 3	3	4	4	4	
	Person 4	4	4	4	4	
	Total	**3,25**	**4,25**	**3,75**	**4,25**	

APPENDIX D - DEBRIEFING OVERVIEW

Topic	Facilitator Questions	Objectives
General Overview	**What was this game all about? / What did you do?** • *What was your approach on solving the puzzles?* • *Did you discuss your findings with your team mates / did you try it first and then discussed the possible solution?* • *How did you do it?* ***Which of these do you face during your work?***	To create a shared understanding of what happened. Example items are: • Collaboration — Trial & Error • Teamwork — Strategy • Leadership — Decision making • Problem solving — Feedback

Topic 1
Collaboration
	• What is collaboration?
	• How did this go during the game?
	• How and when did you collaborate effectively?
	  • if they do not have an example, share an observation
	• How and when did you collaborate ineffectively?
	  • if they do not have an example, share an observation
	• When you could play the game again, what would you do differently in regard to collaboration?
		To create awareness of their (in)effectiveness of their way of collaboration.
		
		Collaboration = working with each other to do a task and to achieve shared goals.

Topic 2
Communication
	• What is communication?
	• How did this go during the game?
	• What went well in regard to communication?
	  • if they do not have an example, share an observation
	• What was ineffective in regard to communication?
	  • if they do not have an example, share an observation
	• When you could play the game again, what would you do differently in regard to communication?
		To create awareness of their (in)effectiveness of their way of communication.
		
		Communication = *Two way process of reaching mutual understanding, in which people not only exchange information, feelings, idea's, and news, but they also create and share meaning. Communication can be verbal and non-verbal.*

Topic 3
Analyzing
	• What is 'Analyzing'?
	• How did this go during the game?
	• When were you effective in analyzing and thus solving a problem / puzzle?
	  • if they do not have an example, share an observation
	• When were you Ineffective in analyzing and thus solving a problem / puzzle
	  • if they do not have an example, share an observation
	• When you could play the game again, what would you do differently in regard to analysis?
		To create awareness of their (in)effectiveness of their way of analyzing and thus solving problems.
		
		Analysis = *The process of working through details of a problem to reach a solution and determining a plan to bring a desired future to life, such as the achievement of a goal or solution to a problem.*

Mental Note	1. **Say:** *You have been collaborating, communicating and analyzing to solve problems in the most effective way while you were under the pressure of time.*
	
	2. **Ask:** *Based on what you just experienced, what would you do differently in the area's of (1) communication, (2) teamwork and (3) problem solving whenever you are working with others?*
	  • → Participants should write three things down, and then share this with the group.
	  • Focus on ***why*** they think these elements are important lessons they have learned
	  • Write these down on the flip chart.
		To make the participants even more aware of their way of communication, collaboration and analysis skills to effectively solve problems and to transfer the knowledge that they learned into a personal note consisting of 3 items.

