



DEPARTMENT OF INFORMATICS

TECHNISCHE UNIVERSITÄT MÜNCHEN

Master's Thesis in Information Systems

**Attribution-based Personas  
in distributed Software Engineering Projects**

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**Attribution-based Personas  
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**Attributionsbasierte Personas in verteilten  
Softwareentwicklungsprojekten**

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I confirm that this master's thesis in information systems is my own work and I have documented all sources and material used.

Munich, 15.11.2021

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## Acknowledgments

# **Abstract**

Virtual team collaboration has introduced leaders of software engineering teams to unexpected situations and challenges. These often occur as a result of misattributing dispositions to team members. Misattributions affect the leader-member relationship and might imply an alternate execution of leadership tasks, which consequently influence the team's performance. In this thesis, we want to provide an overview of the attributions project leaders of the iPraktikum have created as the course turned entirely virtual. This research is characterized by the discovery, categorization and modelling of attribution-based personas following methods of qualitative and quantitative research. Eventually, we want to demonstrate that dispositional attributions are common, and they can be mapped and attached to form pseudo-characters we might all have encountered. The findings are then materialized in PLACC, an app intended to support project leaders with the insights gathered on behaviours and attributions. Research on such a phenomenon not only would introduce virtual leaders to biases previously unknown to them, but could also lead to them recognizing and preventing hasty attributions in themselves. This would consequently reduce the judgement-based errors in future software development projects.

# Zusammenfassung

Die Zusammenarbeit in virtuellen Teams hat die Leiter von Software-Engineering-Teams mit unerwarteten Situationen und Herausforderungen konfrontiert, die oft auf eine falsche Zuordnung von Dispositionen zu den Teammitgliedern zurückzuführen sind. Falsche Zuschreibungen wirken sich auf die Beziehung zwischen Leiter und Mitglied aus und können zu einer alternativen Ausführung von Führungsaufgaben führen, was wiederum die Leistung des Teams beeinflusst. In dieser Arbeit wollen wir einen Überblick über die Zuschreibungen geben, die die Projektleiter des iPraktikums im Zuge der Virtualisierung des Kurses vorgenommen haben. Diese Forschung ist gekennzeichnet durch die Entdeckung, Kategorisierung und Modellierung von attributionsbasierten Personas nach Methoden der qualitativen und quantitativen Forschung. Letztendlich wollen wir zeigen, dass dispositionelle Attributionen weit verbreitet sind und dass sie kartiert und zu Pseudo-Charakteren zusammengefügt werden können, denen wir alle begegnet sein könnten. Die Ergebnisse werden dann in PLACC umgesetzt, einer App, die Projektleiter mit den gesammelten Daten über Verhaltensweisen und Attributionen unterstützen soll. Die Untersuchung eines solchen Phänomens würde nicht nur virtuelle Projektleiter mit Vorurteilen vertraut machen, von denen sie nicht wussten, dass sie sie entwickeln können, sondern könnte auch dazu führen, dass sie diese bei sich selbst erkennen und vermeiden und schließlich den grundlegenden Attributionsfehler in zukünftigen Softwareentwicklungsprojekten reduzieren.

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# 1. Introduction

Success in software engineering projects is determined by various factors, two of the most important being the members of a team and the environment provided to them in order to excel [Ree99]. Numerous studies point at the effect these two have in the success of software developer teams, especially when operating in an agile environment [Lin+16] [CC08]. But among the classical risks teams face in their journey to better collaboration, cognitive biases are an often overlooked aspect that can have a negative impact on the workplace culture as well as on productivity [Cha+20]. Although the most well-known biases in software engineering teams are the ones of anchoring, optimism, and confirmation bias [Moh+18], in this thesis we want to investigate a cognitive bias that would relate more directly to the transformation of teams from traditional, collocated teams, into virtual teams as observed during the pandemic of COVID-19. More specifically, we want to investigate the role virtuality plays in the perception leaders of teams create on the team members. The process of forming a perception on a person is known as attributing and the perception itself as attribution. When these attributions overly consider a person's dispositions, the cognitive bias of the fundamental attribution error or attribution bias is introduced.

This chapter will elaborate more on the problematics of virtual teams, with a focus on attribution bias. Simultaneously, we provide introductory knowledge regarding this bias, in order to familiarize the reader with this notion. Next, we will explain the solution we aim at achieving in order to reveal the forms of dispositional attribution. Furthermore, we will set objectives for this thesis, which will be realized following the methodologies and approaches described in 1.4.

## 1.1. Problem

With the evolution of information and communication technologies (ICT), throughout the years organizations have established virtual teams. Virtual teams are groups of geographically dispersed people that communicate and collaborate via different forms of technologies to accomplish organizational or project-based tasks [TDH98]. Lately, the pandemic of 2020/21, rendered a certain degree of digital transformation obligatory for all businesses and for all sectors [FG20]. Organizations are accelerating the adoption

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of digital transformation as the best way to avoid a short-term economic collapse and survive this crisis with resilience [SA20].

Digital transformation is a complex and strategic activity that encompasses an entire organisation, and it does not solely imply the application of a series of brand new systems, such as video conferencing technologies. A major digital transformation took over the iPraktikum as well, a practical course teaching agile software development in iOS at the Technical University of Munich (TUM). All activities of this course needed to be handled virtually, including a preparatory Swift programming language introductory course, meetings, important milestones, and the development process itself. The teams follow the Scrum structure, and consist of a product owner (alias project leader), scrum master (alias coach) and the scrum team of developers.

Digital transformation is accompanied by an access to new information and development of knowledge through ICT, that can transform what was once considered acceptable and unacceptable behaviours by followers, as well as by leaders [AKD00]. Research shows, that members of short term, distributed, virtual teams are not particularly motivated to get to know their online partners [WBJ02]. Moreover, without gaining such knowledge or experiencing the benefits of proper social interaction, being faced with the demands and impediments of virtual work can be increasingly challenging.

In the face of such circumstances, members of a team can be falsely perceived, especially by the leaders of the team, who create certain expectations. To illustrate such a situation, let's consider a globally distributed team, where a software developer fails to implement features assigned to them by an important project deadline. Fellow team members will feel negative emotions commonly associated with missed deadlines, such as stress and dissatisfaction. How might the developer's project manager, for instance, judge this situation? One possibility is that the manager thinks that the developer lacks commitment to the work, the team, or both. This is a typical example in which members turn their frustration not to their own mistakes or to the situation, but towards their colleagues.

Cramton [Cra01] suggests that the dynamic underlying such perceptions is the psychological principle called the fundamental attribution, in other words, the tendency to blame another's disposition, or personality, for what is actually a situation-stimulated behaviour [TW02]. Synonyms to fundamental attribution error are the attribution bias and correspondence bias. Biases in software development teams are common. They help to explain some of the most prominent software engineering (SE) problems in diverse activities including design, testing, requirements engineering and project management [Moh+18].

Errors in attribution create misleading, usually negative impressions and can lead to avoidable behaviours such as withholding information and backing up a team member's work [AA+13]. As many other cognitive biases, the fundamental attribution

can risk the proper management of the team, and is also correlated with a specific style of leadership, the so-called transactional leadership [Mas12], a style not particularly successful when managing remote or virtual teams [HNA05] [PB09]. Simultaneously, distribution of team members has also been found to result in an increased susceptibility to the fundamental attribution error [TC06].

As stated above, the phenomenon of fundamental attribution can cause unaware and maybe unfair ascription of team members from team leaders. The vast situations introduced by virtual collaboration in the complex domain of software engineering, and more specifically in the context of the iPraktikum, open the door to the possible rise of attributions. Moreover, the fundamental attribution error is a topic, which hasn't been studied in the iPraktikum, and might play a substantial role in the relationship created between the project leader and the scrum team. Studying this phenomenon will hopefully increase the awareness around this topic, as negative, dispositional attributions seem to only be harmful. Eventually, the results of this thesis will help leaders perform important tasks such as decision-making much more efficiently and impartially.

## 1.2. Proposed Solution

Research shows, that there is a shift in project management research from processes towards behaviours [Ley07], and systematic biases are so common in the human decision-making process, that they might even cause project failure [Sho08]. Insights from psychology, and in particular cognitive biases, can further enrich existing theories and models in information systems [Fle+14], which involves software development. In this thesis, we aim at the examination of the range of behaviours a team might manifest as result of remote collaboration as perceived by the project leaders, and model the attribution process and responses. The modelling of such a process includes the identification and definition of biases, a mapping of those onto personas and an examination of the outcome these biases have on the team. The results of this research is further addressed via an software-based solution, which will help future project leaders verify their biases.

The subject of this research was the iPraktikum SS21, founded by the Chair of Applied Software Engineering and, in the summer semester of 2021 (SS21), held by the Professorship for Digital Health at the Technical University of Munich (TUM). There were 12 teams participating, each with their own specific project and domain. The projects had 1-2 project leaders each, which played a key role in the realization of our research. Moreover, the iPraktikum fulfils one core requirement: it takes place virtually, providing the right context and environment for this thesis.

### 1.3. Objectives

To be equipped with guidance and purpose throughout the conduct of the thesis, following research questions were generated:

RQ1 Which are the biases project leaders exhibit in the perception they have on the team members, considering the virtual situation?

RQ2 Can similarities between these perceptions be identified, and structured in the form of personas?

RQ3 How do these biases affect the way leaders react towards members of the team?

The first step in this study is to identify situations that stimulate the emergence of attribution biases, exhibited as a result of remote team collaboration. We expect biases to be present in specific teams, but also across teams. In our study, we define *bias* as a subjectively based tendency to prefer a given cognition over its possible alternatives [KA83]. Repetitive attributions and situations, support the creation of personas, which will include a set of various characteristics defining each one of them. Ideally, there would be 4-5 main personas identified, and multiple minor ones. Additionally, we anticipate the biases to have an affect in team leader - member relationship. This can be observed during interviews, but can also be validated in post-interview procedures to fully answer RQ3.

Eventually, we want to show that different team leaders can form attributions by diverse, unique situations. Considering that most people are unaware of the biases in them, we want to introduce project leaders to a factor that might influence the quality of their decisions. To summarize, how these biases differ from one leader to the other, what can be said in general about the perceptions leaders create, and whether there is a link between this bias and leadership traits or behaviours, are the main goals of this thesis.

### 1.4. Research Approach and Methodology

Considering the explorative nature the research of such a topic requires, and the numerous directions it could take, it was decided from early on that the core objective would be the identification of the attribution bias and the forms it could take. This objective is also meant to be addressed through the first research question presented in the previous section. Another characteristic of this research, is that such a phenomenon would be studied within a specific instance, the one of the iPraktikum SS21. Such circumstances, would be fitting to the following definition of a *case study*:

"Case study in software engineering is an empirical enquiry that draws on multiple sources of evidence to investigate one instance (or a small number of instances) of a contemporary software engineering phenomenon within its real-life context, especially when the boundary between phenomenon and context cannot be clearly specified." [RH09]

The phenomenon we are aiming to study is particularly relevant as remote teams become more ubiquitous, and it will rely on real experiences, rather than simulating an experimental environment. Apart from the exploratory purpose such a research strategy should primarily fulfil, it would be interesting to gather descriptive and explanatory insights as well. In this thesis, these purposes are tackled iteratively, but a separation in three phases helps formalize and structure the processes. These will be described in Research Approach 1.4.1. We will also be using Grounded Theory as the overarching methodology to study data and to drive data acquisition activities within the case study, as suggested by Fernandez et al. [Fer+04].

Grounded theory (GT) is a method developed by Glaser and Strauss [GSS68]. Its core idea is to generate theory from data, as opposed to other social research methods that are concerned with "how accurate facts can be obtained and theory tested". The procedures of GT allow the identification of patterns in data and by analysing these patterns researchers can derive theory that is empirically valid [MT86].

Additionally, the reason for using the grounded theory approach is consistent with the three main reasons suggested by Benbasat et al. [BGM87] for using a case study strategy in IS research, namely:

1. The research can study IS in a natural setting, learn the state of the art, and generate theories from practice.
2. The researcher can answer the questions that lead to an understanding of the nature and complexity of the processes taking place.
3. It is an appropriate way to research a previously little studied area.

Therefore, this thesis will make use of mixed research methodologies to derive the required results and to abide to the framework of the case study. As already mentioned, we made use of the context of the iPraktikum SS21 to perform this study and validate it as well. Our research is supported by empirical evidence, following qualitative and quantitative research methods. Lastly, the development of an algorithmic representation of the results will give an additional quantitative approach to the realization of this thesis.

### 1.4.1. Research Approach

The study we aim to conduct will rely on collecting data from real instances, as a case study requires. Empirical methods see the systematic collection of material or analysis of data as the way to acquire knowledge and to provide evidence to the findings. Such an approach would fit our case as well, and fits the definition of the approach of grounded theory. The process of doing a GT research study is not linear, it is rather iterative and recursive. The researcher collects, codes and analyses their initial data before further data collection/generation is undertaken [CTBF19]. Furthermore, although grounded theory is mainly used for qualitative research (Glaser, 2001), it is a general method of analysis that accepts qualitative, quantitative, and hybrid data collection from surveys, experiments, and case studies (as it is the case of this thesis) [Gla78].

Considering the two distinct approaches of Straussian and Glaserian grounded theory, and the objective of creating personas, we follow the Glaserian approach, in which there is a strong focus on abstract conceptualisations [Fer+04].

As previously mentioned, there are three phases undertaken in order to achieve the objectives of this thesis.

The first *exploratory* phase, aims exactly at generating new insights and hypothesis and corresponds with the approaches of GT. It requires purposive sampling and the collection of data. Since we first want to identify biases, which are textual data representing human experience, methods of qualitative research would be the most appropriate. After the collection of data, the results must be analysed following an inductive approach. This is also referred to as constant comparative analysis, as the results (or rather codes) of each phase should be compared to each other [CTBF19].

The second phase of the thesis relates to portraying the current status of the attribution theory, and is realized via the validation of the hypothesis derived from the previous phase. Not only do we want to gain a general overview of the situation, but through this step we aim at getting more insights regarding concrete occurrences of the attribution bias. Such a phase requires methods of quantitative research.

The combination of both qualitative and quantitative is important in this thesis, as the topic has not been studied before in the given environment. Consequently, we are able to achieve breadth of understanding via the quantitative methods and also depth of understanding via the qualitative methods [Pat02].

Lastly, the theories retrieved from the qualitative research activities in this thesis are then used to develop personas. These are created after the analysis of the exploratory and descriptive phases, and aim at providing more explanation regarding the phenomena. The analysis is conducted by one person (the author of this thesis). Eventually, a summary of patterns with illustrative examples, which can also be regarded as per-

sonas, is reported. These personas provide the basis for the development work that will conclude the activities of this thesis.

### 1.4.2. Research Methodology

Semi-structured interviews are one of the most commonly used qualitative methods for data collection, and the method that fits our research best.

Although the interviewer prepares a list of predetermined questions, semi-structured interviews (SSI) unfold in a conversational manner offering participants the chance to explore issues they feel are important. Semi-structured interviews are conversational and informal in tone. They allow for an open response in the participants' own words rather than a 'yes or no' type answer.

SSIs are especially relevant in the situations in which the results are not pre-defined or expected in any way. This way, during the interview in the following interesting leads can be spotted and then pursued [Ada15]. Although semi-structured, a guide must be crafted for every interview, as well as an outline of planned topics. The questions to be addressed, must be arranged in a meaningful order. The interview is a work in progress until the first trial interview, after which, the questions and agenda might be subject to modifications.

As briefly described in the previous section, data collection must be followed by data analysis, which in such cases, is conducted via coding.

Coding is a method used to identify concepts, similarities and conceptual occurrences in data . Coding is the pivotal link between collecting or generating data and developing a theory that explains the data [Cha12]. It requires for the material to be read and re-read in detail, and is an iterative process in which new codes are constantly formulated, adjusted or removed [Run+12].

Interview coding is an important process, that must take into consideration the goal of the thesis, which is the exploration of participant actions/processes and perceptions found within the data and the creation of personas, as representative patterns or collections of such perceptions. Coding methods that may systematize and better reveal these, include descriptive, and/or pattern coding [Wic17]. Referring to the literature surrounding grounded theory, one of the two basic principles is generating hypotheses using *theoretical coding*.

First step in theoretical coding is explicitly stating the research concerns and conceptual framework. The only framework used in the coding of the interview answers refers to the inappropriate behaviour categories, used during the interviews. Such code frames facilitate the process of finding common themes in accordance to the research questions of the thesis. The rest of the interviews don't contain a framework attached to them. The second step relates to identifying the phrases and sentences that provide

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more insights than the others. This step was conducted by highlighting and laying an emphasis on phrases that would indicate potential attribution. The third step requires a grouping of phrases or passages that revolve around similar ideas. After grouping, organizing the data into coherent categories was the next undertaken step. After coding the semi-structured interviews, the results might be summarized in a report consisting of different sections [Yin09].

The creation of such categories, which represent early personas, would be followed by a validation phase [MSK08]. Such a phase, which constitutes the second one in relation to the thesis, is based on quantitative methods, more specifically the one of survey questionnaire using scales. The primary goal of the this step is to verify the categories that were created previously and to identify correlations. The results of the questionnaire are analyzed via parametric statistics, which work just as well with small sample sizes, unequal variances, and non-normal distributions, without jeopardizing the conclusions [Nor10].

Most importantly, the results will motivate the final creation of personas. Although the persona methodology has been mostly used in website design or marketing, much of the work of building personas has benefits beyond that field [Mad+14]. Personas are identified via major goals, challenges, and core details, attributes which we aim to extract and explore during the interviews. Statistical summaries are often difficult to be understood by the majority of people, hence, the employment of personas is introduced, which facilitates the illustration of the biases. Personas are an especially powerful communication tool because we as humans are naturally equipped to generate and engage with representations of people [Gru06].

To concretely aid project leaders in the prevention of biases, or at least in their identification, an algorithm that maps behaviours into personas was developed. The algorithm will combine the situations leading to biases, the personas themselves, as well as the statistical quantification of the results.

## 2. Background

Although the context of our case study is software engineering, and more specifically in the management of remote agile teams, the motivation originates from the discipline of psychology. The psychological process of finding reasons behind a behaviour happens naturally and often unawares. In the early attempts of studying attribution, Heider [Hei58] even considers people naive psychologists, who try to make sense of the causes and effects of various happenings. Therefore, this chapter dives deeper into the research surrounding attribution, as it is the phenomenon igniting this thesis.

The following section presents the reader with the trajectory of the research surrounding attributions. After elaboration on the *Psychological Background*, we will continue with the circumstances in which this thesis takes place, with a focus on team virtuality and management of software engineering projects.

### 2.1. Psychological Background

*Attribution* is not only the first word in the title of this thesis; it also constitutes the core subject under study. As human beings, we are forming attributions everytime we ask "why" and try to find an answer that argues the cause of an event. The theory that is concerned with studying attributions is known as *Attribution theory* and can be best described through the following definition:

"Attribution theory deals with how the social perceiver uses information to arrive at causal explanations for events. It examines what information is gathered and how it is combined to form a causal judgement". [FT91]

There are various streams of research that have emerged. We want to focus on one of the most substantial works in attribution theory, Heider's *The psychology of interpersonal relations*. The work considers the cause of a behaviour to be either internal (e.g., a disposition or a characteristic of a person) or external (e.g. an environmental factor). These are often referred to also as dispositional and situational attribution.

One of the major areas of interest in the attribution literature concerns the cognitive processes that lead from observation of behaviour to dispositional attribution [TC89]. Trope even constructed a two-stage attribution model. This model fundamentally

## 2. Background

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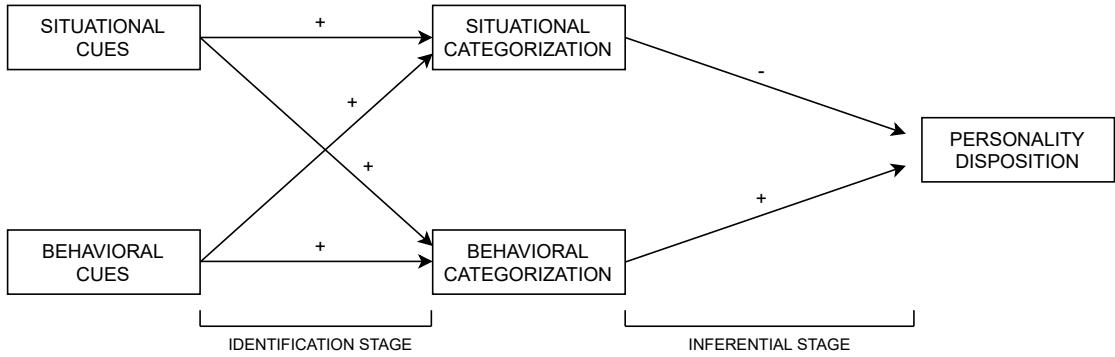


Figure 2.1.: Two-stage model according to Trope [Tro86]

indicates that dispositional attribution is positively related to the identification of the corresponding behaviour and negatively related to the identification of the corresponding situational inducements [Tro86]. A simplified version of the two-stage modelled is depicted in Figure 2.1.

Another stream of research is concerned with the context in which attributions are formed. In 1965, social psychologists Edward E. Jones and Keith Davis proposed an explanation for patterns of attribution termed correspondent inference theory [JD65]. The basis for the inference is a correspondence between behaviour and disposition, according to the perceiver. They explained that certain conditions make us more likely to make a correspondent inference about someone's behaviour. Following points summarize the conditions proposed by [JD65]:

- Choice: If a behaviour is freely chosen it is believed to be due to internal (dispositional) factors.
- Accidental vs. Intentional Behaviour: Behaviour that is intentional is likely to be attributed to the person's personality, and behaviour which is accidental is likely to be attributed to situation / external causes.
- Social Desirability: Behaviours low in sociable desirability (non-conforming) lead us to make (internal) dispositional inferences more than socially desirable behaviours. For example, if you observe a person getting on a bus and sitting on the floor instead of one of the seats, one you interpret this behaviour as non-conforming. This behaviour has low social desirability and is likely to correspond with the personality of the individual.
- Hedonistic Relevance: If the other person's behaviour appears to directly benefit or harm us, the attributions we form are also affected. There is a tendency to

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create more dispositional attributions, if future events are linked to that person and the dependence is higher. An example would be a manager's dependency from the subordinates deliverables.

- Personalism: If the other person's behaviour appears to be intended to have an impact on us, we assume that it is "personal", and not just a by-product of the situation we are both in, which applies more to Hedonistic Relevance.

Harold Kelley is another researcher who focused on how individuals determine the cause of a behaviour or event. In his research, he considered information regarding the consensus, consistency, and distinctiveness of the behaviour or event. Kelley's model explores these three dimensions and argues they covariate with the person's tendency to locate the causality [Kel67].

Another model is proposed by Weiner and colleagues, who focused on the consequences of four different types of causal judgments that people make for events regarding their performance [Wei72]. Specifically, they argued that an individual's expectations, emotions, and behaviours could be predicted by understanding whether the event's cause was believed to be (1) internal or external, (2) stable or unstable, (3) controllable or uncontrollable, and (4) global or specific. These two models are important because the dimensions described by Kelley illuminate the types of information people use to make attributions, whereas the dimensions identified by Weiner help predict both behavioural and emotional responses.

Before even taking in consideration behaviours, Asch's seminal research on impression formation established that particular "central" personality traits shape the interpretation of subsequent traits and, the overall impression formed [Asc61]. In other words, the first impression we created on someone plays a role in the perception of their future behaviours.

Researches have also examined the domains of such perceptions. Personality judgments are made upon a limited number of domains, and early studies consider social and intellectual desirability, as the two axes of attribution forming [RNV68].

Figure 2.2 represents the categorization of 60 distinct attributions. The labels of these two dimensions have varied over time and the newest research labels them as competence and warmth [FCG07; Jud+05]. Warmth is anchored by positive traits such as warm, honest and negative traits such as cold, unreliable and competence is anchored by positive traits such as competent and assertive and negative traits such as inefficient, passive. For the warmth - cold dimension we use the concept of *social acceptance*, and we treat competence as *level of intellect*. These attributions are presented to illustrate the range of attributions a person can form on another.

Whereas people can make relatively logical assessments of cause and responsibility, as Heider predicted [Hei58], researchers have found there are often systematic biases

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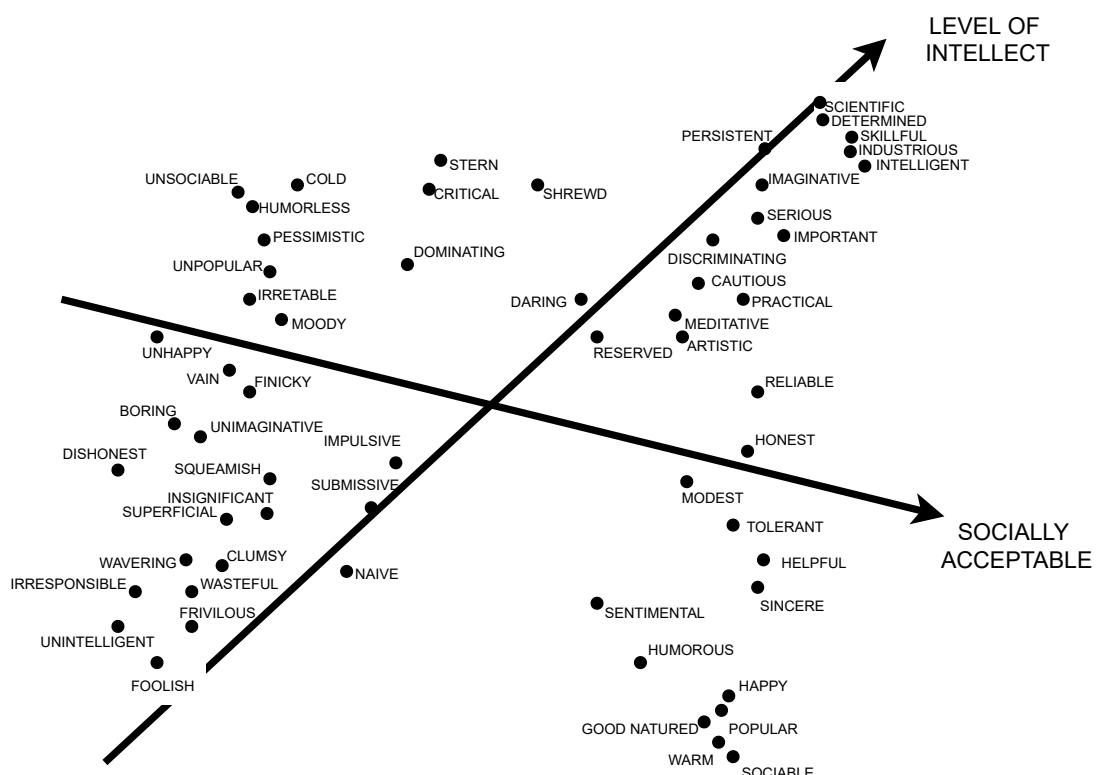


Figure 2.2.: Two-dimensional configuration of 60 traits by [RN68]

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in how we make attributions [Ros77]. Perhaps the most well known bias is the fundamental attribution error, which is our tendency to make more internal attributions than external attributions for others' behaviours.

An explanation of the fundamental attribution error can be either of internal or external origin. Internal explanations have been framed in terms of individuals' perceptual and cognitive information-processing biases [KM80]. An external explanation, which emphasizes that social pressures from the environment are applied to the individual. Reviews by [Zuc79] of the research on attributions for success and failure show that, consistent with these assumptions, attributions for success are usually relatively internal and attributions for failure are usually relatively external.

Attempts have been made to study the consequences of attribution, but the results have been ambiguous to interpret the causal link between an attribution and the reaction [KM80]. Regardless of the research, the hypothesis and results may be revisited to gain more interesting and accurate findings. [IKB76] proposed an attributional analysis of helping behaviour. They hypothesized that more help is given to persons whose need is attributed to unintentional factors rather than intentional ones. [Pha57] found that when subjects were told that their success on a judgment task was due to skill, expectancy of future success was higher than when success was due to chance. On the other hand, failure due to chance rather than skill yielded higher expectancy of future success.

Errors in regards to attributions are also regarded from another perspective. This perspective is based on the assumption that attributions have personal implications for the attribution maker. The self-serving attributional bias is exhibited when attributing success internally and failure externally [DS02]. This bias even appears for many psychologists to have achieved the status of an empirical fact [BR91] as researchers indeed find a consistent tendency for individuals to attribute success to self [MR75].

Whether an action is attributed to the a person's dispositions or to some aspect of the environment affects such things as liking the person, trusting in them, and their persuasiveness [KM80]. The externally justified action that harms or frustrates a person is better tolerated and less reciprocated than a similar action attributed to the character of the actor. Another stream of research looks into the "forgiveness" or tolerability of inappropriate behaviours. The extent to which excused transgressive behaviours are forgiven depends on several factors, such as the perceived match between excuse and transgression [Kim+06], the sincerity with which the excuse was offered [Zec+04], how severe the outcome was [BE94], as well as the time at which the excuse was offered [FB05].

