The effect of Product Owner behaviour on the observed versus perceived psychological safety of agile team members: An exploratory study

Author: Aninka Spekle
University of Twente
P.O. Box 217, 7500AE Enschede
The Netherlands

ABSTRACT

This thesis offered exploratory insights into the possible influence a prominent role or team member can have on the psychological safety of the team members through video-observation methods. Agile teams are known for their autonomous team and iterative sprints. Considering the team effectiveness of agile teams, we see the state of psychological safety (PS) as a determining factor in the acceptance of agile practices. Psychological safety can be influenced by supportive leadership behaviour, and although, agile teams are an example of self-managing teams, the Product Owner role could potentially be seen as an informal leadership role. This thesis explores how the observed psychological safety behaviour of the PO relates to the observed and perceived psychological safety of the team members. The retrospective meetings of four teams were coded, based on the individual-level PS mean, using the Observer XT to observe the psychological safety behaviour of all team members. The perceived individual-level PS was measured using a 3-item individual-level survey scale. Five episodes were examined for the reactions of team members on unsupportive or defensive behaviour of the PO or another prominent team member. The episode analysis showed voice and collaboration behaviour as a common response. However, the teams with a higher individual-level PS held discussions including multiple team members, whereas in the lower individual-level PS teams the discussion was mostly held between a member and the prominent role or team member. The findings show that a prominent role or team member could set the example of psychological safe behaviour. The findings show artefacts such as the setting (i.e., technology present, sitting or standing) and factors such as team/group climate and meeting designs to potentially influence psychological safety as well, and can therefore be included in future research. This research helped improve an observational method (codebook) to measure psychological safety.

Graduation Committee members:

Dr. Desirée van Dun
Prof. Dr. Celeste Wilderom

Keywords

Agile team, Psychological Safety, Product Owner, Social Learning Theory, Video observation, Survey.

1. INTRODUCTION

Organisations "need flexible and adaptable structures to thrive in an increasingly turbulent business environment." (Magpili & Pazos, 2017, p. 3). Self-managing teams emerged as a structure that help organisations increase their flexibility and performance (Magpili & Pazos, 2017). Agile teams are an example of such a self-managing team structure. Agile methods stem from the software development industry and have "changed the software development process in an unparalleled way" (Biesialska et al., 2021, p. 1). Beck et al (2013) wrote a manifesto for agile software development, identifying the following key principles:

- Individuals and interactions over processes and tools
- Working software over comprehensive documentation
- Customer collaboration over contract negotiation
- Responding to change over following a plan

Hennel and Rosenkranz (2020) explained how these agile principles result in flexibility over strict control, increased team autonomy, a less planned or scheduled development process, and iterative phases that encourage change and constant feedback. "Planning becomes a permanent task, and team leadership is established via collaboration" (Hennel & Rosenkranz, 2020, p.13).

In the past years, large international firms outside of the software development industry, such as Zappos and Spotify, have adopted the agile methods as well. Even though the concept of agile has been around, the adaptation outside of the software development industry is only recent (Birkinshaw, 2018). In a systematic literature review on the success factors of at scale adaptations of agile methods, they found that 90% of the papers were experience reports, which indicates a lack of academic research on this topic (Dikert et al., 2016). There is thus a need to study agile and specifically the functioning of teams within agile in more depth

Furthermore, Edmondson had already highlighted in 1999 the need to study real working groups when it comes to psychological safety. Edmondson (1999) said that "the promise of more uncertainty, more change, and less job security in future organizations, teams are in a position to provide an important source of psychological safety for individuals at work" (1999, p. 380). Psychological safety is a fluctuating state, defined as a "sense of confidence that the team will not embarrass, reject, or punish someone for speaking up" (Mathieu et al, 2018, p.7). With regards to psychological safety, positive leader relations are mentioned as moderating the relationship between psychological safety and performance (Mathieu et al, 2018). Leadership is an interesting topic within agile teams as these teams are considered self-managing teams, and thus they lack formal leadership positions. Within the scrum agile method, we find that the Product Owner has a supporting role towards the team and specifically is the connection between the customer and the team (Dönmez et al., 2016). Though this role is not intended as a leadership role, research has shown that the PO has a coordinating role (Kristinsdottir et al.,2016).

Although psychological safety has been found to be a predictor of team outcomes, such as task performance, commitment, and satisfaction (Mathieu et al., 2018), there has been a call to study psychological safety more "through a dynamic lens" (Mathieu et al., 2018, p.17). In addition, a recent study by O'Donovan, Van Dun and McAuliffe (2020) emphasized the need to study psychological safety through different measurement methods, as currently the measurement of psychological safety is dominated by self-report surveys. "Observation measures can complement surveys as they provide a more objective understanding" (O'Donovan et al., 2020, p.2).

In conclusion, there is a need for more academic research on agile teams and psychological safety, as well as the combination of these two, as psychological safety can be a factor in whether team members accept agile practices (Hennel & Rosenkranz, 2020). This research can add important insights on the effectiveness of the agile teams within the service organization where this research is being done. Additionally, there is the need to use a different measurement of psychological safety to provide a better objective understanding of the concept.

The research objective lies in exploring the possible effect of the behaviour of an informal leader which can influence a key state of team effectiveness, namely psychological safety. Furthermore, we will work with and further develop an observational method of measuring psychological safety. Psychological safety has been viewed across three levels, namely individual, team, and organizational (Newman et al, 2017). The focus of this research will be on psychological safety on the individual level. This leads to the following research question:

How does the observed psychological safety behaviour of the product owner relate to an agile team members observed and perceived psychological safety?

2. LITERATURE REVIEW

This section first explores the literature of self-managing teams, including agile teams, and team effectiveness. Next, it identifies psychological safety, within teams, and the relevance of psychological safety to agile teams. Lastly, based on the link between psychological safety and leadership, the social learning and exchange theory are discussed, following an explanation of the role of the Product Owner to agile teams and this research.

2.1 Team Effectiveness in Self-Managing Teams

Self-managing teams are defined by their autonomy and control over their whole work tasks, as well as that the members take care of tasks such as solving quality, interpersonal problems, and conducting team meetings (Tiejun et al., 2013). Benefits attributed to self-managing teams include "increased productivity, better quality work and improved quality of work-life for employees, as well as decreased absenteeism, and turnover" (Tiejun et al., 2013, p.1). Agile teams are an example of such a self-managing team structure.

The agile method focuses on short product or service development iterations, also called "sprints", with multidisciplinary self-organising teams (Dönmez et al., 2016, p. 66). Agile teams work with continuous planning and re-planning, feedback loops and high process transparency for stakeholders, such as clients (Dönmez et al., 2016). These sprints contain a variety of meetings, and the duration can span from 2 weeks to several months (Dönmez et al., 2016). In this research three meetings have been chosen to be recorded, namely planning, refinement, and the retrospective meeting stage. During the planning stage, the team sets goals and tasks to achieve these goals, which are then updated during the refinement stage. These stages, in iteration, allow "for regular stakeholder interaction, corrections made 'on the fly, and the re-scoping of project requirements supported by updated information or a new customer request" (Annosi et al., 2016). In the specific agile approach entitled "Scrum", three different roles can be distinguished within agile teams, namely the Product Owner, the Scrum Master, and the team itself. The Product Owner (PO) is responsible for the interaction with the clients, the Scrum Master helps facilitate the Scrum process, and the team itself is

responsible for self-assigning tasks towards a shared goal (Spiegeler, 2021).

