

The Influence of Displayed Emotions in Facial Expressions on Persuasiveness

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Abstract

The board of directors resides at the apex of the organizational pyramid, and can thus be seen as the highest legal authority within an organization. However, corporate scandals like Enron, the Lehman Brothers, and more recently, Volkswagen, have discredited the role of the board. Therefore, the board is encouraged to take a more active role within organizations. The purpose of this research is to examine the influence of facial emotional display on the persuasiveness of board members on an individual level. The influence of the display of the emotions anger, happiness, and sadness were analysed in 110 board meetings of the Dutch Water Authorities. This study draws upon both social psychology and pitching literature to explain why individual board members may differ in their persuasive capabilities. The empirical results indicate that the facial display of these emotions does not have a significant influence on the persuasiveness of individual board members.

Keywords: board of directors, top management team, displayed emotions, Dutch Water Authorities, binary logistic regression.

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Chapter 1: Introduction

The board of directors resides at the apex of the organizational pyramid, and can thus be seen as the highest legal authority within an organization (Boivie, Bednar, Aguilera, & Andrus, 2016). The board is of vital importance with regard to the strategic decision-making process in organizations (Forbes & Milliken, 1999). Within organizations, the board takes on two important roles concerning the top management team (TMT); both an advising and a monitoring role (Luciano, Nahrgang & Shropshire, 2020). However, corporate scandals like Enron, the Lehman Brothers, and more recently, Volkswagen, have discredited the role of the board. Therefore, the board is encouraged to take a more active role within organizations (Withers, Hillman, & Cannella, 2012).

The importance of the board is stressed in prior research, which points towards positive relationships between board performance and both firm value (Knyazeva, Knyazeva, & Masulis, 2013) and corporate survival (Chancharat, Krishnamurti, & Tian, 2012). Most prior studies focus on the relationship between board performance and group-level characteristics. Examples of these group-level characteristics are board size, board diversity, and meeting frequency (Boivie et al., 2016; Milliken & Martins, 1996; Coles, Daniel & Naveen, 2008; Gabriel, Diamond, Acosta & Grandey, 2013). Recently, more and more scholars are proposing characteristics of individual board members that constitute an effective monitor. Examples of these characteristics are busyness, (Cashman, Gillan & Jun, 2012), independence, expertise, bandwidth, and motivation of the directors (Hambrick, Misangyi & Park, 2015).

The board of directors and the TMT interact in board meetings, where board members can both monitor or advice the TMT about decisions or actions. Currently, the corporate governance literature assumes that the TMT will incorporate this in their decision. On the contrary, social psychology literature has taught us that, within teams, a negotiating and bargaining process is present that determines the extent to which information is incorporated in decisions (Thompson et al., 1996). So, this indicates that the TMT will not always be persuaded by the board of directors. To explain why the persuasiveness of the board of directors concerning the TMT may differ, this research will conceptualize the interaction between the two as a negotiation process. Both social psychology and corporate governance literature are used to explain the difference in persuasiveness on the individual board member level.

Persuasiveness can be displayed in emotions (Kopelman, Rosette, & Thompson, 2006). Emotions can serve as a manipulative negotiation tactic that is used to persuade the other party to take a different course of action than previously anticipated (Kopelman et al., 2006). This holds also true for the negotiating and bargaining process, where the expression of emotions can play a crucial role (Andrade & Ho, 2007). The face is commonly regarded as the most important medium for emotional displays (Mehrabian, 1971; Sato, Hyniewska, Minemoto & Yoshikawa, 2019). These

emotions are commonly displayed through facial expressions (Ekman, 1965; Ekman & Friesen, 1974). However, thus far the role of displaying emotions concerning board effectiveness on an individual level has been overlooked. This study will therefore examine the influence of facial emotional display on the persuasiveness of board members on an individual level.

The persuasiveness of individual board members can be expressed in displaying both positive or negative emotions. Happiness serves as the most common example of positive emotions, while anger and sadness can be regarded as examples of negative emotional display. However, every individual board member will likely be characterized by an average, standard facial expression. Some people are characterized by a face that, on average, scores high values on the emotional display of anger, while others score high average values on the display of happiness. It can be assumed that others might be affected by someone's average, standard angry face at first, but that this effect diminishes quickly when people find out that this is just their standard facial expression. Therefore, the average standard emotion of individual board members is included as a moderating variable in the analysis.

So, this study will try to fill the gap in the current literature base with regard to the facial display of emotions and persuasiveness in board meetings on an individual level. This paper will contribute to both the corporate governance literature and social psychology literature by investigating this relationship within the Dutch Water Authorities. The role of displaying emotions through facial expressions with regard to the concept of persuasiveness has thus far been overlooked in the corporate governance literature. This study will incorporate the effect of happiness, anger, and sadness and explore their relationship with the persuasiveness of board members on an individual level. This could help clarify what exactly constitutes a persuasive board member.

In this paper, the board meetings of the regional Dutch Water Authorities are examined. This authority is a public sector organization that is responsible for water management on a regional level (Havekes, Koster, Dekking, Uijterlinde, Wensink & Walkier, 2017). Videos of the board meetings are publicly available due to the Freedom of Information Act in the Netherlands. This makes the Dutch Water Authorities an interesting object of study, as the interactions between the board of directors and the TMT are captured.

The remainder of this paper is structured as follows. The following section will describe the general theoretical framework which incorporates relevant concepts and theories concerning facial expressions and persuasiveness. The explanation of the data and the methodological approach will be provided in chapter 3, while chapter 4 will present the empirical evidence following this methodological approach. A discussion concerning this study will be provided in chapter 5, and some concluding remarks and practical implications will be given in chapter 6.

Chapter 2: Theoretical Background

2.1 The Board of Directors

The board of directors can be found at the apex of the organizational pyramid (Luciano et al., 2020), and play an important role in the strategic decision-making process (Forbes & Milliken, 1999). In addition to this, boards can influence the strategy formulation process when providing advice to managers considering various strategic alternatives (Forbes & Milliken, 2010). Two main tasks of the board can be distinguished; (1) monitoring managers and firm performance, and (2) providing advice and access to resources (Hillman & Dalziel, 2003). The monitoring role of the board constitutes monitoring managers' behavior and advising them about the strategy identification as well as implementation (De Andres & Vallelado, 2008). Within the literature, two dominant theoretical perspectives concerning these roles of the board can be distinguished; (1) agency theory, and (2) resource dependency theory.

The agency theory separates the decision management and risk-bearing functions within the firm (Fama & Jensen, 1983). The TMT is commonly responsible for both suggesting and implementing policy initiatives, while the shareholders are bearing the risks associated with these decisions (Bathala & Rao, 1995). This unequal division of risk makes way for the agency problem between the TMT and the shareholders. According to Eisenhardt (1989), the agency theory arises when (a) the desires or goals of the shareholders and TMT conflict, (b) it is difficult or expensive for the shareholders to verify what the TMT is doing, and (c) the shareholders and TMT incorporate different attitudes towards risk. The main task of the board is to minimize the agency problem by controlling and monitoring the TMT, so it acts in the best interest of the shareholders and other stakeholders (Fama & Jensen, 1983; Payne, Benson & Finegold, 2009; Scholt & Kieviet, 2018). This also includes the maximization of shareholders' returns (Fama & Jensen, 1983; Jensen & Meckling, 1976). As previously mentioned, one way to do this is by advising the TMT about strategy identification and implementation (De Andres & Vallelado, 2008). However, other perspectives redefine this monitoring role of the board to a more mediating role (Lan & Heracleous, 2010)). They argue that the boards should be treated as mediating hierarchs, that balance competing interests and provide safeguards against mutual opportunism (Lan & Heracleous, 2010).

The monitoring role of the board is thus centered around the agency theory. However, this role also covers the safeguards concerning mutual opportunism between the principal (i.e. shareholders or stakeholders) and agents (TMT). The persuasiveness of the individual board member can help to safeguard either the principal or agent against the opportunism of the other party. On the other hand, the resource dependence theory implies that the effectiveness of the board consists

of the external resources that individual members bring in, that would otherwise not be available (Pfeffer & Salancik, 2003; Pugliese, Minichilli & Zattoni, 2014). This perspective sees the board as an asset that can contribute to the value creation process (Hillman, Withers & Collins, 2009).

Sundaramurthy and Lewis (2003) argue that board capital is critical for enhancing advice and resource provision. The question arises whether we can classify persuasiveness as some form of social capital. So, the resource dependence theory is reflected in the second role of the board; providing advice and access to resources.

This study focuses on the interaction between the board of directors and the TMT. It specifically focuses on the role of individual board members concerning the persuasion process. The board can try to persuade the TMT to make promises ('toezeggingen') that will incorporate certain action(s) in it. For instance, the TMT can promise to continually monitor the water quality of a certain river or stream at the request of the board of directors. Individual board members can speak up in board meetings to provide arguments to the TMT, to try and persuade them to make a promise about that specific subject.

