



**Erasmus University of
Rotterdam**

Erasmus School of Economics

MSc. Marketing

Thesis

Measurement scale for Individual Psychological Safety

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July - 7 - 2020

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Acknowledgement

I would like to express my deepest gratitude to my supervisor, Stacey Malek, for her guidance and feedback throughout this project. She encouraged me to try this challenge and I am satisfied with the results. Her expertise greatly assisted the research. Without her help, I would not have reached the goal of this study. I would also like to thank the respondents that helped me with my research and particularly the respondents that assisted me with the interviews.

Introduction

Companies are experiencing more levels of competition due to trends such as globalisation. They need to act fast and think of new ways to be innovative. Therefore, companies are thinking of multiple ways to enhance their firm performance and be successful (Lovelace, Shapiro, & Weingart, 2001; Tay & Jebb, 2016; Açıkgöz, Günsel, Kuzey, & Seçgin, 2016). Researchers have found various factors that have different effects that could enhance the performance of a firm. One of these factors is psychological safety. Psychological safety has received various definitions throughout the years, but it primarily focusses on feeling safe and confident in a working environment where a person could take risks and speak up without the fear of any negative consequences.

However, after the work of Edmondson (1999) there have been a majority of studies that focus on the team level aspect of psychological safety and the individual level is not receiving proper attention. Both levels are crucial to get a complete view of psychological safety. “Google’s study of why workplace teams are effective revealed that psychological safety may be the most crucial variable in whether a group of people works together effectively.” (The New York Times, 2016). Hence, it is also interesting to understand if individual psychological safety plays a crucial role in this situation.

Nonetheless, there is currently one measurement scale that the majority of researchers use, the team psychological safety scale of Edmondson (1999). This scale is also being used for the individual level as it collects the data at an individual level. Despite it being used to also measure individual psychological safety it was meant to be used for measuring team psychological safety. Hence, the purpose of this paper is to develop a method to measure the construct individual psychological safety. Therefore, the main research question is formulated as follows:

“To what extent can individual psychological safety be measured by a new measurement scale?”

According to various studies it is shown that individual psychological safety is positively associated with an increase in creativity, higher levels of motivated employees and an increase in knowledge sharing (Kark & Carmeli, 2009; Siemsen, Roth, Balasubramanian, & Anand, 2009; Frazier, Fainshmidt, Klinger, Pezeshkan, & Vracheva, 2017; Newman, Donohue, & Eva, 2017). These factors are crucial for marketing in this current time as marketing is required to act fast and be innovative in this strongly changing global marketplace. In addition, it is a key challenge for marketing to improve creativity as consumer preferences rapidly change and technology advances quickly (Andriopoulos, 2001; Açıkgöz, Günsel, Kuzey, & Seçgin, 2016). “We become more open-minded, resilient, motivated, and persistent when we feel safe. Humor increases, as does solution-finding and divergent thinking — the cognitive process underlying creativity.” (Delizonna, Harvard Business Review, 2017). Therefore, a new measurement scale for individual psychological safety will provide marketers with the right tool to enhance individual performance.

A multi-method approach has been conducted to collect data and test the newly developed scale. Both studies focus on the Dutch population that are currently working. Study 1 consists of interviews to assess the various themes that are linked to the construct psychological safety: 'environment', 'speak up', 'consequences', 'risk-taking' and 'respect'. A reflective approach has been taken for the generation of items, meaning all the items will reflect the underlying construct. Two items of each theme were chosen from a total of 38 items. Thus, a 10-item scale has been used in Study 2 to test the reliability of the newly developed scale. An exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) have been used to test the adequacy of the developed measurement scale, to better understand the nature of the construct and to test the model fit. As a result, four items have been removed, which were linked to the themes 'consequences' and 'risk-taking'. The structured equation model (SEM) showed a lack of fit. However, the measurement model showed good fit. Thus, the scale has been tested for reliability, as well as construct validity. Cronbach's Alpha ($\alpha = 0.848$) was highly reliable for the newly developed measurement scale. Following the Fornell and Larcker (1981) criteria convergent validity has been found. However, discriminant validity was not found in this study, meaning construct validity was not achieved. Nonetheless, the test of hypotheses was still conducted and all the formulated hypotheses have been confirmed, meaning nomological validity has been achieved.

This study begins with a literature review that will explain more details about the need for an individual psychological safety scale and the theoretical framework will be described. A conceptual model will show a graphical representation of the theoretical framework. After the literature review, the construct of individual psychological safety will be specified by using the definitions of psychological safety. Both the individual-level construct and team-level construct have been used to assess the attributes. These attributes form a theme, which are used in Study 1 to further understand the feeling of safety in a work environment. The results of Study 1 will be shown and used in the next chapter, Item generation. In this chapter the various criteria will be discussed that have been used to generate the items. The items have been evaluated and assembled in a 10-item scale that has been used in Study 2. Study 2 focusses on a quantitative research method and will explain more about the methodology that has been used. The results of the newly developed scale and the relationship with the other constructs will be shown in the next chapter, Results. Finally, the discussion will be shown. This chapter focusses on the interpretation of the results, providing implications, showing the limitations and the recommendations for future research.

Literature review

Psychological safety

Through the years psychological safety received different definitions. It started with the work of Schein and Bennis (1965) on organizational change. In their research psychological safety was explained as the extent to which individuals feel confident and secure in their capability to handle change. Other researchers have explored psychological safety further. Kahn (1990) proposed that psychological safety was a condition for people to engage or disengage in their work roles. Kahn defined it as “feeling able to show and employ one’s self without fear of negative consequences to self-image, status, or career” (Kahn, 1990, p. 708). These researchers looked more at it from an individual perspective.

Edmondson (1999) proposed that psychological safety would be better to view from a group level climate. She defined it as the “shared belief held by members of a team that the team is safe for interpersonal risk taking” (Edmondson, 1999, p. 350). Therefore, Edmondson created a seven-item scale that collects individual team member data to combine this and form a group perspective of psychological safety.

Due to the method of data collection various researchers have used this same measure to study psychological safety on an individual level (Palanski & Vogelgesang, 2011; B. Kim, Park & T. Kim, 2019). However, most studies have focussed on researching the team level of psychological safety. A total of 38 studies have been collected that researched psychological safety to give a brief overview of how they measured psychological safety and what they found. Three inclusion/exclusion criteria were followed. First, the studies must mention psychological safety in their title, keywords or abstract. Second, the studies must be published between 1990 and 2020 as Kahn’s work led to a renewed focus on psychological safety (Newman et al., 2017). Third, studies must examine how psychological safety interacts with other variables. The theoretical definitions of studies that use different scales to measure psychological safety were examined to assess if they were appropriate for inclusion. For example, Liang, Farh C. and Farh J. (2012) used a 5-item scale to measure the individual-level construct of psychological safety. These five items were adapted from previous studies (Brown & Leigh, 1996; May, Gilson & Harter, 2004), and these studies followed the work of Kahn (1990) and Edmondson (1999). Using the keywords “(individual/team) psychological safety” were used across various databases (e.g. Google Scholar, Wiley Online Library, MEDLINE, WorldCat, ABI/INFORM Collection and ResearchGate). Examples of the journals that have been used are: *Journal of Applied (Social) Psychology*, *Journal of Organizational Behavior*, *Management Science*, *Creativity Research Journal*, *Journal of Business and Psychology*, *The Leadership Quarterly*, *Creativity Innovation Management*, *The Journal of Psychology*, *Journal of Knowledge Management and Journal of Productivity and Performance Management*. The overview can be found in the Appendix chapter A.

At the individual level there is evidence that psychological safety is involved in attaining higher levels of creativity (Kark et al., 2009; B. Kim et al., 2019). Kark et al. (2009) found out that psychological safety activated feelings of vitality, this had an impact on the creativity of an individual. In addition, higher levels of individual psychological safety motivated employees to more knowledge sharing (Siemsen et al., 2009).

At the group level it was found that psychological safety mediates the relationship between team learning and team performance. An environment with high safety enables team members to think differently, be more open, be more creative and to take risks (Choo, Linderman, & Schroeder, 2007; Madjar & Ortiz-Walters, 2009; Hu, Jiang, Erdogan, Bauer, & Liu, 2018). At an organizational level research has found that psychological safety moderates the relationships between innovativeness and firm performance (Edmondson et al., 2014).

Limitations of measures of psychological safety

By looking at the table in the Appendix chapter A it can be seen that various researchers are also applying different scales to measure psychological safety on a team level or individual level. However, these scales have been created by using measurement items from other studies (Newman et, 2017). This continued usage of various measurement items of psychological safety could possibly hinder further advancement in this field. As the results of these studies are not readily comparable.

In addition, the table in the Appendix chapter A shows that throughout the years various researchers have used the Edmondson (1999) scale for research on group level or individual level. Although the measurement scale of Edmondson is being used to measure individual psychological safety, the purpose of this scale was to measure team psychological safety. The items of the scale of Edmondson (1999) have been created by asking team members during interviews to describe features of their team, how the team was organized and what kind of challenges they faced. These insights eventually resulted in a scale to measure psychological safety at the team level. Therefore, doing research on a more individual level could provide new insights and possibly lead to new items that are more relevant to measure individual psychological safety.

Research of Walumbwa & Schaubroeck (2009) shows that both the individual level and group level should be studied as a focus on only one could provide an incomplete understanding of psychological safety. They have found in previous studies, and their own research, that both levels have important implications for the functioning of an organization.

This could be applied in the following example: A team could be working at a project within a company. It is important to measure psychological safety of each individual within that team to know the team psychological safety. Therefore, the scale of Edmondson (1999) would be applied to measure psychological safety on a team level. However, employees that work outside these teams could

contribute to these project teams during general meetings or discussions. An outsider's perspective could lead to new breakthroughs as they might look at this project with a different mindset. One topic that could explain this situation is cross-functional diversity. This implies that employees of various functional areas work together (Malhotra, Ahire, & Shang, 2017). Various studies have concluded that working in this setting is more effective, innovative and creative (van Knippenberg, De Dreu, & Homan, 2004; Horwitz & Horwitz, 2007; Sivasubramaniam, Liebowitz, & Lackman, 2012). Thus, someone active in marketing could have a different perspective on a certain problem than a person who is focusing on engineering. A team of engineers could gain benefits of listening to a marketer. Nonetheless, this individual needs to feel safe to actually share his/her information with this team and according to Edmondson et al. (2014) there has been considerable research that shows that individuals often do not speak if they do not feel safe in their work environment. Therefore, it would be more effective to acquire a scale that measures psychological safety on an individual level. Furthermore, according to Shadish, Cook & Campbell (2001) using the scale on a frequent basis reduces the reliability of the scale due to the history effect (events that are altering the environment which changes the conditions of the study).

Thus, creating a scale especially for individual psychological safety might create new insights when combined with the use of a team psychological safety scale.