Considering the importance of self-managing teams within organizational designs, it is useful to know more about the determinants of (self-managing) team effectiveness (Mathieu et al., 2018). For team effectiveness, there are two categories of outcomes: tangible outputs and influences on team members. (Mathieu et al., 2018). In the second category, we see both collective and individualistic outcomes, where "the collective level of analysis includes shared experiences, such as cohesion or psychological safety" (Mathieu et al., 2018, p.4). Most research on the effectiveness of work teams is guided by an input-mediating mechanism-outcome, or IMO, model (Mathieu et al., 2018). More recent perspectives added that structural and compositional features serve as key inputs and that key processes and emergent states serve as mediating mechanisms. One of these emergent states is psychological safety (Mathieu et al., 2018).

2.2 Psychological Safety in Teams

Psychological safety is defined as a work environment in which it feels "safe to voice ideas, willingly seek feedback, provide honest feedback, collaborate, take risks and experiment" (Newman et al., 2017, p. 521). Edmondson identifies team psychological safety as a "shared belief that the team is safe for interpersonal risk-taking" (Edmondson, 1999, p. 354). Psychological safety is seen as the mechanism through which the effects of supportive environments are transformed to desirable outcomes (Newman et al., 2017).

This concept is said to be increasingly important to organizational success given that employees need to share information and exchange ideas within teams (Newman et al., 2017), which is a relevant topic when it comes to agile teams as it is a "responsive and collaborative approach" (Birkinshaw, 2018 p.39). Another paper mentions "mutual performance monitoring, mutual trust, decision making, team cohesion, team motivation, and conflict resolution" as essential teamwork processes (O'Donovan et al., 2020, p. 2). Hennel and Rosenkranz (2021) found that psychological safety fosters the use of (social) agile practices and enables a positive effect on (social) agile practices on performance. They concluded that psychological safety is a determining factor in whether team members accept (social) agile practices and additionally how the members participate in the practices (Hennel & Rosenkranz, 2020). For instance, if psychological safety is low, team members are less likely to speak their minds, give valuable input, and offer ideas for continuous improvement (Hennel & Rosenkranz, 2020).

O'Donovan et al. (2020) summarised various behaviours belonging to psychological safety, which can be included in observation methods, which created the basis of the codebook used in this research. O'Donovan et al. (2020) combined the behaviours present in the conflict and information/knowledge sharing literature of Hoenderdos (2013), the learning behaviours of Edmondson (1999), the voice behaviours of Le Pine and Van Dyne (1998), and Van Dyne's (2003) silence behaviours.

Van Dyne et al. (2003) distinguishes six behaviours based on two natures of behaviour, namely passiveness and proactiveness, and three employee motives, namely resignation, fear, and cooperation. A passive nature of behaviour leads to disengaged behaviour, whilst a proactive nature leads to either self-protective or other-oriented behaviour. Van Dyne et al. (2003) distinguishes three silence and three parallel voice behaviours: The first is Acquiescent Silence, which refers to intentionally passive disengaged behaviour where people believe that speaking up is "pointless and unlikely to make a difference." (Van Dyne et al., 2003, p.1366). Acquiescent Voice is disengaged behaviour that "results in expressions of agreement and support based on low self-efficacy to affect any meaningful change" (Van Dyne et al., 2003, p.1366). The second is Defensive Silence, which refers to intentional proactive self-protective behaviour to protect the self from external threats (Van Dyne et al., 2003). Defensive Voice is where employees are self-protective by for instance taking fewer personal responsibilities and attributing outcomes to external factors rather than internal ones (Van Dyne et al., 2003). The third one is ProSocial Silence which is proactive cooperative behaviour where withholding ideas, information or opinions is to benefit others (Van Dyne et al., 2003). ProSocial Voice is where employees express ideas, information, and opinions to cooperate with others (Van Dyne et al., 2003). These behaviours, which focus on how individual team members experience PS, lay the foundation for the codebook used in this research.

2.3 Leadership in Agile Teams

Regarding supportive leadership behaviours, there has been growing research at both the individual and team levels (Newman et al., 2017). At the individual level, leader inclusiveness, support, trustworthiness, openness, and behavioural integrity strongly influence team members' perception of psychological safety, which then drives voice behaviour (Newman et al., 2017). Both the *social learning* and *social exchange theories* have been used to explain why a significant relationship may exist between supportive leadership behaviours and psychological safety behaviour (Newman et al., 2017). The social learning theory is based on the idea that the leader can model to team members that it is safe to take risks and engage in honest communication through listening, forwarding support, and providing clear and consistent directions. On the other hand, the social exchange theory says that when "followers are supported by the leader, they will reciprocate with supportive behaviours themselves, creating a safe environment for the rest of their team." (Newman et al., 2017, p.525). Newman (2017) argues that when psychological safety is built through learning and emulating these behaviours, the effects will be stronger, so the social learning theory is preferred. In this research, we investigate self-managed teams without pre-determined leaders where the relevance of the social learning theory is more relevant. Van Dun and Wilderom observed that teams do not only mimic leaders, "but highly performing teams can also drive their leaders to strengthen the level of congruence in their behaviour-value pattern" (2021, p.87). This means that in high performing teams there is a simultaneous or reciprocal top-down and bottom-up social learning between team leaders and teams.

There has been growing research, at the individual and team level, on the effects of supportive leadership on work outcomes through psychological safety (Newman et al., 2017). Kristinsdottir et al. (2016), called agile teams self-organised but not leaderless, and included POs in the list of potential leaders. In scrum literature, the PO is said to be "an important mediator between the customer and the agile team" (Spiegler et al., 2021, p.30). The PO has the overall direction as agreed with the customer and at the same time must protect the team from organizational pressure. In this same research, psychological safety is a feature that enables roles to be transferred from a leadership position to a team member (Spiegler et al., 2021). Berntzen and Wong (2019) found that the coordination a PO gives might differ per PO, based on their personal preferences, the number of teams a PO is responsible for, or the autonomy of the team to choose their approach to agile methods.

Additionally, Edmondson (1999) described how effective team leader coaching and context support can contribute to a

psychologically safe team environment. The organisation where this research will be conducted, calls teams self-managed where the precise role of the PO is still being explored. Therefore, in this research, the assumption is made that the PO resembles in part the role of a team leader. This leads to this explorative research on the observed influence of the POs psychological safety behaviour on the observed and perceived psychological safety of the team.

3. METHODOLOGY

3.1 Research Design

This research is a part of a larger study at a large financial firm executed by the Change Management and Organisational Behaviour research group of the University of Twente. Due to the small sample and the explorative nature of this research, a more qualitative approach was taken to examine whether Po's behaviour could impact the team member's psychological safety.