2.2 Board Effectiveness

In most organizations, groups or teams are of vital importance concerning planning and strategic decision-making (Gilad & Gilad, 1986). The board of directors can be seen as such a team or group that is responsible for processing strategic issues (Forbes & Milliken, 1999). Prior studies on board effectiveness often draw upon group dynamics and group-decision making theories (Boivie et al., 2016). Boards have a lot in common with decision-making teams and can be regarded as social structures (Forbes & Milliken, 1999; Payne et al., 2009). But, determining the effectiveness of a board is difficult. Most studies focus on the role of board group effectiveness with regard to firm performance (Daily, Dalton & Cannella (2003; Hermlin and Weisbach 2001; Ruigrok, Pecks & Keller, 2006; Stiles, 2001). However, this relationship between board effectiveness and firm performance is regarded as ambiguous. The question arises whether firm outcome's like firm value or profit can be viewed as board effectiveness. The board's primary functions are to monitor, provide advice, and thus, to act in the shareholders' interest. So, to directly increase firm value or profit is not part of their primary functions. Determining what part of a firm's profit can be attributed to a specific, individual board member is extremely hard, or maybe even impossible. As this study focuses on the individual level of the board, board effectiveness should be measured in another way.

On the individual level, a board member could be regarded as more effective when he or she has relatively more successful attempt of persuasion. As previously mentioned, this successful attempt of persuasion is reflected in a promise of the TMT. Thus, it seems more appropriate to

regard the promises of the TMT to the board of directors as board effectiveness on the individual level. This individual-level study will therefore regard the promises of the TMT to the board of directors as board effectiveness. Additionally, board effectiveness can thus be seen as the degree of persuasiveness. For conceptual reasons, board effectiveness will be used in the analysis.

2.3 Persuasiveness

The process of persuasion is part of social interactions. This paper covers the interaction between the board of directors and the TMT. Persuasiveness can be defined as (Pornpitakpan, 2004): “A term to describe the ability how a person can change others opinions.” Pornpitakpan (2004) adds that a highly persuasive person can change another person’s decision in a discussion. However, LaCrosse (1975) defines persuasiveness more specifically in an organizational context: “The degree to which a person with an advising role does have the effect of inducing other people to believe some attitudinal and/or behavioral change might be beneficial for him.” This definition seems more appropriate as it specifically reflects on the advising role of the board. An important addition to this comes from Reardon (1991), which states that persuasion is free-of-will. Changing somebody’s behavior or mind with force is not regarded as an act of persuasion. In board meetings, the TMT can make promises to the board of directors that incorporate certain actions. In order to persuade the TMT, board members can speak up and use arguments or facial expressions. As previously mentioned, negotiation and bargaining are important concepts when talking about team decisions (Thompson et al., 1996). The process of persuading the TMT to make a promise can be regarded as such a negotiation or bargaining process.

Aristotle was the first person to break down the principles of persuasion in a scientific manner (Demirdöğen, 2010). Aristotle argued that other people’s opinions could be manipulated by incorporating certain emotions or by framing the argument with emotion (Aristotle, 350 BC/2004). Aristotle broke down the concept of persuasion into three different components: (1) logos (reason), (2) ethos (credibility), and (3) pathos (emotion). Conger (1998) proposed four steps in the persuasion process: (1) establishing credibility, (2) frame for common ground, (3) provide evidence, and (4) connect emotionally. The first step in this process, establishing credibility, can grow in the workplace out of two major sources: expertise and relationships. Practically, this implies to actively listen, demonstrate emotional maturity and value the other person’s opinion (Jena & Pradhan, 2020). The second step consists of framing for common ground. Conger (1998) uses the example of getting a child on a trip to a grocery store. The best way to do this is to point out that there are lollipops at the store. This might feel like a deceptive way, but you are merely using a persuasive way of framing the benefits of such a trip. To generalize this to an organizational context, it is the process of identifying

and pointing out the shared benefits. The third step embodies the provision of evidence. This implies that the persuader should neutralize the challenging alternatives by providing logical facts and figures, that are of interest to all the parties involved (Jena & Pradhan, 2020). The fourth and last step is all about connecting emotionally. This is regarded as one of the most important steps, where the persuader has to read the emotional state of the audience, while at the same time, tuning their own arguments based on this emotional state (Pradhan, Jena & Gitakumari, 2016).

The last step, emotional connectivity, points out the importance of emotions with regard to the persuasion process. However, the question arises of how we can incorporate and display emotions in this persuasion process. The next section will dive deeper into the relationship between the display of emotions and persuasiveness.

2.4 Displaying Emotions

Prior studies have shown that emotional expression can play a crucial role with regard to the negotiation and bargaining process (Andrade & Ho, 2007). For board members, that incorporate an advising role, persuasiveness can be channeled or transferred through nonverbal behavior (LaCrosse, 1975). So, the display of emotions can be channeled through nonverbal behavior like, for example, facial expressions. Thus, as emotions can serve as a means of persuasion (Forgas, 2001), the persuasiveness of individual board members can be displayed in emotions. Within the literature, the face is commonly regarded as the most important medium to display emotions (Mehrabian, 1971; Sato, Hyniewska, Minemoto & Yoshikawa, 2019). This implies that facial expressions can be used to display emotions to, for instance, other board members or the TMT (Bonaccio, O'Reilly, O'Sullivan, & Chiocchio, 2016). However, as emotions can serve as a means of persuasion, the display of emotions can also be employed as a manipulative negotiation tactic (Kopelman et al., 2006). This suggests that board members could intentionally use facial expressions in order to increase their individual persuasiveness. Within the literature, eight basic emotions expressed facially can be distinguished; anger, contempt, disgust, fear, happiness, neutral, sadness, and surprise (Ekman and Friesen (1971; 1974). However, previous research has indicated that the computer-aided facial analysis algorithms are most reliable with regard to only four of the basic facial expressions, namely: happiness, anger, fear, and sadness (ack, Garrod & Schyns, 2014).

The current literature base mainly points towards the theoretical mechanisms underlying the relationship between persuasiveness and facial emotional expressions of happiness, anger, and sadness. These specific relationships or topics have not received a lot of attention in the current corporate governance literature base. However, the pitching literature with regard to, for instance, raising funds has described and analyzed this topic and its corresponding relationships. However,

prior studies within this pitching literature point out that emotional facial expressions have to fall in-between certain thresholds (Shields, 2005). These thresholds or boundaries are formed by society itself. For instance, the entrepreneurial pitching literature has described certain theoretical mechanisms with regard to the relationship between persuasiveness and facial display of emotion. However, they propose inverted U-shaped relationships, as, for example, the overexpression of happiness is associated with naivety (Barasch, Levine, & Sweitzer, 2016), while the over-expression of anger is associated with constructive problem solving (Averill, 1982). Common sense would probably also agree with these mechanisms when generalizing this for the board of directors' literature, as trying to convince or persuade other board members with the biggest smile ever could be perceived as naïve or unprofessional. However, it remains unclear whether these mechanisms also hold through with regard to corporate governance. This study will try to unravel whether the mechanisms or relationships described within, for instance, the entrepreneurial pitching literature, also, hold true with regard to corporate governance.

Therefore, the next section will explore and describe the mechanisms and relationships with regard to the relationship between persuasiveness and the emotional display in facial expressions.

2.4.1 Anger

The emotional display of anger can help negotiators or persuaders to obtain concessions from their opponent(s) (Van Kleef, van Dijk, Steinel, Harinck & van Beest, 2008). Sinaceur and Tiedens (2005) point out that this only holds for face-to-face negotiations where the other party perceives the alternatives as weak. The facial display of anger is associated with favorable perceptions of ambition, competence, determination, toughness, power, and status (Hareli and Hess, 2010; Harmon-Jones, Schmeichel, Mennit, & Harmon-Jones, 2011; Tiedens, 2001; Veling, Ruys, & Aarts, 2012). Within the funding literature, these attributes are assumed to be valued by potential funders within the persuasion process (Alsos & Ljunggren, 2017). Moreover, men that express anger are associated with more social status, while women are associated with less social status when expressing anger (Brescoll & Uhlmann, 2008). The mechanisms and relationships described above point towards a positive relationship between both anger and persuasiveness.

On the contrary, the expression of anger could also spur the act of retaliation by the other party (Allred, 1999). This could ultimately lead to a deadlock or even an escalation of conflict (Ury, Brett & Goldberg, 1988). Allred (1997) shows that negotiators incorporating high levels of anger and low levels of compassion reduces the desire for future negotiations. In addition, displaying anger too often or exceeding a certain threshold, can increase the probability of negative outcomes (Geddes,

Callister, & Gibson, 2020). Concerning the board, this could lead to a failed attempt of persuasion when the individual board member facially displays high levels of anger.

So, both positive as well as negative effects of the facial expression of anger on persuasiveness are identified, which makes the relationship between the two rather ambiguous. However, as the above indicates, a negative relationship between the display of anger most commonly occurs when the persuader expresses extremely high levels of anger. On the contrary, lower levels of anger expression could increase the persuasiveness of individuals. Averill (1982) provides a comparable theoretical argument for these effects, as the author argues that expressing high levels of anger is associated with constructive problem solving. However, expression of extreme anger is associated with impulsiveness and may be counterproductive (Averill, 1982). The latter suggests a curvilinear relationship between the facial, emotional display of anger and the individual persuasiveness of board members.