Interpersonal Trust and Inclusive Leadership as Antecedents of Individual Psychological Safety

Interpersonal trust

Trust has gained a considerable amount of interest throughout the years. Especially an extensive increase in trust research has been done in an organizational context. Trust has been most commonly defined as the confidence in another party and a willingness to be vulnerable to the party, be that a person or a group (the aspect of vulnerability is also an element that relates to psychological safety). Interpersonal trust focusses more on the willingness and confidence to be vulnerable to another person (or to each other) (McAllister, 1995; Ma, Schaubroeck, & LeBlanc, 2019). Edmondson (1999) has previously discussed about using trust as an antecedent for team psychological safety. However, she does not view that trust is involved in team psychological safety. She proposes that team psychological safety focusses more on a team climate in which people share similar perceptions. According to Edmondson (2003) trust does not relate to team psychological safety as trust focusses more on the individual-level construct. However, the willingness and confidence of interpersonal trust is greatly related to the definition of psychological safety. Therefore, it would be interesting to know if interpersonal trust is associated with individual psychological safety. Hence, the following hypothesis is formulated:

Hypothesis 1: Interpersonal trust is positively associated with individual psychological safety

Inclusive leadership

Nembhard and Edmondson (2006) were the first ones to define the construct inclusive leadership as the “words and deeds exhibited by leaders that invite and appreciate other’s contributions”. These leaders try to let others participate in shared decision-making and discussions. It focusses more on acknowledging others’ views and perspectives, and learning from them. Furthermore, leader inclusiveness assures that others feel they are valued, treated fairly and respectfully, and make sure that they are confident to express their concerns. It allows the leaders to encourage others in taking risks and bringing up new ideas as they will communicate that these behaviors would not have any negative consequences. In addition, leaders are more available, accessible and open. This provides a message to others that it is safe to approach them (Carmeli, Reiter-Palmon, & Ziv, 2010; Qi & Liu, 2017). If a leader takes a supportive role and encourages others to ask questions, it is more likely that individuals feel safe when speaking up. Hence, it could be expected that the psychological safety that is perceived by the employees will be greater. Carmeli et al. (2010) concluded that inclusive leadership had a positive effect on psychological safety, which, in turn, increased the creativity of an employee. Furthermore, it has been shown that more leader inclusiveness increases psychological safety, which increases team engagement in improving the quality of work (Nembhard et al., 2006). Hirak, Peng, Carmeli, & Schaubroeck (2012) found out that high levels of leader inclusiveness had an important effect on psychological safety and learning mistakes, which influenced unit performance. Thus, the following hypothesis is formulated:

Hypothesis 2: Inclusive leadership is positively associated with individual psychological safety

Voice Behavior and Employee Engagement as outcome variables of Individual Psychological Safety

Voice behavior

A behavior that plays a critical role in making organizations more innovative, quick, responsive and adaptable to change is voice behavior (Wu, Renhong, & Yongkang, 2010). Voice behavior is defined as “proactively challenging the status quo and making constructive suggestions” (Van Dyne, Cummings, & McLean Parks, 1995). In addition, Van Dyne & LePine (1998) added that making constructive suggestions are intended to improve rather than merely criticize. A frequent topic in voice behavior research is finding the aspects that motivate employees to express their opinions and concerns about organizational issues (without being restricted). One factor that has been found to be positively associated with voice behavior is team psychological safety (Wu et al., 2010). Walumbwa et al. (2009) concluded in their research that psychological safety had an indirect influence on the relationship between ethical leadership and voice behavior. Therefore, it is likely to assume that psychological safety is associated with voice behavior. However, this was tested on team level by using the psychological safety measurement scale of Edmondson (1999).

Furthermore, Maynes & Podsakoff (2014) emphasize that voice behavior is exhibited by individual employees. Therefore, it would be interesting to know if voice behavior is also associated with individual psychological safety. Thus, the following hypothesis is formulated:

Hypothesis 3: Individual psychological safety is positively related to voice behavior

Employee engagement

Nembhard et al. (2006) investigated factors that promote engagement in quality improvement work. One of their findings is that psychological safety is positively related to engagement in quality improvement work (in the healthcare). This research has also used the measurement scale of Edmondson (1999).

Engagement can be defined as “being physically, cognitively, and/or emotionally connected to the improvement of work” (Kahn, 1990). Therefore, it is likely that psychological safety is related to employee engagement as the employee needs to feel safe to engage in quality improvement. It requires the employee to be open to give feedback, but also to receive feedback. In addition, an employee might be more cautious in an environment with low psychological safety. Thus, the employee would be less likely to provide provocative ideas as this could threaten the interpersonal relationships within the organization (Nembhard et al., 2006). A higher level of psychological safety would lower the boundary of an employee to engage in improvement of work as it would feel less of threat.

According to studies of Dutton (1993) & MacDuffie (1997) it is shown that when an individual views their team as hostile it diminishes the willingness to cooperate in problem solving activities. This also diminishes the engagement in quality improvement. Thus, it is expected that individual psychological safety is related to employee engagement.

Hypothesis 4: Individual psychological safety is positively associated with employee engagement

In addition, there could be a high chance that voice behavior might have an indirect effect between individual psychological safety and employee engagement as a higher voice behavior could enhance the employee in challenging the status quo and offering provocative ideas.

Hypothesis 5: Voice behavior mediates a relationship between individual psychological safety and employee engagement

Conceptual framework

The following hypotheses are presented in a conceptual framework in Figure 1.

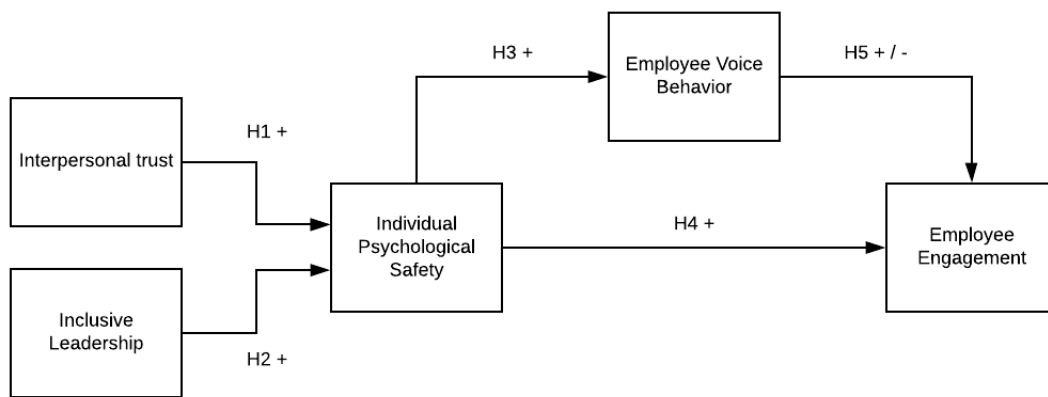


Figure 1 Hypothetical Model for Measuring Individual Psychological Safety

Specifying construct

As the prior discussion demonstrates, there is no existing scale to measure individual psychological safety. Therefore, this study will focus on the development of a new scale. The first step in developing a new measurement scale is specifying the domain of the construct. A deductive approach has been used to identify the various attributes that are related to individual psychological safety. A deductive scale development approach uses the theoretical definition which will be used as a starting point for the creation of the items and/or dimensions (Hinkin, Tracey, & Enz, 1997). It is important to first understand the breadth of the construct before advancing to the next step. Therefore, various definitions of individual psychological safety are shown below in Table 1. By looking at the attributes of the definitions it can be concluded that they differ from each other. Most of these definitions have similarities with the definition of Kahn (1990) as his work has greatly been used in many studies regarding psychological safety. However, there are similarities between a few definitions such as ‘environment’, ‘speak up’, ‘consequences’, ‘risk-taking’, ‘emotional state’ and ‘respect’.

Table 1 Individual Psychological Safety definitions

Author(s)	Definitions	Key attributes
Schein, H. E. & Bennis, W. (1965)	The extent to which individuals feel confident and secure in their capability to handling change. To feel safe at work in order to grow, learn, contribute, and perform effectively in a rapidly changing world.	Self-confidence, Adjustment, Improve
Jones, A. & James, L. (1970)	“Refers to the individual's cognitively based description of the situation; involves a psychological processing of specific perceptions into more abstract depictions of the psychologically meaningful influences in the situation; tends to be most closely related to situational characteristics that have relatively direct and immediate ties to individual experience; and is multidimensional, with a central core of dimensions that apply across a variety of situations” (p. 205)	Mental state, Environment, Individual experience
James & James (1989)	A perception of the employee that the working environment will be helpful for their own well-being.	Environment, Well-being
Kahn, William (1990)	“Feeling able to show and employ one’s self without fear of negative consequences to self-image, status, or career” (p. 708)	Comfortable, Speak up, Consequences, Risk-taking
Tynan (2005)	“How emotionally safe an individual feels with another, whether he or she feels the other is likely to embarrass him or her, and how much he or she feels trusted and respected by the other.” (p.229)	Emotional state, Trust, Disapproval, Respect
Siemens, Roth, Balasubramanian & Anand (2009)	“We define it in this research as the employee’s belief that the dyadic relationship is safe for interpersonal risk-taking (Kahn 1990), including such actions as admitting mistakes to a coworker or sharing potentially inaccurate knowledge with him.” (p.432)	Risk-taking, Speak up, Mistake, Sharing information
Palanski & Vogelgesang (2011)	Psychological safety concerns the ability of individuals to freely offer their opinions and values without fear of derision from others.	Tell opinion, Fear, Respect
Bienefeld, N. & Grote, G. (2013)	Individuals feel that they do not need to fear personal or social repercussions when speaking up; a cognitive and emotional state that has been described as psychological safety.	Consequences, Speak up, Emotional state

It is important to know that all of the definitions are about the experience of an individual. Thus, not a shared belief between team members as various definitions of team psychological safety are referring to as shown below in Table 2. However, the attributes mentioned above are (mostly) mentioned in the definitions of team psychological safety ('risk-taking', 'speak up', 'respect', 'environment' and 'consequences'). Therefore, the difference between the construct individual psychological safety and the construct team psychological safety is primarily between the individual experience and the shared belief between team members.

Table 2 Team Psychological Safety definitions

Author(s)	Definitions	Key attributes
Edmondson (1999)	<ul style="list-style-type: none"> - "Team psychological safety is defined as a shared belief by members of a team that the team is safe for interpersonal risk-taking" (p.354) - That one will not be punished or humiliated for speaking up with ideas, questions, concerns, or mistakes. - "It describes a team climate characterized by interpersonal trust and mutual respect in which people are comfortable being themselves." (p.354) 	Risk-taking, Speak up, Disapproval, Trust, Respect, Comfortable
Baer & Frese (2003)	"A climate for psychological safety describes a work environment where employees are safe to speak up without being rejected or punished."	Environment, Speak up, Consequences, Disapproval
Nembhard & Edmondson (2006)	"Speaking up freely occurs when people are not constrained by the possibility of others' disapproval and/or the negative personal consequences that might accrue to them as a result"	Speak up, Disapproval, Consequences
Pearsall & Ellis (2010)	"A sense of confidence that other team members will not embarrass, reject or punish someone for speaking up"	Self-confidence, Disapproval, Consequences, Speak up

Study 1

Various attributes have been found by specifying the construct in the first step. To examine whether these attributes ('environment', 'speak up', 'consequences', 'risk-taking', 'emotional state' and 'respect') are also perceived by people in the work field qualitative interviews have been conducted. These interviews were conducted to collect a broad array of perspectives of respondents that are currently active in the work field. Additionally, it provided the opportunity to gather detailed information about how these individuals experienced their work environment.