The sprint planning, refinement, and retrospective meetings of nine agile teams, also referred to as 'squads', were video-recorded and transcribed. The retrospective meeting has as goal to reflect on the process of the sprint, including the benefits of altering routines and the discontinuation of routines (Dönmez et al., 2016, p. 73). Due to this reflective nature of retrospectives, and the assumption that higher levels of emotionality are expected, for this research we will focus on the retrospectives. The duration of these retrospective meetings was on average approximately 53.5 minutes, ranging from 41 to 104 minutes. At the end of every video-recorded meeting, the members of each team filled in a survey.

3.2 Sample Approach and Description

Out of the nine agile teams of which meetings were recorded, four teams were chosen for the sample of this research to allow a contrasting case analysis. These teams consist of 26 individuals in total, ranging from six to nine members per team. The teams were selected based on the highest and lowest standard deviation of self-rated individual-level psychological safety during the retrospective. This was measured through a self-rated survey at the end of the meeting using the 3-item individual-level survey scale by Detert and Burris (2007), with had a Cronbach's alpha of .90. These teams also have some of the highest (6.6) and lowest (4.8) psychological safety means, the values can be seen in Table 1.

Table 1. Perceived Individual-level PS

Team	*Category*	*Mean of Team*	*SD*	*Min*	*Max*	*Mean of PO*
01001	High	6.6	0.49	6	7	7
06001	High	6.2	0.4	6	7	6
07001	Low	4.8	1.7	2	7	6
12001	Low	5.6	1.2	4	6.67	5.33[1]

For further reference in this paper, the teams will be referred to their high or low category of PS. Thus, team 01001 will be referred to as team High-PS-1, 06001 as High-PS-2, 07001 as Low-PS-1, and team 12001 as Low-Ps-2.

The duration of the meetings is in total 210 minutes, with a range from 39 to 67 minutes. In the sample, there were four women and 21 men. Every team's composition is slightly different. One team consists of all men, with ages ranging from 28 to 48 with an average age of 33.67. One team consists of 7 men and 1 woman, ages ranging from 27 to 58, with an average age of 41.63. Another team consists of all men as well, with an age ranging from 30 to 35, with an average age of 42.4. The last team consists of 3 women and 3 men with an age range from 37 to 48, with an average age of 41.67.

3.3 Agile Squad Member PS

For the agile team member's psychological safety behaviour, the codebook based on the research of O'Donovan et al (2020) was used. The codebook distinguishes observable behaviours in 5 categories, which was adapted based on the thesis of Gankema (2020) and adopted for use in video observation, as it was originally used for naked-eye observation. The adapted codebook identifies nine categories of behaviours namely:

- Voice behaviours
- Defensive Voice behaviours
- Silence Behaviours (non-verbal)
- Defensive Silence behaviours (non-verbal)
- Collaboration behaviours
- Unsupportive behaviours
- Learning & Improvement Oriented behaviours
- Familiarity behaviours
- Neutral behaviours

Psychological safety was measured by analysing video tapes of the retrospective meeting using the Observer XT software (version 15). The Observer XT program enables minutely assigning specific codes to video observations using individual and couple coding. All meetings were coded with the Observer XT using a codebook that will be described next. To simplify coding, all individuals were given a number as means of identification and, alongside the video data, the meeting transcriptions were available.

Furthermore, first, a meeting outside of the scope of the research was coded as a trial. Based on this trial, more changes were made to the codebook. It was decided then to code the categories, instead of all the individual behaviours, for ease of coding. For all meetings, both the team members and product owner's behaviour were coded by two individual coders, the second coder also being a bachelor student writing thesis research. After coding, the Observer XT was used to calculate Cohen's kappa to explore the reliability of the coding. The Cohen's kappa varied from a .08 to a .36, all of which shows a very low level of agreement. The agreement rate ranged from 21% to 41%, which further showed that the agreement levels were low. Due to this, it was hard to come to an agreement on all coding differences, and so a golden file was not used for the analysis of the data. The coding of the other coder was considered in the episode analysis. This data will be used to make the comparison between perceived and observed psychological safety.

3.4 Data Analysis

For this research, we choose an episode analysis to identify the behavioural differences or similarities between the high and low PS-scoring teams in means of PO behaviour and team members' reactions. An episode is defined as a significant moment in a

[1] This is the Individual-level PS mean of the prominent team member who led the meeting. The PO was not present in this meeting.

team's ongoing activity, where "a team member characterized these episodes as occasions of heavy engagement, salient, interaction dynamics, and strategically important decisions" (Jarrett & Liu, 2016, p.370). Other researchers defined an episode as "a sequence of events in terms of a beginning and an ending" (Jarrett & Liu, 2016, p.370).

For this research, five episodes were chosen where POs or other prominent team members showed behaviour that is assumed to negatively impact the psychological safety of team members (i.e., unsupportive, or defensive voice or defensive silence behaviour) (O'Donovan et al., 2020), and the reaction of the team members. The episodes are chosen based on only negative impacting behaviour, as this occurs less often than positive impacting behaviour (i.e., voice behaviour, collaboration behaviour) and could therefore be impactful on the individual-level PS of team members. Additionally, the episodes are all (mostly) the first examples of defensive or unsupportive behaviour that the PO or another prominent team member shows. This was decided because this could set a precedent for the rest of the meeting or could reflect how the meeting has gone thus far.

Two of these episodes is where a Product Owner displays defensive voice behaviour and how the team members react to this, one of which is from a team that measured higher on the meetings psychological safety and one which measured lower. In the second highest scoring team, the PO displayed no defensive or unsupportive behaviour at all. In this team, an episode is chosen where the prominent team member displays defensive silence behaviour. In the second lowest-scoring team, the PO was not present during the meeting so again also an episode was chosen of the prominent team member, who displays unsupportive behaviour. In this team, there was one team member that was responsible for all the defensive voice behaviour during the meeting, so an additional episode of this was chosen.

The duration of the episodes was between 31 seconds and 64 seconds, with an average duration of 41.6 seconds. Some of the defensive or unsupportive behaviour was only brief, for instance, one sentence or one hand gesture, others were longer which is why some episodes had a longer duration. In addition to the episodes, which can be found in Appendix A through E, details on the overall behaviour in the meeting and the meeting setting was considered.

4. RESULTS

First, we will look at the episodes individually, determining what happened in the episode and what behaviour can be seen. Second, a comparison will be made, looking at the differences and similarities between the behaviours, the presence of the PO, the individual PS scores, and the setting of the meeting.

4.1 Team High-PS-1 – PO

This episode can be found in Appendix A. Overall, in the meeting, the PO is present and is involved in the discussion. This shows in the 46 counts of voice behaviour and the 70 counts of collaboration behaviour, throughout the meeting. The setting is that everyone can see the screen the prominent team member points to, no one has a computer and several team members are standing. The episode starts about thirty minutes into the meeting and lasts about thirty seconds. In the episode, the PO shows a moment of defensive voice behaviour, namely stating that something does not need to be discussed and evading the discussion. Immediately after, multiple team members launch in a cross-talk in which multiple people are talking at the same time. In this cross-talk, we also see some collaboration behaviour of team members. follower 1 speaks up over everyone else and shows voice behaviour, namely disagreeing with the PO. Other team members follow with collaboration behaviour and then follower 6 continues to explain the topic further.