Therefore, the following hypotheses are suggested:

Hypothesis 1: The facial display of anger is positively related to board effectiveness on the individual level.

Hypothesis 2b: The effect of the display of the emotion anger is weaker for high values of the anger.

2.4.2 Happiness

The expression of happiness of a team member concerning, for instance, another team member or a certain topic, can instill a more favorable attitude to that person or topic for another team member (Van Kleef, van den Berg & Heerdink, 2015). Happiness is also associated with confidence (Gleicher & Weary, 1991). High levels of confidence lower the necessity of people to process the message itself, thus, increasing the chance of persuasion. According to Izard (1977) and Tomkins (1962), people tend to be more attracted to people that exert happiness, which in turn can lead to strong social bonds. These stronger bonds can be helpful when trying to persuade, for instance, the TMT. The facial display of happiness can also increase the perceived competence and assertiveness (Lyubomirsky, King, & Diener, 2005), which in the entrepreneurial pitching literature, is associated with more funding (Anglin, Short, Drover, Stevenson, McKenny, & Allison, 2018). Within the entrepreneurial pitching literature, increasing the amount of funding is associated with a successful attempt of persuasion. Therefore, according to the current literature base, the display of happiness is associated with an increased persuasiveness (Warnick et al., 2021) of individual board members.

However, prior studies within the entrepreneurial pitching literature also argue that overly expression of positive emotions, like happiness, can lead to negative inferences about the person displaying these emotions. The overly expression of happiness is associated with naivety and as more likely to avoid negative information (Barasch et al, 2016). These attributes can work counterproductive with regard to the persuasive act of board members (Warnick et al., 2021). In turn, this can lower, or even fully diminish the positive effect of the display of happiness on persuasiveness.

Again, the relationship between the display of happiness and persuasiveness is rather ambiguous, as both positive and negative relationships are described in the current literature base. To follow the same intuitive and theoretical path as described in the previous section about the emotional display of anger, another curvilinear relationship is expected (Averill, 1982; Warnick et al., 2001). This curvilinear relationship between the display of happiness and persuasiveness on an individual level points towards a negative relationship between the display of happiness and persuasiveness for the higher values associated with happiness. The other values associated with the display of happiness are expected to be positively related to the persuasiveness on an individual level.

Therefore, the following hypotheses are suggested:

Hypothesis 2: The facial display of happiness is positively related to board effectiveness on the individual level.

Hypothesis 2b: The effect of the display of the emotion happiness is weaker for high values of the happiness.

2.4.3 Sadness

Sadness is the third and last emotion included into the analysis. Sadness can elicit empathy and sympathy from others, and the perception of being nice, warm and likeable, increasing the chance of persuasion (Clark, Pataki & Carver, 1996; Eisenberg, 2000; Keltner & Buswell, 1997). With regard to group dynamics, as in board meetings, displaying sadness can raise the feeling of concern for the expresser (Sinaceur, Kopelman, Vasiljevic, & Haag, 2015). This might stimulate prosocial behavior of others and increase the individual persuasiveness (DeSteno, Petty, Rucker, Wegener, & Braverman 2004; Dillard and Peck, 2000). So, the emotional display of sadness can increase the persuasiveness (Warnick et al., 2021) of individual board members.

On the contrary, the display of sadness can also increase the possibility of others perceiving the expresser as weak, incompetent and in need of help (Clark & Taraban, 1991; Tiedens, 2001). This is assumed because sadness is often perceived as a passive emotion. In addition to the latter, people associate sadness with doubt, increasing the need for additional information (Petty & Brinol, 2015). Moreover, the display of sadness can also work counterproductive when displaying extremely high levels of sadness. Displaying these extremely high levels of sadness could be perceived as a lack of motivation or competence (Warnick et al., 2021). This implies that the display of sadness can also raise concerns with other board members about the position of the expresser. The expresser could be perceived as weak or unmotivated, which is not a good look when important decisions have to be made. The extreme display of sadness is expected to lower the persuasiveness of board members on the individual level.

Once more, the intuitive and theoretical path described by Averill (1982) and Warnick et al., (2021) can be followed. This implies that another curvilinear relationship is expected between the display of sadness and the persuasiveness on the individual level. This hypothesized curvilinear relationship points toward a negative relationship between high values associated with displaying sadness and the persuasiveness of board members. The other values associated with the display of sadness are expected to be positively related to persuasiveness.

Therefore, the following hypotheses are suggested:

Hypothesis 3: The facial display of sadness is positively related to board effectiveness on the individual level.

Hypothesis 3b: The effect of the display of the emotion sadness is weaker for high values of sadness.

2.4.4 Moderating Effect of Average Standard Facial Expression

The average standard facial expression of individual board members will be included as a moderating variable in the analysis. The logic behind the inclusion of this moderating variable is simple; some people are characterized by a face that some would categorize within the 'sad or 'anger' category. For some people, this display of emotion through the face can be regarded as their standard facial expression. It could be the case that the corresponding display of anger would have an influence on their persuasiveness at first, but when people find out that this is just their standard face, that effect could diminish or fade away completely. Therefore, the average standard emotion of individual board members is included as a moderating variable in the analysis.

This argument would imply that the effect of the emotional display is moderated by the average standard emotion of the individual board member. Therefore, this paper suggests that the influence of the display of a specific emotion is weaker when the average standard facial expression of that specific emotion is already high. The effect of, for instance, anger on the persuasiveness of individual board members would be moderated by a high average standard anger expression of that board member. Therefore, the following three hypotheses are distinguished:

Hypothesis 4: *The effect of displaying the facial expression of anger on board effectiveness is weaker when the average standard facial expression of anger is high.*

Hypothesis 5: *The effect of displaying the facial expression of happiness on board effectiveness is weaker when the average standard facial expression of happiness is high.*

Hypothesis 6: *The effect of displaying the facial expression of sadness on board effectiveness is weaker when the average standard facial expression of sadness is high.*

2.5 Conceptual Model

The six hypotheses are visually represented in figure (1), which depicts the conceptual model for this study.

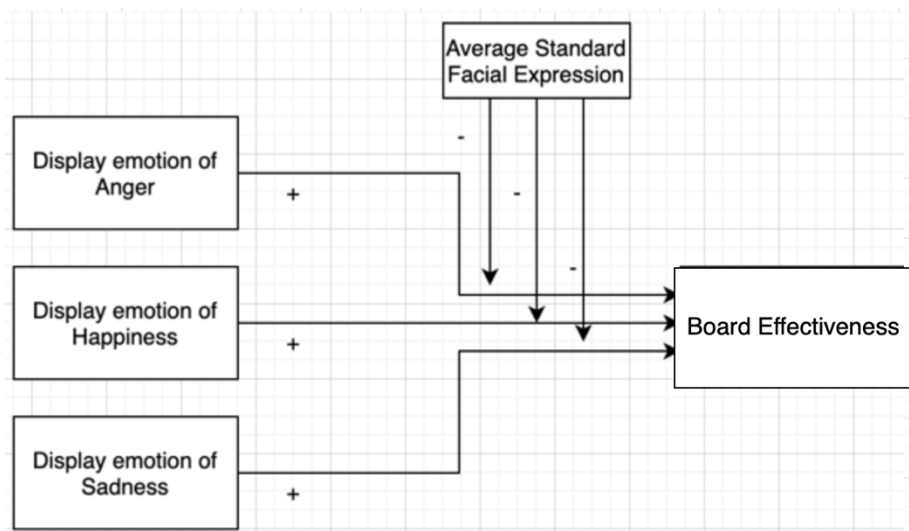


Figure (1). Conceptual Model

Chapter 3: Methodology

This chapter will explain the employed quantitative methods. First, the empirical context, the Dutch Water Authorities, will be described. The following section will elaborate on the data sources and employed research method. In addition, the method for data analysis is explained and described.

3.1 The Dutch Water Authorities

The Dutch Water Authorities form the empirical context for this study. This empirical setting is not unique, as prior studies from, for instance, Gieske, Duijn & van Buuren (2020) and van den Oever & Martin (2019) have used the same empirical context. The Dutch landscape is characterized by the fact that large parts of the landscape lay below sea level. Historically, these battles against floods have been a major challenge for the Dutch citizens. Due to climate change, the sea levels are rising, posing major threats to the Netherlands. 21 Regional water authorities are responsible for this battle against the rising sea levels, however, they are also in charge to provide water quality, water quantity, and other forms of water safety (Dutch Water Authorities, 2021). These 21 regional Water Authorities are gathered in an overarching international organisation; the Dutch Water Authorities. The Dutch Water Authorities is a hierarchical and centralized organisation with clear goals (O'Toole & Meier, 2014). However, these goals can be reached with considerable freedom with the use of an obligatory strategic plan that covers a total of six years (Grotenbreg & Altamirano, 2019). After a long period of isolation concerning the public (Toonen, Dijkstra & van der Meer, 2006), more recently, the Water Authorities have opened up to society (Edelenbos & van Meerkerk, 2015). This is displayed in the fact that the board meetings are publicly available on the Internet.