Considering the objectives of this thesis, our main goal lies not in measuring the fundamental attribution error directly, but rather in investigating the context of dispositional attribution. A focus on the fundamental attribution error would require the

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employment of techniques of experimental social psychology. More realistically, we want to investigate whether a tendency to attribute dispositions exists. Nonetheless, studies around the fundamental attribution error are taken in consideration, as they contain relevant approaches and knowledge that could be of use when conducting the research for this thesis. In a world in which the external environment rapidly changes, dispositional attributions might or might not change as well.

### **2.2. Virtual leadership of software engineering teams**

The pandemic of COVID-19 and the distancing measures in action to prevent its spread, have made digital transformation obligatory for a multitude of businesses and sectors [FG20]. Although professionals in most critical roles (such as medical staff) continued to work on a daily basis, a large part of the working population had to and still works in their home offices (as per submission date of this thesis). At a first glance this may be a comfortable situation for many compared to the struggles of front-line workers, but working or studying from home is not without its challenges.

As subject to this thesis, we will be looking particularly at the field of software engineering and development. Software development has never been more relevant, given our digital age and the fact that human experiences and professional and social exchanges often exclusively rely on digital technologies [Yoo10].

Although software development includes activities that can be performed in a distributed setting, switching completely to virtual collaboration and turning private environments of home into offices presented personal and professional challenges. The teams following agile software development methodologies might be specifically subject to these challenges. According to the agile manifesto, individuals and interactions are valued over processes and tools, and customer collaboration over contract negotiation. These statements depict humans as of great importance in the success of developing software.

The virtuality of teams is a phenomenon dating back to the 90' [Geb95], and thankfully, teams and leaders around the world had already captured the attention of researchers. Let's start with a definition of virtual teams:

"Virtual teams are teams whose members are geographically distributed, requiring them to work together through electronic means with minimal face-to-face interaction [MMR07]. "

In a literature review form [MSR20], virtual teams are affected by physical factors such as geographic distance, in addition to temporal and perceived distance, which are time-based and cognitive respectively. These factors are tightly coupled with social

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and emotional factors, including trust, motivation, and conflicts. We have identified the most prominent factors from [OO00] and [MSR20] challenging geographically distanced teams and they will shortly be elaborated in the following points:

- 1 Awareness of colleagues and their context - Awareness can be defined as an understanding of the activities of others, which provides a context for your own activity [DB92]. Collaborative work has been regarded as significantly delayed without awareness [OO14] and a strong link has been identified between awareness and coordination in group activities, independent of the domain [DB92].
- 2 Motivational sense of presence of others - There are two major observations in regards to motivation. One relates to the lack of social interactions and the other to the motivation one receives observing others working as well [OO14].
- 3 Trust is more difficult to establish - Difficulties in establishing trust has profound effects task coordination and cooperation [OO14], decreased eagerness to communicate [HG99], inability to systematically cope with unstructured tasks and uncertainty [JL99], fewer members willing to take initiative [JL99], and lack of empathy for teammates [Kie03], to mention a few.
- 4 Technical infrastructure and communication - When teams have experience with the task at hand, with each other, and with their communication method, there is less of a need for synchronous computer mediated communication (CMC) technology (e.g., video conferencing). In contrast, when teams do not have this extensive experience, there is a greater need for synchronous CMC technology [DFV08]. In return, communication technologies (including text-based tools) take more time and effort to effectively communicate information and are missing important social information and non-verbal cues that help establish ties between collaborators [DFV08].
- 5 Task dependencies - Complex, tightly coupled tasks may be more difficult to the reliance of virtual teams on virtual tools and tendency to disband after a task has been completed [BK02]. Furthermore, the combination of high task complexity and high levels of virtuality lends itself to misunderstandings and mistakes [OO14].
- 6 Explicit management and leadership - Virtual teams face challenges related to leadership, such as nourishing an environment that fosters creativity and emergent leadership [Cha+16]. There is indeed a rational similarity and relationship between the problems of forming and developing virtual teams and the challenges that leaders may face in subsequent phases [AIM12].

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- 7 Common ground - Research has shown that it is more difficult for virtual teams that are geographically dispersed to develop a shared mental model. [MG14]. In particular, the process of grounding is made more difficult when there is a higher risk of misinterpretation, such as in the presence of multiple cultural practices and languages [OO00]. On the other hand, distanced collaboration becomes easier if team members have common ground (i.e., have worked together before [Cun+19], have shared past experiences [Cun+19], vocabulary [OO00], or mental models [MG14]).
- 8 Work culture - While differences in work culture have the potential for stimulating innovation, proving access to richer skill sets, and sharing best practices, it also has the potential to cause misunderstandings and communication breakdowns between team mates [BN09].
- 9 Alignment of incentives and goals - Differences in expectations can pose very serious problems for a collaboration. These misalignment's are difficult to detect at a distance and require substantial negotiation to overcome [OO00], which is non-trivial using today's technology.

Studies have been conducted also from the perspective of factors predicting a successful team performance. Unsurprisingly, they coincide with some of the biggest challenges in virtual teams. We will elaborate these factors making use of one of the most recent, end-of-pandemic studies from [GAPSAC21], in which the effects of communication, trust, task, leadership, cohesion and empowerment on each other and on virtual team performance are investigated. The teams under investigation are software development teams.

According to this study, the most significant variable for the performance of the virtual teams is *trust*, as this variable has the strongest influence on the dependent variable *performance*.

These results coincide with other recent findings that confirm that *trust* can influence performance by improving member confidence and the subsequent trust [CJ13].

Communication in virtual teams is a key predictor of various outcomes such as improved performance and increased commitment [FK18]. Virtual teams rely heavily on communication technologies to coordinate their work, so the relationship between the nature of the task and the effectiveness of communication was studied in order to find its subsequent impact on team performance. Therefore, one of the determinants was the characteristics of the *tasks* and the positive influence on the *communication* of the members of the virtual team. These results confirm that great uncertainty about the requirements and the risk planning, followed by the technological suitability of the projects, are key to communication [GAPSAC21].

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Empowerment is favourable acknowledgement by the team leader and allows team members to participate in decision making. Other past studies [Kir+04] indicate that teams can be empowered in four different ways, (a) power, which is the collective belief that a team can be effective, (b) significance, which is the extent to which team members care about their tasks, (c) autonomy, in which team members have freedom to make decisions; and (d) impact, the degree to which team members feel that their tasks make important contributions. The level of empowerment of the members of the virtual teams was also found to have a significant effect on *trust* according to [GAPSAC21]. This result showed that *empowerment* positively promotes and increases the *confidence* of a virtual team.

One of the factors is the level of leadership of the members of the virtual teams. The results showed that this had a direct and positive influence on *trust*. The results obtained coincide with other studies that show that the role of leaders is important for working in a virtual team, especially because leaders influence the way a team faces obstacles and the way the team ultimately adapts to such challenges, which is very important for the confidence generated for the future [BRK14]. Furthermore, virtual leadership can help collaboration within the team through providing training, guidance, resources, coaching, and facilitating relationship building [Lia17]. Prior work indicates that leaders play an important role in enhancing team performance by demonstrating empathy and understanding [KL02], monitoring and reducing tensions [WLG08] and clearly articulating role and relationship expectations for team members [KL02].

Another question that arises is which is the type of leadership mostly adequate to tackle the issues that have been mentioned through this section. Thompson and Covert emphasized appropriate leadership as an important factor for improving relationships within technology-based communication [TC06]. Research on virtual team leadership has grown rapidly, with two popular areas being leadership behaviour and traits [Gil+15]. Here, the work has examined inspirational aspects [JR09], as well as transformational and transactional leaders. In virtual teams, transformational leadership seems to be more popular due to personality and communication factors [BWW09] which can increase performance, satisfaction and motivation [PB09].

How a transformational leader operates can be analyzed in four dimensions: idealized influence, inspirational motivation, intellectual stimulation and individualized consideration [Avo+01]. Leaders are inspirational when they appeal to employees' feelings and emotions, transmit an enthusiastic vision of the future, and express confidence about successful completion of goals. Leaders are intellectually stimulating when they question assumptions, challenge their employees intellectually, and encourage re-thinking of ideas. Leaders are individually considerate when they recognize the unique needs and abilities of their employees, treat employees as individuals, and coach and develop their employees. Substantial evidence has accrued that the four

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dimensions of transformational leadership are highly intercorrelated, and that their relations with outcome variables are similar [LKS96].

Transformational leadership is not to be considered the holy grail of leadership styles though; successful virtual leaders tend to adapt their behaviours based on context, but they do not do so in a uniform fashion [PB09]. The results of the same paper are consistent with the notion that social and emotional forms of leadership are more important under conditions where modes of communication are leaner and greater uncertainty exists. Practically, the results highlight the role of leadership in virtual teams, demonstrating that findings from the existing literature linking transformational leadership to team performance can be extended to virtual teams. They also suggest a need for methods to identify leaders who appropriately adjust their behaviour to the team context.

## 3. Related Work

In this thesis, the topic of attribution is studied under specific circumstances. The phenomenon is observed considering project leaders as the perceivers or creators of attributions. This study also specifically tackles software development teams. Moreover, these teams operate and conduct all activities of software development virtually. All these characteristic add more complexity to the research of these topics in conjunction with each other. Hence, we rely on the studies made on combinations of two concepts to build a proper picture of the literature related to this thesis. Specifically, we will discuss Attribution in Leadership Roles, Attribution in virtual setting and Attribution in Information Technology separately.

### 3.1. Attribution in Leadership Roles

In 2.2, we saw how management of virtual teams is one of the biggest challenges teams face. The inability of virtual team members, and especially managers to observe each others actual effort tends to lead to a greater reliance on perceptions and assumptions that could be both biased and error-prone [Peñ+13].

The fundamental attribution error in leadership is studied as early as 1979, a study in which attribution theory is presented as a vehicle for describing and understanding the causes of leader behaviour in leader-member interactions [GM79]. According to the same paper, subordinate behaviour generates leader attributions, which then stimulate certain leader behaviour.

A literature review by Martinko et al. (1987) presents the most prominent hypothesis by researchers of attribution in leadership - member relationship. Some of the most interesting revelations include:

1. P1: Subordinates will have a tendency to favor external attributions for failure, whereas leaders will tend to blame internal subordinate characteristics [MW80].
2. P2: Leaders who attribute poor member performance to effort as opposed to ability exhibit more punitive responses [MW80].
3. P3: The degree of congruence between member behaviours and leader behavioural preferences is related positively to the amount of similarity among leader and

### 3. Related Work

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member attributions. This is a result of the tendency to attribute behaviour that they view as unusual to stable dispositional characteristics of the actor, whereas behaviours that are consistent with their own response tendencies are attributed to environmental causes [Ros77].

4. P4: The hedonic relevance of member behaviour to a leader is related positively to the strength of the attributional biases of leaders. Since leaders are ultimately dependent upon their followers for the successful accomplishment of their objectives, the concept of hedonic relevance is especially pertinent to leader/member relations. Thus, leaders are more likely to make negative dispositional attributions about members whose behaviours they perceive as hindering as opposed to facilitating goal attainment. In effect, hedonic relevance amplifies the impact of the biases discussed above.

Another stream of research examines the attribution members have on the leader of a team [Swe20]. Bligh et al. found that followers' negative views of their work environment were overly attributed to their leaders' in that they viewed the leader as more responsible for these negative outcomes and situations than was warranted [Bli+07]. Similarly, Weber et al. reported that group success and failure were overly attributed to the leader [WCK01].

Furthermore, literature [Gar+18] suggests that the way individuals make attributions of others' behaviours determines how these behaviours affect both individuals' internal psychological states and external relationships with others. A separate family of theories has even emerged for the Leader-Member-Exchange and perceptions formed on these exchanges [Cog+09].

The scope of application for attribution theory has expanded considerably in recent years in other directions as well. Attribution processes have also emerged as an important moderator between supervisory behaviour and subordinates' reports of *abusive supervision* [Mac+17], as a factor for explaining employee entitlement [Har+13], and as a process underlying ethical decisions in the workplace [HMB17]. Attribution processes are also considered a theme to study the effects of high-performance work systems [Mac16].

Specifically, there was evidence for the occurrence of the self-serving bias when supervisors made attributions for the performance of their in-group subordinates and when both in- and out-group subordinates made attributions about their own performance. The results provided some support for the presence of the actor-observer bias when supervisors made attributions about the performance of their out-group subordinates. Consistent with prior research, these results provide yet further evidence for the positive outcomes associated with in-group status, in that in-group members

are being credited with their effective performance and not blamed for their ineffective performance [CS06].

### 3.2. Attribution in virtual setting

In addition to the challenges facing traditional groups, virtual groups must adjust to temporal delays in information exchange, maintain shared context and workflow, and confront other difficulties in order to work and relate effectively. Furthermore, the inability of virtual team members to observe each other's actual effort tends to lead to a greater reliance on perceptions and assumptions that could be both biased and erroneously negative [Peñ+13].

Attribution in virtual teams is studied within teams in various studies. Cramton, 2002 [Cra02] considers how the use of technology mediated communication can contribute to a less shared reality, and then to attribution. The failure to adapt may result in negative interpersonal judgements among group members rather than an appreciation of the socio-technical challenges of distributed work [Cra01].

Walther et al. [WBJ02], study the dynamics in short term distributed teams. They not only suggest that the hypothesized dynamics of outgroup attribution in distributed virtual teams does occur, but also argue that a face-to-face meeting may be valuable for people who work together online. Pauleen [Pau05] argues that time lags due to technical infrastructure and technological breakdowns, if not understood by the people involved, can cause the team leader or team member to attribute non-communication to lack of manners or conscientiousness, which can then seriously affect relationships. Another study though argues, that teams recognize that constraints may create real impediments for their performance, and realizing their negative impact can motivate teams to adjust, in an effort to adapt to those constraints [BH12]. Bazarova et al. categorize attributions into dispositional, situational, generic situation, distance, other members or computer use [BW09], a categorization which might help frame the attributions identified in this thesis as well.

The fundamental attribution error has been studied in virtual teams yielding mixed results. More specifically, research in computer-mediated communication has looked at how different technologies influence the way individuals perceive their collaboration partners [SM94]. Hancock et al. [HD01], for example, found that people's impressions of their partner's personality were more intense and less detailed in CMC than face to face.

Lack of common location did not inflate dispositional attributions in virtual groups. This has been specifically studied in [BW09]. On the contrary, collocated members made greater dispositional judgments about partners, compared to those of distributed groups.

### *3. Related Work*

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The same statement holds true, regardless of the degree of behaviour differences within their groups. These inconsistencies are not altogether surprising because the virtual group setting stretches attribution theory beyond its typical boundaries in several ways: The iterative and cumulative effects of communication with targets, the mediated nature of observations, and, particularly, the active participation rather than passive observation of the observer with the target are uncommon in traditional attribution research.

Attribution is also studied in terms of self-attribution. Interesting studies suggest that members of completely distributed groups attribute the cause of their own negative behaviour to the influence of their partners, more than do members of collocated groups. [WB07].

The findings about greater dispositional attributions for collocated than distributed groups challenge the application of attribution to virtual groups that has dominated the literature [Cra01]. There can be several explanations for the different conclusions. Several are methodological, as detailed in their work [Cra01]. Other differences are more conceptual. The previous research on attributions in virtual groups relied on traditional actor–observer principles (the actor-observer bias is a term in social psychology that refers to a tendency to attribute one's own actions to external causes while attributing other people's behaviours to internal causes) to make predictions, whereas general attribution research has challenged the utility of these principles [BW09].

Another interesting experiment is presented by [TR18], in which a software providing various information on a person's situation or disposition was employed to then investigate the attributions formed. In conclusion, the authors provide initial evidence that greater awareness of collaborator's responsiveness and availability information (information which is unlikely to have in a globally distributed setting [Cra01]), can support team members in accurately explaining negative, unexpected behaviour, and calibrating their trustworthiness toward them appropriately. The study shows that for the most part, these findings hold for both students and professionals.

Jiang et al. [JBH11] deliver insights regarding the dispositional attribution of members showcasing self-disclosure. This result also support the prediction that CMC participants would make more intensified interpersonal attributions when encountering high self-disclosure relative to their face-to-face counterparts. These kind of studies look specifically at behaviours that might influence attributional processes in a person.

Specific work in leader attribution in remote virtual teams has been conducted under the hood of relationship building, communication and trust building. For instance, time lags due to technical infrastructure and technological breakdowns, if not understood by the people involved, can cause the team leader or team member to attribute non-communication to lack of manners or conscientiousness, which can then seriously affect relationships [Cra02]. Lack of situational knowledge of team members

can cause misunderstandings and attribution error, leading to potential obstacles and [Pau05] suggests leaders to ask *What are the boundary crossing influences of this situation?* before making any attribution. Attribution theory has the potential to make significant contributions to information systems research [SSK16]. The more we understand the attribution other form, the sooner managers can expect or prevent certain events from happening [SSK16].

### 3.3. Attribution in Information Technology

Considering software engineering teams, cognitive biases help to explain common software engineering problems in diverse activities. Such biases include estimation bias, optimistic/pessimistic bias, overconfidence among others, observing processes that include design, testing, requirements engineering, and project management [JG12; Fle+14]. Research on cognitive biases has been useful not only to identify common errors, their causes and how to avoid them in SE processes, but also for developing better practices, methods, and artefacts.

Studies on attributions in information systems consider system users as actors, in the case of user-developer misunderstandings [Sne+14], vendors and buyers of outsourcing services [RC07], or attributions between information systems designers [Pet+02]. The results of these studies are similar, showing that negative outcomes such as project or negotiation failure increase the chance of negative attributions towards a counterpart or colleagues.

Understanding the attributional styles exhibited by individuals in the IT project domain can make a significant contribution to our knowledge of project management, given the limited research into individual emotions and behaviour within this domain [SGL06]. In particular, attributional style provides the opportunity to identify the important causal dimensions that affect individual emotions that lead to a behaviour consistent with mastery of the IT project domain (e.g. ability to effectively apply knowledge, skills, tools and techniques to IT projects) [CI96]. For instance, IT support workers may attribute failure to external causes as a means of protecting their self-worth at the expense of being a potential barrier to learning [DS02].

Attribution in IT has been often studied under the veil of success and failure of IT projects. Level of seniority has also been subject to research in relation to project success and failure. According to [SSK16] employees at different levels attribute differently. For example junior staff or support working tend to attribute success more internally than externally whilst more senior staff recognize the contribution of environmental factors more. It could be assumed that the more experienced a person, the more balanced their attribution.

### *3. Related Work*

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Attribution of success and failure to the individual or environment can be problematic when it is not balanced. [SKS12]. So, over attribution of failure to the self, for example, can lead to pessimism and depression [SKS12]. There is a danger in becoming too pessimistic in attributing success to external factors and that this can have a damaging effect on morale [SSK16]. The same paper highlights the need for increasing attribution theory awareness in the leadership community.

Although the research on attribution in IT revolves often around the success rate, we assume that in a virtual scenario many of the situations and discoveries discussed in section 3.2 will apply to the iPraktikum project leaders as well.

## **4. Interviews**

Being the first phase of the thesis, the process of defining the interview questions, preparing the setting, and afterwards, analysing the findings are crucial to the phases following, and to the thesis in general. This chapter aims at elaborating in more detail the steps required for the conduct of the interviews (4.1 and 4.2). The findings from the interviews can be found in 4.3, where the more generic aspects are clustered together and in 4.4, where we will look at the most common inappropriate behaviours PLs have faced, and what their perception of these behaviours was. Section 5.2 describes how these findings fit into the purpose of this thesis and how they contribute to the next steps. Lastly, we will take a look into the limitations and validity of the interviews in 4.6.

When reading the thematic analysis results, one must keep in mind that the statements of the PLs are not facts. Instead, they are the PLs perception of the reality of virtual meetings, which relates to the way they individually experience them. To adequately measure activeness, distraction or other topics discussed, all meetings throughout the iPraktikum should have observed closely, and mechanisms measuring this topics and comparing the virtual and the live setting should have been defined and implemented. This is though not the focus of this thesis, which is interested in studying exactly the PLs perceptions of situations and behaviours.

### **4.1. Setting**

In order to foster flexibility, but also a certain degree of openness and freedom, the semi-structured interview method was chosen as a first phase for this thesis. Such a method has the potential to be more revealing than questionnaire surveys [BW94], it gives the opportunity to explore more than just behaviours, but also attitudes, reactions and reflections.

The semi-structured interview also gives interviewers some choice in the wording to each question but also in the use of probes [HS92]. Probing, in particular, can be a great tool for ensuring reliability of the data as it allows for the clarification of interesting and relevant issues raised by the respondents [HS92], provides opportunities to explore sensitive issues [NB84] and can elicit valuable and complete information.

To structure the interview, the approach and suggestions described by DeJonckheere and Vaughn [DV19] are best suitable for the environment, in which the interviews are to be conducted. The steps described in their paper will be elaborated in the sections to come.

#### 4.1.1. Objectives

Initially, it was important to determine the purpose and scope of the interviews. Considering the research questions of this thesis, the interviews would contribute to answering RQ1: *Which are the biases project leaders exhibit in the perception they have on the team members, considering the virtual scenario?*

Goal of this RQ is to identify behaviours or situations that might drive the project leader into dispositional attribution, and what these attributions are. The foundation would be inappropriate behaviours according to each project leader, which would then facilitate the identification of biases. The scope of the interviews would be to also gather more insights on general issues, and investigate how they could be used to construct a potential Persona.

#### 4.1.2. Participants

The participants of the interviews were all project leaders in the iPraktikum of Summer Semester 2021. In this case study and environment, the project leader acted as a product owner in the team, responsible for communicating the project goal and defining and ensuring the realization of the backlog items in the product backlog. Considering we are conducting interviews within the framework of a case study of the iPraktikum21, and the participants were conveniently located and easily accessed, the sampling strategy corresponds to convenience sampling [Gal05].

To provide a comprehensive overview, 10 project leaders were selected to be contacted, from different backgrounds and experience levels. All agreed to participate in the interview, reaching a response rate of 100%. When approaching the project leaders, attention was given to the right introduction of the topic. Oppenheim [Opp92] has stated that perhaps, the most important determinant both of response rate and of the quality of the responses is the subject's motivation, in our case the project leaders. Therefore, it was crucial to adequately describe the motivation of the topic, and how the exploration of such topics can help future project leaders.

#### 4.1.3. Interviews' conduct

To provide the right atmosphere and to establish a more personal connection, it was crucial to have a previous knowledge of each PLs' experiences in the iPraktikum. This

#### *4. Interviews*

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knowledge would also add naturality to the interview and allow the interviewer to adapt accordingly in certain situations. It is also important to guarantee the interviewees privacy in the process, therefore, it was decided that no actual names and no companies would be transcribed and shared.

The contacting of the interviewees and the conduct of the interviews themselves was semi-sequential, to minimize collision between the time slots, give opportunity to arrange the interview in less intensive weeks and to prevent interview fatigue. The interviewer created a doodle with their free timeslots, and shared it with the interviewees if needed, in order to accelerate the process of scheduling an appointment. The responses were generally fast, except 2 interviewees, which took a week to answer.

The contacting of the interviewees and the conduct of the interviews themselves was semi-sequential, to minimize collision between the time slots, give opportunity to arrange the interview in less intensive weeks and to prevent a mixture of the interviews. The interviewer created a doodle with their free timeslots, and shared it with the interviewees if needed, in order to accelerate the process of scheduling an appointment.

The participants were contacted via RocketChat and Slack, the messaging applications of choice used in the iPraktikum. Because of the times' COVID regulations, but also due to the practicality of virtual meeting tools such as Zoom, 9 out of 10 interviews were conducted virtually, and only one interview in-person. Zoom's built-in feature to record meetings was used to record both the video transmission and the audio. The in-person interview was audio-recorded via iPhone's "Voice memos" App. The location of the virtual interviews did not play a role in the process of interviewing, except for one instance in which the internet connection was unstable from time to time, but still good enough to maintain steady communication with the interviewee. The in-person interview took place at the interviewee's office, providing again an optimal environment.

The interviews were conducted privately, at least from the visibility range of Zoom. Interruptions of the interviews occurred in very rare cases, where a notification would temporarily distract the interviewee, or when a short side task needed to be performed. At the end of each interview, the interviewees were all invited to provide follow-up information, if they would encounter a situation that would contribute to the thesis. During the interviews themselves, no interviewee refused to answer a specific question, seemed apprehensive, or refused to have their interview recorded.

More details about the date, time, duration and data collection model of the the interviews can be found in Table 4.1.

Table 4.1.: Semi-structured interviews' details

Code Name	Date	Time	Duration	Data Collecting Mode
I1	27.05.2021	12:30	71 min	Voice and video recording via Zoom
I2	05.06.2021	19:00	67 min	Voice and video recording via Zoom
I3	07.06.2021	17:00	50 min	Voice and video recording via Zoom
I4	09.06.2021	10:00	63 min	Voice and video recording via Zoom
I5	09.06.2021	11:30	60 min	Voice and video recording via Zoom
I6	09.06.2021	15:00	23 min	Voice and video recording via Zoom
I7	15.06.2021	15:00	54 min	Voice and video recording via Zoom
I8	16.06.2021	14:45	44 min	Voice and video recording via Zoom
I9	25.06.2021	10:00	40 min	Voice recording via Voice Memos
I10	30.06.2021	09:00	34 min	Voice and video recording via Zoom

## 4.2. Design Process

As a semi-structured interview, a guide with questions needed to be designed in order to ensure that the scope and purpose of the interview are achieved. Three types of questions were composed: guiding questions including "grand tour" questions, core questions and planned and unplanned follow-up questions.

The grand-tour questions aimed at making the interviewee comfortable with the interviewer and the interview itself. They are usually generic questions that give the opportunity to give personal insights and allow the interviewee to get in touch with their thoughts and their experiences before the more in-depth questions are addressed.

These more in-depth questions, also known as core questions, directly tackle the goal of the thesis, and are arguably the most important questions of the interview. They served the identification of behaviours that lead to the emergence of attribution bias, and therefore needed to be structured intentionally. In the initial version of the interview, the interviewee was expected to spontaneously mention such behaviours, therefore the core questions revolved around identifying the bias attached to the above-mentioned behaviours. Follow-up questions were also planned for the case an answer would take a certain direction.

The interview was planned to be concluded with a question that summarizes the interview, but also potentially entice more conversations.

Since the quality and efficacy of an interview cannot be assessed during its design, it is crucial to pilot test the interview, and adjust accordingly. The initial interview guide is presented in Table 4.2, and it also includes the goal for each of the questions.

#### 4. Interviews

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Table 4.2.: First draft of interview questions

Question group	Goal
<b>Grand-tour</b> How has the experience as a project leader in the remote setting been? What do you think has been the most difficult thing to handle in the interaction with the team? Do you think the team is more uncomfortable or comfortable in the virtual setting? How would you tell? Do you think team members' presence in virtual meetings has changed in comparison to co-located meetings? Do you think new, inappropriate behaviors have emerged? Can you identify some of the "new" behaviors, not as obvious during the live meetings?	<ul style="list-style-type: none"> <li>Will give indirectly a more personal insight into the PL's perception of "inappropriate".</li> <li>Potential follow-up: Are these behaviors or habits repeated?</li> </ul>
<b>Core</b> What was your first thought when seeing such a behavior? What did you think about the student when seeing such a behavior? Was there a specific motivation or reason attached to such behavior? Was it necessary to take any measurements towards such behavior? Did it have any effect on the way you approached the student, tasks were assigned, feedback was given?	<ul style="list-style-type: none"> <li>Directly identify bias via this question.</li> <li>This question aims to further explore the bias, and to retrieve information that could be used to build a persona.</li> <li>This question might help identify which behaviors were the most triggering</li> </ul>
<b>Finisher</b> What would you consider to be the ideal behavior and setting for a virtual meeting?	<ul style="list-style-type: none"> <li>Summarizes the interview</li> <li>Finish on a positive note</li> </ul>

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After the first pilot interview, the results were analysed to identify strongest and weakest questions, and to restructure if necessary. We concluded that the biggest risk of the interview would be not reaching a satisfying level of model fit when identifying behaviours, but also reactions to such behaviours. Another result of the first test interview was to consider all sides of the attribution process, be this present or absent in a PL, and whether there are specific conditions leading to attribution. Discussions were made around the personality of the team members and how perceptions around their personality are generally formed. Identifying hindrance in a PLs ability to assess personality, and how fast perceptions are created in the remote setting could be potentially mapped to the proneness of forming attribution. Another aspect that could provide insights into the attribution process, is how trusting PLs are.