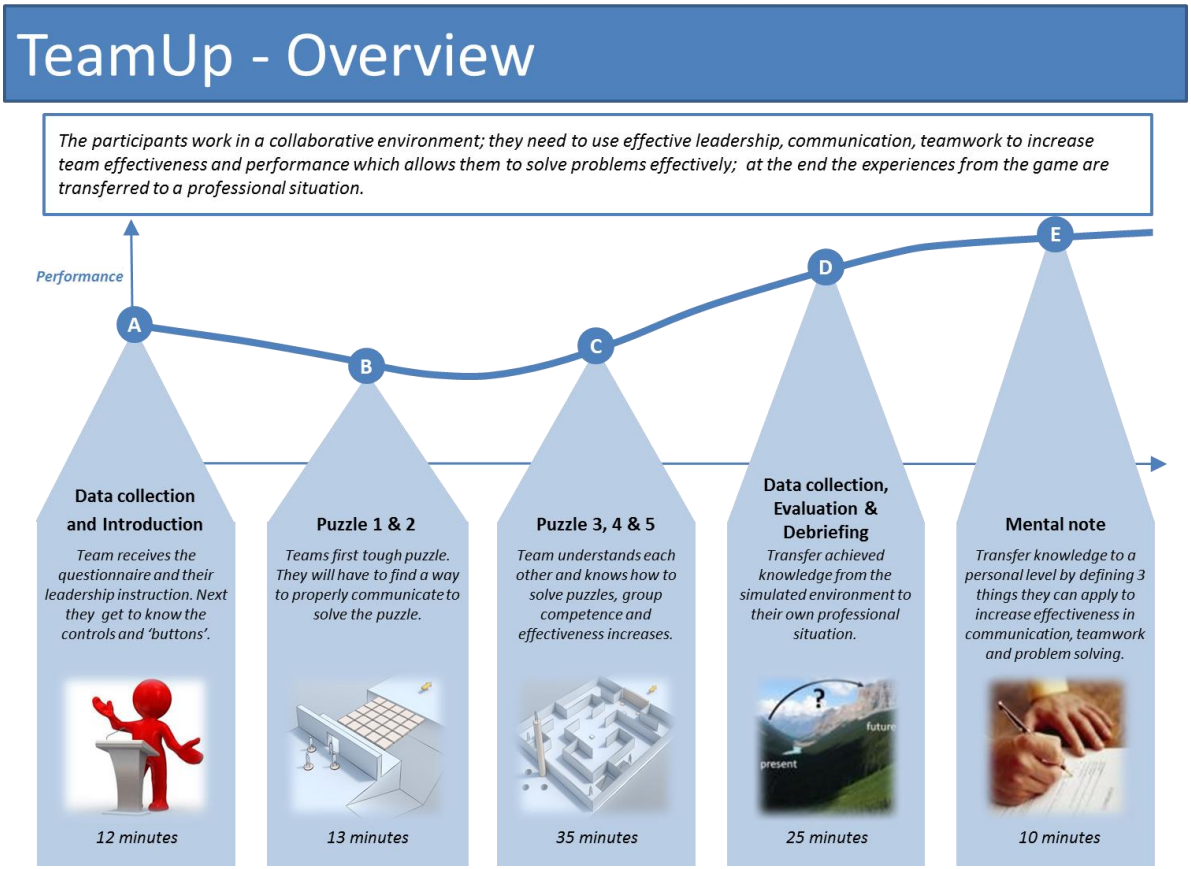
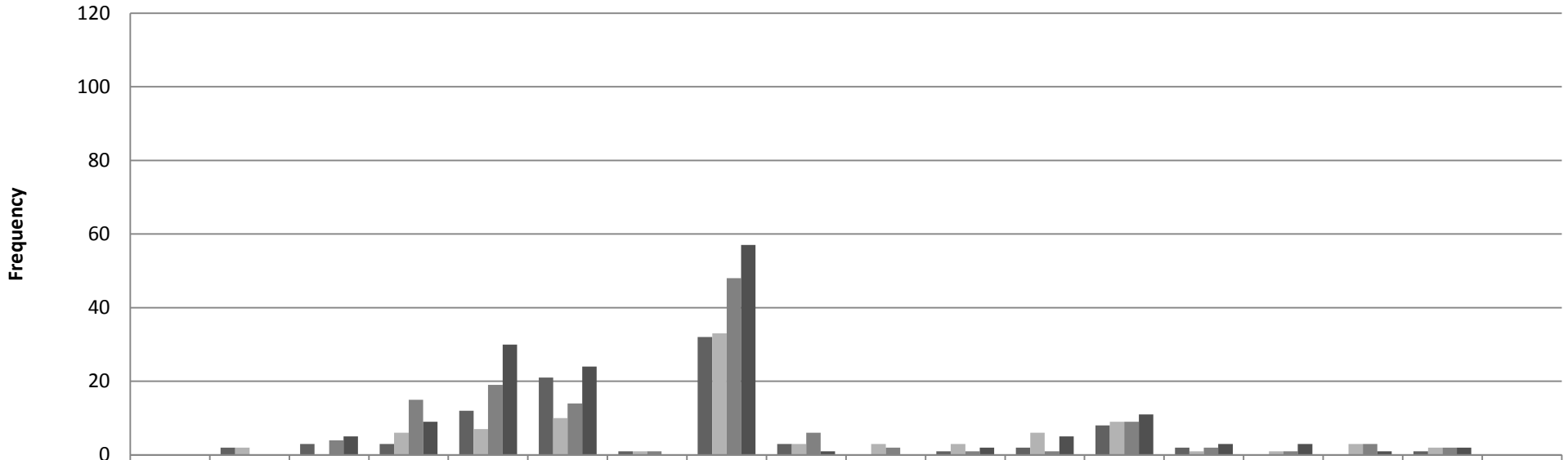
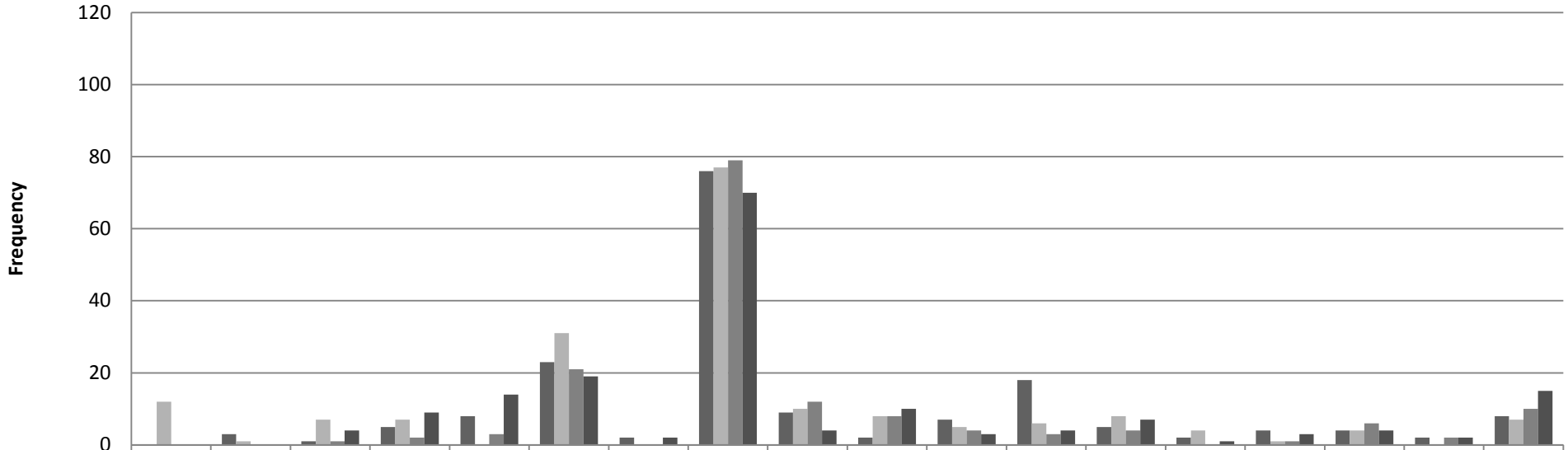