Every regional Water Authority is financially independent as well as responsible, as they obtain tax money from the inhabitants of the respective region (Havekes, Koster, Dekking, Uijterlinde, Wensink & Walkier, 2017). Every Water Authority has its general board and executive committee (Havekes et al., 2017). The board of the regional water authorities consists of a board of directors, a top-management team, and a chairperson (Havekes et al., 2017). The core tasks of the board of directors of the authorities include the monitoring of the executive strategy by the executive committee, resource provision, creation of regulations, imposing fines, and financial tasks like determining the budget (Waterschapswet, 2020). In the board meetings, an individual director of the board can individually, or collectively, decide to submit a motion or amendment. Normally, board directors would submit such a motion when they sense or argue that a problem should be handled. When such a motion or amendment is submitted, majority voting is used to decide on the subject. The board of directors consists of a minimum of 18, and a maximum of 30 members (Havekes et al., 2017). Usually, the executive committee, or the TMT, consists of four to five members (Havekes et

al., 2017). The board of directors meets six times a year, while the TMT meets every two weeks (Havekes et al., 2017). The boards of the regional Water Authorities can be considered as a one-tier board, as the board is composed of both a board of directors and a TMT (Belot, Ginglinger, Slovin, & Sushka (2014). The boards are characterized by a high degree of diversity. Every four years, a public election determines the composition of the board (Havekes et al., 2017). In addition, board spots are established for various stakeholders, such as residents and landowners.

3.2 Sample and Data Sources

The sample of this study contains visual data on the Dutch Water Authorities. The dataset contains a number of 110 board meetings of the following regional authorities: Amstel, Gooi & Vecht, De Stichtse Rijnlanden, Friesland and Zuiderzeeland. These meetings took place between 2013 and 2019. Data from these board meetings are extracted with the help of the software tool Face API. The display of emotions can be collected by gathering video material from the board meetings first, then implement the static images of these meetings with Face API.

Data for the individual performance of the board members are retrieved from the decision lists of these same board meetings. Data about the moderator, a combination of meeting frequency and average standard emotions of the individual board member, is gathered from both the website of the Dutch Water Authorities and the output data from Face API. The data from the control variables, age, gender, the board size, and meeting duration, are retrieved from the annual reports, the website of the Dutch Water Authorities, and the website of the Dutch Government. As all aforementioned data extraction methods are quantitative, the executed research method for this study will be a quantitative analysis. All hypotheses are empirically tested with the aforementioned extracted data. The next section will describe the different variables included in the analysis.

3.3 Dependent Variable

As previously described, the persuasiveness of individual board members is included as the dependent variable in the analysis. This persuasiveness reflects the effectiveness of the board and can be measured in terms of promises made by the TMT to the Board. They can be regarded as a successful attempt of persuasion for the individual board member that participated on a certain agenda point by speaking up. This variable is included as a binary variable that can either take value 0 (= no promise) or 1 (= promise). So, if the dependent variable takes the value of 1, this would imply a successful attempt of persuasion.

3.4 Independent Variables

Three independent variables are included in the analysis, namely: (1) anger, (2) happiness, and (3) sadness. These three variables are both identified and measured by the Microsoft Azure Computer Vision REST Application Program Interface (Face API). This program generates weights concerning scores for these facial expressions, based on static frames and images. Some people display either more emotions or emotions more frequently when compared to others.

The Face API is a machine learning technology that calculates weighted scores from static facial images. These weighted scores are calculated for eight facial expressions, namely: anger, happiness, sadness, disgust, contempt, fear, surprise, and neutral. These weighted scores can be regarded as the output from the Face API. As already specified in the previous chapters, three facial expressions are used in this study, namely: anger, sadness, and happiness.

The Face API uses a supervised neural network algorithm in three consecutive steps. These steps have been explained by various prior studies from, for instance, Choudhury, Wang, Carlson, and Khanna (2019) and Yu and Zhang (2015). First, researchers used static images for practice and labeled them according to the aforementioned facial emotions (Choudhury et al., 2019). Secondly, these static images are separately transformed into a field of weighted pixels, which is necessary for the Face API (Yu & Zhang, 2015). Moreover, these pixel weights are used to generate the weighted values for certain parameters, like, for example, the openness of mouth (Choudhury et al., 2019). Last, these weighted pixels use a minimizing error function to optimize the process (Choudhury et al., 2019). Choudhury et al. (2019) also compared the output of the Face API with human-coded expressions to validate the machine learning technology. In this study, evidence was found that validated the use of the Face API for this particular study, as considerable overlap was found. Validating the use of the Face API is just the first step, as the operationalization for this specific study required even more steps. This data collection process builds upon the work from last year's fellow students that were supervised by van den Oever. These students used the same Face API and the data collected from this study was added to their, overarching dataset. However, this study analyzed board meetings for the year 2020. In this year, the global pandemic affected the lives of many in the world, and the board meetings took place online via Zoom. This affected the data collection process, as more static images were not usable because, for instance, people did not turn on their camera when speaking up, or because a bar in Zoom covered the face of a board member that was located at the lowest, middle square in the Zoom call.

First, the static images were extracted from the board meetings at the rate of one static image per second. Next, these static images were sorted in individual board member folders to maintain an overview of which image belongs to which board member. Within these individual folders, images were labelled, which proved to be of use in the later stages. The images were labelled

in the following way: `namewaterauthority-yearmonthdate-lastnameboardmember-scenenummer`. Unusable frames where, for example, the board member that was speaking did not turn on his or her camera, were deleted. This was necessary because the Face API offered 30.000 free transactions. Next, the images were cropped with the Adobe Lightroom, so only one face would be visible for every static image. After this, the images were prepared and ready to be analyzed by the Face API.

A Python script was used to call the Face API. The output of this Python script is a JSON file for every single static image. Another Python script was used to convert these JSON files to a CSV file. The Face API did not calculate scores for every static image, as for some images the face that was included could not be analyzed the machine learning technology. This was the case for images where the person was, for example, looking up or down. The API calculates a weighted score between 0 and 1 for every emotion. The sum of these weighted scores always equals one.

However, before the data could be included in the dataset used for statistical analysis, individual scores and averages had to be calculated. Average scores were calculated for both every board member, as well as for every agenda point separately. So, for example, for board member Dieperink, average scores were calculated for every single agenda point that he took part in.

3.5 Moderating Variable

The average standard facial expression of individual board members will be included as a moderating variable in the analysis. The logic behind the inclusion of this moderating variable is simple; some people are characterized by a face that some would categorize within the 'grumpy' or 'anger' category. For some people, this facial expression is just their standard facial expression. It could be the case that the corresponding display of anger would have an influence on their persuasiveness at first, but when people find out that this is just their regular face, the effect could diminish or fade away. Therefore, the average standard facial expression of individual board members is included as a moderating variable in the analysis.

3.6 Control Variables

This section will provide some basic theoretical background with regard to the included control variables.

3.6.1 Age Diversity

According to Milliken and Martins (1996), the diversity of composition of groups can impact both the outcome and performance of groups through affective, cognitive, and communication procedures.

Boivie et al. (2016) generalize this claim about the board of directors, arguing that the diversity within the board of directors influences the functioning of the board. This composition includes diversity concerning age as well (Milliken & Martin, 1996). As the board of the Water Authorities typically consists of eighteen to thirty members, the potential for diversity is increased due to its size (Bantel & Jackson, 1989). Therefore, we will include diversity aspects as a controlling variable in the analysis.

3.6.2 Gender Diversity

As previously described, both Milliken and Martins (1996) and Boivie et al. (2016) argue that group diversity has an impact on group outcome and performance. Milliken and Martins (1996) include diversity about gender as well. Gender diversity could be an important control variable, as gender constitutes the non-verbal display of power for both women and men (Aguinis & Henle, 2001; Aguinis, Simonsen, & Pierce, 1998). For example, both positive and negative emotional facial expressions are more easily recognized by women (Hampson, van Anders, & Mullin, 2006). Therefore, gender diversity is included as a controlling variable in the analysis.

The Blau Index (1977) will be used to transform the categorical control variables (age diversity, gender diversity) into metric variables. Blau's index is calculated with the following formula:

$$\text{Blau's index} = 1 - \sum p_i^2$$

Here, p stands for the proportion of members in category i (Blau, 1977). A minimum score of zero would indicate the presence of only one of the categories on the board. A maximum score of 0.5 would be attained if all the categories would be evenly present or distributed across the board.

3.6.3 Board Size

As previously mentioned, the board of the Water Authorities typically consists of eighteen to thirty members (Havekes et al., 2017). Board size can affect the relational dynamics between group members (Boivie et al., 2016). Board size can be measured as the number of board members per Water Authority, as the board size can differ between the regional authorities. Therefore, board size is included as a control variable in the analysis, measuring the number of board members.

3.6.4 Meeting Duration

Meeting duration is included as a control variable in the analysis as, logically, longer meeting times give rise to more opportunities for successful persuasion. Hence, meeting duration is included in the analysis as a control variable. This control variable is measured in minutes.