Sample

For the qualitative interviews five respondents from different work fields were invited to participate. Inclusion and exclusion criteria were generated to make sure the respondents met the requirements for this research, which is shown below in Table 3. However, before starting this research another respondent had been asked to test out the questionnaire. These results provided a better understanding of the questions asked and were therefore slightly adjusted. Nevertheless, the answers of this respondent were quite interesting and therefore added to the sample size making it six respondents that participated in this qualitative research. The sample size included two males and four females. One male and one female had a leading role within the company and were chosen to understand their point of view.

Table 3 Inclusion and exclusion criteria

Inclusion	Exclusion
Working in an organizational context	Part-time
Teams are working within the company	Interns
Has a manager above his/her current position	

Procedure

Semi-structured interviews were conducted to examine what kind of interpretation individuals had of the construct. This method had been chosen to give the respondents enough freedom to answer the questions. In addition, this provided the possibility to ask additional questions when necessary and to focus more on relevant answers (Verhoeven, 2015). Furthermore, the interviews were conducted in Dutch as this was the native language of the respondents, which decreases the language barrier. Participants were assured that their responses are both confidential and anonymous.

The questionnaire has been reviewed by the supervisor to increase the effectiveness of this data collection method. This helped in increasing the validity of this research as it is important to ask the correct questions to enhance the effectiveness. A neutral position was taken during the interviews to be consistent. Furthermore, because of the covid-19 crisis it was not possible to meet face to face with the respondents. Therefore, the interviews were conducted via online video calls. Some examples of the questions that have been asked are: 'Are you confident to take risks within your organization? Why?',

‘Have you ever had an idea that you were not comfortable sharing information? Why?’ and ‘Do you ever feel fear when thinking about the consequences of certain actions? Why?’. The questionnaire has been added in the Appendix chapter B.

The interviews have been recorded by multiple devices and completely transcribed to prevent mistakes being made when analysing the data (these transcripts can be requested when necessary). The input of the respondents have been open, axial and selective coded to gain a better overview of the answers (Verhoeven, 2015). In addition, a second reader has been asked to check the coding of the interviews. The transcripts are in Dutch and have not been translated to English before analysing the data, because translating the transcripts to English might influence the validity of the data as the meaning of the answers could have been lost (Smith, Chen, & Liu, 2008). Therefore, quotations have not been literally translated to English to make sure it does not lose its main message.

Results Interviews

The interviews led to various themes that are linked with the definitions of individual psychological safety, but it also provided some new insights. The majority of respondents acknowledge that the environment plays an important role in feeling safe. They mention that this helps them in not feeling restricted to tell their opinion and share information with each other: “That if you agree or disagree that you can just say it. That there is also room to do that and not immediately be viewed as strange”. But also an open environment: “That everyone is just open and honest of who they are”. They also recognize that this environment helps them in speaking up to someone: “I think the conditions are that the culture is such that you dare to say that you have a good idea or have a different thought”. Therefore, this could also be linked with the attribute ‘speak up’. In addition, a number of participants mention that telling your opinion or giving feedback could create an insecure environment for someone else: “Also try to realize that by being innovative you endanger the job satisfaction of others, which can create an unsafe situation for someone because they may feel unnecessary”. One respondent also mentioned that giving feedback is not just criticizing someone, but it is more a method to be supportive. This could also be linked with the attributes ‘environment’ and ‘speak up’.

Many respondents mention the attribute mistakes as important for feeling safe. Thus, the possibility to make a mistake and admit it, and that there will be no repercussions in doing so. This attribute could therefore be associated with ‘risk-taking’ and ‘consequences’ as one would take a risk in admitting the mistake and this could lead to a certain reaction: “Yes, of course, you could make a mistake ~~there~~, but then they will request an explanation from you”.

Furthermore, many respondents mention that it is important to have a mutual understanding of each other and that you show interest in another: “You should build a piece of mutual understanding towards each other”. One should show empathy while communicating with another and you should treat

someone the same you want to be treated: “You also want to be treated well and you have to do the same to someone else”. These attributes could be linked to the attribute ‘respect’.

Thus, by looking at the various attributes of the definitions and by looking at the data from the interviews it can be concluded that there are five important attributes regarding individual psychological safety. These attributes are ‘environment’, ‘speak up’, ‘consequences’, ‘risk-taking’ and ‘respect’.

Item generation

A deductive approach has been used to get a better understanding of the various attributes that are associated with the construct individual psychological safety. This provided the foundation to begin the generation of items. The next step is to understand the direction of the relationship between the construct and the measurement items. One direction is that constructs are causes of measures. This is called reflective as the measures represent manifestations or reflections of a construct. The other direction is that measures are causes of constructs, which is called formative (Edwards & Bagozzi, 2000; MacKenzie, Podsakoff, & Jarvis, 2005).

The measurement items for the individual psychological safety scale are manifestations of the construct as changes to the construct would mean that the measurement items needs to change and not the other way around. The measurement items are interchangeable as they will have different dimensions to the construct, but will capture the essence of the domain of the construct. Furthermore, the measurement items will help in showing if someone feels safe. Therefore, if someone is not feeling safe all the items will score low and if someone is feeling safe they will have a high score. Thus, the items are expected to co-vary with each other (when one goes up, they all go up).

By looking at these conclusions it can be expected that a reflective approach would be ideal for the construct individual psychological safety. The items will all reflect the underlying construct, they will be interchangeable and they will co-vary. Hence, it is expected that these indicators will have the same antecedents and/or consequences (Edwards et al., 2000; MacKenzie et al., 2005).

There are some guidelines that are important to the development of measurement items: 1) Items should focus on only one issue to prevent confusion (avoid double-barrelled questions), 2) Statements should be simple and short, 3) The language should be familiar to your target group, 4) All items need to be consistent in terms of perspective, and 5) Be careful with reverse-scored or negatively-worded items (Hinkin et al., 1997; Carpenter, 2018). A total of 38 items were generated by looking at the various attributes that link to each theme. These items have than been evaluated based on capturing the domain of the construct. Two items of each theme were chosen to integrate into the second study. This study will show which are more relevant for the construct. These items can be found in the Appendix chapter C. After the second study the initial pool of items will be reduced to an acceptable number of items .

Study 2

The item pool that has been generated after Study 1 will be used in this chapter. To increase the reliability and quality of the newly developed measurement scale, quantitative research has been used to test the content adequacy of the items and to test the formulated hypotheses. More information regarding these results can be found in the next chapter, 'Results'. In this chapter the sampling, procedure and data analysing of this study will be described.

Sample

A population of nine million people will be used as this research will be taken place in the Netherlands (CBS, 2019). A confidence interval of 95% will be used giving a sample size of 385 respondents. A total of 220 individuals were asked to fill in the survey that has been developed for this study in order to obtain independent data that could help in establishing construct validity. According to Carpenter (2018) a sample size of 200 should be fair. However, there is no clear consensus about what the actual sample size should be as this would vary across studies. There are many studies that use smaller sample sizes ranging between 100 and 200 respondents. In total, 188 individuals completed the survey, which would still be sufficient to use to assess the new developed scale. The participants were requested to complete the survey if they were currently working. There were no further requirements to participate in this research. A selective sampling approach was used as one could execute this by sharing the questionnaire with his/her network (Verhoeven, 2015). Furthermore, this network was asked to share this survey to increase the number of respondents.

Procedure

The survey was assembled by using the generated items for the newly developed scale, and various other measurement scales that have already been validated in the literature, to test the full conceptual framework. The scales used the same values in their Likert scale (7-point) to make it easier for the respondents as less cognitive processing is required. Furthermore, negative worded items have been reversed as research has shown that it may produce artifactual response factors (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). In addition, the various scales have been arranged in such a way to reduce the consistency motif (Tehseen, Ramayah, & Sajilan, 2017). After assembling the survey it was then send to the supervisor to receive feedback to further enhance and improve the questionnaire.

The survey was distributed via an online link and took around 5 to 10 minutes to complete. In the introduction it was explained that the answers of the respondents would be anonymous and that there are no right or wrong answers. This should help in reducing the respondents' evaluation apprehension. Thus, making them less likely to change their previous answer to be more consistent, socially desirable and lenient (Podsakoff et al., 2003). The respondents were asked various demographic questions to gain more insights of the overall data set after the introduction. These questions focussed on age, gender, education, and industry. After filling in these general questions the respondents were then asked to

answer the various scales. At the end of the survey, the respondents were asked to provide an e-mail if they wanted to participate in winning a gift card of 20 euros. The questionnaire can be found in the Appendix in chapter D.

Measures

Interpersonal Trust: To test interpersonal trust, the scale of Cook and Wall (1980) has been used. This scale consist of 12 items, which covers four dimensions: 1) Faith in peers, 2) faith in management, 3) confidence in peers and 4) confidence in management. In addition, two items have been reversed as they were negatively worded. A sample question is “I can trust the people I work with to lend me a hand if I needed it”.

Inclusive Leadership: A nine-item scale of Carmeli et al. (2010) has been applied to measure inclusive leadership. The scale has been adjusted from a 5-point Likert scale to a 7-point Likert scale to make it more compatible with the other scales. A sample question is “The manager is available for professional questions I would like to consult with him/her”.

Individual Psychological Safety: The 10 items that have been generated after Study 1 has been used to measure the construct individual psychological safety.

Employee Voice Behavior: For the employee voice behavior the 6-item scale of Van Dyne et al. (1998) has been used. A sample question is “I develop and make recommendations to my supervisor concerning issues that affect my work”.

Employee Engagement: To measure employee engagement the 9-point scale of Soane, et al. (2012) has been applied. This scale has been developed by building on Kahn’s (1990) work. It focusses on three different types of engagement: 1) Intellectual engagement, 2) Social engagement and 3) Affective engagement. A sample question is “I am enthusiastic in my work”.

Team Psychological Safety: To measure the team level construct of psychological safety and look for discriminant validity the 7-point scale of Edmondson (1999) has been used. More information about this will be provided in the next sub-chapter. Three items have been reversed as they were negatively worded. A sample question is “Members of this team are able to bring up problems and tough issues”.

Data analysing

Before analysing the gathered data, it was checked for missing data and outliers using the Statistical Package for the Social Sciences (SPSS version 25.0). There were 12 respondents with missing data. A listwise deletion approach has been used to remove these respondents. This is an acceptable approach if the data is missing randomly (Jackson & Gillaspay, 2009). In addition, one outlier was removed from the data set as they had a low answering time answers of this respondent was unusual. Furthermore, three respondents were removed from the dataset as they had a low answering time (90 seconds). Thus, a total of 16 respondents were removed from the dataset, leaving a sample of 172 respondents. The sample characteristics are shown below in Table 4.

A exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) have been used to measure the adequacy of the new developed measurement scale, to better understand the nature of the construct and to test the model fit. The EFA has been done using SPSS and the CFA has been tested using AMOS (version 26.0), a covariance-based structural equation modelling (SEM) technique. This technique has been chosen as it can show a graphical representation of the model and allows the user to draw the paths instead of writing equations (Xiong, Skitmore, & Xia, 2015).