Table 4.3.: Finalized interview questions

Question group	Questions	Planned follow-up questions
Grand-tour	<ul style="list-style-type: none"><li>• How has the experience as a project leader in the remote setting been?</li><li>• Do you think it is more difficult to establish a relationship between PL and student?</li></ul>	<ul style="list-style-type: none"><li>• What do you think has been the most difficult thing to handle in the interaction with the team regarding typical PL activities?</li><li>• What did you concretely change in your interaction with the team?</li></ul>

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Core questions of inappropriate behaviour

- Do you think the team is more uncomfortable or comfortable in the virtual setting? How would you tell? How has the experience as a project leader in the remote setting been?
- Are students less active in meetings as well?
- Do you think the line between typical home activities and meetings have become more blurry? What are some of the things students do, they would not normally do in a normal meeting?
- What specific behaviours have you observed, that make you think a student is distracted keeping in mind the virtual setting?

Core questions to identify bias

- Do you think x behaviour meant something about the student in the long term?
- Were you ever mistaken about an attribution you made of a student?
- How do you draw conclusions about a student's personality? Do you even take personality into consideration?

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The finalized version of the interview guide focused primarily on identifying inappropriate behaviours and when possible, bias attached to these behaviours. Since it was

not evident at start whether biases even exist, it was important to construct an interview in which the PLs could be presented with different kinds of behavioural categories, inquire if such behaviours were inappropriate and explore the effect of the behaviour in the perception created onto the team members. These eventually constituted the core questions of the interview. Guiding questions and follow-up questions aimed at complementing the biases with more background, being this the effects of the remote setting in the team interaction, the relation of the PL with the team or the role personality of team members play in decision making. Such questions would also give the PLs the opportunity to express their own thoughts, impediments and worries, without intervening. Considering that semi-structured interviews can become lengthy, we strived to keep a set of questions corresponding to 30 - 60 minutes per interview, to respect the participants' time schedules and constraints. Table 4.3 shows the finalized version of the interview.

### 4.3. Generic Thematic Analysis Results

Coding qualitative research to find common themes and concepts is part of thematic analysis, which itself is part of qualitative data analysis. Thematic analysis extracts themes from text by analysing the word and sentence structure. There are several steps included in this process as described in [AS03] and presented in Research Methodology 1.4.2.

Although the focus of the thesis is the attribution error, interesting findings were identified on the experience of being a Project Leader (PL) in a pandemic, the casualty of remote meetings, and activeness of participants . Therefore, the next three subsections refer to the these themes. To provide a better overview of the coding process, tables representing the third step of the thematic coding process can be found in the Appendix for each of these themes. We will be referring to the codes from the interviews using the code names from Table 4.1.

#### 4.3.1. On the experience as a Project Leader

Communicating and working remotely can be experienced differently from different project leaders. During the thematic analysis of the first questions posed at the PLs, several themes and patterns could be identified.

The lack of the social aspect dominated the answers, mentioning various situations or communication opportunities that are non-existent in the virtual setting. Small talk, especially when not related to the project's topics, is missing and effecting the team dynamic. PLs mention that the time before and after the meeting, usually makes the team bond faster (I1). But even discussing project-related ideas is believed to be much

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more difficult without the on- and offboarding phase, as everyone becomes immediately unavailable (I3). Such small talk is perceived also as an innovation driver, and many opportunities to bring ideas forward are left unexplored (I9).

Lack of socialization not only grows the distance between team members, but it also grows the distance between team member – PLs (I9) and team member – project (I3)(I4), PLs say. Project leaders find themselves investing more time in bringing the team closer through weekly ice breakers, non-technical check-ins or social media presence (I6). Regarding the project, students cannot make the difference between the iPraktikum and a classic lecture anymore, considering the format now being the same (I3), and are less invested in giving their best and even prioritizing this course over the other courses of the semester (I2, I4). This results in PLs continuously reminding the students of the gravity of the iPraktikum, which was unnecessary to do in the pre-corona times (I1, I3).

Motivating the team was also one of the recurring topics in the interviews. Since it is now impossible to maintain eye contact with the team, is it difficult to get the usual signals of a person having received a message, or information even reaching everyone. Therefore, how much attention team members are investing cannot be assessed anymore, and announcements, feedback and even appraisal might get lost (I4, I7, I8, I9, I10).

Another perception PLs had is that body language is missing in the meetings, or is at least not as visible as in in-person meetings. Movements such as leaning in, leaning back, crossing arms etc., previously helped PLs in assessing situations. Students' reactions are more difficult to see now (I4), and it's equally difficult to learn more about their personality (I5). Seeing team members as a whole person, would previously also contribute to building trust (I5). In in-person meetings it is easier to see what other people are feeling or thinking (I7), and therefore, react much sooner to situations that might escalate (I3).

##### **4.3.2. On the casualty of remote meetings**

Virtually attending team meetings and simply not having to be in a designated place, in which everyone has agreed to meet, intensifies the occurrence of distracting events, as elaborated by PLs. Such occurrences may happen intentionally or unintentionally.

After the interviewees were asked general questions on their experience, the interviews proceeded with questions that would stimulate thoughts on inappropriate behaviour, while still maintaining an abstract level. Such questions aimed at offering the interviewees the possibility to express their impressions openly, without being biased by the interviewer. The questions serving this goal were:

- Do you think the team is more uncomfortable or comfortable in the virtual setting?

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- Do you think the line between typical home activities and meetings have become more blurry?

Multiple themes emerged when answering these questions and 8 out of 10 project leaders perceived that being in a less professional environment, like a home, does have an impact.

One of the themes mentioned is the mindset. Although in a meeting, it seems to be easier to think about non-work domestic activities, such as chores that need to be completed (I5, I9), or environmental stressors (I2). Being at home, can also put a person in a more relaxed mindset, making it difficult to switch from less demanding tasks to high focus and high productivity activities such as team meetings (I2, I4). This prevents the participants to fully be in the topic, I2 says. Being at home makes switching to a more relaxed atmosphere easier, which can have benefits for students, as well as PLs (I3). Consequently, the flexibility of almost immediately logging off is perceived to increase the distance and detachment to the project and team members too (I2, I4, I5). A discussion or meeting can even be left abruptly, especially when conflict occurs, just as easily according to I8.

It was mentioned that issues emerging from attending the meeting remotely are minimized in the cases in which the participants had a separate room or a designated office-like space (I4).

Another discomfort of remote meetings are latency issues due to the internet. It causes people to talk over each other (I6, I9) and cause distress for the participants, including the project leaders that stated such an opinion.

The remote setting makes it possible to attend a meeting, anywhere in the world, and there have been occasions in which the meetings were joined on the train (I2, I8, I10), and in an extreme occasion while riding the bike, which points out to a tendency for treating such meeting more effortlessly. Being mobile, is usually accompanied with internet connection problems, difficulties understanding the other person due to the face mask (I10), and lack of participation in the said meeting (I2), according to the interviewees.

##### **4.3.3. On being active in remote meetings**

All participants of the interviews perceived that the remote setting postpones the moment of the ideal dynamic in the meetings. The first meetings are usually accompanied by slower sprint plannings (I6, I8), and participation of only few people in the discussions. PLs mention (I3, I7), that it is often necessary to directly ask questions at less active team members, to make sure their opinion is also taken into consideration. Also, more information gets lost (I8), and PLs claimed to be unsure if they were actually being

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heard or whether the others are actively listening (I3, I4, I9). Especially at the beginning, whole teams might seem to be sleepy, which then requires the PL to intervene and "wake" the team up (I3).

As the weeks pass by, these perceptions evolve. According to some PLs, the teams become more comfortable with each other and therefore, more comfortable to be active in the meetings (I3, I4, I8).

One pattern observed in a few interviews (I5, I7, I9) is the one of a dominant, or over-active team members. Such individuals take over most of the discussions, and are usually the first ones to state an opinion. Usually, such individuals may be naturally talkative and dominant (I7), or are already used to communicating remotely, potentially due to online collaborative video games, as one PL assumes (I1).

Having such active team members, might overshadow the rest of the team members (I7). The ones that are less comfortable might turn off their camera or mute themselves (I7), making use or even abusing the virtual format of the meeting to be less participative (I1). In such a team dynamic, the more introverted people remain introverted (I2), by not stepping outside of their comfort zones (I2, I10). Therefore, online communication is perceived to not really develop communication skills by PL I2.

Project leaders also mentioned ways of dealing with such situations. In case the whole team seems distanced or distracted it might be beneficial to address that directly in the meeting, and motivating the team into efficient sprint planning (I3). When it comes to the hyperactive type, a project leader might interrupt them by talking over them (I6) and therefore dominate the situation themselves. Another way to deal with extreme dynamics in a team, is to pair shyer people with more active ones, with the purpose of the shyer person to learn from the confidence of the more active person (I7).

Normally, another way to address participation issues would be directly after the meeting, an occasion which is missing in the virtual setting. Here, the PLs distinguish by the urgency of the problem, and can decide to reach out to the student directly after the meeting (I6), or talk about the issues in the 1 on 1 feedback sessions (I6, I7, I10). On the other hand, participation can be triggered in other, more entertaining ways such as organizing frequent ice breakers (I2, I3, I10) or checking in at the start of each meeting (I6). Also, in-person gatherings have been mentioned to have improved the atmosphere in the team and also participation in sprint planning noticeably.

#### **4.4. Behaviour-based Thematic Analysis Results**

Although the core questions were intentionally designed to identify inappropriate behaviours, 5 out of 10 participants would already mention concerns or dissatisfaction from various situations in the first questions of the interviews. These would then serve

as a good basis for the following core questions. Another noticeable point, is that some of the PLs were more comfortable with sharing their experience, and would talk openly about their dislikings, as for other PLs the familiarity would come later, if they had any experience to share.

After conducting the test interview, it was decided that the interview would need more guidance in the section in which the PL would talk about their perception of inappropriate behaviour. Therefore, a framework was introduced that would guide not only the analysis phase of the interviews, but also present interviewees with eventualities they maybe hadn't noticed before.

Upon transcribing the interviews, reading through their transcriptions, the coding and clustering phase followed, which motivated the identification of behavioural patterns throughout the interviews. Naturally, certain behaviours would be mentioned by a larger number of PLs, whereas others by one or two. Similarly, the gravity of the opinions shared would vary, as some interviewees would have stronger opinions, and others rely on phrases such as "could be", "for the others", to lessen the weight of their statements.

Since the number of the mentioned behaviours are numerous, we are using the same categorization in the interviews questions to introduce more structured. Examples were given though, mostly when the interviewee would ask for illustrations of the categories. If a certain behaviour hasn't been addressed by certain PLs, it is so because they weren't faced with such a situation, or had a neutral opinion.

#### 4.4.1. Zoom presence

Being muted in remote meetings and therefore, not participating as actively, is perceived differently from different PLs. The person exhibiting this behaviour can be considered as shy or introverted (I2), they might not be as experienced as others (I7), and therefore feel reluctant to share an opinion that might be wrong. It can also be a sign that the course is perceived as the typical lecture with a mandatory presence, in which the student "just" needs to listen in (I4). Not hearing too long from a person, it might also give the impression that they are doing something else instead (I9).

Not participating verbally can sometimes be accompanied by not participating visually either. Over Zoom, one has the opportunity to turn off the camera. Although having the camera turned off at all times wasn't mentioned to have happened that often, as the groups in the iPraktikum are smaller than a regular lecture, constantly switching the camera on and off, as a person is e.g. moving, or switching it off at a certain point of the meeting, still happened. Such a behaviour is considered to be confusing (I2), annoying (I2) and even disrespectful towards the others in the group (I9). In one interview it was referred to as an anti-pattern (I7), and another interviewee

concluded that such a behaviour happens when the participant wants to hide what is actually occurring, and affects the way they view this person in a meeting (I3).

Remote meetings give space to an increased level of mobility, which has been noticed from quite a few PLs. Although most of the participants seem to have separate rooms, or a stable area from which the meetings can be followed, there have been a few instances of joining meetings from outdoor locations, especially commuting from one place to another. Such occasions were often accompanied by a lack of participation and a distracted participant (I2, I4). Such behaviour can be considered unprofessional (I6), and shows that the team member isn't interested in getting the most out the iPraktikum (I4). In a team, it was obvious that this person was more involved in getting their side-tasks done, wherever they were, as opposed to being focused on the meeting (I2).

Participants can also be quite relaxed in the remote setting; sometimes too relaxed. Participants might appear to be sleepy (I3), which hurts the atmosphere in the meetings. They might also be slouching, expressing their boredom verbally and signalling a lack of attentiveness (I7). This is inappropriate, and they don't care about getting out of the comfort zone of their homes, according to I9. Being too comfortable also manifests itself through engaging in physical activity which is considered to be rude (I7) and unprofessional (I3, I7). A similar impression was given when a participant joined an important meeting from the comfort of their bed (I2).

Considering the backgrounds of the participants, it usually helps with learning more about the other person's life or hobbies (I5, I6, I9), but when disorganized, it might send the signal of being disorganized at work too (I5). This is especially impolite in formal meetings, as it is quite disrespectful towards the participants (I7).

Making your upper half-body visible is of importance as well, and if someone is showing only a small portion of themselves, it might say that they are doing something else instead which requires their attention (I9). Also the participants should at least look in the direction of the camera (I3).

#### 4.4.2. Communication

Sometimes PLs are faced with situations in which participants rely on empty phrases to engage in the meetings, without actually contributing to the conversations or project. This might give the impression that this person is being too optimistic (I3), lazy (I3), uninterested in the project (I4). It makes it harder to assess this person's personality (I1). As they might be struggling with their performance, it might also not be in their culture to ask for support (I5).

Generally the communication to the customers has become a bit more relaxed, but once (I1) directly contacting them was considered to be inappropriate.

Although interrupting others is not uncommon in normal meetings, it is more

obvious and problematic in remote meetings. In remote meetings, only one person can be heard at a certain time, which makes it easy to talk over the other person (I2). It is considered to be unprofessional and rude (I7) and it gives the impression they want to dominate the situation and make themselves the center of attention (I9). For one of PLs (I5), it was especially irritating when a participant "would not stop talking".

#### 4.4.3. Distractions

Reasons for such a behaviour are numerous, but sometimes, "intruders" of remote meetings are visible in front of the camera too. A few PLs have noticed participants engaging in conversations with other people in their rooms. Such a behaviour is considered to be inappropriate (I3), unacceptable (I5), disrespectful (I7) and unprofessional (I9). It can be associated with not being interested in the meeting (I3) and it has a negative impact on the other participants as they might become distracted from such an interaction too (I7), and feel not being taken seriously (I9). One thing everyone could do, is to make an effort to minimize distractions, by letting other people know they shouldn't be interrupted (I5, I7).

Distractions can also be right on the participants' screens. PLs notice when students are doing something else on their computers, and consider it to be inappropriate (I3), and rude (I4). It might also signal that the team member isn't eager to bring the project forward (I4).

Phones or smartwatches are also big distractions, and it happens more often now that team members use their phone while being in meetings (I3, I5). This would not normally happen, according to I5. It gives the impression that the student isn't interested in the project, or in what the others are saying (I4). In a way, they choose to not pay attention (I4). Such a behaviour can be justified if the reason for such an interaction is of an urgent matter (I2).

#### 4.4.4. Technology

Sometimes using new technology is associated with acquiring new skills and an opportunity to see more of a person, solely by the way they interact with it.

Not knowing how to connect to zoom or screenshare, is no excuse for a computer scientist (I2). On the other hand, viewing 20 open tabs on a persons browser leaves the impression that they probably opened the meeting a bit before the scheduled time (I3, I4) and are more interested in something else (I3). Sometimes people come unprepared, showing that the iPraktikum is not a priority to them (I4)

Problematic and rude is also when a person disagrees to use a certain technology, as it puts everyone in a difficult position and hinders the progress, according to I3.

Less qualitative hardware might come in the way of meetings, and microphones seem to be a problem in a few teams. Having noisy microphones makes the other difficult to understand (I4, I5), and causes an unnecessary raise of voice in the meetings.

#### 4.4.5. Repeated behaviours

Being late at meetings can occur in the virtual scenario too, but they seem to be less tolerable as there is no need to commute from one place to the other. It remains annoying (I2), rude (I3), and gives the impression that this person isn't aware of the scope of the iPraktikum (I1). Leaving early also isn't a good signal, as it shows that the person doesn't want to be there (I4).

Leaving unannounced is also something that remains unacceptable, and one of the very extreme cases of inappropriate behaviour, whether in virtual or in-person meetings (I3, I8). Being unprepared in meetings is inappropriate in any kinds of meetings, and often affects the way the others view you (I4). But, considering the comfortability of home and how there is more time available to prepare adequately, increases the criticism. According to I5, not adhering to deadlines is much less acceptable now.

It also got mentioned in three interviews (I5, I8, I10) that the tutor evaluations play a role in how Project Leaders perceive a student. This is an unchanged procedure from the on-site iPraktikum.

### 4.5. Conclusions

After having looked at behaviours deemed unacceptable or inappropriate by the PLs of the iPraktikum21, it would be interesting to see whether certain groups have attained a bigger mentioning rate and which behaviours were more prone to the attribution bias than other behaviours.

Participation-avoiding behaviours would be the group of behaviours that would concern PLs the most. Joining from other places, camera and volume off, empty phrases would give the impression that the participants aren't really in the meetings - but rather pretend to be there. It is associated with disinterest and disrespect, among other things.

Too-comfortable-at-home is also a pattern identified in the answers given, and, although a lot of activities such as drinking and eating were generally acceptable, others had more extreme responses such as attending from beds, slouching, engaging in physical activities or communicating with flatmates.

Meeting stoppers are also events which are not appreciated by the participants of the meeting, whether it's bad audio, difficulty connecting devices, internet connection

disconnecting etc. These usually stop the flow of the meeting and often require spontaneous solutions.

Ego-centric behaviours such as speaking louder and often, interrupting others, contacting the customers directly, leaving the meeting unannounced are another obvious group identified in the group of behaviours. Although with less occurrences, these behaviours seem to have had a negative and lasting impact on the PLs.

From the thematic analysis of the interviews there is early evidence of the existence of the attribution error, although it was difficult to provide adequate coverage through interviews, as different people would have different opinions on different behaviours. What could be directly identified in regards to the attribution bias are the answers to the question: "Have you ever been wrong about a person's personality?". Four out of ten interviewee admitted to attributing personality traits wrongfully.

Clustering responses together doesn't paint the whole picture. In interviews, the interviewer also needs to remain neutral in the conversations, and can't check cross-check all the mentioned biases with all interviewees. Some of the behaviours were also experienced by others and by others not, so reaching a common set of biases and behaviours was difficult.

A judgemental opinion towards the team members would be expressed in forms of being "rude", "disrespectful", "unprofessional", "lacking interest", to mention some of the most common expressions. These expressions lack situational attribution and refer to a person's attitude and personality, and served as a cue for the existence of dispositional attribution. Bias was present, especially in behaviours that were considered inappropriate before. But new ones also emerged, that were considered extremely inappropriate, even though only a few PLs had experienced them.

After analysing the data, we considered it necessary to cross-check the most common behaviours against most common biases per behaviour. Through hypothetical situations, inspired by real instances, biases can be addressed more directly. Furthermore, the interviews shed light onto the experiences of PLs, and didn't include hypothetical situations, as it was important to gain a spectrum of behaviours first.

## 4.6. Limitations and Validity of the Findings

During a face-to-face interview, there is an opportunity to observe social and non-verbal cues of the interviewee. These cues may come in the form of voice, body language, gestures and intonation, and can supplement the interviewee's verbal response and can give clues to the interviewer about the process of the interview. Similarly to the team meetings discussed in the interviews, the virtual nature of most interviews also made it difficult to properly read body language or other non-verbal cues. Nonetheless, the

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interviewees were comfortable, confident and eloquent in their responses.

Additionally, although the goal of such interviews is to explore motives and patterns, the possibility to explore each one in detail was low, due to time and scoping issues. A compilation of interesting sub-topics is included in Future Work.

Another impediment faced during the interviews was not receiving any problematic behaviors as answers. This case would result in meaningless answers to follow-up questions regarding the attribution process. In such situations, it is necessary to address the questions not linked to a specific behavior, in order to increase the chances of identifying bias. Luckily, only 3 out of the 10 interviews were particularly lower in inappropriate behaviors, therefore, not risking the purpose of the thesis.

Regarding the validation of the process and the data, we relied on the validity categories described in [Run+12].

The purpose of this phase of the thesis was to gain knowledge regarding situations and behaviours which are not only inappropriate, but moreover, trigger the phenomenon of attribution bias into a person. After the analysis of the data, we were able to identify a catalogue of 19 behaviours, and attribution biases attached to most of them. Furthermore, the interviewee statements required no further interpretation, that would threat the construct validity.

A factor that influences the attribution process is the initial impression created on a team member. From the interviews with the PLs, four PLs admitted having difficulties reading the personalities. This information implies, that the initial impression factor is more minimal in comparison to what it would be in a face-to-face setting.

Three PLs did mention one factor influencing how they initially perceive the participants of the team. These are the tutor assessments given to PLs at the beginning of the project. These did not play a role in identifying inappropriate behaviours in remote meetings, but they could play a role in forming biases, which then have an effect on how much attention a PL lays on the behaviours of a certain team member. This third factor could be one to be considered in future works in the topic.

Although considering a case study, the observations and theories from this phase could apply to similar, university-based projects, considering the age of the participants and the social-economical status. A special case of this case study is that it takes place during the pandemic of COVID-19, which introduced multiple changes in the lifestyle of the student population in Germany, regardless whether they were at TUM, or not.

Considering that the interview introduced a framework, which could be used for coding as well, we assume that the process of coding is valid and reproducible in a similar manner. Regarding clarity, the refinements made onto the second iteration of interview questions aimed at increasing the focus of the interview and addressing situations more directly, which we hope to have increased the reliability of the interviewing process.

## 5. Survey

The process of developing hypotheses is an iterative one and, although the first phase of this research resulted in a set of patterns and categories of attribution themes, it is necessary to continue the exploration by validating the findings. Validation in such case, does not relate to the identification of behaviours that cause a dispositional attribution, nor directly to the content of the attribution, but rather to the frequency of certain attributions. Behaviours and biases were collected individually in each interview, and the open-ended questions provided a rich and broad knowledge base, which needed to be further systematized.

Therefore, a survey in the form of a self-administered questionnaire would be an appropriate method to validate the assumptions from the previous phase. If the possibility arises, even gain more insights. These two generic principles accompany the design process of the questionnaire, which will be described in the next section. The second part of this chapter will be dedicated to the analysis of the questionnaire results, namely in Analysis 5.2. This chapter concludes with the Limitations 5.3 that characterize the survey.

Throughout the sections of this chapter the terms *response*, *statement* and *attribution* are often used interchangeably but refer to different things in different contexts. *Response* relates to the answers of the survey, whether predefined or not. *Statement* relates to the formulation of the responses in the closed questions and represents compilations of statements from the interviews. These statements embody *attributions*, which are the core topic under study.

### 5.1. Questionnaire Design Process

The design of the questionnaire required several steps, starting from setting the objectives, formulating the questions, selecting the right format and distribution to mention a few. These processes unfolded iteratively until the survey reached its final form. This section is divided based on the steps described in [Sch04] and [Fin03], in order to explain the realization details in a more orderly manner.

### 5.1.1. Objectives

In the previous phase, the one of *Interviews*, we received compelling information regarding the most prominent inappropriate behaviours and their accompanying *dispositional* attributions. Now, we seek to quantify these attributions, and conclude on the most common attributions in general, but also in regards to a specific behaviour.

More specifically, there is one minor and two major objectives that are tackled through the survey. Initially, we aim at gathering insights regarding the intensity of the attributions. Through descriptive statistics, attributions can be analyzed to reach conclusions such as their commonality or frequency.

A follow-up outcome from descriptive statistics is the identification of the behaviours that are more likely to cause a perceiver to make a dispositional attribution. This information will provide more information on the behaviours that concern or irritate the perceivers.

Another important part of the research is to observe whether a correlation between the attribution tendency or levels and leadership traits exists. The latter is important not only to investigate the causes of the attribution error, but also to give meaning to the way project leaders react to certain behaviours. Considering the feedback from the interview design described in 4.2 and prior research conducted in the topic of leadership, it was observed that the attribute of *trust* received considerable attention. *Trust* is one of the hallmarks of the personality trait of *agreeableness* [KL87] and *agreeableness* has emerged as the strongest and most consistent predictor of transformational leadership behaviour [JB00].

### 5.1.2. Planning and Development

When designing a survey, two are the most important aspects that require specific focus: the *questions* and the *responses*.

Questions in a survey can be closed or open. Since we want to conduct statistical analysis and interpretation of certain biases, the questions require to be closed questions. In closed questions, the answers need to be acquired by the designer. In our case, this process is facilitated by the outcome of the interviews.

During the design, there were also edge cases that needed to be addressed in order to minimize the researcher's bias. Such cases include interview answers that could not be part of the questionnaire responses, due to the length of each question. Additionally, not every interviewee was faced with every behaviour, and was not able to provide attributions towards each one of them. Moreover, the respondents of the survey might form a situational attribution, which does not correspond with any of the responses, but still represents valuable information. Considering these points, we found it necessary

to provide an open question after each closed question.

The selection of the appropriate questions was also an important step, which drew inspiration from the patterns identified in the interviews. There were a few criteria to be considered:

- The questionnaire needed to have a limited number of questions, otherwise it would become too long and uninteresting to the recipient
- The behaviours that were considered grey areas were the most interesting to study
- Completely new, "virtual" behaviours had priority
- Behaviours with a larger number of biases, which corresponds to the most mentions by the PLs, also had priority
- The behaviours with very few mentions could be excluded

Regarding the responses, different options were taken into consideration. First, an alternative-based questionnaire was considered, in which the responder could choose the statement that would best fit their perception. Furthermore, we would equip each question with the possibility to select *other* as an option, and a text field in which more information could be added. Ultimately, it was reasoned that this type of answer would limit the identification of other biases mentioned in the alternatives of the questions. Additionally, the number of participants would remain the same as before, namely ten, and the usage of categorical response choices could result in insufficient data. Comparatively, ordinal responses would produce insights on all the options rather than selecting the most "fitting" alternative out of a few.

The typical ordinal data collection method is using scales to rate the given statements. In this thesis, we opted for the Likert scale. Since the development of the Likert scale, named after the inventor, Rensis Likert, many researchers have developed instruments to measure particular attributes or traits of individuals or groups [AS07]. The instruments usually require respondents to give their level of agreement or disagreement, which can range from 1 to 5, to the statements relating to the attribute being measured. Such a design fits the requirements of this study, and the responses of the questions were evaluated on a five point Likert scale in an order of 1 for Strongly Agree and 5 for Strongly Disagree.

The process of writing the responses required several iterations and made direct use of the answers PLs gave in the interviews. Some of the answers would be similar, or within an answer, one or more attributions would be identified, which required a careful examination of the answers. The response statements must be easily distinctive,

therefore a mix of both combinations and separations of answers resulted in the end-statements.

Other aspects that were considered during the design of survey questions include:

- Formulating phrases in such a way that the dispositional attribution was clear to identify
- Provide answers that are not too difficult even for a willing respondent to answer
- The statements should not be repeating themselves or sound too similar

The survey was decided to be completed using a digital form, therefore, a web-based platform was investigated. Different platforms for the conduct of the survey were considered, from which, Microsoft Forms was selected, due to its flexibility in the design and the unlimited set of questions offered to TUM students. Most importantly, on this platform the questionnaire could be filled anonymously, which was one of the core requirements of the survey. Anonymity would enable the respondents to freely choose the answer, without fear of being judged and without any external influence.

### 5.1.3. Pretest and final questionnaire

Before the distribution of the online questionnaire to the participants, undergoing a reviewing phase by an external entity was considered crucial to the identification of weak points. The questionnaire was tested with one of the PLs, who also provided unbiased feedback.

Specific feedback on the questions related to the usage of words that are misspelled or can be difficult to understand by the majority of participants. The feedback also pointed out at questions that could be ambiguous to the respondent. These points were taken into consideration for the final version of the questionnaire.

More general feedback related to the nature of the response statements. One of the suggestions stated the introduction of a "logical excuse option" in the questions, in order to "push out the biases even more". The "logical excuse option" refers to the situational attribution over a behaviour. After thorough consideration, it was concluded that such a change would not add more value to the questionnaire, as the participants would already have two options to their disposal, for the case the dispositional attribution is absent. One instance is the choice the participant to disagree with the statements or answer with "Neutral". Another way is answering the open question provided after each closed questions, which was designed to serve exactly the purpose of accommodating further attributions. Additionally, the introduction of the situational attribution would require further investigations in the previous phase, namely the interviews, as the focus of the questions should have included the situational attribution explicitly for

every dispositional attribution. Another risk of introducing such a statement would be influencing the participants towards not admitting to dispositional attribution. This could interfere with the goal of the survey, especially considering that three of the participants showed little to no dispositional attribution tendencies during the interviewing process.

In the final version of the questionnaire, there is no specific order of the questions regarding the attribution error. The questionnaire starts with the block of closed questions, each equipped with Likert-scale responses. After each closed question, an open one follows. The last question, refers to the identification of *agreeableness* and *trust* levels in the participants, and was ranked as last, to minimize the bias these questions would have on the previous questions. In the creation of these statements, personality tests regarding the Big Five or OCEAN<sup>1</sup> traits were considered, more specifically the ones on agreeableness and trust<sup>2</sup>.