3.7 Research Method

The quantitative data will be analyzed with the use of logistic regression. Logistic regression is used because the dependent variable (successful attempt of persuasion) takes the form of a binary variable, while the independent variables are either metric or nonmetric variables (Hair, Black, Babin & Anderson, 2018). This research method serves two important objectives while using the maximum likelihood estimation technique: explanation and prediction (Hair et al., 2018). This can be considered as the best choice of method when the dependent variable takes the form of a binary variable that takes values of zero and one. This study acknowledges and meets the minimum sample size requirement of four hundred for logistic regression (Hair et al., 2018). The logistic regression is conducted with the statistical software SPSS Statistics. The dataset does not contain missing cases, so no method of imputation is required.

3.8 Research Ethics

This research will be conducted concerning consequential research ethics. I pledged to act with integrity and with highly valuated ethics. No one should be harmed or suffer any additional consequences. As the information about the board of the Dutch Water Authorities is publicly available, violation of privacy rights can be ignored. Although, I have treated this information with respect and confidentiality. This research and its accompanying findings are objective and have not been conducted for another organization. Reliability with regard to this study is of vital importance.

Chapter 4: Results

This chapter will present the results of the conducted statistical analysis. First, an overview of the descriptive statistics is provided. Next, a correlation matrix will be presented. After this, the results concerning the binary logistic regression will be provided. Finally, a robustness check is presented.

4.1 Descriptive Statistics

Table (1) provides the descriptive statistics for the analysis. A total of seventeen variables are included in the descriptive statistics table.

The number of observations (N) equals 1591, which indicates that the sample size requirement of 400 for logistic regression is met (Hair et al., 2018). Missing data is not present in the dataset, which implies that no missing data analysis is required. Table (1) also provides a logical explanation for the chosen method of analysis. The dependent variable Board Effectiveness reflects whether the TMT made a promise to the board or not. All values for the variable Board Effectiveness take either the value 0 or 1, which justifies the chosen statistical method of binary logistic regression. The number of board members (Board Size) varies between 25 and 31, while on average, 29 to 30 board members are present in every board meeting. Bigger differences are present in the variable meeting duration (Meeting Duration), which is indicated by a high standard deviation.

Variable	N	Mean	S.D.	Min	Max
Board Effectiveness	1591	.0000000	1.0000000	.301068510	.4588666538
Anger	1591	.017331660	.0434819013	.0000000	.5225909
Happy	1591	.080040960	.1379283180	.0000000	1.0000000
Sad	1591	.022820076	.0388155581	.0000000	.4440833
Political Diversity	1591	.878219536	.0219732891	.8136095	.9070295
Gender Diversity	1591	.363173776	.0549260357	.1527778	.4687500
Board Size	1591	29.494657448	1.1963531031	25.0000000	31.0000000
Meeting Duration	1591	173.030169705	79.6690266427	7.0000000	369.0000000
Meeting Frequency	1591	8.792583281	3.0840992572	4.0000000	14.0000000
Average Anger	1591	.017377028	.0297973681	.0000000	.2608232
Average Happy	1591	.078089847	.0956514989	.0000000	.6918140
Average Sad	1591	.024362013	.0285481011	.0005000	.2318500
Year 2017	1591	.0830	.27592	.00	1.00
Year 2017	1591	.1339	.34063	.00	1.00
Year 2018	1591	.2357	.42457	.00	1.00
Year 2019	1591	.3620	.48074	.00	1.00
Year 2020	1591	.1854	.38876	.00	1.00

Table (1). Descriptive Statistics

The observations should not come from either repeated measurements or matched data. Both these assumptions are met, as this is not the case. In addition, the assumption of little to no

multicollinearity is also met. Appendix I provide the evidence for the justification of this assumption. As the dependent variable is binary, VIF-values are calculated separately for every independent variable. To calculate these VIF-values for binary logistic regression, every independent variable serves as the dependent variable once. Due to page limitations, only four VIF-tables have been included. The tables indicate no signs for multicollinearity, as the VIF-values do not exceed the threshold of ten.

4.2 Correlations

Appendix II provides the Pearson correlations matrix between the dependent, independent, and control variables. The year dummies (2016, 2017, 2018, 2019, 2020) are excluded from this analysis. The variable Promise in this table represents the dependent variable Board Effectiveness. SPSS requires the variable names to be shortened when running a logistic regression up to a maximum of eight letters.

All three hypotheses expect positive relationships with regard to the dependent variable. The correlation matrix shows a small positive effect between the variable Anger and the dependent variable Board Effectiveness (.071). This correlation is statistically significant. The variables Happiness and Sadness have a very small negative effect (-0.001, -0.023), although these correlations are not statically significant. Additionally, multiple control variables seem to be correlated to both the dependent and independent variables.

4.3 Binary Logistic Regression

The binary logistic regression analysis examines the influence of the independent, moderator, and control variables on the dependent variable. The results indicate that no hypotheses can be supported, as insignificant results are present. Table (2) shows the output of the binary logistic regression analysis for models 1 to 4. This table includes all the variables and their corresponding p-values and odds ratios. The odds ratios are interpreted differently when comparing them to the beta coefficients in, for instance, multiple regression. For example, an odds ratio for the variable Anger equal to 2 indicates that there is a two times greater probability to fall within the 1.0 category of the dependent variable Board Effectiveness. So, the probability would be two times greater for a promise to be made by the TMT when board members display anger. When a negative odds ratio is mentioned, it means an odds ratio lower than 1. Consequently, a positive odds ratio refers to an odds ratio with a value higher than 1.

Model 1 shows the baseline model which includes all the control and moderating variables. The Hosmer and Lemeshow test is non-significant ($p = 0.185$), which indicates a good fit of the data.

The non-significance implies that enough is going on in the dataset. The Nagelkerke R-squared equals 0.121, indicating that 12.1% of the variation in the dependent variable is explained by the base model. The variables political diversity, gender diversity, board size, meeting frequency, average anger, and two year dummies (2018, 2019) are significant for either the 1%, 5%, or 10% level. The variables Political Diversity and Average Anger have a significant positive relationship with the dependent variable Board Effectiveness. The variables Gender Diversity, Board Size, Meeting Frequency, and the two year dummies (2018, 2019) have significant negative relationships with the dependent variable Board Effectiveness. The variable Political Diversity is characterized by an extremely odds ratio equal to 2999762.16. This would imply that the probability of a promise made by the TMT would be almost 3.000.000 greater when the Political Diversity would increase with 1 unit. This seems illogical, however, dropping this variable increases the p-value of the Hosmer and Lemeshow test to a significant value for all six models. Therefore, the variable is retained in all models. In addition to this, it is tested whether the same variables remain significant when excluding this variable from the analysis. Appendix III includes two examples for models 1 and 5 which exclude the variable Political Diversity. The variable Gender Diversity becomes non-significant, while the year dummy 2018 replaces the year dummy 2019 with regard to their significance levels. Model 2, 3, and 4 separately introduce the independent variables anger, happiness, and sadness to the models.

Model 2 includes the variable anger in the model. The Hosmer and Lemeshow test is still non-significant ($p = 0.170$), indicating a good fit of the data. The Nagelkerke R-squared increases with only 0.001 to 0.122. This increase of 0.001 indicates that the variable anger only has an extremely small effect on the variation of the dependent variable Board Effectiveness. So, the variation in the dependent variable is mostly explained by the control variables. The variable Anger shows a non-significant ($p = 0.421$), positive effect with the dependent variable. Therefore, hypothesis 1a is not supported. Now, only the control variable Political Diversity shows a significant, positive effect with the dependent variable. The variables Gender Diversity, Board Size, Meeting Frequency and the year dummy 2019 still show significant, negative relationships with the dependent variable Board Effectiveness.

Model 3 examines the effect of the independent variable Happiness on the dependent variable Board Effectiveness. Again, the Hosmer and Lemeshow test indicate a good fit of the data, as the value is non-significant ($p = 0.208$). Equally to model 2, the Nagelkerke R-squared increases with only 0.001 to 0.122. This increase implies that the variable Happiness only has an extremely small effect on the variation of the dependent variable. Still, almost all variation is explained by the baseline model. The variable Happiness shows another non-significant (p-value), negative relationship with the dependent variable Board Effectiveness. Therefore, hypothesis 2a cannot be

supported. Now, the variables Political Diversity, Average Anger, and Average Happiness show significant, positive relationships with the dependent variable. The variables Gender Diversity, Board Size, Meeting Frequency, and two year dummies (2018, 2019) have significant, negative relationships with the dependent variable Board Effectiveness.

Model 4 includes the variable Sadness in the equation. The Hosmer and Lemeshow test is still insignificant, indicating a good fit of the data. Just like models 2 and 3, this model's Nagelkerke R-squared equals 0.122. This shows another increase of this R-squared of 0.001, indicating that the variable Sadness has an extremely small effect on the variation of the dependent variable. The variable Sadness shows another non-significant ($p = 0.355$), negative relationship with the dependent variable Board Effectiveness. So, hypothesis 3a cannot be supported. Now, the variables Political Diversity and Average Anger show significant, positive relationships with the dependent variable. The variables Gender Diversity, Board Size, Meeting Frequency, and two year dummies (2018, 2019) have significant, negative relationships with the dependent variable Board Effectiveness.