Five out of eight team members, including the PO, are actively involved in the episode. Noticeable, is that follower 1 is the first team member to use voice behaviour, whilst they have a lower individual PS score (6) than the rest of the team (see, Table 1 and Appendix A), and then afterwards shows some silence behaviour. The other member that has a lower individual PS score compared to the rest of the team is the prominent team member (6). The mean of the individual-level PS is the highest in this team, and the response of the team members show this as well. There is a variation of mostly voice and collaboration behaviour, and a team member with a lower individual-level PS score is the one to speak up to the PO first. Additionally, the PO immediately shows collaboration behaviour in support of the voice behaviour of follower 1. The defensive voice behaviour of the PO leads to several psychological safe behaviours from several team members. The next episode shows another team with a PO but a different team situation, and a different reaction.

4.2 Team Low-PS-2 – PO

This episode can be found in Appendix B. In this meeting, the PO is also involved in the discussion, and with a count of 66 voice behaviours out of a total of 222 voice behaviours, it can be said that the PO is dominant in the meeting. What is interesting to note as well is that the PO is responsible for a large part of psychological unsafe behaviour (i.e., defensive voice, defensive silence, and unsupportive behaviour). For instance, ten out of eleven counts of observed defensive voice behaviour were attributed to the PO. Additionally, only 36 out of 311 counts of observed collaboration behaviours were attributed to the PO. In the setting of this meeting, we see the team, all seated at a large meeting table, with two team members that have a laptop open in front of them. The prominent team member is one of these, and presumably is sharing something on the screen that the whole team can see. This episode starts about twelve minutes into the meeting and has a duration of 64 seconds. The episode starts with about 30 seconds of the PO showing defensive voice behaviour, expressing discontent about a situation where she finds another team member being at fault. The team member she is directing the blame towards is follower 5. The PO had already been discussing this topic before, so they show this defensive voice behaviour in the middle of a discussion.

The two followers that have a computer in front of them, are engaged in silence behaviour because they are focused on their computer. Throughout the episode, follower 6 stays in the silence behaviour, follower 3 looks up from the computer once and then continues in the silence behaviour. Throughout the defensive voice of the PO, follower 5 and follower 7 show some collaboration behaviour. Noticeable is that the defensive voice is directed at follower 5, but they do not show collaboration first nor shortly after the PO started talking. Additionally, this team member had the lowest individual-level PS score, both compared to their team members as well as compared to the other teams.

Only three out of six members, including the PO, are active within this episode, and two out of six members are disengaged from the meeting. Follower 7 responds after the PO is done talking, with only a short sentence in which they agree with the PO but also respond with "but it's something for the whole team" (see, Appendix B) showing some voice behaviour. Follower 5, who the PO talks to, does not respond at all beyond nodding, thus only showing collaboration behaviour. The PO shows collaboration behaviour towards follower 7, who shows learning & improvement behaviour by asking ideas on a possible solution to the topic. Follower 7 also has the highest individual-level PS

(see, Table 1) which is a big difference with follower 5 (see., Appendix B). Interestingly, they both show collaboration behaviour throughout the defensive voice behaviour of the PO, but follower 7 is the one to use psychological safe behaviour (voice and learning & improvement behaviour) to move the discussion along. This team has the lowest mean of individual-level PS (see, Table 1), and this can also be seen in the observed reaction of the team. Three team members do not show much response at all and the team member who is talked to does not respond with anything but collaborative nodding.

4.3 Team High-PS-2 – Not PO

This episode can be found in Appendix C. The PO is overall less involved in this meeting, with 21 counts of observed voice behaviour. The PO has 14 counts of silence behaviour, by for instance being disengaged and looking on their tablet. Throughout the whole meeting, there is no defensive voice found, only 1 count of unsupportive behaviour and 4 counts of defensive silence behaviour. Due to the low count of behaviour that negatively impacts PS, an episode had to be chosen where the prominent team member (follower 1) shows defensive silence behaviour. This meeting has a more dynamic setting, where no team member has a computer, and several team members are standing, and during the meeting, they also move closer or further away from the board that the prominent team member uses. The episode starts eleven minutes into the meeting and takes about 35 seconds. The episode starts where follower 4 is showing voice behaviour, then the prominent team member disagrees after which crosstalk erupts. Follower 4 tries to follow up his statement, where the prominent member says 'yeah' but puts his hand up for a few seconds as to stop people from talking. This is immediately followed up by voice behaviour of two other team members, after which the prominent team member shows collaboration behaviour.

Interesting is here that all team members that are involved have the same individual-level PS score (see, Appendix C). Four out of six team members are involved in the episode and all show voice behaviour. The prominent member puts up the hand, when there are multiple followers talking through each other, and accompanies it with a collaborative 'yeah'. In response, follower 5 speaks up with voice behaviour and the discussion is continued within the team. Noteworthy, is also that the PO shows voice behaviour twice in response to the voice behaviour of other team members. So, we see in this episode that the PO responds with positively impacting PS behaviour, alongside the other team members.

4.4 Team Low-PS-2 – Not PO

This episode can be found in Appendix D. In this meeting the PO was not present, so the episode was chosen based on the behaviour of the prominent team member (follower 9). The setting is that the whole team sits at a meeting table where every member has a laptop in front of them, the prominent team member is showing documents on the big screen. The transcript of this meeting was more often illegible, as the members were talking about what was shown on the screen and because in general, these members were less audible. This made it harder to understand the topic of discussion. Noteworthy about this team is that all members showed both unsupportive and defensive silence behaviour throughout the meeting. This episode shows observed unsupportive behaviour of the prominent team member, where he picks up a phone call in the middle of the meeting. The episode is seventeen minutes into the meeting, and the duration of the episode is about 38 seconds.

Before follower 9 picks up the phone, two team members are already showing silence behaviour as they are occupied with their laptops. Then the prominent team member picks up the phone and starts talking to the person on the phone, explaining they are in a meeting. The first reaction is that of follower 3 who also goes on their laptop. Follower 7 crosses their arm whilst waiting for follower 9 to finish the phone call. Once follower 9 puts down the phone, they continue with the meeting showing learning & improvement behaviour. In reaction, follower 6 shows collaboration behaviour and follower 5 continues the topic follower 9 proposed. Interesting here is that the team completely depends on the prominent team member to continue with the meeting, and so the meeting comes to a halt because of the phone call. This is shown through how all the other four team members show silence behaviour. Only when follower 9 gets back to the meeting do other team members show positive impacting PS behaviour. Notable is that follower 5, who is the first to respond with voice behaviour has the lowest individual-level PS.