Additionally, the closed question were set as required, so that every participant would input the data. The open ones were considered optional.

After approval of the final set of questions, the questionnaire was distributed electronically through messaging applications such as RocketChat and Slack, which were used to contact the participants in the first phase of this study as well.

The finalized version of the survey can be found in Table A.5.

## 5.2. Analysis

The analysis methods selected were highly dependent on the type of data and the context we were working with. In our case study, we did not aim at making assumptions for the whole population, therefore, we were dealing with non-parametric data. Additionally, the type of responses from the survey closed questions qualify as *ordinal data*, considering the ranking that is made between "Strongly Disagree" (marked by the value of 1) and "Strongly Agree" (marked by the value of 5). As a general rule, mean and standard deviation are invalid parameters for descriptive statistics whenever data are on ordinal scales, as are any parametric analyses based on the normal distribution [AS07]. Non-parametric procedures (based on the rank, median or range) are appropriate for analyzing these data, as are distribution free methods such as tabulations, frequencies, contingency tables and chi-squared statistics [SAJ13].

There are though exceptions which tolerate the use of mean for statistical description. Such a case is when researchers are attempting to measure less concrete concepts, such as motivation, satisfaction, and confidence, where a single survey item is unlikely to be

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<sup>1</sup><https://www.truity.com/book/big-five-personality-model>

<sup>2</sup><https://www.truity.com/test/how-agreeable-are-you>

capable of fully capturing the concept being assessed [RMA12]. Another prerequisite of using the mean to describe the central tendency, is that the items of the survey must measure the same underlying variable [SAJ13]. In our case, this variable is the tendency each respondent has to form a specific attribution. Furthermore, we assume that the psychological difference between "Strongly Agree" and "Agree" is the same as "Agree" and "Neutral".

After an initial analysis of median, mean and range, it was identified that the mean provided more context to the data, and a more accurate dissection of the levels of attribution. Consequently, we made use of the mean to derive a first interpretation of the data. The following formula (5.1) describes the initial point of interpretation, where  $\bar{x}$  symbolizes the mean of the data set related to a questionnaire response:

$$\text{Interpretation} = \begin{cases} \text{Very strong attribution,} & \text{if } 4.5 \leq \bar{x} \leq 5.0 \\ \text{Strong attribution,} & \text{if } 3.5 \leq \bar{x} < 4.5 \\ \text{Mild attribution,} & \text{if } 3.0 \leq \bar{x} < 3.5 \\ \text{Not an indicator of strong attribution,} & \text{otherwise} \end{cases} \quad (5.1)$$

The scale we choose for the interpretation corresponds to the tendency for an attribution to be made. After this initial categorization, the medians, the ranges and often the frequencies aid with the analysis of the nuanced response data, especially the ones lying at the edges of the cases. There are often instances, in which attributions have been made, but the mean result does not accurately reflect the right intensity. Therefore, the final interpretation considers the above mentioned techniques of data description too. All relative frequencies of the questionnaire responses can be found in Table A.6.

Part of this study is also finding a correlation between agreeableness and dispositional attribution tendencies. In order to achieve this, before statistically analysing the data, the ratings given as responses were summed to derive an overall score, once for the *agreeableness* score and once for *attribution bias tendencies*. This resulted in the creation of *interval data*, which could then be analyzed through new methods, targeted at this kind of data. Such a method is Pearson's correlation coefficient.

### 5.2.1. Attribution tendencies

The following Table 5.1 displays the results of the analysis on attributions. The *Question* and *Attribution* columns present codes for the questionnaire closed questions and their respective responses/statements/attributions. The original questionnaire with the codes can be found in Table A.5. The next three columns represent the statistical

## 5. Survey

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methods we use to describe the data, namely the *Median*, *Mean* and *Range*. The last column represents the final interpretation of the data on one statement, following the methodology described in the introduction of this section. The interpretation often provide more explanations, in order to adequately describe the phenomenon of attribution in this survey.

Table 5.1.: Questionnaire responses' interpretation

<b>Question</b>	<b>Attribution</b>	<b>Median</b>	<b>Mean</b>	<b>Range</b>	<b>Interpretation</b>
Q1	<b>A1.1</b>	4	4.3	2	Strong to very strong attribution, considering only one neutral answer and multiple strongly agree
	A1.2	4	3.78	3	Strong attribution
	A1.3	4	4.1	3	Strong attribution
	A1.4	4	4	3	Strong attribution
Q2	A2.1	3	2.67	3	Not an indicator of a strong attribution
	A2.2	3	2.78	2	Not an indicator of a strong attribution
	<b>A2.3</b>	4	4.11	2	Strong attribution, no person disagrees
	A2.4	3	2.8	3	Not an indicator of a strong attribution
	A2.4	3	2.9	3	Not an indicator of a strong attribution
Q3	<b>A3.1</b>	5	4.6	1	Very strong attribution
	A3.2	4	3.8	1	Strong Attribution
	A3.3	3	3.1	2	Mild attribution
	A3.4	3	3.4	3	Mild to strong attribution, considering the large range and a higher frequency of total agreement responses
Q4	A4.1	3	3.2	2	Mild attribution
	<b>A4.2</b>	4	4.3	2	Strong attribution
	A4.3	4	3.9	2	Strong attribution
Q5	<b>A5.1</b>	4	3.9	3	Strong attribution
	A5.2	3	3	3	Mild to no attribution, considering Strongly Disagree

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	A5.3 A5.4	2 3	2.3 3	1 3	No attribution Mild attribution
Q6	<b>A6.1</b>	4	4	0	Strong Attribution
	A6.2	3	3.1	3	Mild attribution
	A6.3	3	3	3	Mild attribution
	A6.4	4	3.6	1	Strong attribution
Q7	<b>A7.1</b>	4	3.2	3	Mild attribution
	A7.2	3	2.8	3	Not an indicator of strong attribution
	A7.3	3	3.1	2	Mild attribution
Q8	A8.1	4	4	2	Strong attribution
	A8.2	5	4.6	1	Very strong attribution
	<b>A8.3</b>	5	4.7	1	Very strong attribution
Q9	A9.1	3	2.7	3	Not an indicator of strong attribution
	<b>A9.2</b>	3	2.9	4	Very weak indicator, taking in consideration the large range
Q10	A10.1	2	2.6	2	Not an indicator of strong attribution
	A10.2	3	2.6	3	Not an indicator of strong attribution
	<b>A10.3</b>	3	2.9	4	Very weak indicator, taking in consideration the large range
Q11	A11.1	3	3	2	Mild attribution
	<b>A11.2</b>	3	3.1	2	Mild attribution
	A11.3	3	2.9	2	Not an indicator of strong attribution
Q12	A12.1	4	3.6	3	Strong attribution
	<b>A12.2</b>	5	4.6	1	Very strong attribution
	A12.3	3	2.4	3	Not an indicator of strong attribution
Q13	A13.1	4	3.7	3	Strong attribution
	A13.2	3	3	2	Mild attribution
	<b>A13.3</b>	4	3.9	2	Strong attribution
Q14	A14.1	4	3.8	3	Strong attribution
	<b>A14.2</b>	4	4	3	Strong attribution

From the analysis of the questionnaire data, the results can be summarized as follows:

- 4 responses very strongly indicate dispositional attribution from the perceiver,
- one in-between very strong and strong,
- 15 statements with strong attribution,
- one statement of mild to strong attribution,
- 9 statements have been mildly or moderately indicate attribution,
- 3 statements weakly indicate attribution,
- 9 statements do not indicate a strong attribution,
- 1 statements not presenting any attribution as all.

The strongest attribution per question are marked in bold. The four statements with the highest tendency for attribution present no particular commonalities. They individually refer to a person being impolite, immature, disinterested and unapproachable. However, these attributions *can* be clustered together to form personas, as it will be seen in section 6.3.

### 5.2.2. Attribution-forming Behaviours

In this section we want to present the behaviours with the highest frequencies of "Agree" responses. More colloquially, we aim at answering the following question: *Which are the behaviours that are more likely to push people towards forming attributions?*

Figure 5.1 depicts the data for the "Agree" and "Strongly Agree" relative frequencies in each of the closed questions of the questionnaire. A third bar displays the total sum of the frequencies. The questions are also sorted by the final outcome, in order to improve the readability of the results.

The behaviours which received the highest attribution rate are Q8, Q14 and Q1. They relate to intense interaction with mobile phones, engaging in physical movements while being in the meeting and joining from their mobile phones, respectively. A common theme which characterizes these behaviours is *distraction*. The biggest distractions PLs mention are screens, whether in a monitor, smartphone, or smart watch. Situational attributions also get mentioned, such as the meeting being boring (presented in Q8) or generally irrelevant (according to a respondent in Q1).

A temporary, physical detachment from the proximity of their typical devices (as viewed in Q14 and Q4, but even Q1), drive the participants to strongly agree to the dispositional attributions presented to them. The respondents perceive the distance to not only be physical, but also mental.

The behaviours that rank the lowest are related to the appearance of the participants. When the face is not entirely visible as in Q10, respondents mention the change of natural light as a factor, or attribute the dark atmosphere to the "nerdness" of a person. In regards to backgrounds, considering that the participants of the iPraktikum are students, a certain level of disorderliness is generally tolerated. The open question responses make a difference between formal and informal meetings, and one response suggests to even appreciate this opportunity to learn more about the participants' personality. In regards to Q11, internet issues are also taken in consideration when forming attributions, but again, when the PLs sense a lack of focus, a tendency to form a dispositional attribution persists.

### 5.2.3. Analyzing the correlation between agreeableness and the tendency for attribution

The third RQ in this thesis aims at understanding more about the behaviours of the perceivers too, in our case the PLs. Considering the research methods undertaken in this study, we dedicated part of the survey to answer this question as well. The last question of the survey presents the respondents with statements concerning their personality and reactions towards the team members.

As described at the objectives of the survey, leadership studies have been leaning towards the cognitive approaches to information processing and decision making processes [Din+14]. These even form the branch of *information processing theories* within leadership theories. Another popular branch of leadership theories looks at individual differences in leaders and investigates specific traits or abilities that contribute to leadership effectiveness.

In the survey we look specifically at the subject of *Agreeableness* and *Trust*. The statements are built in such a way, that can be directly associated with agreeableness attributes of the responder. The answers to these statements can be found in Table 5.2.

Table 5.2.: Frequencies of disposition questions

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I trust other people almost immediately	0%	22.2%	44.4%	22.2%	11.1%
It's difficult for me to trust other people actually	22.2%	44.4 %	22.2%	11.1%	0%

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I usually get concerned about the well-being of this person and instruct the coach to look into that	0%	22.2%	33.3%	44.4%	0%
It is not my responsibility to make others feel better or look after everyone	0%	66.67%	22.2%	11.1%	0%
I am quite sharp-tongued when I get back at others	0%	66.67%	22.2%	11.1%	0%
I usually try not to contradict others	33.3%	33.3%	22.2%	11.1%	0%
I state my opinion several times since I know which is the right thing to do	11.1%	11.1%	44.4%	33.3%	0%

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As observed from the results, the respondents perceive themselves considerably trusting towards others. 66.6% of the respondents have no difficulty trusting other people, but only 33.3% agree to trusting others almost immediately, which is indeed a more exaggerated statement. The third and the fourth statement responses also point towards a disposition to provide a comfortable environment for the participants. 66.67% see a responsibility to improve this environment, but less people get concerned about the well-being of the team (44.4%). The last three statements describe the leader's need to dominate within the team. Interestingly, 66.6% of the participants have no problem contradicting others.

To calculate the correlation between the tendency to form attributions and the disposition of agreeableness, every participant's answers were summed to achieve one total score for each of these variables. These scores served as the input for the calculation of *Pearson's correlation coefficient*, which takes the values from -1 to 1.

In order to generate as many insights as possible and to look closer into the topic of *trust*, multiple calculations were performed. Initially, all questions and statements were subject to this computation. In the next rounds, the questions with the highest frequency of agree answers were under study, starting from the thresholds of 50% and continuing to 75%. Another interesting set of attributions were the ones which received 50% or more "Agree"-s, regardless of the questions they were part of. The last row of the table, represent this group of data.

The statistics we derive are shown in third and fourth columns of the table.  $r(7)$  denotes the result of *Pearson's r* or *Pearson's correlation coefficient*, with 7 being the degrees of freedom (calculated as  $N - 2$ ). The presentation form of the coefficient

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follows the APA Style Guidelines <sup>1</sup>. The last column gives an interpretation of the resulted coefficient. Meanwhile, the second column indicates the agree frequency of the question with the lowest value in the group. This value is missing for the last row, as no specific questions are being considered.

Table 5.3.: Pearson's coefficient results

Subjects under consideration	Lowest frequency	r(7)	r(7) only trust	- Meaning
All Questions and Statements	22.22%	-.01	-.11	Although technically a negative correlation, the relationship between the variables is only weak
Q12, Q6, Q13, Q3, Q4, Q1, Q14, Q8	55.56%	-.20	-.23	Although technically a negative correlation, the relationship between the variables is only weak
Q1, Q14, Q8	77.78%	-.24	-.11	Although technically a negative correlation, the relationship between your variables is the weak
Statements with over 50% agree responses		-.27	-.25	Although technically a negative correlation, the relationship between the variables is only weak

As denoted in the fourth column of the table, the meaning of the coefficient is the same in all cases. Nonetheless, there are tendencies and variations to be further examined in each iteration.

Generally, there is a weak negative correlation between the attribution tendency and agreeableness or trust in a person. We observe that, as the set of statements is confined to the questions mostly attributed, the correlation slightly increases. The case in which the correlation is stronger, is the one between the statements with the higher agreement rate and agreeableness.

Trust alone appears to not yield more meaningful results than the total agreeableness score. Therefore, between agreeableness and trust, agreeableness would potentially be

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<sup>1</sup><https://www.socscistatistics.com/tutorials/correlation/default.aspx>

a more significant indicator for a low attribution-making tendency.

The more remarkable difference between agreeableness and trust is in the third case, in which only three questions are taken into consideration. This phenomenon happens due to the covariance being lower between attribution tendency and trust in this specific instance.

### 5.3. Limitations

Considering the relatively small number of respondents (9 out of 10 responses, 90% response rate), and the format of the survey, we were limited in the methods we could use for the analysis of data. Furthermore, the identification of correlation increases in reliability the more data is available, and therefore, the results can potentially vary with a larger data set.

The survey provides a high level of reliability due to being written in simple language and following the feedback given after the first test of the survey. Hence, we assume that the content of the survey is understood and interpreted similarly by the different participants of the survey.

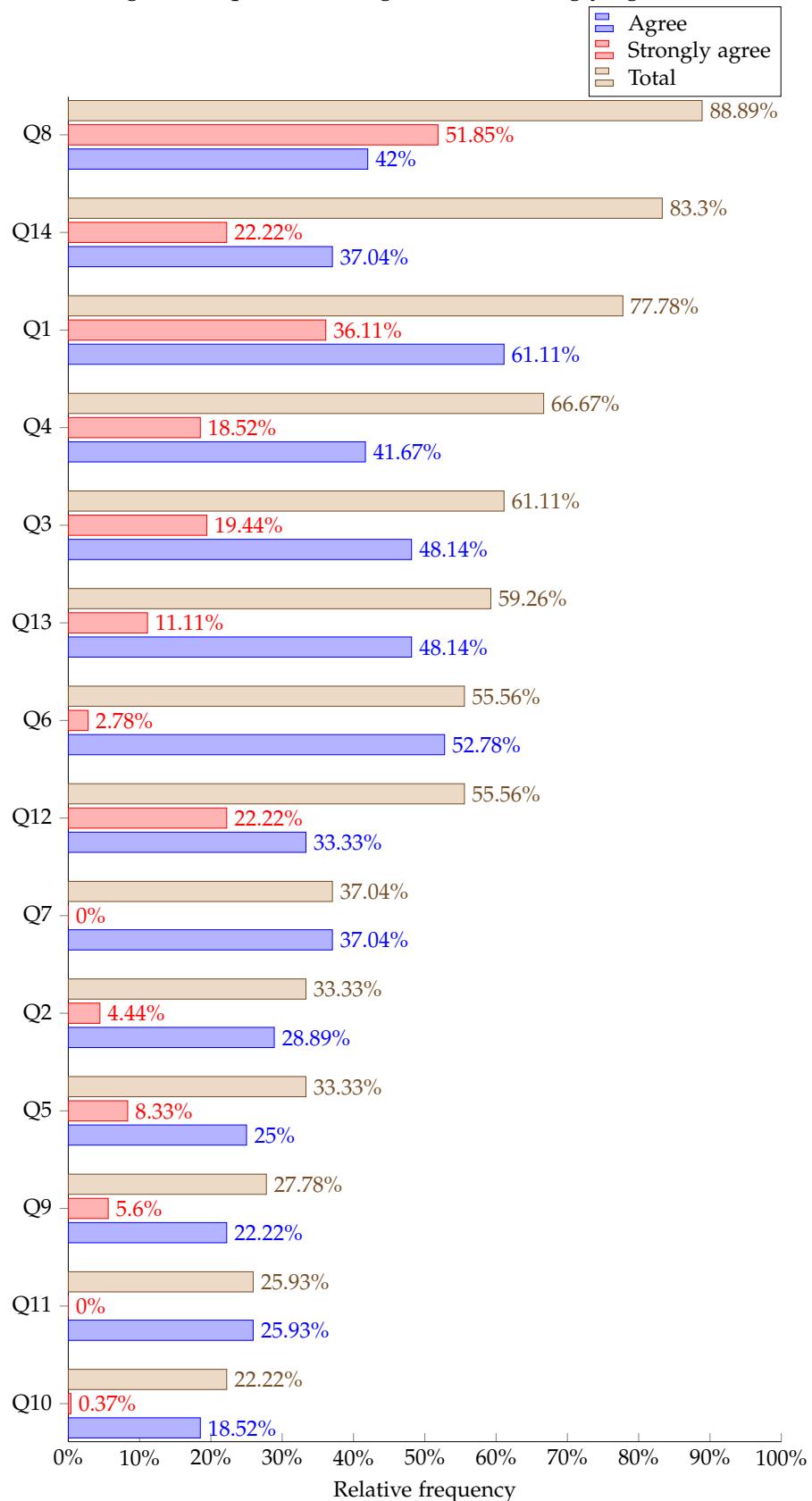
Recalling the small sample under study, external validity is a critical point. Moreover, this case study takes place in a university context, where the majority of the participants in the teams are students in their early adulthood.

The survey is the second part of this research and is built upon the data retrieved from the interviews. Therefore, we consider this phase to serve as a triangulation of the research conducted previously. In principle, it is almost the same data under study in both processes, although the objectives differ. From all the statements representing attributions, only one attribution received no "Agree"-s (out of 46). This serves in itself as an indicator of a high validity.

As the interviewees were asked to evaluate different behaviours in their meetings, four of the interviewees would often admit to exhibiting certain behaviours, and therefore tolerate the same behaviours in others. Considering the survey questions to be more specific and in some cases, more extreme, we assume that this category of respondents have contributed more significantly in the identification of attribution tendency.

Regarding the design of the survey, construct validity is established as the objectives of the survey are addressed. The two major objectives especially, are easily distinguishable in the survey form. Eventually, we were able to deliver an evaluation of the biases PLs form in regards to the disposition of the participants. Moreover, we were able to learn more about the PLs themselves, their agreeableness and ways of interacting.

Figure 5.1.: Histogram of questions' "Agree" and "Strongly agree" relative frequency



## 6. Attribution-based Personas

As explained in Introduction 1, a case study can help retrieve descriptive and explanatory insights regarding a phenomenon, alongside the more common, exploratory ones. After conducting interviews and a survey with the participants of this research, the gathered data presented the opportunity to indeed augment the investigated behaviours and biases with more explanations, justifications and reasonings. These would be directly obtained from the open questions of the interviews and the survey itself.

To better structure such information, we opted for the development of *personas*. Alan Cooper, who conceptualized them, explained that "personas are not real people, but they are based on the behaviors and motivations of real people we have observed and represent them throughout the design process" [CRC07]. The design process Cooper describes, relates to the early phases of the development of any product, be this software-based or a tangible product.

The process of persona development also overlaps with the one followed in our research. Its first phase is focused on research, and it emphasizes the retrieval of qualitative data. It usually includes observations and one-on-one interviews with the stakeholders. According to Cooper, one of the principal outcomes of observation and interviews is an emergent set of behavior patterns, which are identifiable behaviors that help categorize modes of use of a potential or existing product. These patterns furthermore suggest goals and motivations [CRC07].

Although we will not be using the concept of personas to represent users of a product or service, the notions and processes are beneficial to build a more complete and comprehensible portrayal of attribution biases. There will be no "mode of use", but rather modes of operation of people exhibiting certain behaviours, all from the perspective and perceptions of the project leaders.

The first section of this chapter will describe the motivation and process of identifying personas. In Defining a persona, we will elaborate more on what constitutes a persona. Lastly, the third section of this chapter will then present the personas that have been developed with their most identifiable characteristics.

## 6.1. Connecting Behaviours - Attributions - Personas

The process of constructing personas was directly related to answering RQ2: *Can similarities between perceptions be identified and structured in the form of personas?* and made use of the data set gathered from the interviews and the survey.

As described in Questionnaire Design Process, the responses of the questionnaire were derived from the attributions identified in the semi-structured interviews, therefore, the process of linking attributions to behaviours was initially undertaken during the creation of the survey questionnaire itself. To recapitalize, the answers of the interview questions were analysed to derive the most dominant attributions PLs would make on certain behaviours.

Considering personas to be compilations of attributions, the set of responses served as a basis with which initial clusters could be built. The process of clustering attributions followed the logic of thematic analysis, in which a combination of semantic and syntactic analysis methods was employed. Subject of the thematic analysis were initially the questionnaire closed question responses. These would iteratively be completed by the open questions' answers.

In the first round of clustering, which relied primarily on syntactical analysis, a set of 10 clusters was identified. The words that would be repeated the most often were *unprofessional, rude, uninterested, disrespectful, unmotivated* and *distracted*. These were present not only in the survey responses, but in the interviews as well.

Having identified these clusters, the iterations to come focused on identifying sub-patterns and attempting to merge the clusters furthermore. Emphasis was laid on the intention of the statements, perception over personality of the potential persona and various similarities, which would change from persona to persona.

The final round of persona creation based on the survey responses can be found in Appendix. At the end, we settled for a set of 5 major personas (*The Unprofessional, Ego is the enemy, L'Étranger, The Loner, Ther Unterperformer*), with their own subpatterns, and 2 minor personas (*Hiding and not Seeking, Distraction Monster*). What and how we decided to present the information regarding a persona, will be explained in the following section.

## 6.2. Defining a persona

The personas are designed to have (at least) one main distinctive trait, which ought to be represented in the name of each persona as well. Each persona needs to be equipped with a description, elaborating these distinctive features, and setting up the expectations for this persona in terms of attributions and behaviours. In typical persona

representation, the personas are accompanied by an image.

The more important content of a persona, would include a list of attributions that are associated with this persona and the behaviours triggering such an attribution. The list of attributions on a persona display the exact goal of this phase of the thesis. Not only did we intent to identify patterns within perceptions, that would consequently define personas, but we also wanted to provide each persona with a set of perceptions that would point to this same pattern.

As a behaviour can be perceived differently from different PLs and be associated with multiple attributions, the same can be observed for attributions as well. The similar attributions can be made for different behaviours, and this has been noticed especially within the same person/interview. Therefore, as a characteristic of a persona, we want to provide behaviours which entice the attribution as well. As described in the introduction of this chapter, by adding behaviours we want to present the way these personas interact with the remote setting and remote team.

Considering that the data originates from interviews *and* surveys, open *and* closed questions, we have divided the information regarding attributions and behaviours in two categories, to increase readability and transparency regarding the retrieval of the data. More about the constructing technicality of these two aspects, can be found in the next chapter.

### 6.3. Personas

In this section we will be presenting the personas we were able to develop. The data regarding a persona will be presented in a tabular form, as this is the typical representation of a persona. Each persona has a title, to identify personas but also to already indicate about their distinct characteristics. A description will follow, which is derived from the understanding PLs have of the main attributions. To add a more human touch to the personas, they are also enhanced with a representative image. Next, a list of attributions will follow which we believe to be associated with the description and title of the persona.

Considering that the data has been collected either via closed questions (CQ) or open questions (OQ), we make this distinction in the presentation of attributions and behaviours too. Each CQ attribution is followed by the question of the survey, which includes the attribution as a response statement, and the frequency with which the respondents have answered with Agree or Strongly Agree. The OQ attributions can be followed by the question code too, indicating that this is an attribution made in regards to the question and the behaviour associated with that question. If the OQ attribution is followed by the interview code, that is an indicator that the statement has

been retrieved from a specific interview.

Behaviours are divided similarly, where the code is stated at the beginning of each entry in the CQ column. The CQ Behaviours are followed by the agreement percentage of the statement that relates to that persona. This percentage can be read the following way: If Q3 has 87,5% in persona X, it means that 87,5% of respondents (at least) agree that the behaviour exhibited in Q3 relates to persona X. The CQ Behaviours column is in descending order.

The last section of the table presents suggestions made by PLs on how to deal with some of the personas, based on the attributions and typical behaviours. These are retrieved primarily from the semi-structured interviews.

### 6.3.1. The Unprofessional

The term "unprofessional" was associated with 5 of the survey responses and it was mentioned 3 times in the open questions of the survey. This group of attribution is one of the biggest we have identified, and an important one. What was considered unprofessional, was behaviour that didn't conform to the expectations of a specific situation or the participants of a meeting. Generally, unprofessionalism was considered unintentional and was linked to immaturity, considering the later one also unintentional.

Table 6.1.: The Unprofessional Persona

<b>Title</b>	The Unprofessional	
<b>Description</b>	Attribution based on behaviour that does not conform to the one expected by the team. Usually considered unintentional.	
<b>Image</b>		
<b>Closed Questions</b>	<b>Open Questions</b>	
<b>Behaviours</b>	<p>Q8: Constantly interacting with the mobile phone. Typical behaviours include checking notifications, taking phone calls while in the meeting, obviously typing on the device (100%)</p>	<p>Directly contacting the customers (I1)</p>

## 6. Attribution-based Personas

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	<p>Q14: Engaging in physical activity, like walking around or performing some physical exercise (88,9%)</p> <p>Q1: Joins meetings from their phone while engaging in another activity like running errands, commuting (88,9%)</p> <p>Q12: Having audio issues and very bad quality of sound (55,6%)</p> <p>Q5: A person enters/is in the room of one of the participants and they might even engage in conversation (33,3%)</p>	<p>Disagreeing to using a certain tool (I3)</p> <p>Generally when unnecessary things happen behind their backs and are shown in the camera (I7)</p> <p>it is even worse when the sound is too loud (Q12)</p> <p>This behaviour is considered especially unprofessional when there is communication with the other person in the room (Q5)</p>
<b>Attributions</b>	<p>I would personally consider this quite unprofessional (A1.4, 66,6%)</p> <p>They probably easily mix private and professional life (A5.4, 33,3%)</p> <p>This is quite an immature thing to do in meetings (A8.2, 100%)</p> <p>They should consider switching or investing in a more professional setting (A12.1, 55,6%)</p> <p>To me, it shows an unwillingness to adapt to a professional setting (A14.2, 88,9%)</p>	<p>This unprofessionalism translates into their work (I1)</p> <p>If unprofessional behaviour is intentional, I would consider it even rude (I3)</p> <p>They do not care about being perceived as unprofessional. But some people might be offended (I7)</p>
<b>Suggested Reactions</b>	<p>This persona might exhibit inappropriate behaviour in more serious situations. Therefore, the project leader can opt to talk about it to everyone in the internal team meetings, or if there is time-sensitivity, directly contact the person.</p>	

### 6.3.2. Ego is the enemy

This persona is a constellation of traits that refer to putting oneself at the center of a situation, often intentionally. The sense of being egoistical is intertwined with being oblivious to the fact the person is part of the team. The displayed behaviours are often perceived as being disrespectful towards the other participants of the meeting.