Variables	Board effectiveness							
	Model 1		Model 2		Model 3		Model 4	
	OD	Sign. Level	OD	Sign. Level	OD	Sign. Level	OD	Sign. Level
Anger			3.849	.421				
Happy					0.534	.264		
Sad							0.133	0.335
Political Diversity	2999762.16	0.000***	3477488.56	0.000***	3354696.53	0.000***	2963221.89	0.000***
Gender Diversity	0.016	0.018**	0.015	0.016**	0.015	0.016**	0.015	0.017**
Board Size	0.804	0.000***	0.804	0.000***	0.803	0.000***	0.804	0.000***
Meeting Duration	1.001	0.231	1.001	0.243	1.001	0.248	1.001	0.218
Meeting Frequency	0.933	0.005***	0.933	0.005***	0.933	0.005***	0.933	0.006***
Year 2016	0.744	0.291	0.734	0.270	0.737	0.276	0.751	0.307
Year 2017	1.150	0.621	1.133	0.657	1.134	0.657	1.158	0.602
Year 2018	0.630	0.088*	0.615	0.075*	.616	0.075*	0.639	0.099*
Year 2019	0.388	0.000***	0.381	0.000***	.386	0.000***	0.392	0.000***
Average Anger	49.500	0.037**	14.084	0.277	51.579	0.035**	47.157	0.039**
Average Happy	2.076	0.218	2.094	0.213	3.793	0.095*	2.045	0.228
Average Sad	4.362	0.475	4.474	0.467	3.974	0.504	24.767	0.237
Nagelkerke R-squared	0.121		0.122		0.122		0.122	
Hosmer & Lemeshow		0.185		0.170		0.208		0.196

Notes: * $p < 0.1$. ** $p < 0.05$. *** $p < 0.01$

Table (2). Logistic Regression Analyses

Table (3) displays the output of the binary logistic regression for models 5 and 6. Model 5 includes all the interaction terms of the moderating variables. Now, all independent, moderator, and control variables are included in the model. However, the Hosmer and Lemeshow test show significance ($p = 0.016$), implying that the data does not fit the model. The Nagelkerke R-squared increases to 0.126, which implies that the R-squared improves by 0.005 when compared to the baseline model. This model test hypotheses 4 to 6. The results indicate that the moderator effects are non-significant ($p = 0.214$, $p = 0.273$, $p = 0.667$). Therefore, hypotheses 4, 5, and 6 are not supported. In this model, the

control variable Political Diversity shows a significant, positive relationship with the dependent variable. The control variables Gender Diversity, Board Size, Meeting Frequency, and two year dummies (2018, 2019) still show a significant, negative relationship with the dependent variable Board Effectiveness.

Model 6 includes squared variables of the independent variables Anger, Happiness, and Sadness. This model is used to test hypotheses 1b, 2b, and 3b, which all include a possible curvilinear relationship. The Hosmer and Lemeshow test show non-significance again ($p = 0.060$). The Nagelkerke R-squared equals 0.124, which implies that the R-squared improves by 0.003 when compared to the baseline model. Still, most deviation is explained by the control variables. As all the squared variables are non-significant ($p = 0.491$, $p = 0.540$, $p = 0.969$), hypotheses 1b, 2b and 3b can be rejected. The control variable Political Diversity remains significantly, positively related to the dependent variable. The control variables Gender Diversity, Board Size, Meeting Frequency, and the two year dummies (2018, 2019) still show significant, negative relationships with the dependent variable Board Effectiveness.

Variables	Board Effectiveness			
	Model 5		Model 6	
	OD	Sign. Level	OD	Sign. Level
Anger	0.268	0.608	18.966	0.395
Happy	0.310	0.121	1.424	0.764
Sad	0.256	0.664	0.125	0.606
Anger * average A	5.989E+11	0.214		
Happy * average H	17.439	0.273		
Sad * average S	0.000	0.667		
Political Diversity	3332076.72	0.000***	4333892.72	0.000***
Gender Diversity	0.014	0.014**	0.013	0.013**
Board Size	0.798	0.000***	0.800	0.000***
Meeting Duration	1.001	0.212	1.001	0.213
Meeting Frequency	0.933	0.005***	0.930	0.004***
Year 2016	0.772	0.360	0.733	0.366
Year 2017	1.170	0.585	1.174	0.573
Year 2018	0.634	0.097*	0.625	0.088*
Year 2019	0.393	0.000***	0.387	0.000***
Average Anger	4.460	0.585	0.070	0.444
Average Happy	1.789	0.576	0.547	0.638
Average Sad	58.655	0.189	83.874	0.196
Anger Squared			0.002	0.491
Happy Squared			0.382	0.540
Sad Squared			0.517	0.969
Nagelkerke R-squared	0.126		0.122	
Hosmer & Lemeshow		0.016**		0.170

Notes: * $p < 0.1$. ** $p < 0.05$. *** $p < 0.01$

Table (3). Logistic Regression Analyses

4.3 Robustness Check

Binary logistic regression is not as susceptible to overfitting results when compared to, for example, discriminant analysis (Hair et al., 2018). However, one important aspect of persuasiveness and

display of emotions have thus far been overlooked: the interaction between board members. A robustness check will be carried out to compare and contrast previous findings to a new model that includes the interaction between board members. The interaction between board members is difficult to conceptualize, as obtaining data for this interaction variable is difficult. However, the Zoom meetings that took place during the global pandemic gave rise to an opportunity. Previously, the camera was fixed to the person speaking up. In the Zoom meetings, people that turn on their camera, even when not speaking up, are present to the other board members. The faces of board members that are not speaking up, but are present on the computer screen of others, can be used to calculate more weighted scores for the display of the emotions anger, happiness, and sadness. In an ideal situation, the faces of the two board members speaking directly after the board member that is speaking up at that time are used for calculation. Unfortunately, because a lot of board members turn off their cameras, this was not possible. For every static image, two additional board member faces have been selected. These two faces correspond to board members that have been actively participating with regard to a certain agenda point. Of course, another requirement was that these board members turned on their cameras, even when not speaking up. This has only been done for one board meeting, as the Face API was limited to only 30.000 observations. When selecting three images per static image, this counts up very fast.

In addition, all control variables except for the variables measuring the average standard emotion have been dropped. The statistical software SPSS automatically dropped these control variables, as the control variables were constants. This was a logical consequence of the fact that only one board meeting could be analyzed. Table (4) presents the results of models 7 and 8. Model 7 represents the model used in the previous analysis.

<i>Variables</i>	<i>Board Effectiveness</i>			
	<i>Model 7</i>		<i>Model 8</i>	
	OD	Sign. Level	OD	Sign. Level
Anger	1.250	0.889	0.000	0.389
Happy	0.459	0.167	0.286	0.759
Sad	0.052	0.148	1.046E+28	0.250
Anger2			0.000	0.357
Happy2			11.132	0.358
Sad2			21.908	0.641
Anger3			0.073	0.782
Happy3			1.817	0.766
Sad3			0.051	0.782
Average Anger	1224.779	0.002***	1.784	0.980
Average Happy	5.105	0.034**	241.342	0.486
Average Sad	68/129	0.106	0.000	0.254
Nagelkerke R-squared	0.020		0.331	
Hosmer & Lemeshow		0.376		0.202

Notes: * $p < 0.1$. ** $p < 0.05$. *** $p < 0.01$

Table (4). Robustness Check

Model 8 includes the variables that measure the interaction between board members. Model 7 is characterized by an extremely low Nagelkerke R-squared ($R^2 = 0.020$), while the Hosmer and Lemeshow test is statistically insignificant ($p = 0.376$). However, when the interaction variables are added in model 8, the Nagelkerke R-squared increases drastically to 0.331. This could imply that the interaction between board members should not be ignored, as it plays a major role in explaining the deviation in the dependent variable Board Effectiveness. However, this conclusion should be drawn with caution. First of all, multicollinearity could be present within the data. Appendix IV presents some results concerning the test for multicollinearity. No VIF-values were found that exceeded the threshold of 10. But, the sample size used in model 8 equaled only 40. This could be considered low, and for that reason, the interpretation of these results remains ambiguous. Future research could try to dive deeper into the possible effect of the interaction between board members.

Chapter 5: Discussion, Limitations and Practical Implications

This chapter will provide a discussion based on both theory and the analysis. In addition, limitations and practical implications will be discussed which will pose suggestions for future research.