Moreover, what is interesting in this meeting is that follower 3, the team member with the highest individual-level PS, is responsible for all four counts of defensive voice behaviour. In the methodology, we defined the prominent team member as the member who leads the meeting. However, a team member who is very vocal compared to their team members could also potentially have a bigger influence on the psychological safety of the meeting. Thusly, an episode was chosen from the same meeting where follower three exhibits defensive voice behaviour and the reaction of the fellow team members.

4.5 Team Low-PS-2–Team Member

This episode can be found in Appendix E. The episode starts nineteen minutes into the meeting and has a duration of 40 seconds. In this episode, follower three raises their voice to explain that they are not responsible for something that has to do with a specific report. During this observed defensive voice behaviours, they add some big hand gestures which show defensive silence behaviour. Follower 5 was already showing disengaged behaviour by being focussed on their computer. Follower 6 shows some collaboration behaviour, but it is follower 9 that responds with something illegible. On this follower 7 responds with voice behaviour, to which follower three responds with voice behaviour as well. For the rest of the episode, it is only follower three and follower 9 that discuss the topic further. Follower 3 adds more defensive silence behaviour with more hand gestures. At the end of the episode follower 7 retreats to silence behaviour, fiddling with a little piece of paper.

Noteworthy in this episode is that the discussion quickly dwindles to only two team members, and the rest of the team members show little response to the defensive voice behaviour. Follower 5 is already in silence behaviour, follower 6 only shows a little collaboration, and follower 7 shows voice behaviour once and then ends in silence behaviour as well. Follower 5 does have a lower individual-level PS, but both followers 6 and 7 have the same individual level PS (see, Appendix E). Both do respond once but are not involved with the rest of the discussion. Follower 9 has an individual-level PS that is on the lower side, but they continue to show voice behaviour in response to follower 3.

4.6 Comparison

Firstly, in all episodes, we see collaboration and voice behaviour as one of the reactions of team members. The differences lie in who show the collaboration and voice behaviour, to who the behaviour is aimed, and how many of the team members respond. For instance, in team High-PS-1 the voice behaviour is directed back at the PO whilst in team Low-PS-1 the voice behaviour is not directed to anyone in particular. In team High-PS-2, the voice behaviour that follows is aimed not only at the member that showed the defensive (silence) behaviour but also at the rest of

the team. The voice behaviour that follows in the episodes of team Low-PS-2 is mostly directed at the prominent team member.

Another difference that can be seen between the teams with a higher meeting PS is that more of the team members are involved in the episode and the voice behaviours. When comparing team High-PS-1 and team Low-Ps-1, we see both actively involved POs in the meeting but a different reaction by the rest of the team. In team High-PS-1, several members respond with voice behaviour, whilst in team Low-PS-1 there is only one team member that responds with voice and learning & improvement behaviour. In team Low-PS-2, we also see fewer members actively involved in the discussion following the observed unsupportive or defensive behaviour. In both team Low-PS-1 and team Low-PS-2, more members show silence behaviour and do not get involved in the discussion. In team Low-PS-1 it can be said that the PO contributes to a less psychological safe environment, by putting the blame on this follower and defensively tell them what they did wrong or should have done instead. It can also be seen in the reaction of the follower who is addressed, as they only respond with small nods and show no voice behaviour.

Secondly, in all these meetings the PO does not lead the meeting, but there is a variation in how involved the POs are in the meeting. For instance, the PO of team High-PS-2 is not involved throughout the meeting but does show voice behaviour in the episode. In the second episode of team Low-PS-2 it is shown that when a team member exhibits behaviour that negatively impacts the psychological safety, it can have a similar reaction as the PO has in team Low-PS-1. There is more voice behaviour in the second episode of Low-PS-2, but this is also mostly directed at the prominent team member, and the rest of the team members are either listening or exhibiting silence behaviour. Notably, in the episodes of team Low-PS-2, the prominent team member does not show collaboration behaviour, whereas all three other POs or prominent team members do show collaboration in response to the reaction of team members. In team Low-PS-1 the PO has a much more active role, but overall exhibits more defensive behaviour in their meeting than the PO of team High-PS-1. What is also noticeable here is that the episode of Low-PS-1 is relatively at the beginning of that meeting, whilst the episode of team High-PS-1 is relatively at the end of the meeting. The PO exhibiting such behaviour early on in the meeting might set a precedent for the rest of the meeting.

Thirdly, when it comes to setting, we see that the meetings with a higher psychological safety mean are meetings where there is no computers present and there are even members standing in the meeting. These are also the episodes where more of the team members are involved in the reaction on the defensive behaviour, no matter the active or passive involvement of the PO. In teams with a lower psychological safety mean, most team members with a computer are also in silence behaviour either at the start or during the episode. In these episodes, we also see only one or two members respond with voice or collaboration behaviour.

5. DISCUSSION

5.1 Theoretical Implications

This research used an episode analysis to explore how the observed psychological safety of the PO relates to the observed and perceived psychological safety of the team members. In the episode analysis, we saw similar behaviours but varying reactions following unsupportive or defensive behaviour, exhibited by the PO or a prominent team member.

Firstly, the episode analysis showed that voice and collaboration behaviour were always seen in reaction to the negatively impacting PS behaviours. Both teams with a low and a high individual-level PS mean showed these behaviours, however, it differed how many members were involved in these behaviours and to who these behaviours were directed. The High-PS teams showed several members involved in voice behaviour which was directed both at the PO or prominent team member and the rest of the team. In both Low-PS teams we see just one member participating in the discussion which is held mostly with the PO or the prominent team member. It shows that teams with a higher PS, have more involved discussions amongst all members of the team. It also seems that when the PO or prominent team member directs their voice or collaboration behaviour to more than one member of the team, the rest of the team keep being involved in the meeting. For instance, in team Low-PS-2 we see that in the second episode that most voice behaviour of the prominent team member is directed to the follower who exhibited the defensive behaviour. Follower 7 showed voice behaviour as well but was not included in the discussion further on and they ended with exhibiting silence behaviour.

Secondly, the behaviour of the PO or prominent team member after the initial unsupportive or defensive behaviour differed. In team High-PS-2, we saw the PO respond to the defensive behaviour of the prominent team member with voice behaviour. Referring to the social learning theory (Newman, 2017), in which a leader can model behaviour towards team members that show that it is safe to take risks and engage in honest communication, we see that in team High-PS-2 the PO does this. On the other side, we see that in team Low-PS-1 the PO shows psychological unsafe behaviour which results in team members communicating less. Someone with a prominent role within the team can influence the psychological safety of the team members. In the second episode of team Low-PS-2, it is a team member instead who exhibits defensive behaviour which gives a similar less communicative reaction to the rest of the team. This was the prominent team member who did not show any collaboration behaviour in either one of the episodes, thus could still have influenced the rest of the team.