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Table 6.2.: Ego is the enemy Persona

<b>Title</b>	Ego is the enemy	
<b>Description</b>	Attribution formed based on egoistical attitude and behaviour of a person, which often overshadows the efforts of the other members and might even be offensive in more serious cases.	
<b>Image</b>		
	<b>Closed Questions</b>	<b>Open Questions</b>
<b>Behaviours</b>	<p>Q3: Constantly interacting with the mobile phone by looking at it, checking notifications, taking phone calls, even type... (100%)</p> <p>Q4: One of the team members constantly turns their camera on and off to do something meanwhile (87,5%).</p> <p>Q13: A student constantly interrupts/talks over the participants of a meeting (62,5%).</p> <p>Q14: Engaging in physical activity, like walking around or performing some physical exercise(75%)</p> <p>Q5: A person enters/is in the room of one of the participants and they might even engage in conversation (62,5%)</p>	<p>Not giving the other team members complex tasks (I2)</p> <p>Of course there is rude behaviour, like exit the zoom meeting without saying anything (I3)</p> <p>Coming late to the meeting or leaving early quite often (I3)</p>
<b>Attributions</b>	<p>I would consider this impolite towards the participants of the meeting (A3.1, 100%)</p> <p>It's confusing to me why they do this and a bit disrespectful (A4.2, 87,5%)</p>	<p>They were disrespectful not only towards me, but also towards themselves (I2)</p> <p>Undermining the female participant as a sign of toxic masculinity (I2)</p>

## 6. Attribution-based Personas

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	This might be offensive towards the participants in the meeting (A5.1, 62,5%)	Disrespectful towards the contribution others are giving to the meeting (I7)
	This could be disrespectful to the participants, especially in formal meetings (A9.2, 25%)	
	They want to impose their opinion on others (A13.1, 87,5%)	
	That don't want the other members to be heard which is quite improper (A13.2, 37,5%)	
	This is personally even rude (A13.3, 62,5%)	
	This is inconsiderate towards the other participants (A14.1, 75%)	
<b>Suggested Reactions</b>	This is a difficult situation. PLs emphasize addressing the issue as soon as possible, as the team members might be affected. They also mention that the remote setting escalates nerve-wrecking situations quickly, therefore, it is crucial to be alert towards the behaviours described in this persona.	

### 6.3.3. L'Étranger

This group of attributions involves perceptions made on individuals not exhibiting any particular interest, prioritization or appreciation of the project. According to PLs, this is shown in the form of non-participation, or sporadic, irrelevant engagement. Considering the answers given by the PLs, this persona was constructed with attributions pointing at a low conscientiousness of the individual. The name of this persona relates to the main character in Albert Camus' *L'Étranger*, who was completely detached from the happenings around his existence.

Table 6.3.: L'Étranger Persona

<b>Title</b>	L'Étranger
<b>Description</b>	This Persona represents a person detached and disengaged from the activities of a meeting. They are usually not as involved as other participants and therefore, stand out for their distance.

## 6. Attribution-based Personas

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### **Image**



	<b>Closed Questions</b>	<b>Open Questions</b>
<b>Behaviours</b>	<p>Q8: Constantly interacting with the mobile phone. Typical behaviours include checking notifications, taking phone calls while in the meeting, obviously typing on the device (100%)</p> <p>Q1: Joins meetings from their phone while engaging in an other activity like running errands, commuting (87,5%).</p> <p>Q3: A person is actively doing something besides the meeting on their computer (seems focused on another task, are typing) (75%).</p> <p>Q7: A person in the team is slouching and looking quite sleepy... (37,5%)</p>	<p>Having the camera off (I1)</p> <p>Apologizing without giving any valid reason or excuse for being late of joining from other places (I2)</p> <p>Giving the impression the team member is not aware about what is happening (I3)</p> <p>Not sharing their opinion on important issues or just passively agreeing (I4)</p>
<b>Attributions</b>	<p>They are actually not attentive and must schedule more time for the meetings (A1.1, 87,5%)</p> <p>This person isn't particularly interested in getting the most out of the iPraktikum and the meeting (A1.3, 87,5%)</p> <p>They consider the iPraktikum the typical uni lecture and are just there to not absent (A2.4, 25%)</p> <p>The advancement of the project might not be a priority (A3.2, 75%)</p> <p>The project itself is seemingly not appealing to them (A3.3, 33,3%)</p>	<p>I get the feeling I am interacting with a clam (I1)</p> <p>They consciously make a decision to not care about what the others are saying (I4)</p> <p>It seems to me that they are bored (I7)</p>

## 6. Attribution-based Personas

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	<p>They might not be really interested in the project and are just pretending to agree (A6.3, 25%)</p> <p>They might consider it unnecessary to get out of the comfort zone of their home and make an extra effort (A7.3, 37,5%)</p> <p>They are not interested in the discussion and in what everyone else is saying (A8.3, 100%)</p> <p>The iPraktikum is not a priority to them this semester (A11.1, 25%)</p> <p>They are probably just opening the page before having to share the screen (A11.2, 22,2%)</p>
<b>Suggested Reactions</b>	In case of disinterest, there is often not much one can do, as no one can force another person to like or engage in anything. As a few PLs have mentioned, participants in the iPraktikum are adults, and can make their own decisions.

### 6.3.4. The Loner

The difference from the detached persona is that with this persona we do not imply a lack of interest. There might be other perceptions explaining the distance between the person and the other participants, and assumptions regarding the relationship and collaboration with the team. The most common perceptions are that the person is introverted, not being a team member and generally being insecure or unmotivated. Lacking motivation is included in this persona, as it is linked with introversion and a person being more isolated.

Table 6.4.: The Loner Persona

<b>Title</b>	The Loner
<b>Description</b>	A loner is a person that seems to be operating in a more solitary manner and raises therefore questions regarding their engagement, involvement and personality.

## 6. Attribution-based Personas

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### **Image**



	<b>Closed Questions</b>	<b>Open Questions</b>
<b>Behaviours</b>	<p>Q12: A person is having audio issues and very bad quality of sound (100%)</p> <p>Q2: A person in your team is mostly just listening during the meetings and is muted almost all the time (87,5%).</p> <p>Q1: Joins meetings from their phone while engaging in another activity like running errands, commuting (62,5%).</p> <p>Q6: A student is agreeing to "too many" things in the meeting or use empty phrases, but are not actually delivering: (62,5%)</p>	<p>A person sits in the dark and you can barely see their face (I9)</p>
<b>Attributions</b>	<p>This person might not be involved in the team spirit (A1.2, 62,5%)</p> <p>They are just shy/introverted (A2.3, 87,5%)</p> <p>Not getting enough feedback makes me think this is not a person you can easily deal with (A6.2, 25%)</p> <p>It's not in their culture/personality to reply or ask for support (A6.4, 62,5)%</p> <p>They might not be the most engaged and cooperative in the team (A10.3, 25%)</p>	<p>The person may think their work / opinion is not that important. (Q2)</p> <p>They might be afraid to express their own opinion and doubts. (Q6)</p> <p>Attributing a behaviour to "nerdiness" (Q10)</p>

## 6. Attribution-based Personas

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It might hurt the quality of the meeting and it renders the person less approachable (A12.2, 100%)  
 It makes me think that this person is not motivated (A12.3, 11,1%)

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<b>Suggested Reactions</b>	PLs have mentioned often being mistaken about the people not being as dominant as others. Therefore, it is important here to keep an eye on the progress of the tasks, and the perceptions the other team members have on this person. Ice-breakers are also perceived as the traditional remedy to bringing teams together.
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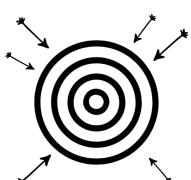
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### 6.3.5. The Underperformer

The perception created on this persona is generally that they are not performing on the same level as the other participants of the team. PLs in this case, try to reason why this is the case. Typical attributions can relate directly to poor performance or indirectly to avoiding work, lack of experience, etc.

Table 6.5.: The Underperformer Persona

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<b>Title</b>	The Underperformer	
<b>Description</b>	Attributions related to this persona are usually made with the goal of explaining this person's lack of performance or a tendency to perform in a poorer manner.	
<b>Image</b>		
<b>Closed Questions</b>	<b>Open Questions</b>	
<b>Behaviours</b>	<p>Q3: But then you realize that a person is actively doing something besides the meeting on their computer (seems focused on another task, are typing) (37,5%)</p>	<p>Not trying to improve the situation regarding their tech setup (I4)</p>

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## 6. Attribution-based Personas

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	<p>Q4: One of the team members constantly turns their camera on and off to do something meanwhile (37,5%)</p> <p>Q2: A person in your team is mostly just listening during the meetings and is muted almost all the time (25%)</p> <p>Q7: A person in the team is slouching and looking quite sleepy... (25%)</p> <p>Q9: A student has a stack of dishes waiting to be cleaned or a pile of clothes behind. (25%)</p>	<p>Being too optimistic and asking about the consequences of not achieving something on time (I3)</p> <p>Giving the impression one is not fully grasping what needs to be done (I1)</p>
<b>Attributions</b>	<p>They probably just want to pretend to be in the meeting, but not put in the work (A3.4, 37,5%)</p> <p>This could make me suspicious of their performance (A10.2, 12,5%)</p> <p>I would assume they are not that committed to the project and teamwork (A4.1, 37,5%)</p> <p>They are likely facing impediments with their tasks/ struggling with productivity (A2.5, 25%)</p> <p>This "sluggishness" probably translates into their work (A7.2, 25%)</p> <p>This person might be disorganized in their work too (A9.1, 25%)</p> <p>This person is probably not as experienced as the others (A2.1, 11,1%)</p> <p>They might be lacking the skills to keep up to their promises (A6.1, 100%)</p>	<p>Thinking a person is lazy (I1, I3)</p>

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<b>Suggested Reactions</b>	If the PL reasons that the person is facing difficulties, it might be beneficial to ask the coach to gather more insights about one's impediments. But as this might just be a perception, tracking the performance through other tools such as Jira and Bitbucket is the more accurate evaluation of one's performance.
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### 6.3.6. Hiding and not seeking

This persona is presumably trying to hide something, whether it is in regards to something personal or related to the project. It is often assumed that this persona is not actively trying to change something about their presence in the meeting.

Table 6.6.: Hiding and not seeking Persona

<b>Title</b>	Hiding and not seeking
<b>Description</b>	Attributions regarding this persona are made as the PLs notice a tendency to not openly approach the virtual setting
<b>Image</b>	



	<b>Closed Questions</b>	<b>Open Questions</b>
<b>Behaviours</b>	<p>Q4: One of the team members constantly turns their camera on and off to do something meanwhile (77,8%).</p> <p>Q2: A person in your team is mostly just listening during the meetings and is muted almost all the time (22,2%).</p> <p>Q11: One of the participants is facing problems connecting his devices or seems reluctant to do so. You probably also see other things open on their screen (22,2%)</p>	

## 6. Attribution-based Personas

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	Q10: A person doesn't make themselves visible in the meeting (not because their camera is off, but because they sit in the dark, the camera is in a weird position) (11,1%)	
<b>Attributions</b>	I would assume they are doing something else in parallel (A2.2, 22,2%)  They are possibly not actively listening and don't want to show what they are doing instead (A4.3, 77,8%)  They don't want to show their facial expressions and reactions (A10.1, 11,1%)  They might not be actively sharing so they don't have to show their actual progress (A11.3, 22,2%)	It's easier for the participants to avoid confrontation when you can immediately leave a meeting (I3)
<b>Suggested Reactions</b>	Some of the PLs compile rules for the remote meeting, which could minimize the probability of someone engaging less than the others.	

### 6.3.7. Distraction monster

Sometimes attribution are made on the level of focus one has, or as in this case, the lack thereof. Distraction was a big theme in the interviews, and a large part of the behaviours PLs consider inappropriate come as a result of distractions. This persona is a minor one though, because when a distraction happens, the typical reaction or attribution is not to say, that they are distracted, but to make an attribution more fitting to the first personas presented in this thesis. Nonetheless, there are attributions directly related to being distracted. We also include being bored, as it might be an indicator of lack of focus.

Table 6.7.: Distraction Monster Persona

<b>Title</b>	Distraction monster
<b>Description</b>	Attributions of this persona relate to the lack of focus one might exhibit during team meeting activities

**Image**



	<b>Closed Questions</b>	<b>Open Questions</b>
<b>Behaviours</b>	<p>Q8: Constantly interacting with the mobile phone. Typical behaviours include checking notifications, taking phone calls while in the meeting, obviously typing on the device (66,6%)</p> <p>Q7: A person in the team is slouching and looking quite sleepy... (55,6%).</p> <p>Q5: A person enters/is in the room of one of the participants and they might even engage in conversation (33,3%).</p>	Simply looking downwards, or in a direction where a computer screen would not be considered normal (I4)
<b>Attributions</b>	<p>To me, it looks like they are not focused on the meeting and get distracted easily (A5.2, 33,3%)</p> <p>Perhaps, they are bored and are not really attending (A7.1, 55,6%)</p> <p>They could be into social media or communication apps (A8.1, 66,6%)</p>	It's easier for the participants to avoid confrontation when you can immediately leave a meeting (I3)
<b>Suggested Reactions</b>	What PLs say, it to ask questions to the person that seems distracted, in the hopes of them redirecting their focus into the meeting.	

## 6.4. Limitations

Despite the analogies between the typical personas, and the ones we have developed, the reader must keep in mind that this research's personas are built on perceptions of PLs, and are no factual representations of real people. The focus of personas is *not* the investigation of inappropriate behaviours, or the reasons these behaviours are

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exhibited.

The personas presented in this chapter might also resemble antipatterns. Personas personify attribution biases, and, if an antipattern were to be investigated, it would be the one of forming dispositional attributions, rather than the personas in isolation. In order to construct antipatterns, a specific structure must exist, which does not apply to the topic of attribution bias.

Considering the limited resources of this study, it was not feasible to test every behaviour towards every attribution. Considering the dependency from the survey, we can assume that if the survey questionnaire were to be designed differently, the developed personas could differ as well.

## 7. PLACC - Project Leader Attribution Companion and Consultant

As seen in the previous chapters, the research conducted in the topic of Attribution Theory in Software Engineering Team Management has produced valuable insights and results. Such knowledge could be beneficial to a larger audience, and therefore, motivated the creation of a tool, intended to be used by future project leaders or anyone interested in the topics of this thesis. We decided to name this tool PLACC, which is an abbreviation for *Project Leader Attribution Companion and Consultant*. Although the solution we provide is a prototype based on the findings in this thesis, this prototype can be further extended to include more empirical data. An overview with the motivation is included in 7.1, whereas the requirements elicited for the product can be found in 7.2. The models representing PLACC will conclude this chapter in 7.3. We assume that the majority of the users will be project leaders, therefore, we will be utilizing them often as representatives of the users throughout this chapter as we further describe PLACC.

### 7.1. Overview

As the name itself suggests, with PLACC we aimed at defining and developing a tool which would offer interested parties a variety of overarching information. PLACC would now only present project leaders with inappropriate behaviours and their corresponding attribution biases, but also provide data and best practices on dealing with them. We envisioned PLACC to consult project leaders especially when a situation seems disturbing to them or if they are confused on how to assess a certain behaviour. Furthermore, considering that many project leaders were willing to share their tips and tricks for the virtual setting, we decided to add a second "C", standing for Companion. This addition serves exactly the purpose of guiding especially young PLs in their endeavours, with an emphasis at the activities at the beginning of projects.

The main motivation for the development of such a tool, were the project leaders themselves (current and future). The virtual setting introduces challenges unthinkable before (as described in 2.2), which have been subject to research for two decades now and continue to yield new insights. Our goal is to address the challenges concerning wrongful and unnecessary perceptions of project leaders, by making the knowledge we

have gathered more accessible. Throughout the interviews, the project leaders shared an interest in a centralized pool of data, which we hope to have been materialized, at least to some extent, through PLACC.

## 7.2. Requirements Elicitation

In this section we will elaborate on the application domain and define requirements in more detail. We will start with user stories, which describe the system from the point of view of the user and are concerned with adequately representing their needs. The user of PLACC is primarily the project leader, but an extended version of PLACC also considers the developer and the researcher as users. Next, we will advance with requirement elicitation, by showcasing the functional and non-functional requirements the system under development should fulfil. The source of these requirements are the project leaders, which would express their desires during the interviews. Next, we will discuss more advanced topics of requirements elicitation such as scenarios and use case model.

### 7.2.1. User Stories

Considering that the literature and projects surrounding the attribution bias in the management software engineering projects is limited, we considered it necessary to formulate user stories that capture the desired outcome and the reason for wanting that specific outcome. In Extreme Programming, user stories are used in the early phases of planning and they represent requirements which are elicited and written with the client. Stories are high-level use cases that encompass a set of coherent features. The structure of the following user stories follows the one described in the agile software development literature, such as in [Coh04].

As briefly described in the introduction of this section, the origin of the user stories are the project leaders themselves. During the interviews, numerous project leaders would express their interest in the topic, suggesting functionalities and preferences. These requirements are compiled together and represented through the following user stories:

- As a project leader, I want to be introduced to behaviours that can potentially bias me, so that I can better prepare for what awaits me.
- As a project leader, I want to see how other project leaders have perceived the person exhibiting an inappropriate situation (to me) so that I can compare my experience to theirs.

- As a project leader, I want to be provided with suggestions on how to deal with a certain situation, so that I can apply this knowledge in real projects.
- As a project leader, I want to be acquainted with variations of main types of behaviours, so that I can be aware of a broader spectrum of behaviours.
- As a project leader, I want to be able to differentiate between data retrieved from different sources or methods, so that the source of the information is more transparent to me.
- As a project leader, I want to read a "manual" of what to keep in mind especially in the first weeks of leading a project, so that I can minimize unpleasant experiences in the future.
- As a project leader, I want to learn about the real reasons behind a behaviour, so that I can adjust my reaction accordingly.

User stories also represent functionality that the system must offer to the users. They are organized into stacks of related functionality and the list above is already prioritized to fit the needs of the users. More on the way *how* these can be realized, will be described in the next subsection.

### 7.2.2. Functional Requirements

Functional requirements describe the interactions between the system and its environment independent of its implementation [BD09]. We will be basing the functional requirements on the user stories presented above and the descriptions also follow the examples in [BD09] .

**FR1 Browse behaviours:** The user should be able to browse through a catalogue of behaviours. The title of the behaviour must be easily distinguishable and the items of the catalogue can be chosen for further reading.

**FR2 Examine behaviour details:** The user should be provided with various details associated with a behaviour. The most important details include a list of attribution as well as suggestions on how to deal with the behaviour. It must be noted that a behaviour might be exhibited in different variations, which are in themselves also behaviours. PLACC behaviour details should also be backed up with the source of the information presented.

**FR3 Learn from former PL experience:** Young PLs should have a designated place with suggestions and recommendations about virtual project management. PLACC

contains and prepares a compilation of such experiences to be accessible by everyone.

**FR4 Follow tutorial:** The users should be provided with a designated space in which they learn more about the purpose of PLACC and how to navigate through the app. The tutorial should be presented to the users the first time they use the app, and be accessible anytime in the app too.

We were able to identify one more functionality, which unfortunately could not become part of the implementation of PLACC. Regardless, this functionality would contribute to the richness, validity and extensibility of the application, and is described in the following functional requirement:

**FR5 Share own experience:** The users should be integral part of the PLACC database of behaviours and attributions. This is achieved by allowing the users to provide their own experiences. PLACC takes these experiences into consideration when putting the app data at the users' disposal.

### 7.2.3. Nonfunctional Requirements

In this section we will elaborate on the nonfunctional requirements of PLACC. Before diving into them, we want to denote that PLACC is not meant for commercial use, and is not currently supposed to distributed in a production environment.

**NFR1 Usability:** Since the topics of PLACC are very domain specific, the mode of use should be explained in a manual-like text.

**NFR2 Usability:** The presentation should unfold in a friendly, human-centered design.

**NFR3 Usability:** There is no need for authentication when reading the PLACC data.

**NFR4 Maintenance, Extensibility:** The system should be built in such a way, that can be easily extensible in the future with more behaviours and their accompanying attributes.

**NFR5 Performance:** The system should immediately register user input and present in the PLACC UI.

Furthermore, we have identified the following pseudo-requirements:

**PR1 Implementation:** In order to practically visualize the results and stay within the language constraints of the iPraktikum, this application will be developed in *Swift*, relying on the library of SwiftUI as interface builder.

**PR2 Operation:** The source data must be stored in a format that can be easily read and written by humans. This data must be accessible and manageable from the researchers of PLACC, in order to guarantee data integrity.

## 7.3. System Models

According to [BD09], system models describe the scenarios, use cases, object model, and dynamic models of the system. This section contains the complete functional specification, starting from the scenarios and concluding with mock-ups illustrating the user interface of the system and navigational paths representing the sequence of screens. In this chapter we will refrain from the dynamic models, as there is no direct or complex interaction between the participants of the system.

### 7.3.1. Scenarios

After defining the requirements of the system and identifying the actors, it is beneficial to describe features as in a narration, in order to better understand the steps and interactions with the system. A scenario fulfils such purposes and it is a concrete, informal description from the viewpoint of a single actor. There will be two types of scenarios presented in this section: *visionary* and *demo* scenarios.

PLACC is primarily intended to demonstrate the findings of the case study, but the numerous behaviours, attributions and personas are indicators that these topics can be extended even more. Therefore, we describe in visionary scenarios an idealized and futuristic version of the system. The demo scenario will present what realistically could be accomplished within the scope of this thesis.

Regarding the actors, the most prominent one is the project leader, who not only makes use of the data of PLACC, but also contributes to its value. Other actors include the developer and the researcher.

In the scenarios with project leader as an actor, the motivation and entry points are the same. A project leader identifies a behaviour which they consider to be subjectively inappropriate, and turn to PLACC to learn more about the behaviour and how it can be addressed.

#### Visionary Scenarios

The visionary PLACC system does not only provide information to the interested user but also includes their input as part of the calculated and presented data. The following scenarios explain two ways this can be realized, with two distinct actors.

## 7. PLACC - Project Leader Attribution Companion and Consultant

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**Table 7.1.: inappropriateBehaviorDetected Visionary Scenario**

<i>Scenario name</i>	<u>inappropriateBehaviorDetected</u>
<i>Actors</i>	<u>Anna: Project Leader</u>
<i>Flow of events</i>	<ol style="list-style-type: none"> <li>1. Anna detects an unusual behaviour in her virtual team and turns to PLACC. She is asked to select from a list of behaviours or to enter her own identified behaviour. She finds the behaviour of <i>wearing an inappropriate attire</i> in the list.</li> <li>2. Anna needs to enter two more fields. She need to answer how she feels about the behaviour and to reason about the motivation and the causes. She can then submit this data and proceed to reading about the behaviour.</li> <li>3. Anna is faced with a personalized set of information to her. She firstly reads statistics about her own attribution and then proceeds to read about the perceptions other people might have created. Additionally, the system provides what other PLs think the cause of the behaviour is.</li> <li>4. Anna is also presented with an estimation of the <i>actual</i> reason behind the behaviour, which does not include other PLs perceptions.</li> <li>5. Anna has now learned that the reason for this behaviour is probably a comfortability of the person exhibiting this behaviour. This behaviour is not intended to disrespect anyone, which was the way she initially felt. Anna knows 30% of PLs also do not appreciate this behaviour and learns from them that this issue can be addressed in the meeting opener.</li> </ol>

The second visionary scenario achieves similar results as the previous one, but from the subject's point of view. The subject in this case is the member whose behaviour is being perceived by the project leader a certain way. In the context of the iPraktikum, the subject is a developer.

**Table 7.2.: argueBehaviourReason Visionary Scenario**

<i>Title</i>	<u>argueBehaviourReason</u>
<i>Actors</i>	<u>Tom: Developer</u>

<i>Flow of events</i>	<ol style="list-style-type: none"><li>1. Tom is a developer who listens about PLACC in one of his lectures and wants to contribute to it. He is asked to select from a list a behaviour that he has consciously exhibited before. Tom selects the behaviour of <i>communicating with another person in the room</i> from the list.</li><li>2. Tom is then required to answer the question: <i>What was the reason behind this behaviour?</i> He replies saying that no one would notice him talking to another person, and that he did not think it would be considered abnormal. He then submits this data.</li><li>3. He is then being presented with statistics regarding the above selected behaviour from the PLs points of view. Tom reads through them, and realizes that his behaviour might be more inappropriate than what he thinks. 75% of PLs think this behaviour is unprofessional, while 60% think it is disrespectful towards the participants of the team.</li></ol>
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The actors in these visionary scenarios are actively collaborating to the improvement of PLACC. The second scenario especially does not only take in consideration the perceptions of the PLs, but takes into account input from the other members of the team as well, hopefully providing bidirectional benefits.

The intention behind this scenario, is that quite often the perceptions we create as humans are not correspondent to reality, and gaining insights directly from the source, can reject the (false) hypothesis the human brain creates. From the developer's point of view, a behaviour might be exhibited as they do not realize the impact it has in the perception PLs or other team members create.

This knowledge would help all stakeholders prevent an escalation of events or deeper misunderstandings. Awareness is described in [TR18] as an important contributor in building trust and improving team collaboration. We believe that a version of PLACC supporting the above-described scenarios would achieve a higher awareness between the participants. Furthermore, the system described in these scenarios is intended to be self-sufficient and reliable on manual interpretation of input data.

### Demo Scenarios

The following demo scenarios provide a more feasible expectation from PLACC and are part of the version we were able to deliver. The first scenario describes the process of getting acquainted with the attributes of a behaviour which disturbs the project leader.

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**Table 7.3.: disturbingBehaviourInTeam Demo Scenario**

<u>Title</u>	<u>disturbingBehaviourInTeam</u>
<u>Actors</u>	<u>Anna: Project Leader</u>
<u>Flow of events</u>	<ol style="list-style-type: none"> <li>1. Anna is very surprised to see how quiet everyone is in the meetings and turns to PLACC to learn more about this situations. She is presented with a list of behaviours she can choose from. She finds the behaviour of <i>Lack of audible participation</i> in the list which fits her situation and clicks on it to learn more.</li> <li>2. Anna has the opportunity to choose between different variations of the behaviour that provide a bit more context. She clicks on one of the variations which reads "Stays muted almost all the time".</li> <li>3. Anna can read about the attributions others have formed, and see where her opinion stands in comparison to others. She realizes that just as her, 85% of her colleagues consider this behaviour to be unprofessional.</li> <li>4. Anna reads about suggestions on how to deal with this specific behaviour and makes a decision.</li> <li>5. Anna is more clarified now and is relieved to see other PLs share the same opinion. She is also more confident in her next steps.</li> </ol>

The following scenario describes the situation of a project leader being faced with the responsibility of managing a virtual team. In this scenario we assume that the app is an additional source for the management of virtual teams, which can be distributed or presented to project leaders at the beginning of projects.

**Table 7.4.: newVirtualProject Demo Scenario**

<u>Title</u>	<u>newVirtualProject</u>
<u>Actors</u>	<u>Emma: Project Leader</u>
<u>Flow of events</u>	<ol style="list-style-type: none"> <li>1. Emma is a young project leader who is assigned the job of managing a virtual team. Among other resources, she learns that PLACC offers an aggregation of advice from previous project leaders. She downloads the app.</li> </ol>

2. Emma is presented with a tutorial which explains the information architecture of PLACC. Although the focus seems to be on behaviours and attributions, it is too early for her to be concerned with such issues. Additionally, the app does offer tips and tricks for young project leaders in a designated area.
  3. Emma navigates to that area and continues to read about the typical challenges of remote teams and how to address them.
  4. Emma is clearer now about the atmosphere of the first weeks of the project, and is determined to create a healthy social relationship within the team.
- 

The fundamental difference between the visionary scenarios and the demo is the addition of features which automate the process of gathering data manually from project leaders or students. A generic solution to these differences will be presented in the Use Case Model.

### 7.3.2. Use Case Model

After presenting the scenarios, in this section we will be defining and describing a use case model that better determines the scope of the actor-system interaction. Use cases generalize scenarios and clarify to the developer the tasks of the system under development.

Additionally, attaching use cases to initiating actors enables developers to acknowledge the roles of the different users. Often, by focusing on who initiates each use case, developers identify new actors that have been previously overlooked. Similarly to the scenarios, a crucial activity before deriving the use cases of our system, is to identify the actors that will interact with it.

The Use Case Model in Figure 7.1 presents the use cases distinguished in the analysis of PLACC, as well as the participating actors and the relationships between them.

In the process of identifying the actors, we have recognized the **DataProvider** and the **ProjectLeader**. In our case, we introduce the role of the **DataProvider** as the initiator of the use case, as it is them who has previously conducted the research provides the initial data. This actor is a typical generalization, as they might be the researcher, as in the current case, or fellow project leaders and developers who input their data into the app directly, as elaborated in the visionary scenarios.