5.1 Discussion

The corporate governance literature assumes and describes that both the advising and monitoring information will be incorporated into the TMT's decisions. However, social psychology literature has taught us that the possible incorporation of this information is part of a negotiating and bargaining process (Thompson et al., 1996). This implies that not all advising and monitoring information provided by the board of directors is incorporated into the decision of the TMT. It can therefore be assumed that the board of directors' persuasiveness plays an important role in the final decisions made by the TMT. Persuasiveness can be displayed in emotions (Kopelman et al., 2006). As the face is commonly regarded as the most important medium for emotional displays (Mehrabian, 1971; Sato et al., 2019), this study examined the influence of facial emotional display on the persuasiveness of board members on an individual level. Persuasiveness was analysed with regard to board effectiveness, which measured whether the TMT made a promise regarding a certain agenda point. The facial display of the emotions anger, happiness, and sadness were included in the analysis. This study could not find statistically significant evidence for a possible relationship between board effectiveness and the display of either anger, happiness, and sadness. In addition, this study hypothesized a possible curvilinear relationship between board effectiveness and the display of anger, happiness, and sadness. Again, no statistically significant evidence was found for these hypotheses.

One possible explanation for the fact that no significant evidence was found is related to the complexity of the context. The R-squared deviates around 0.122, indicating that almost 88% of the variation in the dependent variable Board Effectiveness could not be explained. In addition, the extremely small increases in R-squared when adding the variables measuring the display of anger, happiness, and sadness (0.001), suggest that these variables only have a minor effect on the variation in the dependent variable. This complexity can also be found within the literature. There is no clear consensus present within the literature concerning the relationships between the display of emotions and persuasiveness. Some studies find positive relationships between the two, while others find negative relationships. One possible explanation for this could be the fact that some researchers find curvilinear relationships between the two (Averill, 1982; Warnick et al., 2001). So, the relationships between the display of emotions and persuasiveness remain two-folded within the literature. This could partly explain why no significant relationships were found in this study.

In addition to this, there was almost no literature present in the corporate governance literature concerning the display of emotions and the concept of persuasiveness. The theory was mostly extracted from either social psychology or the pitching literature. This study tried to analyse the relationships with regard to the display of emotions and persuasiveness in another research context: board meetings. Because there was no literature or theory present yet in this specific research context, the generalisation of assumptions and outcomes from other research fields like social psychology or funding pitches could be an explanation as to why no significant evidence was found in this particular study. This directly points towards another difference between ordinary boards and the boards within the Dutch Water Authorities: the boards within the Water Authorities are linked to the public sector, while most boards examined within the social psychology or pitching literature are linked to the private sector. At this point, there is a lack of literature present concerning the display of emotion and persuasiveness in the public sector.

One major difference between the public and private sector regarding boards is the size of the board. The board of directors in the Dutch Water Authorities typically consists of approximately 30 members, while the average board consists of approximately 9 members (Segal, 2020). Moreover, private sector companies are profit-oriented, while the goals within the public sector are different. For the Dutch Water Authorities, profit is not a goal. Their goal is, for example, to make sure the Dutch landscape is prepared for the rising sea levels. In addition, when comparing to the private sector, these 30 board members also come from different political and industrial backgrounds, which leads to conflicting interests. This conflicting interest should have been reflected by a negative odds ratio for the variable Political Diversity. However, as this variable showed an extremely high odds ratio, the interpretation of this variable is omitted. So, the different board characteristics could be a possible explanation as to why no significant relationships have been found for this specific, public sector board context. This study found no evidence for possible curvilinear relationships between the display of emotion and board effectiveness. Possible explanations for this follow the same reasoning as above. These explanations include the different board characteristics with regard to public and private sector boards and the difficult research context.

5.2 Practical Implications, Limitations and Future Research

The results of this provide some practical implications for the board of directors and the TMT within the board meetings of the Dutch Water Authorities. Firstly, the facial display of emotion by board members does not affect the likelihood of the TMT making a promise. This holds true for all three emotions: anger, happiness, and sadness. This implies that, when board members try to persuade the TMT to make a certain promise and speak up, they do not have to consider displaying more

anger, happiness, and sadness with regard to their facial expressions. Other factors, such as political diversity, gender diversity, the board size, and meeting frequency did have a significant influence on board effectiveness. The variable political diversity was characterized by an extremely high, positive odds ratio in this study. However, a negative variable was expected. Therefore, the interpretation for this variable is omitted. The other control variables, gender diversity, the board size, and meeting frequency were found to have significant negative values with regard to board effectiveness. This implies that all these control variables would decrease the likelihood of the TMT making a promise. Future research could dive deeper into the mechanisms of the relationship between these control variables and persuasiveness. For example, the fact that the control variable gender diversity was found to have a significant, negative odds ratio, implies that gender does affect persuasiveness. Future research could, for example, dive deeper into this relationship and its underlying mechanisms. This study is also subjected to some limitations. This study is the first to measure the board effectiveness or promises of the TMT as a performance indicator with regard to persuasiveness. Although unique, this was also necessary as no prior study examined the relationship between persuasiveness and the display of emotion. In addition, this study is the first to examine the relationships between the display of emotion and the concept of persuasiveness on an individual level. Studies have been carried out on meeting-level, however, the individual level has been ignored thus far.

Moreover, a prior study by Jarvis (2017) presented a difference between the displayed and experienced the emotion of people. This study explained that sometimes, people tend to feign or conceal emotions, either on purpose or unconsciously. This also relates to the fact that people can use emotions as a manipulative negotiation tactic to persuade others to take a different course of action than previously anticipated (Kopelman et al., 2006). This gives rise to the opportunity for a discrepancy to exist between the emotions actually felt by someone, and the emotions displayed to other people. So, this study only measures the displayed emotion, not the true emotions. Discrepancies can also emerge with regard to the displayed and experienced emotions. For example, people tend to use gender stereotypes when perceiving emotions displayed by others (Ragins & Winkel, 2011). Future research could use gender variables to control for these gender stereotypes.

In addition, due to time constraints, this study was not able to capture all factors related to the display of emotion and persuasiveness. For example, the display of emotion can also be captured in voice intonation and voice tone (Levenson, 1999). With modern technologies, voices can be analysed and transformed into values that could be included in future studies. Thus, to better capture the concept of persuasiveness and the display of emotion, future researchers could potentially include things like voice intonation and voice tone.

The robustness check discovered a possible effect of the interaction between board members on the dependent variable. However, the sample size was possibly too small, which could have influenced the corresponding high Nagelkerke R-squared. However, this does open up the opportunity for further exploration. Future research could try to dive deeper into the possible effect of the interaction between board members.

The methodology with regard to the Face API followed was based on Choudhury et al. (2019). However, the Face API could not calculate scores for all the cropped images. Sometimes, the camera was not pointed directly to the person speaking up. So, the angles were a bit off sometimes when, for instance, the person speaking up was looking up, down, or sideways. Moreover, the camera quality was not very sharp. As a consequence, the Face API could not calculate scores for all the images which decreased the total output of the Face API. It could be the case that some board members tend to look up, down, or sideways more frequently than others. This could potentially lead to some bias.

Last, the results of this study can be generalized to the Dutch Water Authorities. However, only 110 board meetings have been analysed in this study, which is only a small part of the total board meetings within the Dutch Water Authorities. However, as this is such a specific research context, the question arises of whether the results can be generalized to board meetings in other organizations. This is difficult as the analysed board meetings in this study are part of the public sector. Moreover, most board meetings in private sector organizations are very confidential. Due to the Freedom of Information Act in The Netherlands, the board meetings of the Dutch Water Authorities are publicly available. This also means that the board meetings of other Dutch Municipalities are publicly available, which could offer an interesting research context for future researchers.

Chapter 6: Conclusion

This study examined the influence of facial emotional display on the persuasiveness of board members on an individual level. Persuasiveness was analysed with regard to board effectiveness, which measured whether the TMT made a promise regarding a certain agenda point. This analysis was carried out on an individual level with regard to the board meetings of the Dutch Water Authorities. The facial display of the emotions anger, happiness, and sadness were included in the analysis. In addition, curvilinear relationships with the dependent variable board effectiveness were expected for these emotions. Moreover, the average standard emotion of the individual board member was included as a moderating variable.

This study draws upon both social psychology and pitching literature to explain when and why individuals tend to be more or less persuasive. This study is the first to theorize as well as analyse this in the corporate governance literature. Additionally, the use of machine learning in the form of the Face API by Microsoft Azure characterized a unique research setting and context. The main contribution to the corporate governance literature is that this study could not find any statistically significant evidence that the display of emotions through facial expressions had any influence on the persuasiveness of individual board members. This holds true for the display of anger, happiness, and sadness. In addition, the moderating variables that expressed the average standard emotion of the individual board members on all three emotions remained statistically insignificant.

However, as this study is the first to examine the influence of the display of emotion on persuasiveness within board meetings, it contributes to the literature by showing a novel and fresh perspective to both extend and increase our understanding of how boards work. The limitations with regard to the currently existing literature are pointed out, which could be helpful for future researchers within this field. Moreover, a methodological contribution is made with the use of machine learning techniques which proved to be helpful with regard to analysing the display of emotion in visual materials. Last, a considerable amount of suggestions for future research have been proposed. For example, the control variable gender diversity was characterized by a significant, negative odds ratio, implying that gender does affect persuasiveness. Future research could, for example, dive deeper into this relationship and its underlying mechanisms.