TeamUp - Overview
The participants work in a collaborative environment; they need to use effective leadership, communication, teamwork to increase team effectiveness and performance which allows them to solve problems effectively; at the end the experiences from the game are transferred to a professional situation.
Performance
A
B
C
D
E
Data collection and Introduction
Team receives the questionnaire and their leadership instruction. Next they get to know the controls and 'buttons'.
12 minutes
Puzzle 1 & 2
Teams first tough puzzle. They will have to find a way to properly communicate to solve the puzzle.
13 minutes
Puzzle 3, 4 & 5
Team understands each other and knows how to solve puzzles, group competence and effectiveness increases.
35 minutes
Data collection, Evaluation & Debriefing
Transfer achieved knowledge from the simulated environment to their own professional situation.
?
future
present
25 minutes
Mental note
Transfer knowledge to a personal level by defining 3 things they can apply to increase effectiveness in communication, teamwork and problem solving.
10 minutes

Figure 2. Leadership Behaviors in Vertical Team 1



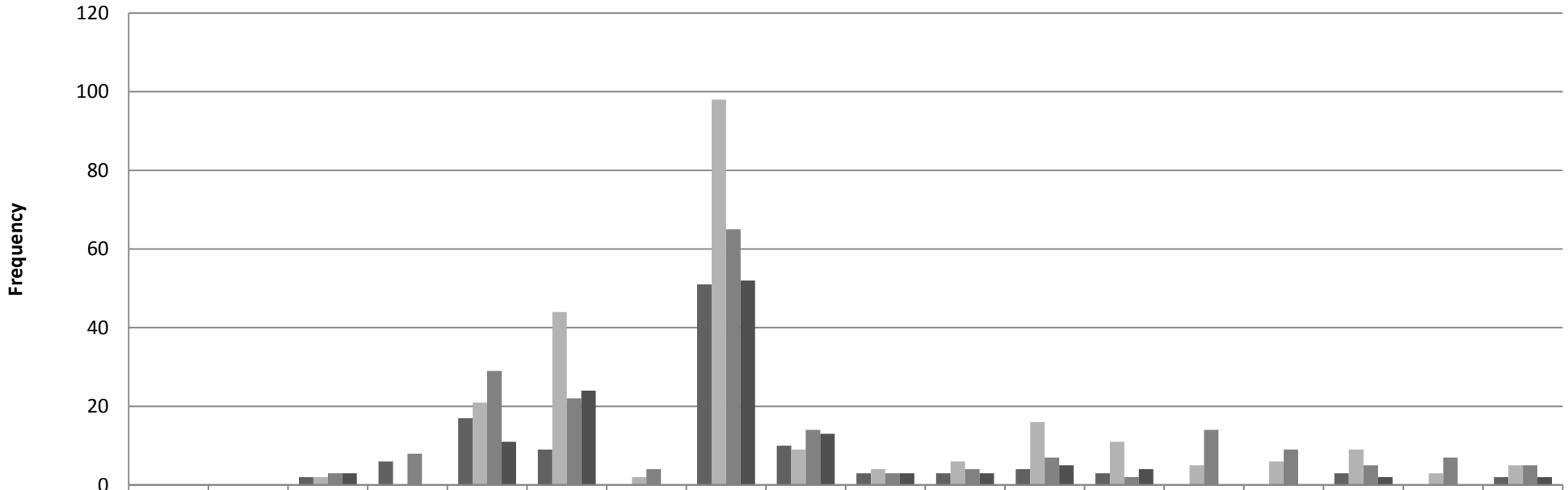
	Showing disinterest	Defending ones own position	Providing negative feedback	Directing / Correcting	Directing / Delegating	Verifying	Structuring the conversation	Informing	Visioning	Disagreeing	Agreeing	Asking for Idea's	Cooperating	Positive Rewarding	Encouraging	Being Friendly	Showing personal interest	Active Listening
Leader	0	2	3	3	12	21	1	32	3	0	1	2	8	2	0	0	1	0
Follower1	0	2	0	6	7	10	1	33	3	3	3	6	9	1	1	3	2	0
Follower2	0	0	4	15	19	14	1	48	6	2	1	1	9	2	1	3	2	0
Follower3	0	0	5	9	30	24	0	57	1	0	2	5	11	3	3	1	2	0