Table 4 Sample characteristics

Criterion			Industry	
	Characteristics			
Age	Mean	27.81	Agriculture	1.7%
	Minimum	18	Computer and Software	2.3%
	Maximum	63	Construction	5.2%
	SD	10.74	Education	8.7%
Gender	Female	52.3%	Entertainment	2.9%
	Male	47.1%	Finance and Insurance	8.1%
	Other	0.6%	Food	11.0%
Employment	Full-time	41.3%	Government	2.9%
	Part-time	42.4%	Health care	6.4%
	Temporary	16.3%	Manufacturing	6.4%
Education	Less than a high school diploma	2.3%	Media	6.4%
	High school degree or equivalent	17.4%	Real Estate, Rental and Leasing	1.2%
	MBO degree	16.3%	Retail	10.5%
	Bachelor's degree	47.7%	Telecommunications	2.3%
	Master's degree	14.5%	Tourism	2.3%
	Doctorate	0.6%	Transportation and Warehousing	7.0%
	Other	1.2%	Other	14.5%

To test the appropriateness of the data to conduct EFA two tests were applied: (1) Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and (2) the Bartlett test of Sphericity. The value of KMO should be greater than 0.5 to be acceptable (Choi, Chan, & Chan, 2011; Hair, Black, Babin, & Anderson, 2010) and the significance of Bartlett's test should be below 0.05 (Bartlett, 1951), which means that there is at least one significant correlation between two items. An Eigenvalue greater than one test has been used for factor extraction. As this scale is meant to explain only one construct one factor will be extracted with an acceptable level of reliability. Cronbach's Alpha test will be used to measure this level of reliability as this measure is regarded as the most appropriate method (Gilbert & Churchill, 1979; McMillan & Schumacher, 1989). A value greater than 0.7 is acceptable (Litwin, 1995).

Following the EFA, the model fit of the measurement model will be tested by conducting an CFA. A direct reflective model has been used to conduct the CFA (Edwards et al., 2000). Items within the scale have been evaluated by looking at the squared multiple correlations and the standardized regression weights (Hair et al., 2010). The establish model fit is assessed by various goodness-of-fit (GOF) indices: (1) Absolut fit, consisting of root mean square error of approximation (RMSEA), goodness-of-fit statistics (GFI) and root mean square residual (RMR). RMSEA and RMR should be lower than 0.80 to be considered good. GFI should be greater than 0.90 to be considered good (Hooper, Coughlan, & Mullen, 2008; Zahoor, Chan, Utama, Gao, & Memon, 2017); (2) Incremental fit, consisting of comparative fit index (CFI), which should be more than 0.90 to be considered good and higher than 0.95 is perfect (Hooper et al., 2008). The chi square test is a traditional method to measure the overall model fit. However, this method has not been used as this test is impacted by sample size. Thus, it is not uncommon that this test will be significant (Barrett, 2007).

After evaluating the measurement model, the full model will be evaluated for model fit using the same model fit indices. In addition, the internal consistency of the constructs will be evaluated based on the composite reliability (CR), also known as construct reliability. The CR must be greater than 0.7 to establish construct reliability (Hair et al., 2010). CR can be calculated by using the following equation:

$$CR = SSI/(SSI + SEV)$$

SSI is square of sum of all factor loadings of a construct and SEV is sum of all error variances of a construct (Zahoor et al., 2017).

Construct validity has been evaluated with the Fornell-Larcker criterion (Fornell & Larcker, 1981). These criterion have been used to measure convergent validity and discriminant validity. Convergent validity is "the degree to which multiple attempts to measure the same concept are in agreement" (Bagozzi, Yi, & Phillips, 1991). Thus, the items within a measurement scale should covary if they are similar and should not correlate with items that are dissimilar. Discriminant validity is "the degree to which measures of different concepts are distinct" (Bagozzi et al., 1991). The items of the scale should not correlate too highly with other scales in order to establish discriminant validity. The general rule is

that the items should relate more strongly to their own factor. Thus, not to another factor. To establish convergent validity, the average variance extracted (AVE) must be higher than 0.5 and CR must be achieved. Discriminant validity is achieved if: (1) The square root of AVE is greater than the correlation amongst the constructs (Xiong et al., 2015); (2) The AVE of a construct is greater than the maximum value of the squared correlation of that construct (MSV) (Hair et al., 2010); (3) The AVE is greater than the average shared variance (ASV) (Hair et al., 2010).

The Shapiro-Wilk normality test and a normal P-Plot have been applied to check the data normality as this has an impact on the interpretation of the tests. The significance of the all the items must be greater than 0.05 (Schreiber, Nora, Stage, Barlow, & King, 2006). To test the hypotheses a series of linear regressions have been used after computing the constructs to continuous variables to test the interaction between constructs. The software PROCESS has been used to test the mediation between the construct individual psychological safety, voice behavior and employee engagement. This software uses a bootstrap method to test the mediation (Hayes, 2013). This method has been chosen as the bootstrap method produces confidence intervals, which provides more valuable information than using a p value as this only estimates the likelihood that the null hypothesis is true (Preacher & Hayes, 2008).

Results

EFA

An EFA was conducted to measure the underlying structure of the construct and to identify the relationship between items. The KMO test provided a value of 0.853, which is greater than 0.05. Thus, the sample size is adequate (Hair et al., 2010). Similarly, the results of the Bartlett's test of Sphericity had a significance level of 0.001. Therefore, it can be concluded that there is at least one significant correlation between two items (Bartlett, 1951).

The initial EFA of the 10-item individual psychological safety scale produced two factors with eigenvalues greater than 1. This accounted for 58% in total as shown below in Table 5. Based on this it can be concluded that items must be deleted as only one factor must be achieved. A correlation matrix showed that three items (Risk 1, Risk 2 and Consequences 1) had a correlation below 0.4 with other items.

Table 5 Eigenvalue and Scree Plot

Factor	Scree plot	Eigenvalue > 1	Cum. Percentage
1	Accept	4.512	45%
2	Accept	1.294	58%

To be accurate the direct oblimin method had been used to rotate the factor structure. The component correlation matrix was not greater than 0.5. Thus, it can be concluded it is an orthogonal matrix and the rotation is put on Varimax (Hair et al., 2010). This resulted in a rotated component matrix, which is shown below in Table 6. The three items that are in factor 2 are the same items with the low correlation. To test various outcomes items with the highest component were removed. This provided the overall the same outcome, which is that the three items from before should be removed. Two of them are linked to the theme risk and the other is linked to consequences, as shown in Table 6.

Table 6 Rotated Component Matrix

Variables	Factor(s)	
	1	2
Environment 1	0,679	
Speak 1	0,767	
Risk 1		0,671
Consequences 2	0,662	
Risk 2		0,817
Environment 2	0,794	
Respect 1	0,801	
Speak 2	0,720	
Consequences 1		0,740
Respect 2	0,719	

Note: Coefficients below 0.4 were suppressed

The seven items were included in a new EFA and it showed only one factor, which accounted for 57% of the total variance. Cronbach’s Alpha is 0.871, which is greater than the threshold of 0.7. Thus, the scale has achieved an excellent reliability.

CFA

The measurement model was comprised of seven variables and one latent variable, the construct individual psychological safety. The scale of the latent variable in relation to one of the indicator variables was set to 1 as this cannot be directly measured. It can only be observed. Therefore, one indicator variable must be assumed to have a regression effect of 1 to calculate the estimates of the other indicator variables. This model showed minimum was achieved in AMOS. This indicator shows that AMOS successfully estimated the covariances and variances, which means that there are no errors or warnings. It will fail if the model has an identification problem (no solution) (Bain, 2012). Thus, it is safe to proceed to the output of model fit (The University of Texas, 2012). All of the variables showed significance. By looking at Table 7 (7 items) below it can be stated that the measurement model has a lack of GOF. However, this model was enhanced after eliminating one item after looking at lowest standardized regression weight and squared multiple correlation. Thus, the item ‘consequences 2’ was removed from the model.

Table 7 Model-fit measurement model

7 items			
Model-fit category	Model-fit indices	Measurement model	Acceptable fit indices
Absolute	RMSEA	0.163	Less than 0.08
Absolute	RMR	0.087	Less than 0.08
Absolute	GFI	0.869	More than 0.9
Incremental	CFI	0.891	More than 0.9
6 items			
Model-fit category	Model-fit indices	Measurement model	Acceptable fit indices
Absolute	RMSEA	0.151	Less than 0.08
Absolute	RMR	0.063	Less than 0.08
Absolute	GFI	0.918	More than 0.9
Incremental	CFI	0.923	More than 0.9

Before continuing with this measurement model Cronbach’s Alpha was conducted again, which provided a value of 0.863. Thus, it can be concluded that the measurement of six items shows reliability. By looking at Table 7 (6 items) it can be seen that the overall model fit has enhanced. However, it still has a lack of fit according to the RMSEA. The modification indices of AMOS had been used to look into potential reasons for the lack of fit. Apparently the error variables had a high correlation amongst each other. Therefore, covariances were drawn between these error variables, as shown on the next page in Figure 2.

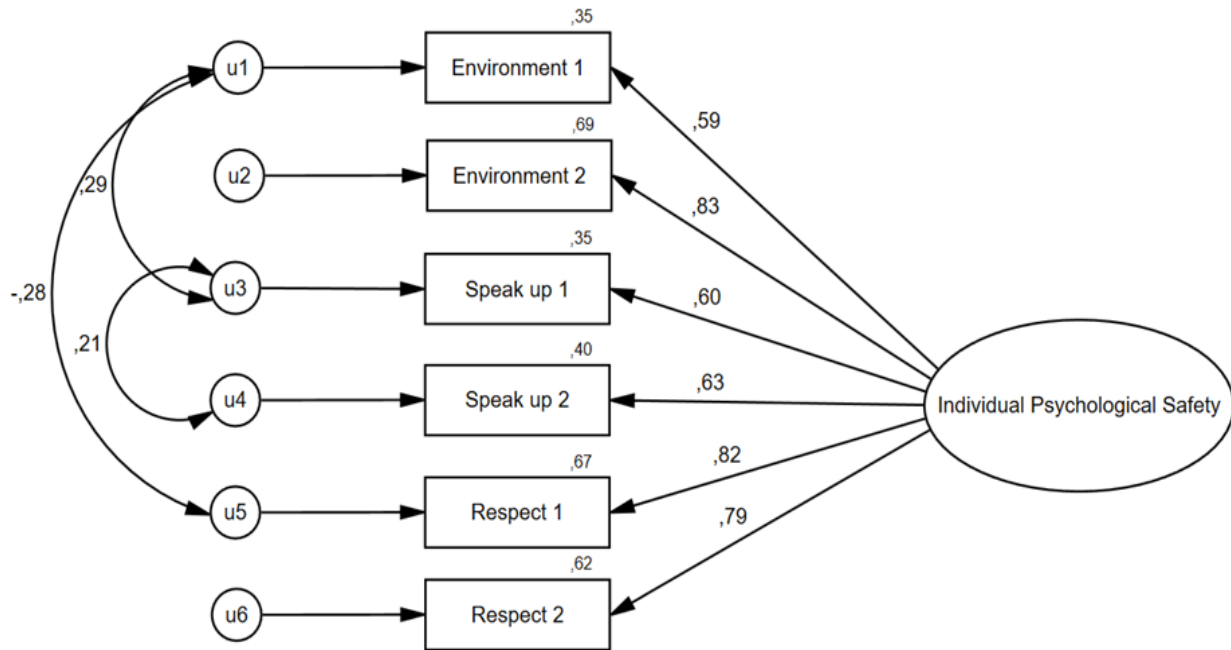


Figure 2 Measurement model using CFA

By looking at Table 8 below it can be stated that the measurement model demonstrates a significantly superior fit as all GOF indices have been achieved. Fit indices of the finalized model were $RMSEA = 0.08 \leq 0.08$; $RMR = 0.036 < 0.08$; $GFI = 0.975 > 0.95$; $CFI = 0.985 > 0.95$.