Logically, PLACC cannot exist without the core behaviour data provided by e.g. a researcher. Therefore, starting from the top right corner of the use case model (see Figure 7.1), the initiatory use case would be **ProvideAttributionData**. This data

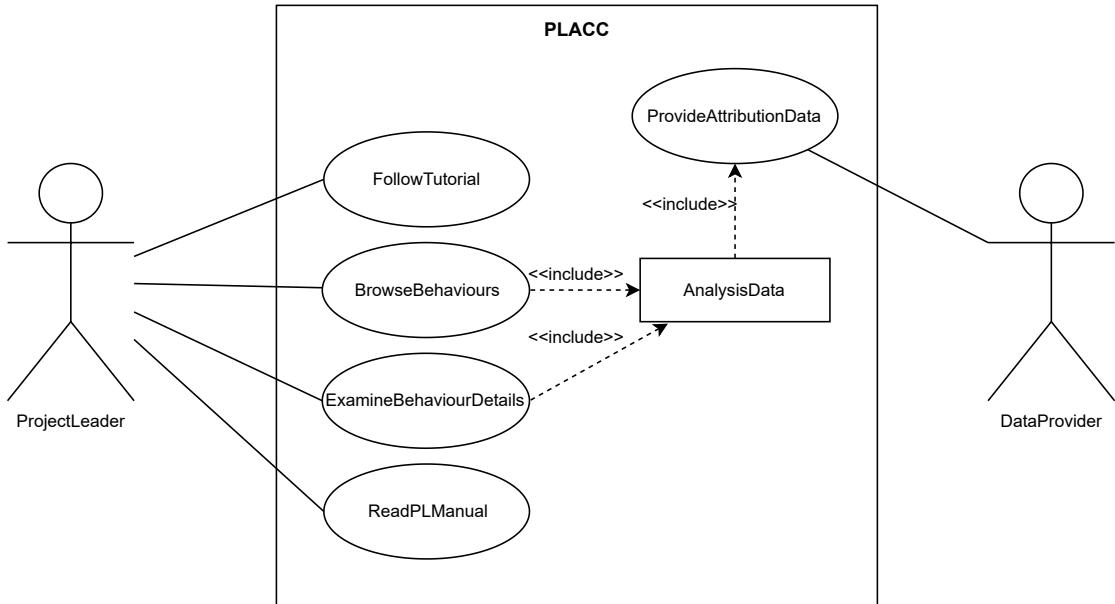


Figure 7.1.: Use Case Model

is then processed by PLACC to be readable and understandable from the end-user of the system. The object of **AnalysisData** is concerned with exactly this issue and represents the processed set of data. It is the system itself that supports the preparation of the data and places the data at the disposal of the user. Therefore, the relationship between **ProvideAttributionData** and **AnalysisData** is denoted with include, as the **AnalysisData** must be preceded by an input or injection.

From the **ProjectLeader**'s perspective, they should be able to follow a tutorial within the app, in order to understand the motivation behind PLACC and the structure of the application. This is the first step a PL must go through, as they are not informed on the nature of the study and the different ways they can profit from PLACC.

Upon learning more about PLACC and its range of knowledge, the project leader can **BrowseBehaviours** to find a behaviour they are particularly interested in. It can also be that the project leader is curious about PLACC, wants to explore the findings of the research. Next, they can choose to **ExamineBehaviourDetails**. With this use case, the project leader can dive into the results of the research and learn about the behaviour's variations, attributions and personas.

In order for the data to be examined by the project leader, they should be previously processed and prepared for visualization. For that reason, a «*include*» relationship exists between **BrowseBehaviours**, **ExamineBehaviourDetails** and the object of **AnalysisData**. These relationships denote that, in order for the user to browse behaviours or a single

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behaviour, the input data is pre-processed following the logic provided by PLACC and prepared for visualization. The **AnalysisData** should contain behaviours, attributions and personas.

Another use case of PLACC is the opportunity to learn from the experience of previous project leaders. This activity is represented via the use case of **ReadPLManual**. The manual should elaborate on the experience as a virtual leader of software development teams and provide advice on the situation.

We will elaborate two of the use cases in the next tables. The first use case is a generalization of the two visionary scenarios, and represents a high-level solution intended to include both.

Table 7.5.: ProvideAttributionData Use Case

<i>Name</i>	ProvideAttributionData
<i>Participating actors</i>	Initiated by DataProvider
<i>Flow of events</i>	<ol style="list-style-type: none"><li>1. The DataProvider goes into the system to input their own data.</li><li>2. The PLACC system presents a designated interface in which the DataProvider can make their contribution. The interface supports a variety of behaviours and the attached questions in a form.</li><li>3. The DataProvider chooses a specific behaviour and answers the questions. They also submit the answers.</li><li>4. The system stores the new data and processes the input into the AnaysisData, which will then be presented to the other users of PLACC.</li></ol>
<i>Entry conditions</i>	App is downloaded.
<i>Exit conditions</i>	The contribution made my the DataProvider is available directly to the users of PLACC.

The second use case we decided to present relates to the display of the core information of PLACC. A ProjectLeader makes use of PLACC to learn more about an inappropriate behaviour, including variations, attributions and advice. Table 7.6 represents the circumstances and the flow of actions leading to the fulfilment of the ProjectLeader's goal.

Table 7.6.: ExamineBehaviourDetails Use Case

<i>Name</i>	ExamineBehaviourDetails
<i>Participating actors</i>	Initiated by ProjectLeader
<i>Flow of events</i>	<ol style="list-style-type: none"> <li>1. The ProjectLeader selects one of the behaviours for further examination.</li> <li>2. The PLACC system opens a new view presenting initial content of an behaviour including variations.</li> <li>3. The ProjectLeader reads through the different variations of a behaviour and opens one of them.</li> <li>4. The variation is expanded to accommodate other data such as personas, attributions etc.</li> <li>5. The ProjectLeader goes through the details of the variation of choice.</li> </ol>
<i>Entry conditions</i>	Sufficient AnalysisData is available.
<i>Exit conditions</i>	None

We decided to focus of these two use cases as they depict an indirect interaction between ProjectLeaders and DataProviders and satisfy a big part of the requirements from the system.

### 7.3.3. Analysis Object Model

Figure 7.2 depicts the *Analysis Object Model (AOM)* of the system under development. The AOM represents the main objects and the relationships that exist among them from the user's point of view. As specified in [BD09], the AOM serves as a visual dictionary of the concepts participating in the system and its objects are to be identified in the use cases.

As PLACC combines project leader needs and this thesis's results, the AOM also combines objects from both these sources. The paragraphs to come will describe the analysis object model following a top-down approach.

Not only the AOM, but also the ideation of this thesis started from observing agile software development **teams** and the dynamics that emerge between its participants. The teams we observe are distributed and operate using means of remote communication and collaboration. Meetings are held on Zoom, communication takes place

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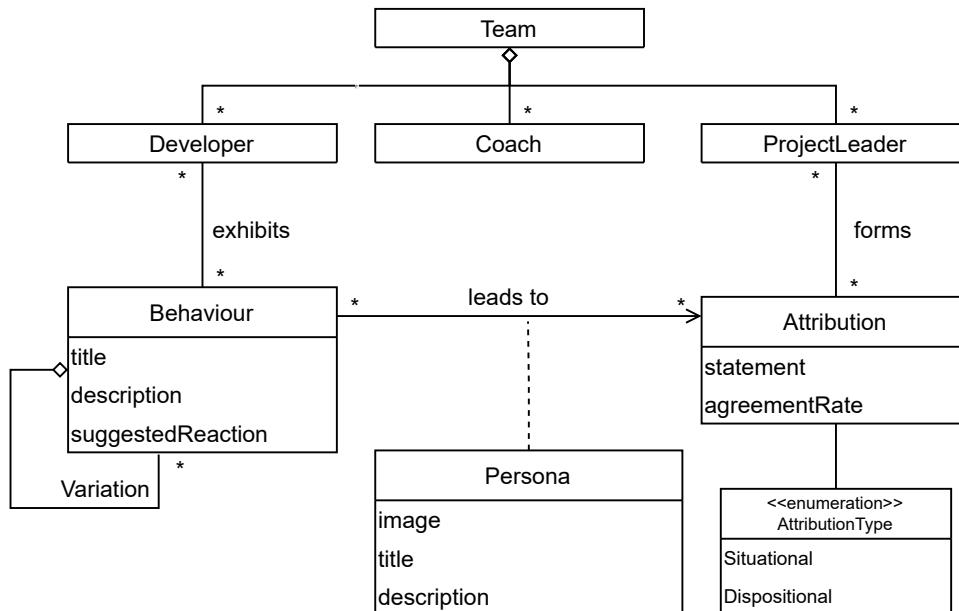


Figure 7.2.: Analysis Object Model

in platforms such as RocketChat or Discord and screensharing and remote control facilitate group collaboration especially in development tasks. The team follows the structure, guidelines and processes of Scrum<sup>1</sup>.

The iPraktikum teams consist of the **project leader**, **coach** and **the developers**. The project leader serves as the product owner and is responsible for communicating and reinforcing the product goals into the team. The coach represents the scrum master, and makes sure that the scrum principles are maintained. The scrum developers are responsible for providing increments until eventually building the product. In the semester in which this case study took place, there were 1-2 project leaders and coaches per team.

Although every human being acts and expresses oneself via **behaviours**, we are specifically interested in the ones exhibited by the developers of the team. We consider the relation between the developers and the project leaders the more interesting to observe, as their competences are distinct and as the project leader has a more distant relationship to the team. This is contrasting to the position of the coach, who needs to stay closer to team.

After the interviews with the project leaders and the process of building a taxonomy of behaviours, it was identified that, although some behaviours were similar in their

<sup>1</sup><https://www.scrum.org/resources/what-is-scrum>

core, they could also vary depending on the context or circumstances. This taxonomy was constructed as an attempt to understand the domain, and we concluded that broader behaviours consist of more specific **variations**.

We judged that a behaviour consists of a title, a description and a suggested reaction towards this behaviour. Normally a behaviour is characterized by numerous other properties, but these three are the ones we consider.

Other important properties such as motivation or reason of a behaviour are not studied directly, but rather indirectly as part of the **attributions** project leaders form. Similarly to behaviours, everyone is capable of forming attributions, but the project leaders are taken into consideration as the subjects of the study. Attributions are formed as a developer exhibits a behaviour, usually new or different from what the perceiver (in our case the PL) is used to see.

An attribution is expressed by a statement, and embodies the reasoning behind the causes of a behaviour. Considering that the survey described in chapter 5 also served the validation and quantification of attributions, we were able to retrieve the frequency of the agreeing responses to each attribution. Although we have retrieved other metrics in regards to an attribution, the agreement rate is the one we deemed as interesting for the users of PLACC. The agreement rate makes it possible to identify **personas** too.

Although different researchers use different conventions, we simplify different attribution types by focusing on situational and dispositional attributions. These are also represented in the enumeration **AttributionType**. If the **attribution type** is situational, it means that the project leaders take in consideration the situation and circumstances of the developer when forming an attribution. Dispositional attribution happens, when the disposition of the developer is considered as the cause of a behaviour. The disposition included character, personality and demeanour.

A behaviour can lead to multiple attributions, and a attribution (e.g. bad internet connection) can be used as an excuse to many behaviours. In this system we focus rather on the first association between the two objects, hence, the unidirectional arrow in the model.

In the intersection of behaviours and attributions is where **personas** will be found. A persona is a personification of an individual which exhibits a certain set of behaviours, and is perceived a specific way by the project leaders. A persona has a title, usually a short and striking one, and a description that gives more details. An image is also associated with a persona, in order to add a visual element as well.

#### 7.3.4. UI Mockups

One important aspect of system analysis is also contemplating the user interface with which PLACC will be presented. We decided to follow a lean and modern design, with

few accents of colour and rich imagery. The UI aims at conveying the novelty and quirkiness of the thesis, and tries to make it more approachable and friendly with the human elements in the graphic design.

These arguments motivated the choice of a sans serif font for the modelling of the mock-ups, a font style which symbolizes modernity, approachability and cleanliness. The accent colour of choice is purple as it is associated with wisdom, independence and magic and can evoke creativity.

Not only did this phase help with envisioning PLACC, but we were also able to identify omissions in the functional requirements. Such a case were the personas, which we intended to include in the behaviours, but did not receive a specific requirement. Since the functional requirements were inspired by the project leaders, they had no information regarding personas, during the interviews. Therefore, such a gap in the requirements was to be expected.

Table 7.7 depicts three out of 4 tabs of the application. Since the behaviours and their details are of importance, we have dedicated more space to showcasing this view of the application. The open tab can be noticed by the coloured tab item at the bottom of the views.

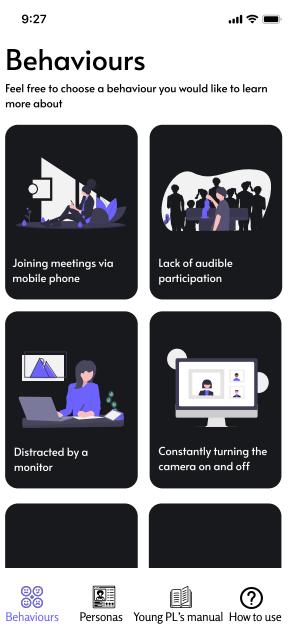
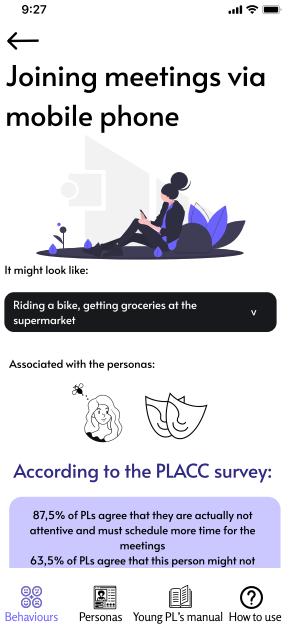
The order of the tab represents also the order of importance. The two first tabs are associated directly with the core objective and deliverables of this thesis, whereas the last two ones represent manual-like information.

The last tab of the application is reserved as a tutorial for the new users of PLACC. We assume that the user is not acquainted with PLACC, its purpose and elements. Therefore, we take this place to elaborate on them, and to enable a more straightforward navigation through the app. The first part of the view will be dedicated to the research behind PLACC, emphasizing its objectives. The following sections will explain each tab of the application in detail, starting from the personas and finishing with the Young Project Leader's Manual.

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Table 7.7.: UI Mock-ups

Name Mock-up	Description
<p><b>Browse behaviours</b></p>  <p>The first tab of the application presents a grid of cards, each constituting and redirecting to a behaviour. Each card contains a representative image and the title of the behaviour.</p>	<p>9:27</p> <p>Behaviours</p> <p>Feel free to choose a behaviour you would like to learn more about</p> <p>Joining meetings via mobile phone</p> <p>Lack of audible participation</p> <p>Distracted by a monitor</p> <p>Constantly turning the camera on and off</p> <p>Behaviours Personas Young PL's manual How to use</p>
<p><b>Explore behaviour details</b></p>  <p>Upon choosing one of the behaviours, the user will be presented with a detailed behaviour view. Every behaviour will be distinguished in further variations, containing personas, attributions and suggested solutions or reactions towards that behaviour. In this first screenshot of the view we can see a variation of the behaviour in the black button. We see the open version of the variation which includes personas and the beginning of the attributions made part of the survey.</p>	<p>9:27</p> <p>Joining meetings via mobile phone</p> <p>It might look like:</p> <p>Riding a bike, getting groceries at the supermarket</p> <p>Associated with the personas:</p> <p>According to the PLACC survey:</p> <p>87,5% of PLs agree that they are actually not attentive and must schedule more time for the meetings</p> <p>63,5% of PLs agree that this person might not</p> <p>Behaviours Personas Young PL's manual How to use</p>

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### Explore behaviour details (continuation)

### Personas

The screenshot shows two main sections of the PLACC app. The top section, titled 'Joining meetings via mobile phone', displays a card with a purple header and a light blue body containing statistics and a 'How to deal with it' section. The bottom section, titled 'Personas', shows two cards: 'Distraction Monster' and 'Hiding and not Seeking', each with an image, title, and a brief description of attributions.

**Joining meetings via mobile phone**

ATTENTIVE AND MUST SCHEDULE MORE TIME FOR THE MEETINGS  
63,5% of PLs agree that this person might not be involved in the team spirit  
87,5% agree that this person isn't particularly interested in getting the most out of the iPraktikum and the meeting  
62,5% would personally consider this quite unprofessional

How to deal with it:

You should keep a close eye to this situation, as it might affect the team and the progress of the project. When in doubt, analyze their performance and listen to the rest of the team and their impression. Also, pay close attention to the explanations they are giving, or better say, if they are giving any at all.

Being on a train, in nature >

Behaviours Personas Young PL's manual How to use

**Personas**

**Distraction Monster**

Attributions of this persona relate to the lack of focus one might exhibit during team meeting activities

**Hiding and not Seeking**

Attributions regarding this persona are made as the PLs notice a tendency to not openly approach the virtual setting

Behaviours Personas Young PL's manual How to use

The user will not only be able to learn and assess attributions, but also be presented with suggestions on how to deal with this behaviour. This is shown in the second block of the variation data. Afterwards, the user can choose to open the second variation (at the bottom of the screen) or navigate back to the behaviour card grid (arrow at the top-left corner)

As personas will be part of a behaviour's description, the second tab of the application will be dedicated to the explanation of personas. These are also represented via cards, and contain an image (which can be found in the behaviour details), the title and a description of the persona.

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### Young PL's Manual

The screenshot shows a mobile application titled "Young PL's Manual". At the top, there is a header bar with icons for signal strength, battery level, and time (9:27). Below the header, the title "Young PL's Manual" is displayed in a large, bold font. Underneath the title, there is a welcome message: "Hey you, welcome to the world of project management and leadership!". A descriptive text follows: "Over the course of the last semesters, we have created a compilation of tips and tricks to help you navigate through this experience. Hope we can be of help". Below this text are two dark blue buttons with white text: "Social aspect" and "Behavioural aspects", each accompanied by a right-pointing arrow. At the bottom of the screen, there is a navigation bar with five items: "Behaviours" (represented by three circles icon), "Personas" (represented by a person icon), "Young PL's manual" (represented by a book icon, which is highlighted in blue), and "How to use" (represented by a question mark icon).

Considering the knowledge we have gathered in this thesis, want to offer young PLs a space in which they can read about previous leadership experience and tips on how to deal with specific situations. The information is categorized in sections, using the same button design and behaviour of the variation.

# **8. Summary**

The topic of this thesis was conceptualized being motivated by the new virtual setting of software development projects. It was the first time the phenomenon of dispositional attribution was being studied, and the uncertainty of coming up with interesting findings was high. Regardless, we were able to identify the most common dispositional attributions project leaders form, as well as the behaviours triggering the most attributions.

## **8.1. Status**

In this section we will discuss the status of the thesis in two spectres. First we will discuss the details of the realized goals, and then the open ones, which could not be tackled within the scope of this thesis.

We will be presenting the status on the basis on the research questions, introduced already in 1.3:

RQ1 Which are the biases project leaders exhibit in the perception they have on the team members, considering the virtual situation?

RQ2 Can similarities between these perceptions be identified, and structured in the form of personas?

RQ3 How do these biases affect the way leaders react towards members of the team?

Apart from the research questions, the development of an application that would present the findings was contemplated as one of the goals and deliverables of the thesis. The status of its realization will also be subject to this section.

### **8.1.1. Realized Goals**

The case study treated in this thesis unfolded in multiple iterations and the results were yielded after each phase of the case study. in the introduction of this thesis we display three phases:

- 1 Exploratory phase, realized through the interviews with the project leaders

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- 2 Descriptive phase of attributions, realized through the survey and descriptive statistics
- 3 Explanatory phase, characterized by the development of personas and finding answers to RQ3

A last phase was concerned with the presentation of this data in a tool, which was named *PLACC (Project Leader Attribution Companion and Consultant)*.

Through the first phase of interviews we were able to identify the behaviours that were perceived negatively from the project leaders, as well as the perception themselves. Although attributions were the most important outcome, we were also able to provide a taxonomy of behaviours which seem to be the most problematic in the virtual environment. Although biases were identified in individual project leaders, we were able to obtain superficial information on the most common attributions across all the participants of the research, as the behaviours mentioned in the interviews would vary considerably.

In the second phase of the research we wanted to retrieve a complete, focused and all-project-leader-inclusive dataset of attributions. This step was important in order to generalize and analyze the before identified attributions. Previously, they would be expressed from different individuals with experiences unalike one another. By the means of the survey, we were able to identify the most common attributions made towards specific behaviours. We could also identify in total, which behaviour-attribution pairs were more frequent or more likely to exist. Eventually, we could also identify the behaviours that would probably result in dispositional attribution.

This phase served as a validation round would increase the validity of the personas too, which rely on the results of the survey. The personas were identified in a following, third phase, by clustering together similar attributions. This similarity was defined by the type of disposition, the intention of the person, consequences on the team to mention a few of them. We equipped personas with a title, description, image, attributions, behaviours and suggested reaction, as these would construct the similarities required for the development of personas.

In the same phase of the study we laid attention to the third research question as well. Directly observing or identifying reactions caused from attributions could not be attained, but we utilized the survey to make assumptions about these reactions by testing the personality trait of agreeableness. Agreeableness is a personality trait which manifests itself in being considerate, cooperative and empathetic. By analyzing the correlation between agreeableness and attribution tendencies we were able to form early assumptions on the team-member relationship, and the way project leaders deal with new situations.

In conclusion, a tool encompassing the results of the study was developed. The interested reader can refer to Requirements Elicitation to recapitalize on the demands from PLACC. The final version we were able to deliver offers the opportunity to browse through behaviours, and examine behaviour details. The behaviours offer variations, in order to cover as much ground as possible. The variations which were subject to the survey, contain attributions retrieved from the same source, accompanied by the agreeability frequencies. These variations are also equipped with the associated personas. Each variation also contains advice on how to deal with that specific behaviour. Other fulfilled requirements include a tutorial for the users of PLACC and a compilation of general advice on virtual team management under the concept of a *Young PL's Manual*.

### 8.1.2. Open Goals

During the survey analysis, we were able to derive a generic correlation between leadership traits and tendency to form attribution, but were not able to look into attributions causing specific reactions. A perfect result would be to associate reactions to a behaviour based on the attribution one forms as a result of the named behaviour. Normally, behaviours would need to be spontaneously exhibited in the meetings, and the project leader would have to provide their attributions and reaction right after the occurrence in order to lose as little information as possible. We reasoned, that the realisation could not fit into the scope of the thesis, and therefore followed a more practical approach which would generalize the answer to RQ3. We decided to rely on the personality traits of trust and agreeableness to derive such information. Therefore, a clear link between attributions of a certain nature and a specific reaction was not able to be found.

Another open goal relates to the application supporting this thesis, namely PLACC. The current version of PLACC requires the researcher to manually insert behaviour and persona data in a json file, which is then decoded to be "digestible" by the application. A better approach would be providing a user interface in which researchers could add more of the research data and therefore enrich the dataset of PLACC without the domain knowledge. Such an interface could also be used by project leaders themselves to directly share their experience. This functionality is expressed in FR5 in the Functional Requirements. In a more advanced version, PLACC would also store and process data from the subjects of attribution, which in the context of iPraktikum are the team developers. In such a case, PLACC would not only take in consideration the attributions project leaders form, but also provide suggestions about the real reason behind a behaviour. A researcher's role then, would be to maintain the model on which PLACC bases the behaviour categories, variations and personas.

Although not technically part of the research questions, the fundamental attribution

error is almost always the theme of the research papers tackling dispositional attribution. This attribution could not be observed directly, as it would require a comparison of dispositional and situational attributions. Future Work briefly discussed how this can be realized.

## 8.2. Conclusion

The virtual setting gave rise to a multitude of unexpected conditions, including behaviours, perceptions and attributions. In order to understand the attribution process, inappropriate behaviours were first analyzed. After the thematic analysis of interviews, we concluded that the most disturbing behaviours are part of the following categories: *participation-avoiding behaviours, too-comfortable-at-home, meeting stoppers* and *ego-centric behaviours*.

The interviews yielded other interesting results too. When it comes to fundamental attribution error or to over-attribute, it was observed that the more tolerant PLs were also the ones that exhibited themselves such a behaviour. Examples of such behaviour would be getting distracted, doing side work on the computer, or not participating as actively. Seemingly, project leaders would refrain from judging a behaviour they would exhibit themselves, and, on the other side would judge more harshly behaviours, for which the PLs themselves made an effort.

By pinpointing such a set of behaviours, we could continue with the identification of dispositional attributions. We would notice that different variations of the same behaviour resulted in similar dispositional attributions in comparison to situational. Matching behaviours to attributions and simultaneously clustering behaviours was an iterative process that was based on the interviews. The results of this matching correspond to the survey questions and responses, which can be found in Table A.4 and Table A.5. Since we restricted ourselves to 14 behaviours, we tried to generalize the behaviours in order for them to correspond to as many respondents experiences as possible.

After retrieving the results of the questionnaire, we were able to identify the most common dispositional attributions made towards a certain behaviour. Unanimously, the following behaviour-attribution pairs received an agreement rate of 100%:

- A team member, who is doing something else on their computers during the meeting is perceived as impolite towards the participants of the meeting.
- A student agreeing to too many things, often using empty phrases, but not actually delivering might be lacking the skills to keep up to their promises.

## *8. Summary*

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- A team member constantly interacting with their phone appears to be disinterested in the discussion and in what everyone else is saying.
- A person having a very bad sound quality renders them less approachable as a person.

We also examined the behaviours and attributions separately. By default, we focused on behaviours that were affected by the introduction of technology in the collaboration of teams. The most attributed behaviours were Q8: Interacting with phone while in the meetings, Q14: Engaging in physical movements, Q1: Joining meetings from the phone while being on the go, Q4: Constantly turning the camera on and off, Q3: Actively doing something besides the meeting on their computer, Q13: Constantly interrupting or talking over another person, Q6: Agreeing to too many things whilst not delivering, Q12: Audio issues and bad sound quality. These behaviours received an over 50% agreement rate in total.

In the work regarding personas, each attribution was analyzed and compared to the others in order to identify commonalities in semantics, intention, social acceptance and level of intellect. These criteria was based on the research on attribution theory, which is elaborated in Psychological Background. The clusters of attributions served as the backbones of the personas.

It was identified that most of the attributions were made in regards to unprofessionalism, impolite or inconsiderate behaviour, indifference, performance etc. Eventually we were able to construct the following personas:

- The Unprofessional (5) - compilation of attributions linked to behaviours not adhering to the level of professionalism expected.
- Ego is the enemy (8) - attributions in this group regard the persona as ego-centric, displaying behaviours inconsiderate towards the needs and space of other team member.
- L'Étranger (10) - the stranger is perceived as indifferent to the importance of the course and seems detached from the team and the activities of the meeting
- The Loner (7) - is sometimes perceived as an outsider. Contrarily to L'Étranger, the attributions on this personas are predominately linked to a person being an introvert.
- The Underperformer (8) - this persona is "judged" based on their performance, commitment and experience.

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- Hiding but not Seeking (4) - relates to attributions made when a person seems to be hiding what they are doing in the meanwhile, and are not making visible efforts to improve.
- Distraction Monster (3) - getting easily distracted is what strikes the most about this persona.

The number in brackets denotes the number of attributions associated with the persona. The "cluster" with the most attributions is L'Étranger, which is an expected result considering the distance virtual teams face and the difficulty of trusting each other. More details on the personas can be found in Personas.

Attribution is a natural process which people use in different ways, to satisfy different needs. The virtual setting presents a deficiency of social cues, and a physical distance which rendered project leader hesitant to form perceptions on the team members personality. Nevertheless, the virtual scenario introduced new situations and new behaviours. Although few instances, the project leaders of this iPraktikum were faced with unpleasant or unconventional behaviours, unlikely to happen in face-to-face collaboration. Such situations were tested in a survey consisting of hypothetical situations., which showed a higher agreement to attributions. 22 out of 46 attributions presented in the survey received an agreement rate of at least 50%.

From the results we understand that attributions are common when behaviours are inconsistent with the expectations. What is considered inappropriate is also a matter of personal flavour, and it requires deeper insights into the psychology of the project leader and their pre-defined notions of appropriate virtual setting behaviour.

The research on virtual team management and attribution theory shows that being trusting and non-judgemental seems to have benefits in the well-being of the project leader and the team too. We believe this to be the road taken as we catch ourselves forming a dispositional attribution too. One possibility is to take the situation into account, and to acknowledge that the initial, instinctual attributions we form might be façades for deeper issues. Although Heider described people as naive psychologists, maybe leaders should in fact be equipped with knowledge from the field of psychology. That way, leaders can assess behaviours more objectively and react accordingly.

### **8.3. Future Work**

From the interviews: We take a look at behaviours and attributions in general, but future work can be focused on only one type of attribution or only one type of behaviour. This will allow more specific data to be identified, as the the time of interviews was limited, and the the size of the survey as well.

## *8. Summary*

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When studying attribution, nuances can be taken into consideration. Although we treated all attributions to have the same severity, they can be characterized with a score symbolizing the "harshness" of the statement. Such a categorization can add more clarity to the attribution tendencies.

The personas can also be studied in more detail and be compared to common anti-patterns in software engineering or project management. They can themselves serve as a basis for further anti-patterns.

Now that inappropriate behaviours are clear there can be specific study of the fundamental attribution error. This can be realized via experimental study methods, in which project leaders can be faced with different situations, maybe even repeated.

PLACC is also a tool that can be extended even more. In the scenarios section we discuss a visionary scenario in which the project leaders and developers are active actors in PLACC and provide their own perceptions continuously. The synergy between the two parts of the coin would increase the accuracy of the results and bring even more transparency and clarify to future project leaders. Nonetheless, we see potential in the automation of other processes too. The construction of personas and the creation of the taxonomy of behaviours were manual tasks performed by the author of this thesis. Through techniques of natural language processing, a categorisation of personas and behaviours could be supported. Such techniques would clearly require considerable efforts.