Figure 3. Leadership Behaviors in Vertical Team 2



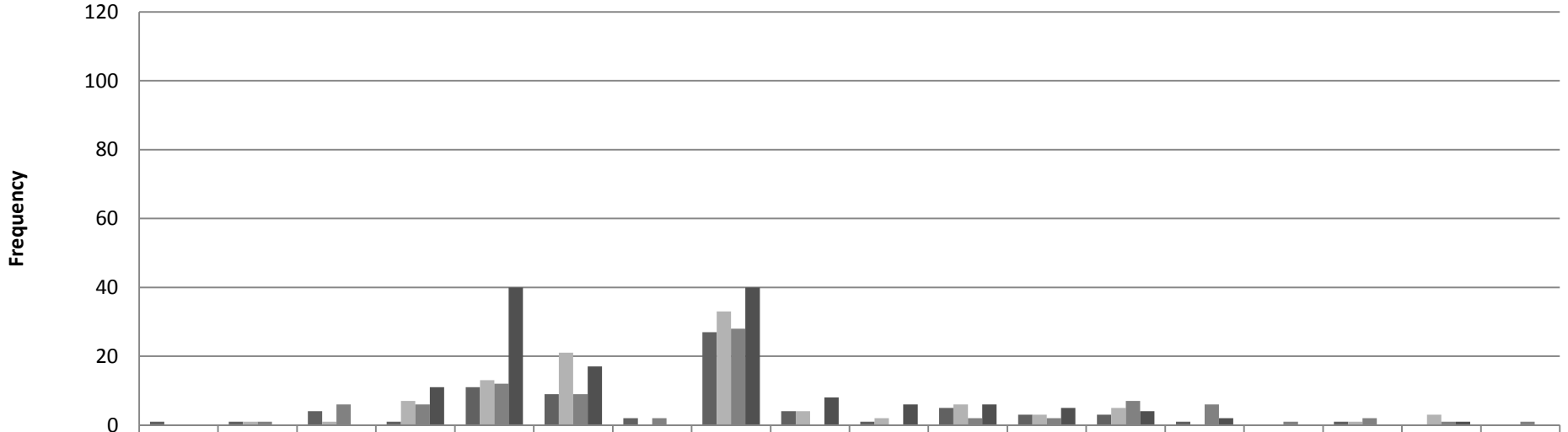
	Showing disinterest	Defending ones own position	Providing negative feedback	Directing / Correcting	Directing / Delegating	Verifying	Structuring the conversation	Informing	Visioning	Disagreeing	Agreeing	Asking for Idea's	Cooperating	Positive Rewarding	Encouraging	Being Friendly	Showing personal interest	Active Listening
Leader	0	3	1	5	8	23	2	76	9	2	7	18	5	2	4	4	2	8
Follower1	12	1	7	7	0	31	0	77	10	8	5	6	8	4	1	4	0	7
Follower2	0	0	1	2	3	21	0	79	12	8	4	3	4	0	1	6	2	10
Follower3	0	0	4	9	14	19	2	70	4	10	3	4	7	1	3	4	2	15

Figure 4. Leadership Behaviors in Vertical Team 3



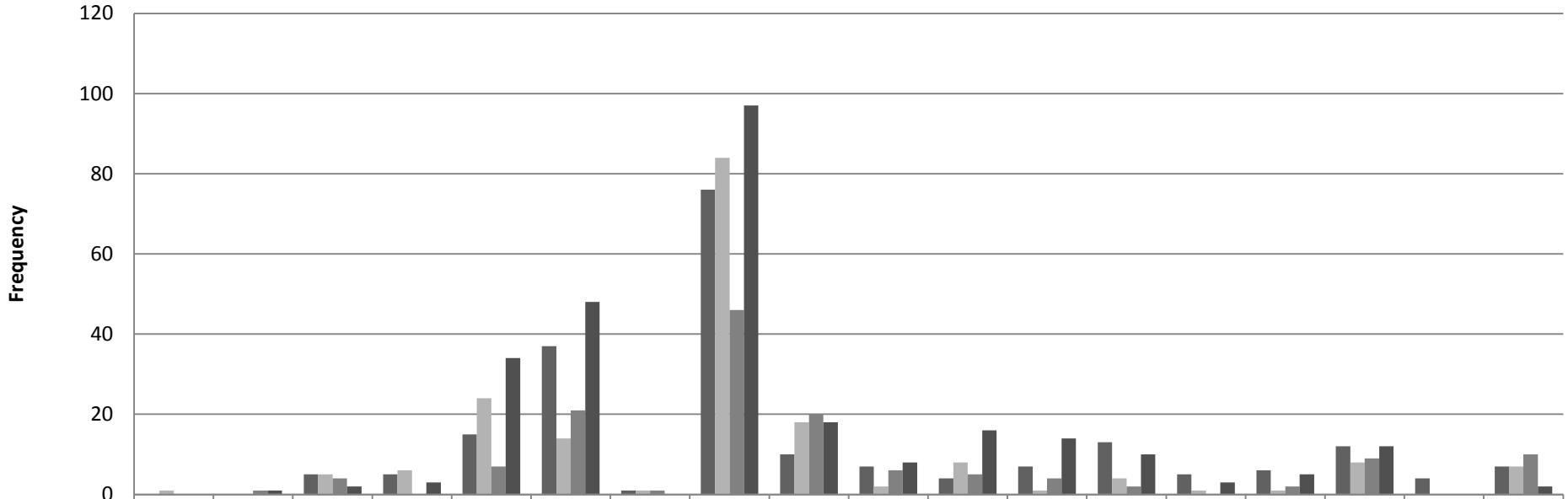
	Showing disinterest	Defending ones own position	Providing negative feedback	Directing / Correcting	Directing / Delegating	Verifying	Structuring the conversation	Informing	Visioning	Disagreeing	Agreeing	Asking for Idea's	Cooperating	Positive Rewarding	Encouraging	Being Friendly	Showing personal interest	Active Listening
Leader	0	0	2	6	17	9	0	51	10	3	3	4	3	0	0	3	0	2
Follower1	0	0	2	0	21	44	2	98	9	4	6	16	11	5	6	9	3	5
Follower2	0	0	3	8	29	22	4	65	14	3	4	7	2	14	9	5	7	5
Follower3	0	0	3	0	11	24	0	52	13	3	3	5	4	0	0	2	0	2