Thirdly, in this research, we looked at retrospective meetings. These meetings are known for their reflective nature (Dönmez et al., 2016), and it is therefore important that members feel psychologically safe to partake in open and honest communication. What we can see is that in meetings where the perceived individual-level psychological safety was lower, there were fewer team members involved in the discussions. On several occasions, they exhibited silence behaviour, showing they were disengaged from the meeting. What we could consider here is that the team members do not feel like the team climate is safe enough for them to speak up with suggestions or solutions. Morrison and Milliken introduced the ‘climate of silence’ in 2000, defining it as “shared perceptions among employees that speaking up about problems or issues is futile and/or dangerous” (p.708). Morrison et al at the combination of voice behaviour and the climate of work groups in 2011 and established the concept of group voice climate. They conceptualise that there is a “shared belief about whether speaking up is safe versus dangerous” (Morrison et al, 2011, p.184). It might be the case that the followers from the Low-Ps teams, felt like it was too dangerous for them to speak up, afraid that they would be negatively impacted by speaking up. Morrison et al concluded in their research that a group climate can help encourage open communication and that for team members to show more voice behaviour, it is up to the leader or the team member to ensure that the “group’s climate is one in which members collectively feel confident that they can voice successfully and that doing so will not be punished or ignored.” (2011, p.190).

This leads to the fourth finding, namely during coding and during the episode analysis artefacts such as the setting of the meeting and the presence of technology appeared as noteworthy factors. Both in the Low-PS teams we see that either a few, or all members of the team had their laptop in front of them. At the beginning or throughout the episodes of the Low-PS teams we see silence behaviour of followers being focused on their computer and therefore being disengaged from the meetings' discussion. Additionally, in both the meetings of the High-PS teams we saw that there were team members standing or sitting at higher levelled tables. Moreover, in the Low-PS teams we saw that the prominent team members were leading the meeting whilst referring to documents or something on a screen. In the High-PS teams they seemed to be working with whiteboards, only a presentation as the prominent team members had no laptop in front of them. Rogelberg (2019) discovered that many managers do not know how to lead a meeting effectively, and identified assessment, preparation, and facilitation as three steps to improve on this. In these steps it is recommended for instance to look at previous attendee behaviours and conversational dynamics to reflect, to make deliberate choice when it comes to about setting goals for the meeting and the time and place for the meeting. This aligns with Cohen et als' research (2011) on meeting design characteristics. Cohen et al focus on identifiable, measurable and plannable design characteristics that "relate to the temporal, attendee, physical, and procedural natures of the meeting" (2011, p.91). Their study highlights for instance specific relationships for facility quality characteristics like lighting and meeting space, as well as identifying agreement use and the number of attendees of a meeting to be important (2011). Cohen et al suggest that "effective meeting design warrants holistic attention to all meeting aspects" (2011, p.100). Four out of nine of their found significant characteristics were physical elements, and therefore the right meeting environment is essential, which also aligns with the affective events theory which states that work environment can impact an employees' mood and emotions (Cohen et al, 2011). Cohen et al (2011) also mention setting meeting expectations to heighten perceptions of meeting quality. The artefacts found in this exploratory research seem to point to look further into artefacts and meeting designs to see if they could influence psychological safety.

Fifthyly, in the episode analysis, we have seen that the perceived and observed psychological safety correspond with each other often, but not always. For instance, we do see that in the meeting of team Low-PS-1, follower 5 with the lowest perceived individual-level PS remains silent even though they are addressed in the defensive voice of the PO. Additionally, in the second episode of team Low-PS-2 we see that follower 7, who has a higher perceived individual-level PS, exhibits voice behaviour in reaction to the defensive behaviour of follower 3. However, follower 7 does this once, then remains silent, and then exhibits silence behaviour as follower 3 and follower 9 continue the discussion. These findings further establish psychological safety as a state (Mathieu et al, 2018), rather than a characteristic a team or a meeting has. A team has to continuously work to make their team and their meetings a safe place to voice ideas, ask and provide feedback, take risks etcetera (Newman et al., 2017). O'Donovan et al (2020) establish observational methods to gain a more dynamic and holistic perspective of psychological safety. In this research, we see that observational methods give the possibility to explore psychological safety more. Moreover, these findings further emphasise what Hennel and Rosenkranz (2020) found, namely that psychological safety is an important factor in agile practices.

5.2 Practical Implications

Furthermore, the findings of this research also have practical implications. First, the previous findings of the possible influence of the PO or the prominent team member can be used to further create more awareness and supportive actions. O'Donovan et al offered that more consciousness about psychological safe and unsafe behaviours could enable team leaders to "find the root causes and act upon them" (2020, p.16). The financial organisation can use the observations made in this research and any further research, to finetune the role of the product owner and any other roles that may be established within the squads. Additionally, the teams can be made aware of the fact that a safe environment is a state that needs to be continuously worked on. This includes not only showing psychological safe behaviour but also learning how to deal with unsupportive and defensive behaviours. The consciousness of psychological safe behaviour takes the first step, the ability to deal with psychological unsafe behaviour will be the next step to take. A prominent role or team member can positively influence this and should be made aware of their position. However, the responsibility lies with the whole team, especially in agile self-managing teams.

Secondly, as aforementioned in the theoretical implications, the artefacts that were found could have an additional influence on the psychological safety of the meeting. In the episodes, we saw that when team members had laptops, most showed silence behaviour and were less active within the discussion. The teams with more members involved in the discussion of the episode had more active meeting settings where no laptops were on the tables and members could stand, or even move around. Cohen et al (2011) included in their practical implications that trainings should be provided to the employees that organise and attend the meetings, to fully integrate the meeting design parameters in the organisation's meeting process. The firm this research was conducted at could consider to discuss meeting designs and potential artefacts that could influence the team members during meetings. A more considered choice of the setting, the present technology, the pre-set goals of the meeting, and many other factors might support an environment where more team members feel engaged and feel safe to openly communicate.

5.3 Limitations & Future Research

All the previous presented findings are subject to limitations. As this was exploratory research the sample consisted of four teams and just one meeting per team. To further investigate the role of the PO and the effect of the POs and prominent team members' behaviour, a larger number of teams and more meetings per team should be coded and analysed. This will also allow for a better view of the teams across the different meetings, which can help in better interpreting their behaviour. Occasionally, whilst for instance coding silence behaviour, the coders wondered whether a certain position was silence behaviour or a position a person was comfortable in. For instance, if someone had their hand underneath their head it could be because they were bored or disengaged from the discussion, or it is just a comfortable position because of the way they sat at the table. Looking at the planning and refinement meetings as well, might allow for a better overview of the teams' and the team members' behaviours.

Additionally, due to the different natures of the planning and refinement meeting the team members might show different behaviours as well. In the retrospective, they reflect on what has happened so naturally feedback is a big part of this meeting. In the planning meeting, goals are set and so the meeting will be more focussed on brainstorming and gathering ideas, which might show more combinations of learning & improvement behaviours and voice behaviours.

The version used of the codebook in this research, made hard to reach an acceptable intercoder reliability rate. The agreement rate ranged from 21% to 41% and the Cohens' kappa per coded meeting also varied from a .08 to a .36, all of which is low. Evidenced by the low Cohen's kappa scores, a full agreement could not be reached between the coders, and this could influence the outcome of this research. This was the result of categories not being mutually exclusive and therefore some behaviours, interpreted in different ways, could belong in multiple categories.