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Appendices

Appendix I: VIF-values

Coefficients^a

Model		Collinearity Statistics	
		Tolerance	VIF
1	Happy	.540	1.851
	Sad	.542	1.845
	P_Divers	.545	1.836
	G_Divers	.464	2.157
	B_Size	.644	1.552
	M_Dur	.624	1.604
	M_Freq	.579	1.727
	2016	.670	1.493
	2017	.647	1.545
	2019	.387	2.582
	2020	.331	3.020
	Average_Anger	.897	1.115
	Average_Happy	.542	1.845
	Average_Sad	.535	1.870

a. Dependent Variable: Anger

Coefficients^a

Model		Collinearity Statistics	
		Tolerance	VIF
1	Sad	.547	1.827
	P_Divers	.544	1.837
	G_Divers	.464	2.156
	B_Size	.644	1.552
	M_Dur	.623	1.605
	M_Freq	.579	1.728
	2016	.669	1.494
	2017	.646	1.549
	2019	.389	2.569
	2020	.329	3.041
	Average_Anger	.543	1.843
	Average_Happy	.980	1.021
	Average_Sad	.535	1.869
	Anger	.563	1.776

a. Dependent Variable: Happy

Coefficients^a

Model		Collinearity Statistics	
		Tolerance	VIF
1	B_Size	.668	1.496
	M_Dur	.634	1.576
	M_Freq	.608	1.645
	Average_Anger	.539	1.855
	Average_Happy	.540	1.852
	Average_Sad	.535	1.868
	Anger	.556	1.799
	Happy	.533	1.875
	Sad	.542	1.844
	P_Divers	.686	1.457
	2016	.637	1.571
	2017	.648	1.544
	2018	.566	1.767
	2020	.522	1.917

a. Dependent Variable: G_Divers

Coefficients^a

Model		Collinearity Statistics	
		Tolerance	VIF
1	Average_Happy	.545	1.836
	Average_Sad	.538	1.858
	Anger	.924	1.082
	Happy	.536	1.864
	Sad	.542	1.844
	P_Divers	.545	1.833
	2016	.635	1.574
	2017	.638	1.569
	2018	.496	2.015
	2020	.426	2.349
	G_Divers	.463	2.159
	B_Size	.646	1.547
	M_Dur	.622	1.607
	M_Freq	.585	1.709

a. Dependent Variable: Average_Anger

Appendix II: Correlation Matrix

Correlations

	Anger	Happy	Sad	P_Divers	G_Divers	B_Size	M_Dur	M_Freq	Average_Anger	Average_Happy	Average_Sad	Promise
Anger	Pearson Correlation	1	-.113**	.067**	-.016	-.094**	.073**	-.098**	.652**	-.070**	-.119**	.071**
	Sig. (2-tailed)		.006	.008	.518	.000	.004	.000	.000	.005	.000	.005
	N	1591	1591	1591	1591	1591	1591	1591	1591	1591	1591	1591
Happy	Pearson Correlation	-.113**	1	-.066**	-.010	-.048	-.019	-.028	-.044	.669**	.009	-.001
	Sig. (2-tailed)	.000	.008	.699	.054	.802	.444	.264	.079	.000	.725	.969
	N	1591	1591	1591	1591	1591	1591	1591	1591	1591	1591	1591
Sad	Pearson Correlation	-.068**	-.066**	1	-.044	-.088**	.005	.020	-.120**	.009	.667**	-.023
	Sig. (2-tailed)	.006	.008	.078	.000	.011	.844	.421	.000	.712	.000	.369
	N	1591	1591	1591	1591	1591	1591	1591	1591	1591	1591	1591
P_Divers	Pearson Correlation	.067**	-.010	-.044	1	.256**	-.188**	-.013	.128**	-.030	-.033	.151**
	Sig. (2-tailed)	.008	.699	.078	.000	.000	.000	.602	.000	.229	.193	.000
	N	1591	1591	1591	1591	1591	1591	1591	1591	1591	1591	1591
G_Divers	Pearson Correlation	-.016	-.048	-.088**	.256**	1	.240**	.070**	-.006	-.080**	-.067**	-.010
	Sig. (2-tailed)	.518	.054	.000	.000	.000	.000	.005	.807	.001	.007	.692
	N	1591	1591	1591	1591	1591	1591	1591	1591	1591	1591	1591
B_Size	Pearson Correlation	-.094**	.006	-.064*	-.281**	1	-.263**	.044	-.123**	.025	-.097**	-.089**
	Sig. (2-tailed)	.000	.802	.011	.000	.000	.000	.078	.000	.324	.000	.000
	N	1591	1591	1591	1591	1591	1591	1591	1591	1591	1591	1591
M_Dur	Pearson Correlation	.073**	-.019	.005	-.188**	.240**	1	-.319**	.067**	.006	.005	.039
	Sig. (2-tailed)	.004	.444	.844	.000	.000	.000	.000	.007	.813	.847	.124
	N	1591	1591	1591	1591	1591	1591	1591	1591	1591	1591	1591
M_Freq	Pearson Correlation	-.098**	-.028	.020	-.013	.070**	-.319**	1	-.168**	-.056*	-.008	-.192**
	Sig. (2-tailed)	.000	.264	.421	.602	.005	.000	.000	.000	.026	.746	.000
	N	1591	1591	1591	1591	1591	1591	1591	1591	1591	1591	1591
Average_Anger	Pearson Correlation	.652**	-.044	-.120**	.128**	-.006	.067**	-.168**	1	-.080**	-.166**	.101**
	Sig. (2-tailed)	.000	.079	.000	.000	.807	.000	.000	.001	.001	.000	.000
	N	1591	1591	1591	1591	1591	1591	1591	1591	1591	1591	1591
Average_Happy	Pearson Correlation	-.070**	.669**	.009	-.030	-.080**	.025	-.056*	-.080**	1	.047	.033
	Sig. (2-tailed)	.005	.000	.712	.229	.001	.324	.026	.001	.062	.186	.000
	N	1591	1591	1591	1591	1591	1591	1591	1591	1591	1591	1591
Average_Sad	Pearson Correlation	-.119**	.009	.667**	-.033	-.067**	.005	-.008	-.166**	.047	1	.006
	Sig. (2-tailed)	.000	.725	.000	.193	.007	.847	.746	.000	.062	.062	.818
	N	1591	1591	1591	1591	1591	1591	1591	1591	1591	1591	1591
Promise	Pearson Correlation	.071**	-.001	-.023	.151**	-.010	.039	-.192**	.101**	.033	.006	1
	Sig. (2-tailed)	.005	.969	.369	.000	.692	.124	.000	.000	.186	.818	.000
	N	1591	1591	1591	1591	1591	1591	1591	1591	1591	1591	1591

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Appendix III: Logistic Regression (Political Diversity Excluded)

Variables	Board Effectiveness			
	Model 1		Model 5	
	OD	Sign. Level	OD	Sign. Level
Anger			0.148	0.452
Happy			0.335	0.147
Sad			0.146	0.534
Anger * average A			4.979E+13	0.145
Happy * average H			13.262	0.321
Sad * average S			0.001	0.826
Gender Diversity	0.523	0.646	0.444	0.568
Board Size	0.777	0.000 ***	0.772	0.000 ***
Meeting Duration	1.000	0.739	1.000	0.681
Meeting Frequency	0.924	0.001 ***	0.923	0.001 ***
Year 2016	1.197	0.459	1.251	0.362
Year 2017	1.926	0.006 ***	1.976	0.005 ***
Year 2018	1.075	0.741	1.090	0.699
Year 2019	0.510	0.003 ***	0.520	0.005 ***
Average Anger	62.433	0.027 **	5.234	0.545
Average Happy	0.206	2.104	1.876	0.540
Average Sad	3.467	0.549	34.032	0.255
Nagelkerke R-squared	0.110		0.115	
Hosmer & Lemeshow		0.010 ***		0.001 ***

Notes: *p<0.1. **p<0.05. ***p<0.01

Table (4). Logistic Regression Analyses (Political Diversity Excluded)

Appendix IV: VIF-values robustness check

Coefficients ^a			
Model		Collinearity Statistics	
		Tolerance	VIF
1	Anger	.853	1.172
	Happy	.131	7.607
	Sad	.684	1.462
	Anger2	.880	1.137
	Happy2	.673	1.487
	Sad2	.628	1.594
	Anger3	.743	1.345
	Happy3	.782	1.279
	Sad3	.775	1.290
	Aver_Anger	.654	1.529
	Aver_Hap	.134	7.466

a. Dependent Variable: Aver_Sad

Coefficients ^a			
Model		Collinearity Statistics	
		Tolerance	VIF
1	Happy	.132	7.579
	Sad	.327	3.062
	Anger2	.845	1.183
	Happy2	.622	1.607
	Sad2	.637	1.571
	Anger3	.734	1.363
	Happy3	.826	1.210
	Sad3	.776	1.289
	Aver_Anger	.675	1.482
	Aver_Hap	.119	8.369
	Aver_Sad	.360	2.777

a. Dependent Variable: Anger