Figure 5. Leadership Behaviors in Shared Leadership Team 1



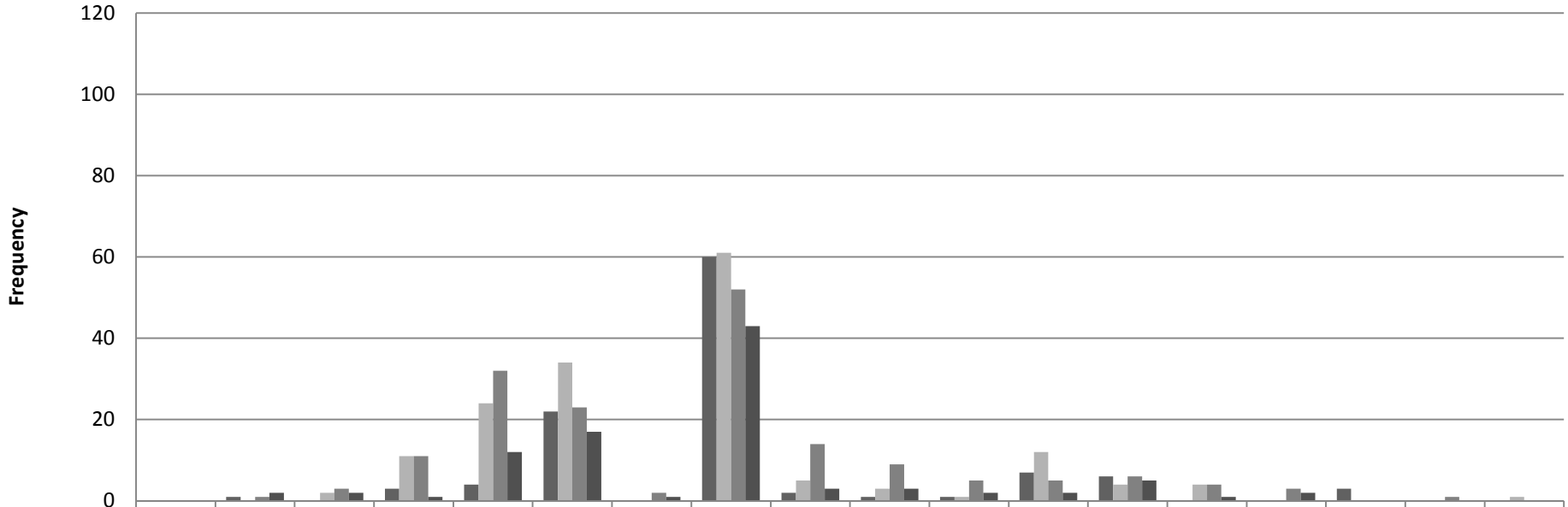
	Showing disinterest	Defending ones own position	Providing negative feedback	Directing / Correcting	Directing / Delegating	Verifying	Structuring the conversation	Informing	Visioning	Disagreeing	Agreeing	I.C. Asking for Idea's	I.C. Cooperating	I.Con. Positive Rewarding	I.Con Encouraging	I.Con Being Friendly	I.Con Showing personal interest	Active Listening
Member 1	1	1	4	1	11	9	2	27	4	1	5	3	3	1	0	1	0	0
Member 2	0	1	1	7	13	21	0	33	4	2	6	3	5	0	0	1	3	0
Member 3	0	1	6	6	12	9	2	28	0	0	2	2	7	6	1	2	1	1
Member 4	0	0	0	11	40	17	0	40	8	6	6	5	4	2	0	0	1	0