Table 8 Complete model-fit measurement model

Model-fit category	Model-fit indices	Measurement model	Acceptable fit indices
Absolute	RMSEA	0.080	Less than 0.08
Absolute	RMR	0.036	Less than 0.08
Absolute	GFI	0.976	More than 0.9
Incremental	CFI	0.985	More than 0.9

A structural equation model (SEM) has been conducted to test the internal reliability and construct validity. This model has been generated using the AMOS software and is presented in the Appendix in chapter E. The fit indices of this model were $RMSEA = 0.070 \leq 0.08$; $RMR = 0.130 > 0.08$; $GFI = 0.679 < 0.90$; $CFI = 0.859 < 0.90$. Only RMSEA was acceptable. The modification indices were used to draw correlations between the error variables, but no improvements were found. Therefore, the model-fit was not achieved. Nevertheless, it was achieved in the measurement model. Hence, the construct reliability and construct validity will be tested of this model. The results of these tests are shown in Table 9 on the next page. All the construct have achieved CR as the values are greater than the threshold of 0.7. The AVE of individual psychological safety, leader inclusiveness and voice behavior are greater than 0.5. Thus, by looking at the CR and AVE it can be concluded that individual psychological safety, leader inclusiveness and voice behavior have achieved convergent validity. The other constructs only partial achieved this as they only meet the requirement of CR.

Table 9 Reliability and Validity measures

Construct	Mean	SD	CR	ASV	MSV	AVE	√AVE	IPS	TPS	Leader	Trust	Engagement	Voice
Individual psychological safety	2,335	0,832	0,848	0,566	0,716	0,513	0,7161			Squared factor correlation (R ²)			
Team psychological safety	2,557	0,845	0,793	0,449	0,716	0,431	0,657	0,7157	-	-	-	-	-
Leader inclusiveness	2,671	1,151	0,894	0,387	0,623	0,643	0,802	0,452	0,396	-	-	-	-
Interpersonal trust	2,708	0,973	0,877	0,485	0,623	0,496	0,705	0,618	0,563	0,623	-	-	-
Employee engagement	2,614	0,946	0,819	0,414	0,648	0,460	0,678	0,648	0,392	0,268	0,415	-	-
Voice behavior	2,716	0,958	0,820	0,265	0,397	0,534	0,705	0,397	0,181	0,195	0,206	0,347	-

A discriminant validity test was conducted and was not achieved, because (1) \sqrt{AVE} of individual psychological safety ($0.7161 > 0.7157$) is slightly higher than each correlation amongst the constructs; (2) The AVE is not greater than MSV ($0.513 < 0.716$); (3) The AVE is slightly lower than ASV ($0.513 < 0.556$). Thus, overall the construct individual psychological safety has a lack of discriminant validity. Only leader inclusiveness and voice behavior met all the requirements and have achieved discriminant validity. Interpersonal trust and employee engagement both meet the first and third requirement and have therefore partially achieved discriminant validity. Team psychological safety did not meet any requirement and did not achieve discriminant validity. In addition, the highest correlation between constructs is between individual psychological safety and team psychological safety (0.7157). However, this is below the threshold of 0.85 confirming the nonexistence of multicollinearity (Awang, 2012).

Table 10 Correlation matrix

Variables	1	2	3	4	5	6
1 Individual psychological safety	1					
2 Employee engagement	0,650 **	1				
3 Voice behavior	0,574 **	0,558 **	1			
4 Interpersonal trust	0,700 **	0,597 **	0,415 **	1		
5 Team psychological safety	0,693 **	0,522 **	0,363 **	0,684 **	1	
6 Leader inclusiveness	0,580 **	0,464 **	0,398 **	0,707 **	0,542 **	1

** Correlation is significant at the 0,01 level (2-tailed)

A correlation matrix has been conducted to analyse why there is no discriminant validity, which is shown above in Table 10. It can be seen that individual psychological safety has a high correlation with team psychological safety and interpersonal trust. Discriminant validity should relate more with the items of their own construct and not with other constructs. Therefore, the correlation between constructs should be low to achieve discriminant validity. An effort was made to improve the discriminant validity by looking at the correlation matrix between the items of the constructs and deleting the highest correlated item of the individual psychological scale. At first one item (Environment 2) was removed and it did improve the correlation as it became lower (Interpersonal trust $0.7 \rightarrow 0.677$; Team psychological safety $0.693 \rightarrow 0.664$). However, it is still not enough as a threshold lower than 0.65 should be achieved as anything higher than 0.65 is indicated as a good correlation. A second factor item (Respect 1) was

removed that was highly correlated with the team psychological safety and interpersonal trust items. This further enhanced the correlation between constructs (Interpersonal trust 0.7 → 0.644; Team psychological safety 0.693 → 0.629). A new reliability test was conducted with the four-item scale. This provided a Cronbach’s Alpha of 0.769, which is above the threshold of 0.7. The two items were removed in the CFA and it actually worsened the criteria of Fornell and Larcker (AVE 0.513 → 0.266). The five-item scale was then tested in the CFA, but it also worsened the criteria (AVE 0.513 → 0.3983). Thus, the six-item scale was deemed most appropriate to test the hypothetical model. The purified 6-item scale is shown below in Table 11.

Table 11 Individual Psychological Safety (6-item scale)

1. I can be myself	(Environment 1)
2. I feel comfortable in my current work environment	(Environment 2)
3. I can safely express my concerns	(Speak 1)
4. I can safely disagree with my co-worker(s)	(Speak 2)
5. When I tell my opinion it is appreciated	(Respect 1)
6. I feel valued when sharing ideas	(Respect 2)

Note: 7-point scale from "strongly disagree" to "strongly agree"

Testing the hypotheses

A series of linear regressions have been used to test the hypotheses. Hypothesis 1 (interpersonal trust is positively associated with individual psychological safety) and 2 (inclusive leadership is positively associated with individual psychological safety) were tested using a linear regression. One of the assumptions of linear regression is that the data is normally distributed. A Shapiro-Wilk normality test was conducted by looking at the distribution of the residuals (error terms). The unstandardized and standardized residuals were used and the Shapiro-Wilk test provided a significance level lower than 0.05 (Zahoor et al., 2017). A normal P-Plot has been generated to further assess the normality distribution of the residuals. By looking at the normal P-P plot in Figure 3 on the right, it can be stated that there is a little bit of deviation. However, this is still acceptable for the assumption of normality, because there are not any drastic deviations. The data had been checked again for outliers using a boxplot, but there were no extreme values. Therefore, it can be assumed that it is still acceptable to assume a normal distribution. Furthermore, Box (1976) once said: “that in nature there never was a normal distribution, there never was a straight line, yet with normal and linear assumptions, known to

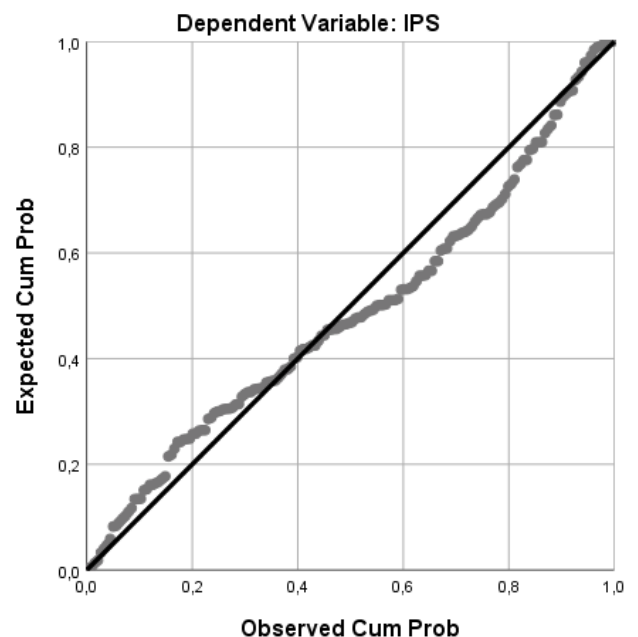


Figure 3 Normal P-Plot of Linear Regression (Independent variable = Interpersonal Trust & Leadership Inclusiveness)

be false, he can often derive results which match, to a useful approximation, those found in the real world". Thus, the assumption of normality will never be exactly true when someone is working with real data.

The next assumption of linear regression is to check homoscedasticity, which refers to the residuals being equally distributed of the independent variables. A scatterplot has been used to plot the predicted values and residuals. By looking at Figure 4 below, it can be seen that there is no systematic pattern or clustering (George & Mallery, 2010). Thus, it can be concluded that the assumption of homoscedasticity has been achieved.

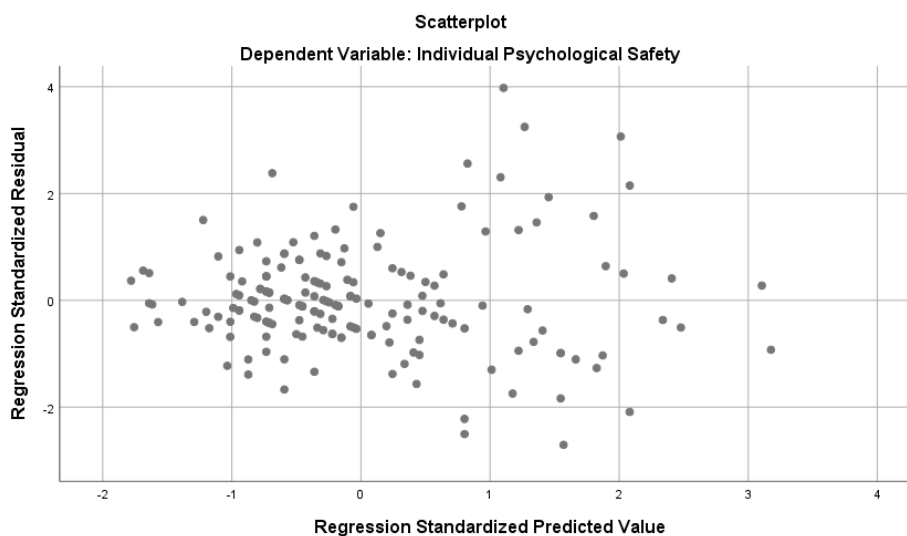


Figure 4 Scatterplot (Independent variable = Interpersonal Trust & Inclusive Leadership)

Finally, it is necessary to check for multicollinearity issues. Both variance inflation factors (VIF) are 1.998, which is shown on the next page in Table 12. Thus, they are lower than 10, which indicates that there is no problem with multicollinearity (Hair et al., 2010).