Ultimately, any body of work aiming to increase awareness around dispositional attribution would be a valuable contribution to the performance and work environment of distributed software engineering teams all around the world.

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# Bibliography

- [AA+13] B. Al-Ani, M. Bietz, Y. Wang, E. Trainer, B. Koehne, S. Marczak, D. Redmiles, and R. Prikladnicki. “Globally distributed system developers: Their trust expectations and processes.” In: Feb. 2013, pp. 563–574. doi: 10.1145/2441776.2441840.
- [Ada15] W. Adams. “Conducting Semi-Structured Interviews.” In: Aug. 2015. doi: 10.1002/9781119171386.ch19.
- [AIM12] B. Abbasnejad and H. Izadi Moud. “Leadership Functions and Challenges in Virtual Teams -A Review Paper.” In: Jan. 2012. doi: 10.13140/2.1.3542.7204.
- [AKD00] B. Avolio, S. Kahai, and G. Dodge. “E-Leadership: Implications for theory, research, and practice.” In: *The Leadership Quarterly* 11 (Dec. 2000), pp. 615–668. doi: 10.1016/S1048-9843(00)00062-X.
- [AS03] C. Auerbach and L. B. Silverstein. *Qualitative data: An introduction to coding and analysis*. Vol. 21. NYU press, 2003.
- [AS07] I. E. Allen and C. A. Seaman. “Likert scales and data analyses.” In: *Quality progress* 40.7 (2007), pp. 64–65.
- [Asc61] S. E. Asch. *Forming impressions of personality*. University of California Press, 1961.
- [Avo+01] B. J. Avolio, S. Kahai, R. Dumdadum, and N. Sivasubramaniam. “Virtual teams: Implications for e-leadership and team development.” In: *How people evaluate others in organizations* (2001), pp. 337–358.
- [BD09] B. Bruegge and A. H. Dutoit. *Object Oriented Software Engineering Using UML, Patterns, and Java*. Prentice Hall, 2009.
- [BE94] M. Bennett and D. Earwaker. “Victims’ responses to apologies: The effects of offender responsibility and offense severity.” In: *The journal of social psychology* 134.4 (1994), pp. 457–464.
- [BGM87] I. Benbasat, D. K. Goldstein, and M. Mead. “The case research strategy in studies of information systems.” In: *MIS quarterly* (1987), pp. 369–386.

## Bibliography

---

- [BH12] N. N. Bazarova and J. Hancock. "Attributions After a Group Failure: Do They Matter? Effects of Attributions on Group Communication and Performance." In: *Communication Research - COMMUN RES* 39 (Aug. 2012), pp. 499–522. doi: 10.1177/0093650210397538.
- [BK02] B. S. Bell and W. Kozlowski. "Goal orientation and ability: Interactive effects on self-efficacy, performance, and knowledge." In: *Journal of Applied Psychology* 87.3 (2002), p. 497.
- [Bli+07] M. Bligh, J. Kohles, C. Pearce, J. Justin, and J. Stovall. "When the Romance is Over: Follower Perspectives of Aversive Leadership." In: *Applied Psychology* 56 (Oct. 2007), pp. 528 –557. doi: 10.1111/j.1464-0597.2007.00303.x.
- [BN09] P. Bjørn and O. Ngwenyama. "Virtual team collaboration: building shared meaning, resolving breakdowns and creating translucence." In: *Information systems journal* 19.3 (2009), pp. 227–253.
- [BR91] J. D. Brown and R. J. Rogers. "Self-serving attributions: The role of physiological arousal." In: *Personality and Social Psychology Bulletin* 17.5 (1991), pp. 501–506.
- [BRK14] S. K. Baard, T. A. Rench, and S. W. Kozlowski. "Performance adaptation: A theoretical integration and review." In: *Journal of Management* 40.1 (2014), pp. 48–99.
- [BW09] N. N. Bazarova and J. Walther. "Attributions in Virtual Groups: Distances and Behavioral Variations in Computer-Mediated Discussions." In: *Small Group Research - SMALL GROUP RES* 40 (Jan. 2009), pp. 138–162. doi: 10.1177/1046496408328490.
- [BW94] K. L. Barriball and A. While. "Collecting data using a semi-structured interview: a discussion paper." In: *Journal of Advanced Nursing-Institutional Subscription* 19.2 (1994), pp. 328–335.
- [BWW09] P. A. Balthazard, D. A. Waldman, and J. E. Warren. "Predictors of the emergence of transformational leadership in virtual decision teams." In: *The Leadership Quarterly* 20.5 (2009), pp. 651–663.
- [CC08] T. Chow and D.-B. Cao. "A survey study of critical success factors in agile software projects." In: *Journal of systems and software* 81.6 (2008), pp. 961–971.
- [Cha12] K. Charmaz. "The Power and Potential of Grounded Theory." In: 2012.

## Bibliography

---

- [Cha+16] S. D. Charlier, G. L. Stewart, L. M. Greco, and C. J. Reeves. “Emergent leadership in virtual teams: A multilevel investigation of individual communication and team dispersion antecedents.” In: *The Leadership Quarterly* 27.5 (2016), pp. 745–764.
- [Cha+20] S. Chattopadhyay, N. Nelson, A. Au, N. Morales, C. Sanchez, R. Pandita, and A. Sarma. “A tale from the trenches: cognitive biases and software development.” In: *Proceedings of the ACM/IEEE 42nd International Conference on Software Engineering*. 2020, pp. 654–665.
- [CI96] P. S. Committee and P. M. Institute. “A guide to the project management body of knowledge.” In: Project Management Institute. 1996.
- [CJ13] C. B. Crisp and S. L. Jarvenpaa. “Swift trust in global virtual teams.” In: *Journal of Personnel Psychology* (2013).
- [Cog+09] C. C. Cogliser, C. A. Schriesheim, T. A. Scandura, and W. L. Gardner. “Balance in leader and follower perceptions of leader–member exchange: Relationships with performance and work attitudes.” In: *The Leadership Quarterly* 20.3 (2009), pp. 452–465.
- [Coh04] M. Cohn. *User stories applied: For agile software development*. Addison-Wesley Professional, 2004.
- [Cra01] C. Cramton. “The Mutual Knowledge Problem And Its Consequences for Dispersed Collaboration.” In: *Organization Science* 12 (May 2001), pp. 346–371. doi: 10.1287/orsc.12.3.346.10098.
- [Cra02] C. D. Cramton. “Attribution in distributed work groups.” In: *Distributed work* (2002), pp. 191–212.
- [CRC07] A. Cooper, R. Reimann, and D. Cronin. *About face 3: the essentials of interaction design*. John Wiley & Sons, 2007.
- [CS06] C. R. Campbell and C. O. Swift. “Attributional comparisons across biases and leader-member exchange status.” In: *Journal of Managerial Issues* (2006), pp. 393–408.
- [CTBF19] Y. Chun Tie, M. Birks, and K. Francis. “Grounded theory research: A design framework for novice researchers.” In: *SAGE open medicine* 7 (2019), p. 2050312118822927.
- [Cun+19] G. Cundill, B. Harvey, M. Tebboth, L. Cochrane, B. Currie-Alder, K. Vincent, J. Lawn, R. J. Nicholls, L. Scodanibbio, A. Prakash, et al. “Large-scale transdisciplinary collaboration for adaptation research: Challenges and insights.” In: *Global Challenges* 3.4 (2019), p. 1700132.

## Bibliography

---

- [DB92] P. Dourish and V. Bellotti. "Awareness and coordination in shared workspaces." In: *Proceedings of the 1992 ACM conference on Computer-supported cooperative work*. 1992, pp. 107–114.
- [DFV08] A. R. Dennis, R. M. Fuller, and J. S. Valacich. "Media, tasks, and communication processes: A theory of media synchronicity." In: *MIS quarterly* (2008), pp. 575–600.
- [Din+14] J. E. Dinh, R. G. Lord, W. L. Gardner, J. D. Meuser, R. C. Liden, and J. Hu. "Leadership theory and research in the new millennium: Current theoretical trends and changing perspectives." In: *The Leadership Quarterly* 25.1 (2014), pp. 36–62.
- [DS02] T. S. Duval and P. J. Silvia. "Self-awareness, probability of improvement, and the self-serving bias." In: *Journal of personality and social psychology* 82.1 (2002), p. 49.
- [DV19] M. DeJonckheere and L. M. Vaughn. "Semistructured interviewing in primary care research: a balance of relationship and rigour." In: *Family Medicine and Community Health* 7.2 (2019).
- [FB05] C. M. Frantz and C. Bennigson. "Better late than early: The influence of timing on apology effectiveness." In: *Journal of Experimental Social Psychology* 41.2 (2005), pp. 201–207.
- [FCG07] S. T. Fiske, A. J. Cuddy, and P. Glick. "Universal dimensions of social cognition: Warmth and competence." In: *Trends in cognitive sciences* 11.2 (2007), pp. 77–83.
- [Fer+04] W. D. Fernández et al. "The grounded theory method and case study data in IS research: issues and design." In: *Information Systems Foundations Workshop: Constructing and Criticising*. Vol. 1. 22. 2004, pp. 43–59.
- [FG20] G. Fletcher and M. Griffiths. "Digital transformation during a lockdown." In: *International Journal of Information Management* 55 (July 2020), p. 102185. doi: 10.1016/j.ijinfomgt.2020.102185.
- [Fin03] A. Fink. *The survey handbook*. sage, 2003.
- [FK18] J. Ferrell and K. Kline. "Facilitating trust and communication in virtual teams." In: *People & Strategy* 41.2 (2018), pp. 30–36.
- [Fle+14] M. Fleischmann, M. Amirpur, A. Benlian, and T. Hess. "Cognitive Biases in Information Systems Research: A Scientometric Analysis." In: June 2014.

## Bibliography

---

- [FT91] S. T. Fiske and S. E. Taylor. *Social cognition*. McGraw-Hill Book Company, 1991.
- [Gal05] A. Galloway. "Non-Probability Sampling." In: *Encyclopedia of Social Measurement*. Ed. by K. Kempf-Leonard. New York: Elsevier, 2005, pp. 859–864. ISBN: 978-0-12-369398-3. doi: <https://doi.org/10.1016/B0-12-369398-5/00382-0>.
- [GAPSAC21] V. Garro-Abarca, P. Palos-Sanchez, and M. Aguayo-Camacho. "Virtual Teams in Times of Pandemic: Factors That Influence Performance." In: *Frontiers in Psychology* 12 (2021), p. 232.
- [Gar+18] W. Gardner, E. Karam, L. Tribble, and C. Cogliser. "The Missing Link? Implications of Internal, External, and Relational Attribution Combinations For Leader-Member Exchange, Relationship Work, Self-Work, and Conflict." In: *Journal of Organizational Behavior* 40 (Dec. 2018). doi: 10.1002/job.2349.
- [Geb95] B. Geber. "Virtual teams." In: *Training*. 32, 4, 36-40, 1995 (1995), pp. 36–40.
- [Gil+15] L. L. Gilson, M. T. Maynard, N. C. Jones Young, M. Vartiainen, and M. Hakonen. "Virtual teams research: 10 years, 10 themes, and 10 opportunities." In: *Journal of management* 41.5 (2015), pp. 1313–1337.
- [Gla78] B. Glaser. *Theoretical Sensitivity: Advances in the Methodology of Grounded Theory*. Advances in the methodology of grounded theory. Sociology Press, 1978. ISBN: 9781884156014.
- [GM79] S. Green and T. Mitchell. "Attributional Processes of Leaders in Leader-member Interactions." In: *Organizational Behavior and Human Performance* 23 (June 1979), pp. 429–458. doi: 10.1016/0030-5073(79)90008-4.
- [Gru06] J. Grudin. "Why Personas Work: The Psychological Evidence." In: Dec. 2006, pp. 642–664. ISBN: 9780125662512. doi: 10.1016/B978-012566251-2/50013-7.
- [GSS68] B. G. Glaser, A. L. Strauss, and E. Strutzel. "The discovery of grounded theory; strategies for qualitative research." In: *Nursing research* 17.4 (1968), p. 364.
- [Har+13] P. Harvey, K. Harris, W. Gillis, and M. Martinko. "Abusive supervision and the entitled employee." In: *The Leadership Quarterly* 25 (Jan. 2013). doi: 10.1016/j.lequa.2013.08.001.

## Bibliography

---

- [HD01] J. T. Hancock and P. J. Dunham. "Impression formation in computer-mediated communication revisited: An analysis of the breadth and intensity of impressions." In: *Communication research* 28.3 (2001), pp. 325–347.
- [Hei58] F. Heider. *The psychology of interpersonal relations*. Psychology Press, 1958.
- [HG99] J. Herbsleb and R. Grinter. "Splitting the Organization and Integrating the Code: Conway's Law Revisited." In: Jan. 1999, pp. 85–95. doi: 10.1145/302405.302455.
- [HMB17] P. Harvey, M. Martinko, and N. Borkowski. "Justifying Deviant Behavior: The Role of Attributions and Moral Emotions." In: *Journal of Business Ethics* 141 (Apr. 2017). doi: 10.1007/s10551-016-3046-5.
- [HNA05] J. Howell, D. Neufeld, and B. Avolio. "Examining the relationship of leadership and physical distance with business unit performance." In: *The Leadership Quarterly* 16 (Apr. 2005), pp. 273–285. doi: 10.1016/j.lequa.2005.01.004.
- [HS92] W. H. Hutchinson S. "Validity threats in scheduled semistructured research interviews." In: *Nurs Res.* (1992).
- [IKB76] W. J. Ickes, R. F. Kidd, and L. Berkowitz. "Attributional determinants of monetary help-giving." In: *Journal of Personality* (1976).
- [JB00] T. A. Judge and J. E. Bono. "Five-factor model of personality and transformational leadership." In: *Journal of applied psychology* 85.5 (2000), p. 751.
- [JBH11] L. C. Jiang, N. N. Bazarova, and J. T. Hancock. "The disclosure–intimacy link in computer-mediated communication: An attributional extension of the hyperpersonal model." In: *Human communication research* 37.1 (2011), pp. 58–77.
- [JD65] E. E. Jones and K. E. Davis. "From acts to dispositions the attribution process in person perception." In: *Advances in experimental social psychology*. Vol. 2. Elsevier, 1965, pp. 219–266.
- [JG12] M. Jorgensen and S. Grimstad. "Software Development Estimation Biases: The Role of Interdependence." In: *IEEE Transactions on Software Engineering* 38.3 (2012), pp. 677–693. doi: 10.1109/TSE.2011.40.
- [JL99] S. L. Jarvenpaa and D. E. Leidner. "Communication and trust in global virtual teams." In: *Organization science* 10.6 (1999), pp. 791–815.

## Bibliography

---

- [JR09] A. Joshi and H. Roh. "The role of context in work team diversity research: A meta-analytic review." In: *Academy of management journal* 52.3 (2009), pp. 599–627.
- [Jud+05] C. M. Judd, L. James-Hawkins, V. Yzerbyt, and Y. Kashima. "Fundamental dimensions of social judgment: understanding the relations between judgments of competence and warmth." In: *Journal of personality and social psychology* 89.6 (2005), p. 899.
- [KA83] A. W. Kruglanski and I. Ajzen. "Bias and error in human judgment." In: *European Journal of Social Psychology* 13.1 (1983), pp. 1–44.
- [Kel67] H. H. Kelley. "Attribution theory in social psychology." In: *Nebraska symposium on motivation*. University of Nebraska Press. 1967.
- [Kie03] L. Kiel. "Experiences in distributed development: a case study." In: *Proceedings of International Workshop on Global Software Development at ICSE, Oregon, USA*. 2003.
- [Kim+06] P. H. Kim, K. T. Dirks, C. D. Cooper, and D. L. Ferrin. "When more blame is better than less: The implications of internal vs. external attributions for the repair of trust after a competence-vs. integrity-based trust violation." In: *Organizational behavior and human decision processes* 99.1 (2006), pp. 49–65.
- [Kir+04] B. Kirkman, B. Rosen, P. Tesluk, and C. Gibson. "The Impact of Team Empowerment on Virtual Team Performance: The Moderating Role of Face-to-Face Interaction." In: *Academy of Management Journal* 47 (Apr. 2004), pp. 175–192. doi: 10.5465/20159571.
- [KL02] T. R. Kayworth and D. E. Leidner. "Leadership effectiveness in global virtual teams." In: *Journal of management information systems* 18.3 (2002), pp. 7–40.
- [KL87] K. W. Kuhnert and P. Lewis. "Transactional and transformational leadership: A constructive/developmental analysis." In: *Academy of Management review* 12.4 (1987), pp. 648–657.
- [KM80] H. H. Kelley and J. L. Michela. "Attribution theory and research." In: *Annual review of psychology* 31.1 (1980), pp. 457–501.
- [Ley07] S. Leybourne. "The Changing Bias of Project Management Research: A Consideration of the Literatures and an Application of Extant Theory." In: *Project Management Journal* 38 (Mar. 2007), pp. 61–73. doi: 10.1177/875697280703800107.

## Bibliography

---

- [Lia17] C. Liao. "Leadership in virtual teams: A multilevel perspective." In: *Human Resource Management Review* 27.4 (2017), pp. 648–659.
- [Lin+16] Y. Lindsjørn, D. I. Sjøberg, T. Dingsøyr, G. R. Bergersen, and T. Dybå. "Teamwork quality and project success in software development: A survey of agile development teams." In: *Journal of Systems and Software* 122 (2016), pp. 274–286.
- [LKS96] K. B. Lowe, K. G. Kroeck, and N. Sivasubramaniam. "Effectiveness correlates of transformational and transactional leadership: A meta-analytic review of the MLQ literature." In: *The leadership quarterly* 7.3 (1996), pp. 385–425.
- [Mac16] J. D. Mackey. "High Performance Work Systems, Attributions, Justice, and Perceptions of Abusive Supervision: What's the Tipping Point?" In: *Understanding the High Performance Workplace*. Routledge, 2016, pp. 188–208.
- [Mac+17] J. Mackey, R. Frieder, J. Brees, and M. Martinko. "Abusive Supervision: A Meta-Analysis and Empirical Review." In: *Journal of Management* 43 (July 2017). doi: 10.1177/0149206315573997.
- [Mad+14] A. Madsen, S. Mckagan, E. Sayre, M. Martinuk, and A. Bell. "Personas as a Powerful Methodology to Design Targeted Professional Development Resources." In: 2 (Aug. 2014).
- [Mas12] D. S. Masood. "Transformational Leadership and Attribution Theory: The Situational Strength Perspective." In: *Life Science Journal* 9 (Sept. 2012), pp. 317–329.
- [MG14] M. T. Maynard and L. L. Gilson. "The role of shared mental model development in understanding virtual team effectiveness." In: *Group & Organization Management* 39.1 (2014), pp. 3–32.
- [MMR07] A. Malhotra, A. Majchrzak, and B. Rosen. "Leading virtual teams." In: *Academy of Management perspectives* 21.1 (2007), pp. 60–70.
- [Moh+18] R. Mohanani, I. Salman, B. Turhan, P. Rodríguez, and P. Ralph. "Cognitive Biases in Software Engineering: A Systematic Mapping Study." In: *IEEE Transactions on Software Engineering* PP (Oct. 2018). doi: 10.1109/TSE.2018.2877759.
- [MR75] D. T. Miller and M. Ross. "Self-serving biases in the attribution of causality: Fact or fiction?" In: *Psychological bulletin* 82.2 (1975), p. 213.

## Bibliography

---

- [MSK08] T. Miaskiewicz, T. Sumner, and K. Kozar. "A Latent Semantic Analysis methodology for the identification and creation of personas." In: Jan. 2008, pp. 1501–1510. doi: 10.1145/1357054.1357290.
- [MSR20] S. Morrison-Smith and J. Ruiz. "Challenges and barriers in virtual teams: a literature review." In: *SN Applied Sciences* 2 (2020), pp. 1–33.
- [MT86] P. Y. Martin and B. A. Turner. "Grounded theory and organizational research." In: *The journal of applied behavioral science* 22.2 (1986), pp. 141–157.
- [MW80] T. R. Mitchell and R. E. Wood. "Supervisor's responses to subordinate poor performance: A test of an attributional model." In: *Organizational Behavior and Human Performance* 25.1 (1980), pp. 123–138.
- [NB84] R. Nay-Brock. "A comparison of the questionnaire and interviewing techniques in the collection of sociological data." In: *The Australian journal of advanced nursing : a quarterly publication of the Royal Australian Nursing Federation* 2 1 (1984), pp. 14–23.
- [Nor10] G. Norman. "Likert scales, levels of measurement and the "laws" of statistics." In: *Advances in health sciences education* 15.5 (2010), pp. 625–632.
- [OO00] G. Olson and J. Olson. "Distance Matters." In: *Human-Computer Interaction* 15 (Sept. 2000), pp. 139–178. doi: 10.1207/S15327051HCI1523\_4.
- [OO14] J. S. Olson and G. M. Olson. "Bridging Distance: Empirical studies of distributed teams." In: *Human-Computer Interaction and Management Information Systems: Applications. Advances in Management Information Systems*. Routledge, 2014, pp. 117–134.
- [Opp92] A. Oppenheim. "Questionnaire design, interviewing and attitude measurement." In: (1992).
- [Pat02] M. Q. Patton. "Two decades of developments in qualitative inquiry: A personal, experiential perspective." In: *Qualitative social work* 1.3 (2002), pp. 261–283.
- [Pau05] D. Pauleen. "Leader-Facilitated Relationship Building in Virtual Teams." In: Jan. 2005, pp. 1794–1799.
- [PB09] R. Purvanova and J. Bono. "Transformational leadership in context: Face-to-face and virtual teams." In: *The Leadership Quarterly* 20 (June 2009), pp. 343–357. doi: 10.1016/j.lequa.2009.03.004.

## Bibliography

---

- [Peñ+13] V. Peñarroja, V. Orengo, A. Zornoza, and A. Hernández. "The effects of virtuality level on task-related collaborative behaviors: The mediating role of team trust." In: *Computers in Human Behavior* 29.3 (2013), pp. 967–974.
- [Pet+02] D. K. Peterson, C. Kim, J. H. Kim, and T. Tamura. "The perceptions of information systems designers from the United States, Japan, and Korea on success and failure factors." In: *International Journal of Information Management* 22.6 (2002), pp. 421–439. ISSN: 0268-4012. DOI: [https://doi.org/10.1016/S0268-4012\(02\)00033-6](https://doi.org/10.1016/S0268-4012(02)00033-6).
- [Pha57] E. J. Phares. "Expectancy changes in skill and chance situations." In: *The Journal of Abnormal and Social Psychology* 54.3 (1957), p. 339.
- [RC07] A. Rouse and B. Corbitt. "Understanding Information Systems Outsourcing Success and Risks Through the Lens of Cognitive Biases." In: Jan. 2007, pp. 1167–1178.
- [Ree99] J. S. Reel. "Critical success factors in software projects." In: *IEEE software* 16.3 (1999), pp. 18–23.
- [RH09] P. Runeson and M. Höst. "Guidelines for conducting and reporting case study research in software engineering." In: *Empirical software engineering* 14.2 (2009), pp. 131–164.
- [RMA12] G. Rickards, C. Magee, and A. R. Artino. "You Can't Fix by Analysis What You've Spoiled by Design: Developing Survey Instruments and Collecting Validity Evidence." In: *Journal of graduate medical education* 4 4 (2012), pp. 407–10.
- [RNV68] S. Rosenberg, C. Nelson, and P. Vivekananthan. "A multidimensional approach to the structure of personality impressions." In: *Journal of personality and social psychology* 9.4 (1968), p. 283.
- [Ros77] L. Ross. "The intuitive psychologist and his shortcomings: Distortions in the attribution process." In: *Advances in experimental social psychology*. Vol. 10. Elsevier, 1977, pp. 173–220.
- [Run+12] P. Runeson, M. Host, A. Rainer, and B. Regnell. *Case study research in software engineering: Guidelines and examples*. John Wiley & Sons, 2012.
- [SA20] P. Soto-Acosta. "COVID-19 Pandemic: Shifting Digital Transformation to a High-Speed Gear." In: *Information Systems Management* 37.4 (2020), pp. 260–266. DOI: [10.1080/10580530.2020.1814461](https://doi.org/10.1080/10580530.2020.1814461).

## Bibliography

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- [SAJ13] G. M. Sullivan and A. R. Artino Jr. "Analyzing and interpreting data from Likert-type scales." In: *Journal of graduate medical education* 5.4 (2013), pp. 541–542.
- [Sch04] F. Scheuren. "What is a Survey?" In: American Statistical Association Alexandria. 2004.
- [SGL06] C. Standing, D. A. Guilfoyle, and C. Lin. "The attribution of success and failure in IT projects." In: *Industrial Management and Data Systems* 106 (Oct. 2006), pp. 1148–1165. doi: 10.1108/02635570610710809.
- [Sho08] B. Shore. "Systematic Biases and Culture in Project Failures." In: *Project Management Journal* 39 (Dec. 2008), pp. 5 –16. doi: 10.1002/pmj.20082.
- [SKS12] C. Standing, E. Kordt, and O. Standing. "The Relevance of Attribution Theory to IT Project Management." In: (2012).
- [SM94] S. G. Straus and J. E. McGrath. "Does the medium matter? The interaction of task type and technology on group performance and member reactions." In: *Journal of applied psychology* 79.1 (1994), p. 87.
- [Sne+14] K. Snead, S. Magal, L. Christensen, and E. Charo. "Attribution Theory: A Theoretical Framework for Understanding Information Systems Success." In: *Systemic Practice and Action Research* 28 (June 2014). doi: 10.1007/s11213-014-9328-x.
- [SSK16] O. Standing, S. Standing, and E. Kordt. "Explaining attribution in information technology projects." In: *Journal of Systems and Information Technology* 18 (May 2016), pp. 216–227. doi: 10.1108/JSIT-01-2016-0002.
- [Swe20] K. Sweet. "A Fit Model of Organizational Leadership." In: *Journal of Organizational Psychology* 20 (Apr. 2020). doi: 10.33423/jop.v20i1.2763.
- [TC06] L. Thompson and M. Covert. "Understanding and developing virtual computer-supported cooperative work teams." In: *Creating High-Tech Teams* (Jan. 2006), pp. 213–241. doi: 10.1037/11263-010.
- [TC89] Y. Trope and O. Cohen. "Perceptual and inferential determinants of behavior-correspondent attributions." In: *Journal of Experimental Social Psychology* 25.2 (1989), pp. 142–158. issn: 0022-1031. doi: [https://doi.org/10.1016/0022-1031\(89\)90009-7](https://doi.org/10.1016/0022-1031(89)90009-7).
- [TDH98] A. Townsend, S. DeMarie, and A. Hendrickson. "Virtual Teams: Technology and the Workplace of the Future." In: *Academy of Management Perspectives* 12 (Aug. 1998). doi: 10.5465/AME.1998.1109047.

## Bibliography

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- [TR18] E. H. Trainer and D. F. Redmiles. "Bridging the gap between awareness and trust in globally distributed software teams." In: *Journal of Systems and Software* 144 (2018), pp. 328–341.
- [Tro86] Y. Trope. "Identification and inferential processes in dispositional attribution." In: *Psychological review* 93.3 (1986), p. 239.
- [TW02] L. Tidwell and J. Walther. "Computer-Mediated Communication Effects on Disclosure, Impressions, and Interpersonal Evaluations: Getting to Know One Another a Bit at a Time." In: *Human Communication Research* 28 (July 2002), pp. 317–348. doi: 10.1111/j.1468-2958.2002.tb00811.x.
- [WB07] J. Walther and N. N. Bazarova. "Misattribution in Virtual Groups: The Effects of Member Distribution on Self-Serving Bias and Partner Blame." In: *Human Communication Research* 33 (Jan. 2007), pp. 1 –26. doi: 10.1111/j.1468-2958.2007.00286.x.
- [WBJ02] J. Walther, M. Boos, and K. Jonas. "Misattribution and Attributional Redirection in Distributed Virtual Groups." In: Jan. 2002, p. 269. doi: 10.1109/HICSS.2002.994427.
- [WCK01] R. Weber, C. Camerer, and M. Knez. "The Illusion of Leadership: Misattribution of Cause in Coordination Games." In: *Organization Science* 12 (Sept. 2001). doi: 10.1287/orsc.12.5.582.10090.
- [Wei72] B. Weiner. "Attribution theory, achievement motivation, and the educational process." In: *Review of educational research* 42.2 (1972), pp. 203–215.
- [Wic17] D. Wicks. "The Coding Manual for Qualitative Researchers (3rd edition)The Coding Manual for Qualitative Researchers (3rd edition) Johnny Saldaña Sage 2015 ISBN-13: 978-1473902497." In: *Qualitative Research in Organizations and Management: An International Journal* 12 (June 2017), pp. 169–170. doi: 10.1108/QROM-08-2016-1408.
- [WLG08] R. L. Wakefield, D. E. Leidner, and G. Garrison. "Research note—a model of conflict, leadership, and performance in virtual teams." In: *Information systems research* 19.4 (2008), pp. 434–455.
- [Yin09] R. K. Yin. *Case study research: Design and methods*. Vol. 5. sage, 2009.
- [Yoo10] Y. Yoo. "Computing in Everyday Life: A Call for Research on Experiential Computing." In: *MIS Quarterly* 34 (June 2010), pp. 213–231. doi: 10.2307/20721425.