Figure 6. Leadership Behaviors in Shared Leadership Team 2



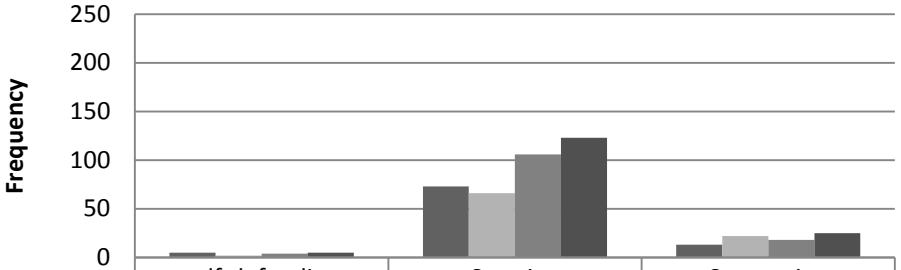
	Showing Disinterest	Defending ones own position	Providing negative Feedback	Directing / correcting	Directing / delegating	Verifying	Structuring the Conversation	Informing	Visioning	Disagreeing	Agreeing	I.S. Asking for ideas	I.S. Cooperating	I.C. Positive rewarding	I.C. Encouraging	I.C. Being Friendly	I.C. Showing personal interest	Active Listening
Member1	0	0	5	5	15	37	1	76	10	7	4	7	13	5	6	12	4	7
Member2	1	0	5	6	24	14	1	84	18	2	8	1	4	1	1	8	0	7
Member3	0	1	4	0	7	21	1	46	20	6	5	4	2	0	2	9	0	10
Member4	0	1	2	3	34	48	0	97	18	8	16	14	10	3	5	12	0	2

Figure 7. Leadership Behaviors in Shared Leadership Team 3



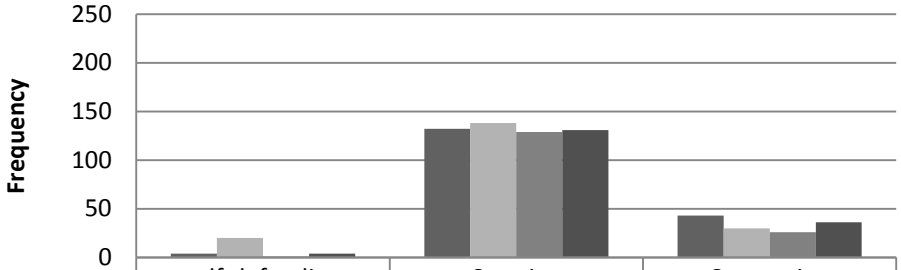
	Showing Disinterest	Defending ones own position	Providing negative feedback	Directing / Correcting	Directing / Delegating	Verifying	Structuring the Conversation	Informing	Visioning	Disagreeing	Agreeing	I.C. Asking for Idea's	I.C. Cooperating	I.Con. Positive Rewarding	I.Con Encouraging	I.Con Being Friendly	I.Con Showing personal interest	Active Listening
Member1	0	1	0	3	4	22	0	60	2	1	1	7	6	0	0	3	0	0
Member2	0	0	2	11	24	34	0	61	5	3	1	12	4	4	0	0	0	1
Member3	0	1	3	11	32	23	2	52	14	9	5	5	6	4	3	0	1	0
Member4	0	2	2	1	12	17	1	43	3	3	2	2	5	1	2	0	0	0

Figure 8. Vertical Leadership Team 1



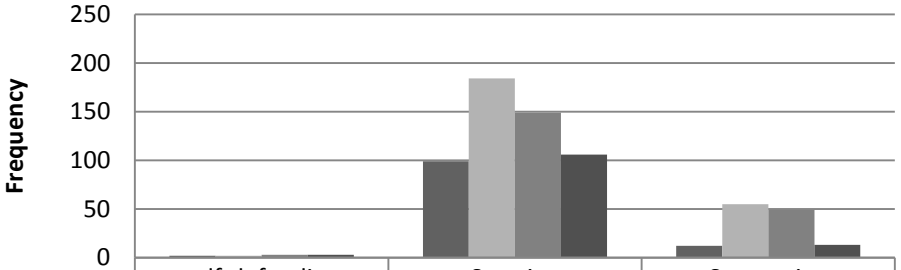
	self-defending	Steering	Supporting
Person1	5	73	13
Person2	2	66	22
Person3	4	106	18
Person4	5	123	25

Figure 9. Vertical Leadership Team 2



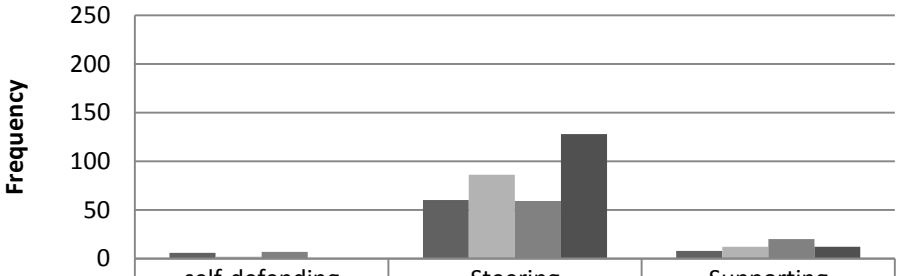
	self-defending	Steering	Supporting
Person1	4	132	43
Person2	20	138	30
Person3	1	129	26
Person4	4	131	36

Figure 10. Vertical Leadership Team 3



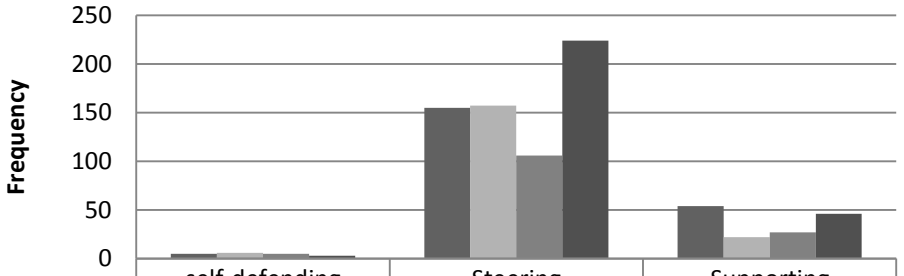
	self-defending	Steering	Supporting
Person1	2	99	12
Person2	2	184	55
Person3	3	149	49
Person4	3	106	13