This research allowed for more testing with the codebook, and as a result the codebook has been subject to changes, to improve the intercoder reliability of future research with this codebook. With the improved codebook, the theoretical link between perceived and observed behaviour can be further built, as O'Donovan et al. suggested "to test whether scores on the observation measure items are statistically correlated with behaviour counts for the corresponding survey items" (2020, p.14).

Moreover, as seen in the transcript of the episodes of team Low-PS-2, occasionally members or an entire team is less audible. This can be due to poor audio, or what is discussed in the meeting (for instance specific documents). A less clear transcript can also make coding harder and less reliable, which should be considered in future research.

Further research should not only focus on further exploring the effect of the PO on the psychological safety of the team members but also explore the effects of artefacts and other factors such meeting designs or a team/group climate. Other factors outside of the behaviour of the team members could influence the psychological safety of the team members. This research showed some initial signs that the setting of the meeting could influence psychological safety, however, a larger sample size and more quantitative and qualitative analysis is needed to further determine the effect. These artefacts could further support the team in creating a psychologically safe environment. This can be especially interesting with the surge of online and hybrid meetings, that organisations must deal with considering the COVID-19 pandemic. Similar to Van Dun and Wilderom (2021) calling for more studies on (partially) virtual lean teams, more research is needed on the psychological safety in hybrid or complete virtual meeting settings. Cohen et al mention meeting modality, "e.g., face-to-face vs. technology-facilitated)", as a possible characteristic to impact the process and satisfaction of a meeting (2011, p.91).

6. CONCLUSION

This study aimed to explore through an episode analysis how the observed psychological safety behaviour of the product owner relates to an agile team's observed and perceived psychological safety. In the episode analysis, both POs and prominent team members were looked at. In the episode analysis, we see a reaction of voice and collaboration behaviour in all the episodes. The teams with higher individual-level PS responded to the psychological unsupportive or defensive behaviour of the PO or prominent team member with multiple team members. Teams with a lower individual-level PS had only one or two members respond to the psychological unsupportive or defensive behaviour. Especially in retrospective meetings, it is important that all team members feel safe to reflect on the sprint, and this showed less in the lower PS scoring teams.

We can see that the observed and perceived psychological safety behaviour of the team members largely corresponds, and we can see that the behaviour of a prominent team member or the PO can influence the psychological safety behaviour of the team members.

In conclusion, this research offers novel insights into the possible influence of the POs and other prominent team members on psychological safety in agile teams. Further research should focus on the further exploration of the effect of prominent roles or team members, and possibly other artefacts and factors such as team climate and meeting designs that can influence the psychological safety of the team members.

7. ACKNOWLEDGMENTS

I want to offer the most gratitude to my first supervisor Dr. Desirée van Dun, without whose forever patience and guidance and support I could not have written this thesis. Her flexibility, her insightful feedback and never-ending support have helped me learn and grow throughout this process. Next, I would like to thank my second supervisor Prof. Dr. Celeste Wilderom, whose critical questions and feedback helped me develop my thesis. Additionally, I would like to thank Dr. Lara Carminati, whose opinions and feedback I highly appreciated. Finally, I would like to thank my second coder, without whom I would not have reached the results.

8. REFERENCES

Annosi, M. C., Magnusson, M., Martini, A., & Appio, F. P. (2016). Social Conduct, Learning and Innovation: An Abductive Study of the Dark Side of Agile Software Development. *Creativity and Innovation Management*, *25*(4), 515–535. https://doi.org/10.1111/caim.12172

Beck, K.M., Beedle, M., Bennekum, A.V., Cockburn, A., Cunningham, W., Fowler, M., Grenning, J., Highsmith, J., Hunt, A., Jeffries, R., Kern, J., Marick, B., Martin, R.C., Mellor, S.J., Schwaber, K., Sutherland, J., & Thomas, D. (2013). Manifesto for Agile Software Development. Retrieved from: https://agilemanifesto.org/

Berntzen, M., & Wong, S. I. (2019). Coordination in distributed, self-managing work teams: The roles of initiated and received task interdependence. *Proceedings of the Annual Hawaii International Conference on System Sciences*, 973–982.

Biesialska, K., Franch, X., & Muntés-Mulero, V. (2021). Big Data analytics in Agile software development: A systematic mapping study. *Information and Software Technology*, *132*, 1–25. https://doi.org/10.1016/j.infsof.2020.106448

Birkinshaw, J. (2018). What to Expect From Agile. *MIT Sloan Management Review*, 38–42. https://sloanreview.mit.edu/article/what-to-expect-from-agile/

Cohen, M. A., Rogelberg, S. G., Allen, J. A., & Luong, A. (2011). Meeting design characteristics and attendee perceptions of staff/team meeting quality. *Group Dynamics: Theory, Research, and Practice*, *15*(1), 90–104. https://doi.org/10.1037/a0021549

Dikert, K., Paasivaara, M., & Lassenius, C. (2016). Challenges and success factors for large-scale agile transformations: A systematic literature review. *Journal of Systems and Software*, *119*, 87–108. https://doi.org/10.1016/j.jss.2016.06.013

Dönmez, D., Grote, G., & Brusoni, S. (2016). Routine interdependencies as a source of stability and flexibility. A study of agile software development teams. *Information and Organization*, *26*(3), 63–83. https://doi.org/10.1016/j.infoandorg.2016.07.001

Dyne, L. V., Ang, S., & Botero, I. C. (2003). Conceptualizing Employee Silence and Employee Voice as Multidimensional Constructs*. *Journal of Management Studies*, *40*(6), 1359–1392. https://doi.org/10.1111/1467-6486.00384

Edmondson, A. (1999). Psychological Safety and Learning Behavior in Work Teams. *Administrative Science Quarterly*, *44*(2), 350–383. https://doi.org/10.2307/2666999

Hennel, P., & Rosenkranz, C. (2020). Investigating the "Socio" in Socio-Technical Development: The Case for Psychological Safety in Agile Information Systems Development. *Project Management Journal*, *52*(1), 11–30. https://doi.org/10.1177/8756972820933057

Jarrett, M., & Liu, F. (2016). "Zooming With". *Organizational Research Methods*, *21*(2), 366–385. https://doi.org/10.1177/1094428116656238

Kristinsdottir, S., Larusdottir, M., & Cajander, S. (2016). Responsibilities and Challenges of Product Owners at Spotify - An Exploratory Case Study. *Lecture Notes in Computer Science*, 3–16. https://doi.org/10.1007/978-3-319-44902-9_1

Magpili, N. C., & Pazos, P. (2017). Self-Managing Team Performance: A Systematic Review of Multilevel Input Factors. *Small Group Research*, *49*(1), 3–33. https://doi.org/10.1177/1046496417710500

Mathieu, J. E., Gallagher, P. T., Domingo, M. A., & Klock, E. A. (2018). Embracing Complexity: Reviewing the Past Decade of Team Effectiveness Research. *Annual Review of Organizational Psychology and Organizational Behavior*, *6*(1), 1–30. https://doi.org/10.1146/annurev-orgpsych-012218-015106