## Bibliography

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- [Zec+04] J. S. Zechmeister, S. Garcia, C. Romero, and S. N. Vas. "Don't apologize unless you mean it: A laboratory investigation of forgiveness and retaliation." In: *Journal of Social and Clinical Psychology* 23.4 (2004), pp. 532–564.
- [Zuc79] M. Zuckerman. "Attribution of success and failure revisited, or: The motivational bias is alive and well in attribution theory." In: *Journal of personality* 47.2 (1979), pp. 245–287.

## A. Appendix

Table A.1.: Codes of the experience in the virtual setting

Interview code	Describing experience as PL
I1	<ul style="list-style-type: none"> <li>• Some things got easier: finding a suitable time slot, students don't have the pressure to schedule in commuting time and can mix work and uni meetings, so a lot easier to organize that. Easier to reach students. Not necessary to communicate directly to get tasks done</li> <li>• Downside: Social aspect. There used to be an onboarding and offboarding phase with the team before and after meetings. Team that filmed the trailer together really bonded together.</li> </ul>
I2	<ul style="list-style-type: none"> <li>• A lot more distance between PL and team members</li> <li>• Everything got more static, less emotion involved</li> <li>• They cannot talk directly to each other, which hinders the overall team dynamic.</li> <li>• Need to work much more on communication</li> </ul>
I3	<ul style="list-style-type: none"> <li>• Difficult to motivate the team</li> <li>• Difficult convincing the students that this is something much bigger than a university course</li> </ul>
I4	<ul style="list-style-type: none"> <li>• You can't see their reactions</li> <li>• You are more involved in the meetings</li> </ul>

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I5	<ul style="list-style-type: none"><li>• The first big difference is the body language you are missing in virtual communication. Seeing their body language or seeing them as a whole person builds more trust, and you also learn about their personality, and that is missing.</li><li>• harder to motivate people over the camera, when you can't engage, can't have small talk after the meeting</li><li>• hard for the PL to trust the team and let loose a bit and not micromanage. Now I have to trust them blindly.</li></ul>
I6	<ul style="list-style-type: none"><li>• The teams that I have supervised were really good so this didn't seem to suffer from the virtual setting.</li></ul>
I7	<ul style="list-style-type: none"><li>• And for me as a PL it is important to get a feeling of what everyone is thinking and that is much easier to assess sitting next to each other. Because how someone speaks, gestures, body language are much easier to assess when you sit closely. And that is much more difficult to do in a virtual setting.</li></ul>
I8	<ul style="list-style-type: none"><li>• It's been pretty good so far.</li></ul>

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I9	<ul style="list-style-type: none"> <li>• Each three semesters, in the beginning it was a bit weird and difficult because a lot of information gets lost if you can't see how they behave and I think that, if you are in person, sometimes people next to each other have more interactions with each other, and now one person is talking and the others are just listening. This reduces the level of "getting in touch" with each other and get closer faster.</li> <li>• I think is that people get distracted much more easily in the virtual setting</li> <li>• in a person setting you also have more social interactions and can look at someone when you talk to them</li> <li>• I have another point I find really challenging is that you do not have small talk anymore</li> </ul>
I10	<ul style="list-style-type: none"> <li>• I think it went better than expected. Both times it went really smoothly. But it wasn't the same thing when being a coach, when we first learned the iPraktikum was going to be virtual. It really stressed me out at the beginning because it was quite a different experience from being a developer.</li> <li>• Yeah that happens. I think I still am really close to the team, I think I am closer to the team than other project leads. Maybe because last semester my coach... I also tried at the beginning to act like a second coach.</li> </ul>

Table A.2.: Codes of the casualty of remote meetings

Interview code	Describing experience as PL

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I1	Students also become more detached. The ones used to virtual communication (e.g. gamers) are still the same, but other students make use / abuse of this setting to draw back from the meetings, switch off the camera. From a technological perspective, it is also easier to pretend you are present in the meeting, while you are actually doing something else.
I2	Students can attend meetings from everywhere, e.g. while riding a bike. In a real meeting they could come up with some excuse to not attend the meeting, and if present, would be more attentive. And this is another thing, people at their homes, I mean this doesn't only hold true for the iPraktikum but for any level in any lecture, I think their mindset is not only into that work mode. Their mind is probably thinking about doing the groceries, feeding the dog or behind me my boyfriend or girlfriend is working. I feel you are not fully into the topic. This doesn't only hold for students but for me as well and I love to work from home general but then I'm fed up with working from home so I think some balance needs to be found.
I3	For me personally, I don't think that (being at home) impacts me that much, I think it makes switching off and relaxing easy. I think you get distracted at home but also at work. Maybe the atmosphere isn't right. I also think that the person that would do that in an online meeting could also do that in a in-person meeting. Not to that extend and one of the reasons can be being at home, but one of them is that the actual impacts are mitigated by the virtual setting.
I4	To be honest I haven't experienced something like this. Usually everyone has their own room. They are well prepared and just sit until the end of the meeting. There would be a problem if you share your flat or room, but for me there hasn't been any interference let's say. Wherever they were, it was like being in the same room, nobody else.

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I5	If it's in some norm, it's okay, and with all these distractions and being at home it is more difficult to be in a working mindset. For me honestly, I skip some meetings because it is difficult to switch from doing something mundane, to solving world problems.
I6	I haven't seen anything that was a major discomfort. It happens that people talk over one another because there is only one channel and a lot of latency involved. This is slightly annoying but not a big deal I think. Maybe one thing this year is that the sprint planning is a bit sluggish at the moment, that might be due to the virtual setting. It is harder to checkout if someone wants to take over a task, the coach has to wait longer for a response.
I7	Both, you can see people who are very comfortable not sitting together next to each other and being in the virtual environment where there are also people which go into the opposite direction.
I8	I am not sure. I am lucky enough to differ between a bedroom and an office room and leave the work for the office. I know though that this is difficult for most to differ between these two worlds and maybe the people can't relax any more as easily. But most people separate that visually, whether it is with a virtual background or something else. It's been pretty good so far.
I9	It's difficult to say I think when I have a feeling that people are not listening the majority of the time so I mean there really more than 50 percent of the time they aren't listening they are doing something else and I have the feeling they just don't care about this meeting, because again, if you sit with other people you sit up straight most of the time trying to follow, even if they're not very interested they might just look somewhere else but they used to be present, where in these meetings then you can see when people disappear below their tables or just down in the chair. Of course, it's more comfortable at home but I mean it's but maybe part of the job is not being too comfortable.

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I10	I think the first one two meetings are a bit awkward than what they would have been in real life. Just because you press a button and you get thrown into it and there is none of the feedback from the meetings you do in person. Then that kinda fades away a little bit. It gets harder to really estimate the other persons. Once you meet and really try to play games the first two meetings just to get more comfortable with each other. That really helped.
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Table A.3.: Codes of being active in remote meetings

Interview code	Describing experience as PL
I1	Students also become more detached. The ones used to virtual communication (e.g. gamers) are still the same, but other students make use / abuse of this setting to draw back from the meetings, switch off the camera. From a technological perspective, it is also easier to pretend you are present in the meeting, while you are actually doing something else.
I2	I think what is easier to solve in a real setting is that introverted people become more talkative overtime and over zoom at least from what I observed maybe some other project leaders too, is that the more introverted ones stay in their comfort zone and I don't know if psychologist study on that or if they would agree on that and if there is something to it, but in my experience again this online communication does not really develop your communication skills.
I3	That depends from team to team. In the beginning, the students were less comfortable, in the first few weeks. Everyone unmutes themselves when they have something to say, which is in their eyes pretty important. The virtual formal makes it more difficult for the students. But that changes over time when they have met each other already., I think it makes switching off and relaxing easy. I think you get distracted at home but also at work. Maybe the atmosphere isn't right.

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I4	To be honest I haven't experienced something like this. Usually everyone has their own room. They are well prepared and just sit until the end of the meeting. There would be a problem if you share your flat or room, but for me there hasn't been any interference let's say. Wherever they were, it was like being in the same room, nobody else.
I5	Sometimes you have hyperactive people that jump into discussions, and in the virtual setting it is easier to calm them down, by talking over them maybe. And having a 5 minute check-in about the last week where everyone can say what they struggled with university-wise, opens up the communication.
I6	Not that I know of, at least not in a way that would disturb the meeting. So far, the people were focusing on the meeting and quite active.
I7	They don't say anything, they're not very active and even if you speak to them and say hey what do you think about ... and say their name and address questions to them to force them somehow to participate in those meetings. And that's kind of an anti pattern I experienced and that there are those two guys, the ones who are very communicative (most of them I think also have been communicative beforehand) I have to say but for those who are not that communicative I also don't think that they have been very communicative before. I guess they don't know really how to make up their voice during those meetings because there are these very dominant persons which speak all the time, and I bet, when you would give those people who a little bit more shy the chance to say something or space somehow that would work. I also have the feeling, as we never met in person, that you have kind of this distance between the people and if you have the distance and you're a shy person you might be afraid to say something wrong that's where the behavior of not saying something especially for shy people comes from.

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I8	<p>Each three semesters, in the beginning it was a bit weird and difficult because a lot of information gets lost if you can't see how they behave and I think that, if you are in person, sometimes people next to each other have more interactions with each other, and now one person is talking and the others are just listening. This reduces the level of "getting in touch" with each other and get closer faster.</p>
I9	<p>It's difficult to say I think when I have a feeling that people are not listening the majority of the time so I mean there really more than 50 of the time they aren't listening they are doing something else and I have the feeling they just don't care about this meeting right because again if you sit with other people you sit up straight most of the time trying to follow, even if they're not very interested they might just look somewhere else but they used to be present, where in these meetings then you can see when people disappear below their tables or just down in the chair. Of course, it's more comfortable at home but I mean it's but maybe part of the job is not being too comfortable.</p> <p>This is also one of the things that I have observing home really invading the meeting space whether it's about positions like damaged air or on the bed or somewhere in the toilet but also in regards to this really comfortability they should have at home...</p> <p>You would rarely see someone eating in on site meeting, we always brought some food for the middle of the sprint and now you can see people are just bringing their lunch basically during the meeting. But I have heard of this happening so in other key in many other things I mean eating and drinking maybe just one example.</p>

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I10	<p>It's really hard because I was really lucky with my teams. Very motivated teams. Maybe it is even easier in the virtual setting to be active because someone is working in the evening, is on discord and wants to discuss something with the team. In a non-virtual setting you would be more likely to collaborate when you meet up in the work meetings. I wouldn't say that it's better, but it's not worse.</p> <p>Sometimes someone rings the door, or someone is in the train. I would not mind, but if the meeting was non-virtual, maybe they would not come at all to the meeting...</p> <p>Totally, also because of the mask, and poor internet connection, you can't really understand what they are saying. The train can be a bit tricky.</p> <p>I don't mind, if the team is being functional, I don't care if it happens once or twice. Yeah that person then doesn't speak that much during the meeting and tries to listen more, but happened only once. It didn't even bother me. Because our meetings again are super smooth. And it was a process to get there.</p>
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Table A.4.: Codes of inappropriate behaviours

<b>Behaviours</b>	<b>Interview Code from the interview</b>
Join meetings from random places	I2
	On a specific instance: I noticed that he was more focused on his thoughts than on the team spirit or activities. They were always in a rush, what I did not notice is that the team was also not happy with his productivity and performance
	I4
	This person doesn't care about getting the most out of the iPraktikum and the meeting
I6	They don't know how to be professional
Being muted and not participating actively	I7
	This person is not as experienced and are usually lacking in productivity

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	I2	They are just shy/ introverted. You could think he would be one of the people that tags along.
	I4	They think this is just another lecture and they just say something in the standup table and then they just mute themselves and don't speak a word for the rest of the meeting. They just join to not be punished.
	I9	They are doing something else. I am concerned that this effects their productivity
Constantly switching the camera on and off	I2	It's very confusing when they do this and it annoys me
	I3	having it off without a reason is a bit strange, gives me the feeling that they are not really paying attention, and that they have something else going on that they need to pay attention to and don't want to show, and that def. effects the way I see someone in a meeting.
	I7	It's definitely an anti-pattern, I don't like that
	I9	This shouldn't happen, this is a meeting, and all should commit and respect each other
Engaging in physical movements	I3	...or walking around it's worse.
	I7	This is rude and unprofessional
Engaging in conversation with other people in their physical room	I3	Inappropriate and disinterest in the meeting
	I5	That is totally unacceptable, you are in a team meeting, and should be 100 percent focused there, even for me, I let everyone know that they should not bother me or distract me while in a team meeting.

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	I7	Disrespectful towards everyone in the meeting. This is distracting to the participants of the meeting, me included, and steals our attention from the meeting.
	I9	It is unprofessional as the private life should not interfere with the meeting. Other team members might not feel being taken seriously.
Agreeing to "too many" things in the meeting or use empty phrases but are not actually delivering	I3	They were being too optimistic, and asking about the consequences of not achieving something on time, and that gave me the impression they were lazy.
	I1	It feels like I'm interacting with a clam
	I4	They are not interested in the project
	I5	It's not in their culture to ask for support
Actively doing something beside the meeting on their computer	I4	I would consider this rude and are not eager to bring the project forward
	I3	I think when you are actually doing something in you laptop is less inappropriate (than communicating with others in the room)
	I9	Most of the time I don't attribute that to the performance but in some cases I do, when I see that some person is doing this all the time.
Slouching and looking quite sleepy	I7	They are probably bored and are not really attending
	I9	They are not in the mood and are quite inappropriate. They don't care about getting out of the comfort zone of home. They feel too comfortable at home.
Constantly interacting with their phone. They look at it, take phone calls...	I2	They might be waiting for something important

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I4			It is obvious they are not as interested in what everyone else is saying, or in the project at all. I would def draw the conclusion that they don't really want to pay attention, they think it is not important what is being said.
I5			Checking the phone is something that would not normally happen in a meeting
Having a stack of dishes waiting to be cleaned and a pile of clothes behind	I5		This person is quite disorganized and that translates to their work
	I7		This is disrespectful to the participants, especially in formal meetings
A person doesn't make themselves visible in the meeting (because they sit in the dark, the camera is in a weird position)	I5	I9	It is a bit weird and they at least looking in the direction of the camera. They are not really being attentive. They don't want to participate in the activities and don't want to show when they are doing something else
	I10		They couldn't do better
Facing problems connecting their devices or seems reluctant to do so	I2		Not knowing how to connect to zoom, or screen share, which has no excuse for a computer scientist.
	I3		If it takes for example long for you to connect. But we are also human and that is excusable if you directly communicate that. In the meeting itself it does leave a bad mark if you are screen sharing and you have 20 tabs open. Or if you need to tell a person three times that they need to share their screen for a demo and still doesn't happen then it does leave a bad impression. I think it shows that you are not interested, probably opened that just before sharing the screen.

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	I4	Yeah that's definitely something annoying when some people open up their laptop one minute before and then they say they still have to update zoom or install something... It's of course frustrating when people come unprepared and don't have everything ready and so on. There is always one person in the meeting that is unprepared.. showing that this doesn't have any priority for them.
Leave early from a meeting, being late at a meeting or not attending:	I1 I2 I3 I4	Unaware that the iPraktikum goes beyond the scope of a practical course Coming late to meeting is quite annoying Of course there is rude behaviour, like ... or joining late, like in normal in-person meeting ... this person doesn't want to be there because maybe always wants to jump off at the ending
Having audio issues and a bad quality of the sound	I2 I4	I know that it is hard, and I know that not everyone can afford having a good mac, but this is your profession. This is your work environment and need to invest in it. I know sometimes it's hard to listen to, it hurts my ears if I have to listen to that for two hours.. he's always then shouting and so on... a bad microphone quality can def hurt.
A student constantly interrupts/talks over the others:  not looking into the direction of the camera	I7 I9 I3	That's very unprofessional and rude They want to dominate the situation and not make the others heard They should at least look into the direction of the camera (interview 3), otherwise more social cues are missing

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Walking out of the meeting unannounced:	I3	Of course there is rude behaviour, like exit the zoom meeting without saying anything and no one understands what happened there...
	I8	Rude
Directly communicating with the customers:	I1	Lack of professional communication, communication streams are less professional
Not agreeing to using certain tools	I2	I think there are a few ruder things here and there. E.g. I don't use tool x and y because whatever reason. This is not great for everybody, blockading a tool makes it a bit harder on the team.

Table A.5.: Questionnaire

Survey question	Statements or Attributions
Q1: If one of your team members would often join meetings from their phone, (e.g. while running errands, commuting) would you think:	A1.1: They are not actually attentive and should schedule more time for the meetings A1.2: This person might not be involved in the team spirit A1.3: This person isn't particularly interested in getting the most out of the iPraktikum and the meeting A1.4: I would personally consider this quite unprofessional
Would some other statements better describe your impression?	
Q2: A person in your team is mostly just listening during the meetings and is muted almost all the time:	A2.1: This person is probably not as experienced as the others A2.2: I would assume they are doing something else in parallel A2.3: They are just shy/introverted A2.4: They consider the iPraktikum the typical uni lecture and are just there to not absent

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	A2.5: They are likely facing impediments with their tasks/ struggling with productivity
Would another statement be more fitting?	
Q3: But then you realize that a person is actively doing something besides the meeting on their computer (seems focused on another task, are typing):	<p>A3.1: I would consider this impolite towards the participants of the meeting</p> <p>A3.2: The advancement of the project might not be a priority</p> <p>A3.3: The project itself is seemingly not appealing to them</p> <p>A3.4: They probably just want to pretend to be in the meeting, but not put in the work</p>
Maybe something else applies?	
Q4: One of the team members constantly turns their camera on and off to do something meanwhile:	<p>A4.1: I would assume they are not that committed to the project and teamwork</p> <p>A4.2: It's confusing to me why they do this and a bit disrespectful</p> <p>A4.3: They are possibly not actively listening and don't want to show what they are doing instead</p>
Would another statement be more suitable to you?	
Q5: A person enters/is in the room of one of the participants and they might even engage in conversation:	<p>A5.1: This might be offensive towards the participants in the meeting</p> <p>A5.2: To me, it looks like they are not focused on the meeting and get distracted easily</p> <p>A5.3: This might indicate that they are not contributing enough to the team</p> <p>A5.4: They probably easily mix private and professional life</p>
If none of these statements apply, what would?	
Q6: A student is agreeing to "too many" things in the meeting or use empty phrases, but are not actually delivering:	<p>A6.1: They might be lacking the skills to keep up to their promises</p> <p>A6.2: Not getting enough feedback makes me think this is not a person you can easily deal with</p>

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	<p>A6.3: They might not be really interested in the project and are just pretending to agree</p> <p>A6.4: It's not in their culture/personality to reply or ask for support</p>
Other better-fitting statement maybe?	
Q7: A person in the team is slouching and looking quite sleepy...	<p>A7.1: Perhaps, they are bored and are not really attending</p> <p>A7.2: This "sluggishness" probably translates into their work</p> <p>A7.3: They might consider it unnecessary to get out of the comfort zone of their home and make an extra effort</p>
Another opinion maybe?	
Q8: One team member is constantly interacting with their phone. They look at it, check notifications, take phone calls, even type...	<p>A8.1: They could be into social media or communication apps</p> <p>A8.2: This is quite an immature thing to do in meetings</p> <p>A8.3: They are not interested in the discussion and in what everyone else is saying</p>
Other reasons?	
Q9: A student has a stack of dishes waiting to be cleaned or a pile of clothes behind. You think:	<p>A9.1: This person might be disorganized in their work too</p> <p>A9.2: This could be disrespectful to the participants, especially in formal meetings</p>
Would another statement be more suitable	
Q10: A person doesn't make themselves visible in the meeting (not because their camera is off, but because they sit in the dark, the camera is in a weird position):	<p>A10.1: They don't want to show their facial expressions and reactions</p> <p>A10.2: This could make me suspicious of their performance</p> <p>A10.3: They might not be the most engaged and cooperative in the team</p>
If you disagree, would there be a more realistic perception?	

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Q11: One of the participants is facing problems connecting his devices or seems reluctant to do so. You probably also see other things open on their screen:	<p>A11.1: The iPraktikum is not a priority to them this semester</p> <p>A11.2: They are probably just opening the page before having to share the screen</p> <p>A11.3: They might not be actively sharing so they don't have to show their actual progress</p>
Other reasons this might happen?	
Q12: A student is having audio issues and the quality of the sound is very bad.	<p>A12.1: They should consider switching or investing in a more professional setting</p> <p>A12.2: It might hurt the quality of the meeting and it renders the person less approachable</p> <p>A12.3: It makes me think that this person is not motivated</p>
Another opinion you would have?	
Q13: A student constantly interrupts/talks over the participants of a meeting:	<p>A13.1: They want to impose their opinion on others</p> <p>A13.2: That don't want the other members to be heard which is quite improper</p> <p>A13.3: This is personally even rude</p>
Or maybe something else?	
Q14: Having the camera on, the student engages in physical movements, like walking around or performing some physical exercise:	<p>A14.1: This is inconsiderate towards the other participants</p> <p>A14.2: To me, it shows an unwillingness to adapt to a professional setting</p>
If disagreeing, how would you consider this behaviour instead?	
Q15: To what extent do the following statements apply to you?	<p>A15.1: I trust other people almost immediately</p> <p>A15.2: It's difficult for me to trust other people actually</p> <p>A15.3: I usually get concerned about the well-being of this person, and instruct the coach to look into that</p> <p>A15.4: It is not my responsibility to make others feel better or look after everyone</p> <p>A15.5: I am quite sharp-tongued when I get back at others</p>

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	A15.6: I usually try not to contradict others A15.7: I state my opinion several times since I know which is the right thing to do
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Table A.6.: Frequencies of attribution responses

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
A1.1	0%	0%	11.1%	44.4%	44.4%
A1.2	0%	11.1 %	22.2%	44.4%	22.2%
A1.3	0%	11.1%	0%	55.6%	33.3%
A1.4	0%	11.1%	22.2%	22.2%	44.4%
A2.1	11.1%	22.2%	55.6%	11.1%	0%
A2.2	0%	44.4%	33.3%	22.2%	0%
A2.3	0%	0%	11.1%	66.7%	22.2%
A2.4	11.1%	11.1%	55.6%	22.2%	0%
A2.5	11.1%	22.2%	44.4%	22.2%	0%
A3.1	0%	0%	0%	44.4%	55.6%
A3.2	0%	0%	22.2%	77.8%	0%
A3.3	0%	22.2%	44.4.1%	33.3%	0%
A3.4	0%	22.2%	44.4%	11.1%	22.2%
A4.1	0%	11.1%	55.6%	33.3%	0%
A4.2	0%	0%	11.1%	44.4%	44.4%
A4.3	0%	0%	22.2%	66.7%	11.1%
A5.1	0%	11.1%	22.2%	33.3%	33.3%
A5.2	11.1%	11.1%	44.4%	33.3%	0%
A5.3	0%	66.7%	33.3%	0%	0%
A5.4	11.1%	11.1%	44.4%	33.3%	0%
A6.1	0%	0%	0%	100%	0%
A6.2	0%	22.2%	44.4%	33.3%	0%
A6.3	0%	44.4%	22.2%	22.2%	11.1%
A6.4	0%	0%	44.4%	55.6%	0%
A7.1	0%	33.3%	11.1%	55.6%	0%
A7.2	11.1%	22.2%	44.4%	22.2%	0%
A7.3	0%	22.2%	44.4%	33.3%	0%
A8.1	0%	0%	33.3%	33.3%	33.3%
A8.2	0%	0%	44.4%	55.6%	0%

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A8.3	0%	0%	0%	33.3%	66.7%
A9.1	11.1%	33.3%	33.3%	22.2%	0%
A9.2	11.1%	33.3%	22.2%	22.2%	11.1%
A10.1	0%	55.6%	33.3%	11.1%	0%
A10.2	22.2%	22.2%	33.3%	22.2%	0%
A10.3	11.1%	33.3%	22.2%	22.2%	11.1%
A11.1	0%	33.3%	33.3%	33.3%	0%
A11.2	0%	11.1%	66.7%	22.2%	0%
A11.3	0%	33.3%	44.4%	22.2%	0%
A12.1	0%	11.1%	33.3%	44.4%	11.1%
A12.2	0%	0%	0%	44.4%	55.6%
A12.3	22.2%	22.2%	44.4%	11.1%	0%
A13.1	0%	22.2%	0%	66.7%	11.1%
A13.2	0%	33.3%	33.3%	33.3%	0%
A13.3	0%	0%	33.3%	44.4%	22.2%
A14.1	0%	22.2%	0%	55.6%	22.2%
A14.2	0%	11.1%	0%	66.7%	22.2%

Table A.7.: Persona allocation

Behaviour	Responses	Personas				
		The Unprofessional	Ego is the enemy	L'Étranger	The Loner	The Underperformer
1. One of your team members often joins meetings from their phone, (e.g. while running errands, commuting)	They are actually not attentive and must schedule more time for the meetings This person might not be involved in the team spirit		*	*		

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	This person isn't particularly interested in getting the most out of the iPraktikum and the meeting I would personally consider this quite unprofessional	*	*				
2. A person in your team is mostly just listening during the meetings and is muted almost all the time	This person is probably not as experienced as the others  I would assume they are doing something else in parallel  They are just shy/introverted  They consider the iPraktikum the typical uni lecture and are just there to not absent  They are likely facing impediments with their tasks/ struggling with productivity			*	*	*	
3. But then you realize that a person is actively doing something besides the meeting on their computer (seems focused on another task, are typing)	I would consider this impolite towards the participants of the meeting  The advancement of the project might not be a priority  The project itself is seemingly not appealing to them  They probably just want to pretend to be in the meeting, but not put in the work	*	*				
4. One of the team members constantly turns their camera on and off to do something meanwhile:	I would assume they are not that committed to the project and teamwork			*			

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	<p>It's confusing to me why they do this and a bit disrespectful</p> <p>They are possibly not actively listening and don't want to show what they are doing instead</p>	*				
5. A person enters/is in the room of one of the participants and they might even engage in conversation:	<p>This might be offensive towards the participants in the meeting</p> <p>To me, it looks like they are not focused on the meeting and get distracted easily</p> <p>This might indicate that they are not contributing enough to the team</p> <p>They probably easily mix private and professional life</p>	*			*	*
6. A student is agreeing to "too many things in the meeting or use empty phrases, but are not actually delivering:	<p>They might be lacking the skills to keep up to their promises</p> <p>Not getting enough feedback makes me think this is not a person you can easily deal with</p> <p>They might not be really interested in the project and are just pretending to agree</p> <p>It's not in their culture/personality to reply or ask for support</p>		*	*	*	
7. A person in the team is slouching and looking quite sleepy...	Perhaps, they are bored and are not really attending					*

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	<p>This "sluggishness" probably translates into their work They might consider it unnecessary to get out of the comfort zone of their home and make an extra effort</p>		*		*	
8. One team member is constantly interacting with their phone. They look at it, check notifications, take phone calls, even type...	<p>They could be into social media or communication apps This is quite an immature thing to do in meetings They are not interested in the discussion and in what everyone else is saying</p>	*	*			*
9. A student has a stack of dishes waiting to be cleaned or a pile of clothes behind. You think:	<p>This person might be disorganized in their work too This could be disrespectful to the participants, especially in formal meetings</p>	*			*	
10. A person doesn't make themselves visible in the meeting (not because their camera is off, but because they sit in the dark, the camera is in a weird position):	<p>They don't want to show their facial expressions and reactions This could make me suspicious of their performance They might not be the most engaged and cooperative in the team</p>			*		*
11. One of the participants is facing problems connecting his devices or seems reluctant to do so. You probably also see other things open on their screen:	<p>The iPraktikum is not a priority to them this semester</p>		*			

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	<p>They are probably just opening the page before having to share the screen They might not be actively sharing so they don't have to show their actual progress</p>		*				
12. A student is having audio issues and the quality of the sound is very bad.	<p>They should consider switching or investing in a more professional setting It might hurt the quality of the meeting and it renders the person less approachable It makes me think that this person is not motivated</p>	*		*			
13. A student constantly interrupts/talks over the participants of a meeting:	<p>They want to impose their opinion on others They don't want the other members to be heard which is quite improper This is personally even rude</p>	*	*				
14. Having the camera on, the student engages in physical movements like walking around or performing some physical exercise:	<p>This is inconsiderate towards the other participants, pants To me, it shows an unwillingness to adapt to a professional setting</p>	*	*				