Shared Leadership Team 1



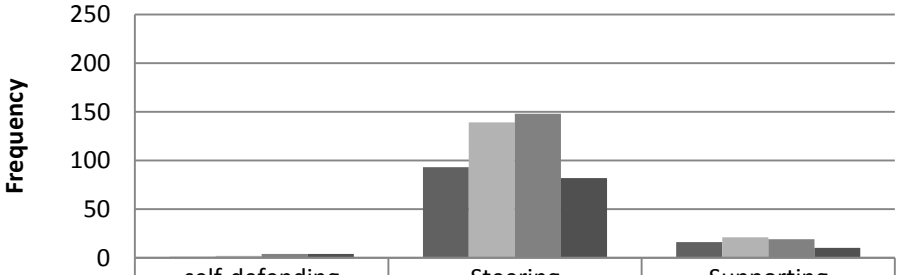
	self-defending	Steering	Supporting
Person1	6	60	8
Person2	2	86	12
Person3	7	59	20
Person4	0	128	12

Shared Leadership Team 2



	self-defending	Steering	Supporting
Person1	5	155	54
Person2	6	157	22
Person3	5	106	27
Person4	3	224	46

Shared Leadership Team 3



	self-defending	Steering	Supporting
Person1	1	93	16
Person2	2	139	21
Person3	4	148	19
Person4	4	82	10

Vertical Leadership Team 1 - First minute - solving puzzle 1
Player2: "I am blue"
Player 4: I am red
Player 3: I am yellow.
Player2: I will stand on the button.
Player 4: I will go left, left.
Player 2: I am standing on the right side. Leader, you can go through the door
Leader: Oh god, but I cannot control my player with my left hand.
Player4: "You can also.. *shows how the leader can move* ...like this".
Leader: Yeah but that doesn't work any better. That is still the same. oh god.
Player 2: No pressure! (smiling)
Player3: we must move through the open door.
Player2: (at the same time) Through the door!
Player4: (at the same time) we should move through the door.
Leader: So we have to move through the door.
Player2: You are green. Who will go next?
Player4: Yes!
Player3: Me.
Player2: And, do we.. you should go that way!
Player3: We have to go back, go back, go back! Green!
Player4: Oh no, they have to stand on one of those things.
Player 3: walk back. And then to your right. Sorry, to the left.
Leader: Oh yeah.
Player 3: And then stand on that thing there.
Player4: Yes. Just one more person..
Player 3: Right there, stand on it there. Good job.
Leader: And now?
Player2: Next time, will you go first again Player4?
Player3: Yes.
Player2: Yes, you can go.
Player3: Ok, where there.
Player4: I will take the right button.
Player2: I will take the middle one.
Player3: *looking at the leader* Shouldn't you go to the left..? Green?
Leader: Then I will go to the right. Huh?
Player2: You should stand on the left disc.
Player3: the left.
Leader: oh.

From the observation and conversation it becomes clear that the scouts go first, and examine the area, whereas the leader is the one who falls behind (or is being protected). There were also moments where the leader asked something, and the players did not respond to the question of the leader. For example:

Leader: Can you see which way Player2 and I are looking in?
Player3: You should have to go back, all the way where you came from!
(Minutes: 10.00 - 10.10)

Another example:
Player2: oh we can push this one!

Leader: I got a torch. We can do something with this.
Player4: Can red or green go towards the bridge. So, go out of the box.
Player3: now towards the bridge.
Leader: But I have a torch now, so we can ... *others keep on talking* go into..
Player2: Oh!
Player4: everything alright with blue?
(minutes: 12.15 - 12.25)

This can mean several things. Either, the leader did not have any influence over the team, as in a vertical influence. Or the leader was seen as an out-group member (Haslam et al., 2011), or finally, the intervention did have some effect resulting in the 'scouts' figuring out how the game should be played and then guiding the leader through the game. Still the question remains why the leader showed less behavior. Overall in the video observation, it became clear that the leader was often not heard. The others mostly collaborated, where player4 delegated and decided most, and player2 and 3 were mostly the ones who 'scouted' throughout the game.

Vertical Leadership Team 2 - First minute - solving puzzle 1
Player3: I can see you.
Player2: hello.
Player4: who are you Leader?
Leader: I am green.
Player4: I am pink.
Player2: oh we are allowed to talk. I am blue. Isn't this the place where we should stand on?
Player4: this thing lowers, when we stand on it.
Leader: *mumbles*
Player2: yes that is that fire.
Player3: so we can't stand next to each other.
Leader: But maybe we should ....
Player2: *interrupts* But you are standing on a button... yes exactly.
Leader: Oh wait, i must coordinate this. Oh well.
Player2: yes. There we go! Something is opening.
Leader: Is something happening?
Player4: Yes the thing in the middle is opening.
Player3: Yes! The gate is opening.
Player2: There we go.
leader: Shall we all go through?
Player2: no wait, hold on. I will have to stand on something here. I am standing in the opposite of Leader.
Player3: oh hold on, I am standing on ...
Leader: 2..1.., Player3 is standing right on my opposing side.
Player3: Yes.
Player2: I am blue.
Leader: Shall we now go Player4?
Player4: Yes. If they are standing on the buttons. *makes a compliment about the game*
Leader: *mumbles something about the laptops*
Player2: Is everyone through?
Leader: and lets continue.
Player2: Can't we run any faster?