Following the assumptions of a linear regression hypothesis 1 and 2 can be measured. The R square of the model is 0.504 and therefore the independent variables interpersonal trust and inclusive leadership explain about 50.4% of the dependent variable individual psychological safety. The regression model has a significance level of $\alpha = 0.001$. Therefore, while assuming a confidence interval of 95%, it can be confirmed that this model is statistically significant. This means that the significance level of the variables can be assessed. Interpersonal trust on individual psychological safety has a significance level of 0.001, which is below 0.05 if a confidence interval of 95% is assumed. Interpersonal trust is positively

associated with individual psychological safety, supporting H1. Inclusive leadership shows a significant positive relationship with individual psychological safety as $\alpha = 0.027 < 0.05$, providing support for H2.

Table 12 Linear Regression for Hypotheses 1 & 2

Independent variables	Unstandardized coefficients	Sig.	Tolerance	VIF
Interpersonal trust	0.495	0.001	0.501	1.998
Leadership inclusiveness	0.124	0.027	0.501	1.998

Note: n = 172

Hypothesis 3 (individual psychological safety is positively related to voice behavior) and 4 (individual psychological safety is positively associated with employee engagement) were also tested using a linear regression.

The Shapiro-Wilk normality test shows that the significance level of the unstandardized and standardized residuals for hypothesis 3 is higher than 0.05 (p-value = 0.08). In addition, by looking at the P-Plot in Figure 5 it can be seen that there is a normal distribution between individual psychological safety (IV) and voice behavior (DV). Thus, the assumption of normality has been met for hypothesis 3.

The significance level of the unstandardized and standardized residuals for hypothesis 4 are lower than 0.05 (p-value = 0.001), which means there is no normal distribution. Nevertheless, by looking at the P-Plot in Figure 6 it can be concluded that there is a normal distribution between individual psychological safety (IV) and employee engagement (DV) as there are no extreme deviations.

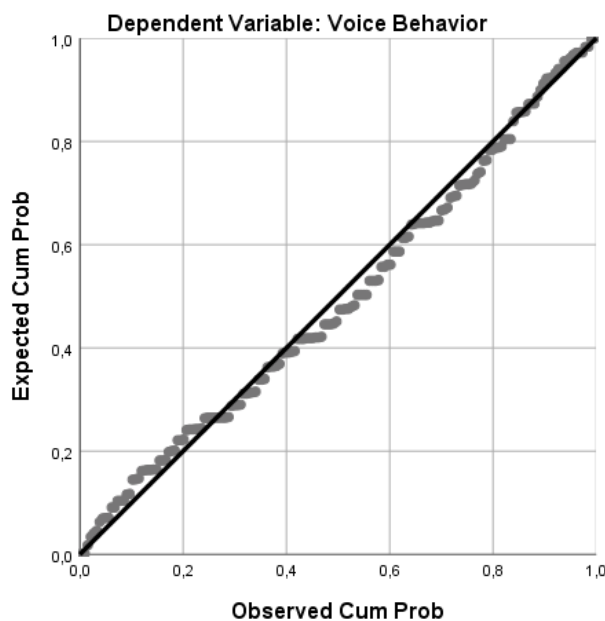


Figure 5 Normal P-Plot of Linear Regression
(Independent variable = Individual psychological safety)

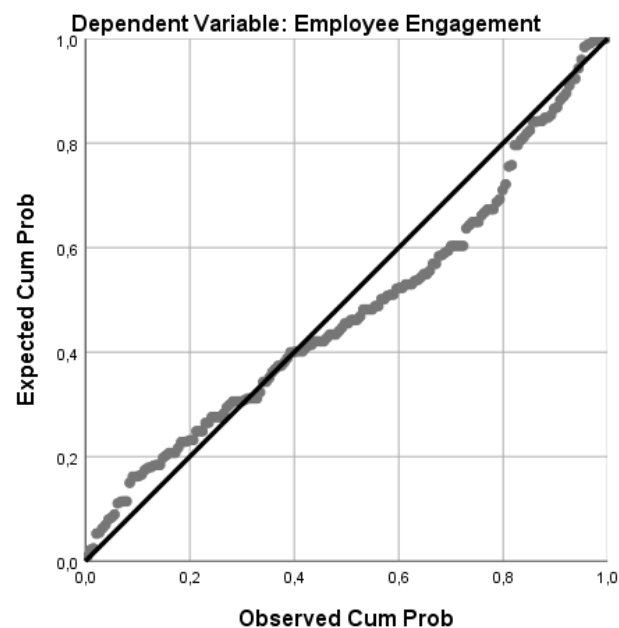


Figure 6 Normal P-Plot of Linear Regression
(Independent variable = Voice behavior)

By looking at the scatterplots in Figure 7 and Figure 8 below, it can be seen that there is no systematic pattern or clustering (George & Mallery, 2010). Thus, homoscedasticity has been achieved. Both VIF are 1 and therefore below the threshold of 10 (Hair et al., 2010). Thus, there is no problem with multicollinearity. Thus, all the assumptions have been met.

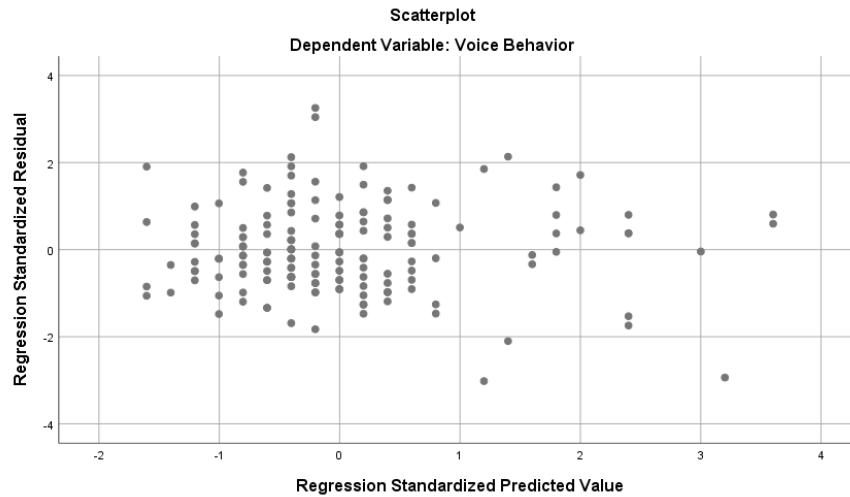


Figure 7 Scatterplot Voice Behavior (Independent variable = Individual Psychological Safety)

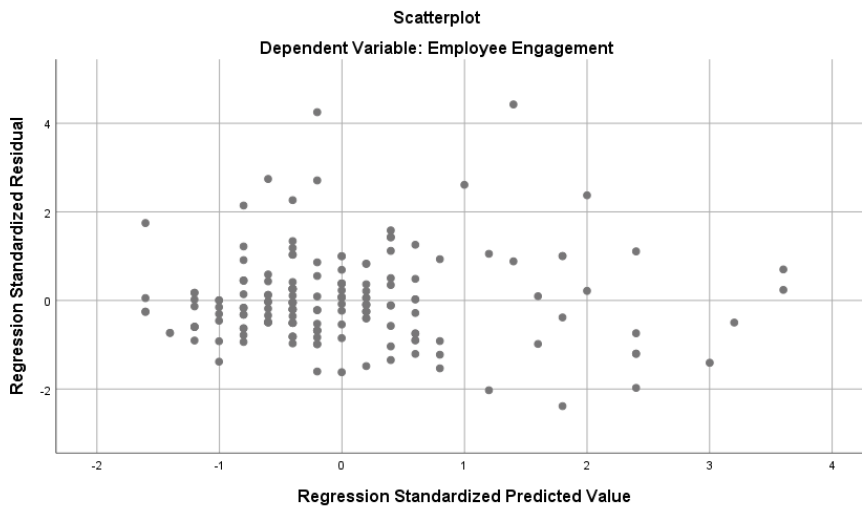


Figure 8 Scatterplot Employee Engagement (Independent variable = Individual Psychological Safety)

Following the assumptions of a linear regression hypothesis 3 and 4 can be measured. By looking at Table 13 below it can be seen that individual psychological safety explains about 33% of voice behavior and about 42.2% of employee engagement. Assuming a confidence interval of 95% it can be concluded that individual psychological safety has a significant positive relationship with voice behavior and employee engagement, supporting H3 and H4.

Table 13 Linear Regression for Hypotheses 3 & 4

Independent variables	Explained variance	Unstandardized coefficients	Sig.	Tolerance	VIF
Individual psychological safety --> Voice behavior	33.0%	0.661	0.001	1.000	1.000
Individual psychological safety --> Employee engagement	42.2%	0.739	0.001	1.000	1.000

Note: n = 172

Hypothesis 5 proposed voice behavior as a mediator between individual psychological safety and employee engagement and was tested using the plug-in PROCESS in SPSS. A 95% confidence interval and a bootstrap of 5000 samples have been used to conduct this method. All variables have a significance level lower than 0.05. By looking at Table 14 it can be concluded that the indirect effect between individual psychological safety and employee engagement is significant as the confidence interval does not contain zero. In addition, by looking at Figure 9 below it can be seen that the indirect effect of individual psychological safety on employee engagement through voice behavior is $a*b$, which is $0.661*0.272 = 0.18$. Thus, the effect is positive and the mediation of voice behavior between individual psychological safety and employee engagement is significant. Therefore, H5 is accepted.

In sum, based on the linear regressions and bootstrap method it can be concluded that all the hypotheses can be accepted.

Table 14 Indirect effect of Individual psychological safety on Employee engagement

	Effect	BootSE	BootLLCI	BootULCI
Voice behavior	0.1800	0.0608	0.0785	0.3154

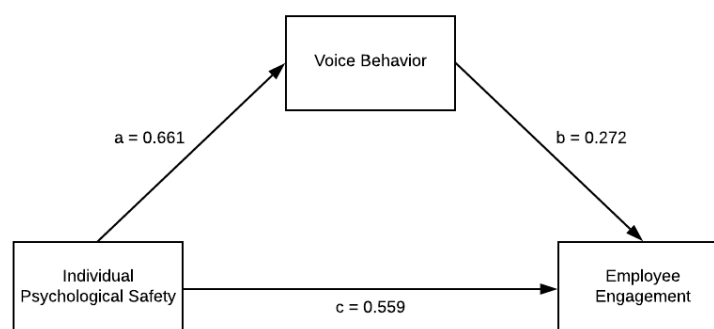


Figure 9 Mediation model

Discussion

Interpretations

This study aimed to understand the extent that a new measurement scale could measure individual psychological safety. Currently, most studies focus on a team level or use the team level scale to measure individual psychological safety.