Morrison, E. W., & Milliken, F. J. (2000). Organizational Silence: A Barrier to Change and Development in a Pluralistic World. *Academy of Management Review*, *25*(4), 706–725. https://doi.org/10.5465/amr.2000.3707697

Morrison, E. W., Wheeler-Smith, S. L., & Kamdar, D. (2011). Speaking up in groups: A cross-level study of group voice climate and voice. *Journal of Applied Psychology*, *96*(1), 183–191. https://doi.org/10.1037/a0020744

Newman, A., Donohue, R., & Eva, N. (2017). Psychological safety: A systematic review of the literature. *Human Resource Management Review*, *27*(3), 521–535. https://doi.org/10.1016/j.hrmr.2017.01.001

O'Donovan, R., van Dun, D., & McAuliffe, E. (2020). Measuring psychological safety in healthcare teams: developing an observational measure to complement survey methods. *BMC Medical Research Methodology*, *20*(1). https://doi.org/10.1186/s12874-020-01066-z

Rogelberg, S. G. (2019). Why Your Meetings Stink—and What to Do About It. *Harvard Business Review*, 140–143.

Spiegler, S. V., Heinecke, C., & Wagner, S. (2021). An empirical study on changing leadership in agile teams. *Empirical Software Engineering*, *26*(3), 1–35. https://doi.org/10.1007/s10664-021-09949-5

Tiejun, W., Wenjun, W., Xin, B., & Dianzhi, L. (2013). Mediating Effect of Team Trust Between Team Conflict and Team Effectiveness in Self-management Teams. *Journal of Applied Sciences*, *13*(9), 1–5. https://doi.org/10.3923/jas.2013.1504.1508

van Dun, D. H., & Wilderom, C. P. (2021). Improving high lean team performance through aligned behaviour-value patterns and coactive vicarious learning-by-doing. *International Journal of Operations & Production Management*, *41*(13), 65–99. https://doi.org/10.1108/ijopm-11-2020-0809

9. APPENDIX

9.1 Appendix A – Team High-PS-1 - PO

The episode starts at 33.21 and ends at 33.52. The numbers in between brackets are the individual-level PS of the followers.

Transcript	Follower	Behaviour
But we don't have to discuss about that.	F7 (PO, 7)	Defensive Voice
(Crosstalk)	F5 (7)	Collaboration
But it is important that we know that it is.	F1 (6)	Voice
	F2 (7)	Collaboration
	F7 (PO)	Collaboration
But in this case, I want to achieve some trade-off. I don't want to waste time for infrastructure stuff, *(F1 crosses arms*). I want to have a project deployed and just forget about it and work on the other stu-	F6 (7)	Voice
	F1	Silence
	F5	Collaboration
Yeah, I know	F5	Collaboration
Yeah, if it would introduce more complexity that we need to go there, there, there or there.	F6	Voice
And we can check how complex it is and maybe if it's too complex we just find the source.	F5	Voice
Yeah, sure.	F6	Collaboration
Alright. *(crosses arms)*	F2	Silence

9.2 Appendix B – Team Low-PS-1 - PO

The episode starts at 12.19 and ends at 13.23. The numbers in between brackets are the individual-level PS of the followers. PTM means prominent team member.

Transcript	Follower	Behaviour
(F3 is focussed on computer, so is F6)	F6 (4)	Silence
	F3 (PTM, 4)	Silence
But for instance in - in – in – in this case hè what is given as like what I didn't think little bit, sorry in my opinion as an excuse, because I also raised that ticket. *(F3 looks up, then back to the computer*). So I see like the emails coming from sales and then I also briefly discussed it with the people from the platform team. Why would be an issue and then we were – we were also discussing it, right? You said like: "oh I will go over to *name* and – and see, what is actually the issue, to get it more refined. So that I'd know what to do	F1 (PO, 6)	Defensive Voice
	F3 (PTM)	Silence
	F7 (7)	Collaboration
	F5 (2)	Collaboration
	F5	Collaboration
	F5	Collaboration
	F7	Collaboration

or where to look and in that case than I – than it's not really with the scrum master. The person is not involved, right? So you just raise it in the stand-up and then you go to look for the people that were actually maybe involved that can help you.		
Yeah exactly, but it's something for the whole team.	F7	Collaboration & Voice
Yeah	F1 (PO)	Collaboration
So, is there something you want to do differently? To change in this approach or what is the learning?	F7	Learning & Improvement

9.3 Appendix C – Team High-PS-2 – No PO

The episode starts at 11.16 and ends at 11.51. The numbers in between brackets are the individual-level PS of the followers. PTM means prominent team member.

Transcript	Follower	Behaviour
That is not enough explanation for them to exactly know how to calculate-	F4 (6)	Voice
But, if this is explained like you have to take this and that	F1 (PTM, 6)	Voice
(Crosstalk) This is specifically say this eh-	F4	Voice
Yeah. *(puts up hand palm up)*	F1 (PTM)	Collaboration & Defensive Silence
If you step back as to do an individualised one.	F5 (6)	Voice
But I think you need to have a word with the unit when you-	F2 (PO, 6)	Voice
Yeah, yeah, yeah.	F1 (PTM)	Collaboration
This is not like: Shit I need to do it like bang boom.	F2	Voice

9.4 Appendix D – Team Low-PS2 – No PO

The episode starts at 17.44 and ends at 18.22. The numbers in between brackets are the individual-level PS of the followers. PTM means prominent team member. When there is a < or >, it means that it was unclear what the follower said according to the transcript.

Transcript	Follower	Behaviour
(F5 and F6 are on their computer)	F5 (4) F6 (6)	Silence Silence
[F9 takes a phonecall]	F9 (PTM, 5.33)	Unsupportive
(F3 also goes on their computer)	F3 (6.67) F7 (6)	Silence Silence
(F7 crosses arms)		
<Plan> stories, asking you to <un plan> stories.	F9 F6	Learning & Improvement Collaboration
<Cover up- euh - Cover up>< plan story>	F5	Voice

9.5 Appendix E – Team Low-PS-2 – Team Member

The episode starts at 19.05 and ends at 19.45. The numbers in between brackets are the individual-level PS of the followers. PTM means prominent team member. When there is a < or >, it means that it was unclear what the follower said according to the transcript.

Transcript	Follower	Behaviour
(F5 is on their computer)	F5 (4)	Silence
<> ask for the report. I was the one to ask <name>, *(F3 starts making big hand gestures)* to test with that then we got the report. So if the report <is not how we discussed>	F3 (6.67) F6 (6) F3	Defensive Voice Collaboration Defensive Silence
(F9 says something illegible)		
But it is different euh-, <> is there, <> getting <> extra something.	F7 (6)	Voice
<><deliver> is supposed to something. What-	F9 (5.33, PTM)	Voice
Is there eh- <> to show with that?	F3	Voice
Euh from <>, I am sure that there is no tax officer <that show me that> –	F9	Voice
But it is not that, that is all a different issue - (*F3 makes hand gestures again)*	F3	Voice & Defensive Silence
<> considered that <>-	F9	Voice