From the observation and conversation it becomes clear that the 'scouts' are the ones who examine everything and go first. The leader then, coordinates this all, and therefore says less. This can mean that the intervention did have any effect resulting in the 'scouts' figuring out how the game should be played and then guiding the leader through the game. The latter is suggested, since the leader did mention that he 'was the one who should coordinate'. Later on

the ‘leader’ did coordinate a little more. Further in the game the same pattern occurred. However, leader was, again, ignored regularly when he wanted to say something. For example:

Leader: where are we going?
remains silent
Player 2: where are you standing?
Leader: I am standing somewhere near a chimney, with a…
Player 2: Can someone try to look up, whether you can see player3?
Player4: I can look up.
(minutes: 12.24 – 12.38)

Another example:
Leader: wait a second. Is this correct?
Player2: Ho, mine is deactivated! That means I have to go back!
Leader: you were correct Player2?
Player2: yes, it is activated. *not in response of the leader*

Vertical Leadership Team 3 - First minute - solving puzzle 1
Player 3: "so me and Leader are here, where are you Player2? Who is the red one?"
Player 2: "Right behind you"
Leader: "the-the-there is another one of those platforms over here."
Player 2: "I'm blue".
Player 4: "And I'm a scout, so I’ll stand here".
Player 2: "so you are red Player4?"
Leader: "The other two can go through then" (no-one moved)
Player 2: "And you are green"? (to Player 2)
Player 3: "No, Yellow".
Player4: "So there is a door open. What did happen in the middle?" (looking at the leader)
Leader: "The door opens, so two other people can go through"
Player2: Which door opens?
Leader: The one in the middle, in between the two platforms.
Player3: Oh yeah. Follow me.
Player 4: if we get off, is the door then still open Ronald?
Leader: Probably not.
Player3: Follow me.
Player2: Oh the door is closing again.
Player4: So we have to come up with a trick. Maybe you on the other side have to look for a similar thing. So you can go through, both of you.
Player3: Oh I’ve gone through.
Player4: and you have to look where there is also a place to stand on the other side, because that, i think, will keep the door open.
Player2: Yep, I’m standing here on something.
Player4: Player3, you as well?
Player2: Are you going to the right? To stand on that thingie as well, right behind you?
Player3: on the other side?
Player2: yep. Let’s try it.
Player4: Let’s see whether the door opens.

From the observation and conversation it becomes clear that the 'scouts' collaborated together. The leader was not part of the conversation, unless the 'scouts' needed the idea or vision of the leader. This pattern predominantly repeated itself throughout the entire game. This can mean several things. Either, the leader did not have any influence over the team, as in a vertical influence. Or the leader was seen as an out-group member, or finally, the intervention did have any effect resulting in the 'scouts' figuring out how the game should be played and then guiding

the leader through the game. The latter is assumed, because during the video the players mentioned that they were "the scouts".

Observations
Noteworthy observations were that in each of the observed teams, there was an assigned leader, however, one who knew how to solve the puzzle, was granted 'leadership'. This pattern is especially obvious in puzzle 2, 3 and 4. In both these settings teams were split up, and the official leader did not direct or control the conversation or the other team members. For example in Team [2]:
"Player2: if you [player3] go stand on the water waves, I will go stand on the water waves as well."

Shared Leadership Team 2 - First minute - solving puzzle 1
Player1: how can you jump?
Player4: I assume we will have to continue on forward. Oh no, I guess not.
Player2: *mumbles*
Player3: we are all heading in the same direction.
Player4: Oh I think that we all have to… I am standing on one of the circles, if someone stands on the other one..
Player2: Yeah, well then it still won't work.
Player3: Yeah then we still have to do two others Player4.
Player4: Then there must be something in the middle.
Player2: yeah or..
Player4: yes, the door is opening now! *points at his screen*
Player2: Oh yes.
Player3: And then we have to stand on the circles here again.
Player2: Yeah, I think you should..
Player4: Ahh! Yeah, you must be able to…
Player1: I think you can enter it from the other side.
Player2: I am stuck right at the gate.
Player4: Who is green?
Player1: Are you locked right '*in*' the gate?
Player2: Yeah. Blue is eh..
Player1: *laughs*
Player2: Yeah, cool isn't it.
Player4: Yeah stand on the round one yes.
Player2: I would like to get through, but I'm stuck.
Player1:*laughs*
Player2: oh my character is being squashed.
Player3: You must go to your right *looks at player1* and move onto the circle so they can get through.
Player1: yeah? Can we go now?
Player3: yeah I think so.
Player2: so get off on time, and then..
Player3: how can you sprint? *laughs*
Player4: How can you roll *laughs*