By specifying the construct and doing qualitative research, themes were identified that were related to the construct individual psychological safety. These themes helped in generating the items that were then tested in Study 2. The 10-item scale went through an EFA and CFA, which resulted in the removal of four items. Two items that have been removed are linked to the theme risk-taking. This theme was mentioned by various definitions when looking at the attributes. Apparently, risk does not immediately measure feeling safe. This might be influenced by someone's personality as one person might feel safe, but still is not confident enough to take certain risks. The other two items that have been removed are linked to the theme consequences. One of the items might also be influenced by someone's personality as this question is about an individuals' concern about the consequences, which could also be linked to taking a risk. The other item is about the restrictions of telling your opinion. One might feel safe in their work environment, but there could be some restrictions in telling your opinion as some subjects might be too sensitive.

The new developed 6-item scale was then tested for convergent validity and discriminant validity. Convergent validity was achieved and this shows that the items measure the same construct. However, discriminant validity was not achieved meaning that the items in the new developed scale are correlated with the items of the other scales. The most important one was the team psychological safety scale. The items between these scales had a high correlation, which indicates that discriminant validity has not yet been achieved between the two scales. A potential reason that this has not been achieved could be as both the individual and team level scale have similar attributes when looking at the definitions.

According to Edmondson (2003) trust relates more to an individual-level construct than a team-level construct. The results of hypothesis 1 confirm this statement as interpersonal trust has a significant positive relationship with individual psychological safety. Thus, the definition of interpersonal trust to have the willingness and confidence to be vulnerable to another person is associated with the individual level (McAllister, 1995; Ma et al., 2019). However, there was an issue with discriminant validity between individual psychological safety and interpersonal trust, because some items between each scale had a high correlation. Thus, interpersonal trust might have a great relation with the individual-level construct of psychological safety.

Carmeli et al. (2010) mentioned that a leader that values leader inclusiveness assures that others feel they are valued, treated fairly and respectfully. The findings of Study 1 can confirm this as the respondents acknowledge that it is important to treat each other fairly and respectfully to feel safe. This

has been used to analyse the themes that are involved in the individual-level construct of psychological safety. Therefore, generating two items that are linked to the theme respect, which are active in the new scale. Thus, it could have been expected that individual psychological safety and leader inclusiveness have a positive relationship with each other. In line with the hypothesis it can be confirmed that the leader inclusiveness has a positive effect on individual psychological safety, supporting research of Carmeli et al. (2010).

It was expected that individual psychological safety should have a positive relationship with voice behavior as the definitions of both constructs share a common theme, speaking up. According to Palanski, et al. (2011) psychological safety concerns the ability of an individual to offer his/her opinion and values without fear of derision from others. Van Dyne et al. (1995) defined voice behavior as “proactively challenging the status quo and making constructive suggestions”. Thus, it can be seen that both constructs share this theme. Similar to leader inclusiveness, the items that have been generated for the theme speaking up are still in the new scale. Therefore, it was not unexpected that individual psychological safety would have a positive relationship with voice behavior.

According to the results it has been found that individual psychological safety has a positive relationship with employee engagement. This confirms research of Dutton (1993) & MacDuffie (1997) as they showed that when an individual views their team as hostile it diminishes the willingness to cooperate in problem solving activities. As the respondents felt safe they were also more engaged in their work.

In addition, the results have shown that voice behavior mediates the relationship between individual psychological safety and employee engagement. Van Dyne et al. (1995) have stated that voice behavior is about challenging the status quo and making constructive suggestions. Therefore, feeling safe should have a great impact on actually being able to express your concerns and opinion. In addition, being able to do this should have an impact on the involvement in work as an individual would be able to help others in improving themselves in their work. Thus, it was expected that the mediation effect should be significant. Taken together, hypothesis testing results demonstrate the nomological validity (i.e. “the degree to which predictions in a formal theoretical network are confirmed” (Hagger, Gucciardi, & Chatzisarantis, 2017)) of the individual psychological safety scale.

Implications

Managerial implications

As previously mentioned, a new scale for measuring individual psychological safety would be useful to measure individuals outside of a project team. Discriminant validity has not yet been achieved between the two psychological safety scales. Nevertheless, this newly developed scale is still capable of measuring the individual level of psychological safety and provide more insights for an organization to increase the overall organizational performance. In addition, the scale will help in measuring safety amongst remote and temporary workers.

The results showed that individual psychological safety has a positive significant effect on employee engagement. This provides support to the importance of achieving higher levels of psychological safety within a firm as this would be beneficial in the engagement of an employee in the improvement of their work (Nembhard et al., 2006). In addition, the results showed that voice behavior mediates the relationship between individual psychological safety and employee engagement. Thus, it can be concluded that the ability to feel safe and speaking up are essential in the engagement of a employee. Therefore, a firm should try to motivate her employees to proactively challenge the status quo and make constructive suggestions (Van Dyne et al., 1995) by providing a safe environment.

Interpersonal trust did not show discriminant validity with the individual psychological safety scale as the items were highly correlated. Nevertheless, the results showed a significant positive relationship between interpersonal trust and individual psychological safety, meaning trust is important for an individual to feel safe. Thus, a firm should try to focus on a work environment that encourages their employees to trust each other.

Consistent with Carmeli et al.'s (2010) finding, the results showed that inclusive leadership has a positive effect on individual psychological safety. Thus, it is more likely that individuals feel safe if a leader takes a supportive role and encourages their employees to ask questions, take risks and bring up new ideas. Furthermore, leaders should assure their employees that they are treated fairly and respectfully to achieve higher levels of psychological safety.

Theoretical implications

The results of this study make an important contribution to the literature on individual psychological safety. Prior research on individual psychological safety has been conducted using the Edmondson (1999) scale or developing a new scale by adapting items from previous studies. This study developed a scale of individual psychological safety that is easily applicable, which provides researchers with an instrument for psychological safety research. Researchers and investigators can build on this newly developed scale and broaden their understanding. Furthermore, if discriminant validity is achieved in a future study this individual level scale could be combined with the team level scale to get a broader understanding of psychological safety, providing new insights to researchers. In addition, the individual scale might be useful as an antecedent for the team level scale. It could be possible that an individual with a higher level of psychological safety would be fast accustomed to working within a newly formed project team.

The construct of individual psychological safety was specified by five themes. These five themes were used in the generation of the initial item pool as a reflective approach was taken. Two of these themes were removed from the scale, risk-taking and consequences. This is quite interesting as Edmondson (1999) describes the concept of psychological safety as “a shared belief about the consequences of interpersonal risk-taking”. Nevertheless, there was no discriminant validity found between the scales.

Thus, future research should try to better understand the themes that are related to the constructs and how they differ from each other, as well as to explore additional themes that may arise when observing a workplace.

Limitations

The most important limitation of this research is the lack of discriminant validity between the newly developed scale and the team psychological safety scale. This confirms that the newly developed measurement scale is not entirely unique when compared to the team level scale, because there is significant overlap between the two constructs. When compared to the construct interpersonal trust there was also no discriminant validity, because of high correlation amongst the items. Thus, it can be concluded that these constructs are similar and could not be differentiated in this research.

This study has been conducted in the Netherlands. Dutch respondents have been used in both studies. This might have had an impact on the results as Dutch people are more direct and honest in answering. The respondents also mentioned the Dutch culture in Study 1. They described this as being more open to their colleagues and to their boss. Going directly to your supervisor and asking for advice is normal in the Dutch culture. Therefore, their feeling of safety could be different than how others might feel safe as other company cultures might experience a strict hierarchy in their work environment. In addition, because of the Covid-19 crisis the interviews have been conducted using Skype and Zoom. Five out of the six respondents were at home when the interview took place. This might influence their feeling of safety and could have had an effect on their answers to the questions. Furthermore, the survey has been conducted in English to not hinder the effectiveness of the scales. Making the scale simple and easy to understand was important. However, some words in the other scales could have hindered the answering of the respondents if their English was below an average level.

A total of 172 respondents were used as a sample for the population of nine million people in the Netherlands that are currently employed. Carpenter (2018) mentioned that a sample size between 100 and 200 respondents would be fair as there is no clear consensus about the exact number. However, by using the sample calculator (with a confidence interval of 95%) a sample size of 385 respondents would be necessary. In addition, the data normality assumption was not achieved for hypothesis 4. Even though data normality is rarely seen (Box, 1976), it might have been more effective to reach a sample size of 385 respondents to have a more reliable sample of the population.

Recommendations and Future Research

In the previous chapter it was explained that there is no discriminant validity, which indicates that no construct validity was established. Therefore, additional conceptual and empirical work is needed to refine and extend this scale. Future research should focus on extending the sample size used for qualitative research. Two separate samples might be more effective to examine how each scale correlates with each other. This might provide a better understanding of the interaction between each scale. The

analysis that have been used in this study are recommended to find discriminant validity. Furthermore, collecting additional data will help in determining if discriminant validity issues are a result of the sample that has been gathered.

More respondents from different work fields should be used in Study 1 to gather a broader understanding of their experience of feeling safe. This will also help in confirming the themes that have been identified in this study, or even help in discovering new themes. Doing so could actually be more beneficial for the generation of items as future studies could find new insights regarding the themes. This might help in improving the newly developed scale for measuring individual psychological safety. Hence, construct validity might be established.

Another method to achieve discriminant validity could be to do a repetition of Study 2 by using a larger sample size. In addition, this study should be conducted in a different setting, meaning the questionnaire should be tested in another country. These results might provide new insights and could better the understanding of this newly developed scale. Furthermore, a longitudinal study could be conducted to include job experience as a control variable since prior research has found that this variable can influence psychological safety (Detert & Burris, 2007; Nembhard et al., 2006).

Hirak et al. (2012) concluded that high levels of leader inclusiveness had an important effect on psychological safety, which influenced unit performance. It might be interesting to research the implications of leader inclusiveness on individual psychological safety and learn the extent of the effect on individual performance. Furthermore, this study only focussed on the direct paths of individual psychological safety, but it would also be interesting to study the indirect paths. For example, future research could study the mediation effect of individual psychological safety between the relationship of inclusive leadership and individual performance.

According to Carmeli et al. (2010) leadership behaviors are found to be a major influencer of psychological safety. Both Kahn (1990) and Edmondson (1999) acknowledge that leadership has a critical influence on perceptions of psychological safety. Furthermore, leadership plays an essential part in creating expectations regarding appropriate behavior (Edmondson, 2004). Hence, there have been many studies that have looked into the various leadership constructs, such as: (1) Transformational leadership (e.g., Detert & Burris, 2007), (2) change-oriented leadership (e.g., Ortega, van den Bossche, Sánchez-Manzanares, Rico, & Gil, 2014), (3) ethical leadership (e.g., Tu, Lu, Choi, & Guo, 2019), (4) leader behavioural integrity (e.g., Palanski & Vogelgesang, 2011) and servant leadership (e.g., Schaubroeck, Lam, & Peng, 2011). Therefore, it might be interesting to research more leadership behaviors and their relationship with individual psychological safety as the newly developed scale could provide new insights.

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Appendix A Overview Research Psychological Safety

Reference	How it was measured	Results
Edmondson, A. (1999). Psychological Safety and Learning Behavior in Work Teams. <i>Administrative Science Quarterly</i> , 350-383.	Edmondson (1999) Team Psychological Safety (TPS) seven item scale. Team level.	TPS is associated with team learning behaviour and has an indirect effect on team performance. In addition, TPS mediates between context support, coaching and team learning behaviour.
Baer, M., & Frese, M. (2003). Innovation is not enough: climates for initiative and psychological safety, process innovations, and firm performance. <i>Journal of Organizational Behavior</i> , 45-68.	Edmondson TPS scale. Organizational level.	Psychological Safety (PS) is positively associated with firm performance and (partially) moderated between process innovativeness and firm performance.
Tynan, R. (2005). The Effects of Threat Sensitivity and Face Giving on Dyadic Psychological Safety and Upward Communication. <i>Journal of Applied Social Psychology</i> , 223-247.	Edmondson TPS scale. Individual level (“self psychological safety” (SPS)).	There is a positive relationship between supervisor supportiveness and PS. In addition, SPS predicted the likelihood of admitting errors and seeking help. Furthermore, SPS mediates the relationship between supervisor face and help seeking, subordinates raising disagreement, give feedback and point out errors.
Nembhard, I. M., & Edmondson, A. C. (2006). Making it safe: The effects of leader inclusiveness and professional status on psychological safety and improvement efforts in health care teams. <i>Journal of Organizational Behaviour</i> , 941-966.	Edmondson TPS scale (Four items adapted to context of study). Team level (between groups).	PS is positively associated with leader inclusiveness, professional status and engagement in quality improvement work. In addition, PS mediates between leader inclusiveness and engagement in quality improvement work.
Wilkins, R., & London, M. (2006). Relationships between climate, process, and performance in continuous quality improvement groups. <i>Journal of Vocational Behavior</i> , 510-523.	Edmondson TPS scale. Team level.	PS is linked to more feedback giving and seeking behaviour. In addition, it is associated with task conflict and lower quality relationships.
Choo, A. S., Linderman, K. W., & Schroeder, R. G. (2007). Method and Psychological Effects on Learning Behaviors and Knowledge Creation in Quality Improvement Projects. <i>Management Science</i> , 437-450.	Edmondson TPS scale (four items were adapted). Team level.	Found a positive relationship between PS and knowledge created. PS is also associated with creativity leading to knowledge created.
Detert, J. R., & Burris, E. R. (2007). Leadership Behavior and Employee Voice: Is the Door Really Open? <i>The Academy of Management Journal</i> , 869-884.	Edmondson TPS scale (three items adapted to context of study). Individual level.	PS mediates between leader behaviours and subordinate voice. In addition, PS mediates the relationship between (General Manager) openness and time to voice behaviour.
Carmeli, A., & Gittell, J. H. (2008). High-quality relationships, psychological safety, and learning from failures in work organizations. <i>Journal of Organizational Behavior</i> , 709-729.	Edmondson TPS scale. Organizational level.	PS is significantly associated with learning from failures and high quality relationships. In addition, PS (partially) mediates between high quality relationships and learning from failures.
Halbesleben, J. R., & Rathert, C. (2008). The role of continuous quality improvement and psychological safety in predicting work-arounds. <i>Health Care Manage Review</i> , 134-144.	Edmondson TPS scale. Team level.	Partial support that PS mediates the relationship between management style, personal influence, and work-arounds.
Faraj, S., & Yan, A. (2009). Boundary Work in Knowledge Teams. <i>Journal of Applied Psychology</i> , 604-617.	Edmondson TPS scale. Team level.	“Team engagement in boundary work (buffering, spanning, and reinforcement) are positively associated with higher levels of TPS.”
Kark, R., & Carmeli, A. (2009). Alive and creating: the mediating role of vitality and aliveness in the relationship between psychological safety and creative work involvement. <i>Journal of Organizational Behavior</i> , 785-804.	Edmondson TPS scale. Individual level.	A positive relationship between PS and feelings of vitality, which affects creative work.
Madjar, N., & Ortiz-Walters, R. (2009). Trust in Supervisors and Trust in Customers: Their Independent, Relative, and Joint Effects on Employee Performance and Creativity. <i>Human Performance</i> , 128-142.	Edmondson TPS scale. Team level.	There is a relationship between PS and creativity.
Siemens, E., Roth, A. V., Balasubramanian, S., & Anand, G. (2009). The influence of psychological safety and confidence in	Edmondson TPS scale. Individual level.	PS is positively associated with high degree of communication between employees and an employee’s motivation to share knowledge. In addition, higher levels

knowledge on employee knowledge sharing. <i>Manufacturing & Service Operations Management</i> , 429-447.		of confidence in the knowledge of an employee means a lower effect of PS on the motivation to share the knowledge.
Bunderson, S. J., & Boumgarden, P. (2010). Structure and Learning in Self-Managed Teams: Why "Bureaucratic" Teams Can Be Better Learners. <i>Organization Science</i> , 609-624.	Edmondson TPS scale (four items were used). Team level.	Team structure is positively related to PS in teams.
Carmeli, A., Reiter-Palmon, R., & Ziv, E. (2010). Inclusive Leadership and Employee Involvement in Creative Tasks in the Workplace: The Mediating Role of Psychological Safety. <i>Creativity Research Journal</i> , 250-260.	Edmondson TPS scale (five items adapted to context of study). Individual level.	PS is positively associated with employee involvement in creative work and inclusive leadership. In addition, PS mediates the relationship between inclusive leadership and employee involvement in creative work.
Ortega, A., van den Bossche, P., Sánchez-Manzanares, M., Rico, R., & Gil, F. (2014). The Influence of Change-Oriented Leadership and Psychological Safety on Team Learning in Healthcare Teams. <i>Journal Bus Psychology</i> , 311-321.	Edmondson TPS scale. Team level.	PS is related to change-oriented leadership and team learning behaviour (in the healthcare).
Pearsall, M. J., & Ellis, A. P. (2011). Thick as Thieves: The Effects of Ethical Orientation and Psychological Safety on Unethical Team Behavior. <i>Journal of Applied Psychology</i> , 401-411.	Edmondson TPS scale. Team level.	Found a negative side of PS as stronger levels of PS could lead to engagement in unethical behaviour of team members.
Wong, A., Tjosvold, D., & Lu, J. (2010). Leadership values and learning in China: The mediating role of psychological safety. <i>Asia Pacific Journal of Human Resources</i> , 86-107.	Edmondson TPS scale (six items were used). Team level.	PS improves team learning and individual learning. In addition, leader values increases a PS climate in teams.
Palanski, M. E., & Vogelgesang, G. R. (2011). Virtuous Creativity: The Effects of Leader Behavioural Integrity on Follower Creative Thinking and Risk Taking. <i>Canadian Journal of Administrative Sciences</i> , 259-269.	Edmondson TPS scale. Individual level.	There is a positive link between TPS and intentions to think creatively and risk-taking. In addition, PS is positively associated with leader behavioural integrity.
Kostopoulos, K. C., & Bozionelos, N. (2011). Team Exploratory and Exploitative Learning: Psychological Safety, Task Conflict, and Team Performance. <i>Group & Organization Management</i> , 385-415.	Edmondson TPS scale. Team level.	TPS is positively related to exploratory learning. PS is positively related to team exploitative learning. In addition, PS has a direct and indirect relationship with team performance when mediated by team exploratory and exploitative learning. Furthermore, task conflict moderates between PS and exploitative learning.
Hirak, R., Peng, A. C., Carmeli, A., & Schaubroeck, J. M. (2012). Linking leader inclusiveness to work unit performance: The importance of psychological safety and learning from failures. <i>The Leadership Quarterly</i> , 107-117.	Anderson and West (1994) eight-item scale. Unit and individual level.	There is a positive relationship between individual PS and leader inclusiveness. In addition, a PS climate has an effect on unit performance when mediated by unit learning from failures.
Kessel, M., Kratzer, J., & Schultz, C. (2012). Psychological Safety, Knowledge Sharing, and Creative Performance in Healthcare Teams. <i>Creativity and Innovation Management</i> , 147-157.	Edmondson TPS scale (three items were adapted). Team level.	Sharing information and know-how within a team mediates the relationship between TPS and creative team performance. In addition, TPS is positively related to creative team performance.
Leroy, H., Anseel, F., Halbesleben, J. R., Savage, G. T., Dierynck, B., Simons, T., McCaughey, D., Sels, L. (2012). Behavioral Integrity for Safety, Priority of Safety, Psychological Safety, and Patient Safety: A Team-Level Study. <i>Journal of Applied Psychology</i> , 1273-1281.	Edmondson TPS scale. Team level.	TPS is associated with decreasing employee errors and enhancing safety.
Liang, J., Farh, C., & Farh, J.-L. (2012). Psychological Antecedents of Promotive and Prohibitive Voice: A Two-Wave Examination. <i>The Academy of Management Journal</i> , 71-92.	Liang et al. (five-item scale, 2012). Individual level. Five items were adapted from previous studies (Brown & Leigh, 1996; May, Gilson & Harter,	PS is positively associated with voice behaviour and amongst the three psychological antecedents of voice, PS has the strongest positive effect on prohibitive voice. "The positive relationship between psychological safety and both promotive and prohibitive voice is significantly weaker when felt obligation for constructive change is lower: when felt obligation for constructive change is low, voice is low regardless of levels of PS."

	2004). The previous studies took various items of Kahn's (1990) work.	
Post, C. (2012). Deep-Level Team Composition and Innovation: The Mediating Roles of Psychological Safety and Cooperative Learning. <i>Group & Organization Management</i> , 555-588.	Edmondson TPS scale (Four items adapted to context of study). Team level.	"PS is statistically a predictor of learning and an indirect predictor of innovation." In addition, PS is related to sequential thinking and connective thinking.
Gu, Q., Wang, G. G., & Wang, L. (2013). Social capital and innovation in R&D teams: the mediating roles of psychological safety and learning from mistakes. <i>R&D Management</i> , 89-102.	Edmondson TPS scale. Team level.	TPS is positively related with team innovation (in R&D teams).
Singh, B., Winkel, D. E., & Selvarajan, T. T. (2013). Managing diversity at work: Does psychological safety hold the key to racial differences in employee performance? <i>Journal of Occupational and Organizational Psychology</i> , 242-263.	Chrobot-Mason and Aramovich (2004) three-item scale. Individual level.	There is a positive relationship between PS and diversity climate. In addition, there is a positive relationship between PS and employee performance.
Liu, S., Hu, J., Li, Y., Wang, Z., & Lin, X. (2014). Examining the cross-level relationship between shared leadership and learning in teams: Evidence from China. <i>The Leadership Quarterly</i> , 282-295.	Edmondson TPS scale (Four items adapted to context of study). Team level.	"TPS (partially) mediates the relationships between shared leadership and both team learning and individual learning."
Basit, A. A. (2017). Trust in Supervisor and Job Engagement: Mediating Effects of Psychological Safety and Felt Obligation. <i>The Journal of Psychology</i> , 701-721.	Liang et al. (five-item scale, 2012). Team level (work unit).	The effect of trust in supervisor on job engagement is mediated by PS.
Hjertø, K. B., & Paulsen, J. M. (2017). Learning outcomes in leadership teams: The multilevel dynamics of mastery goal orientation, team psychological safety, and team potency. <i>Human Performance</i> , 30(1), 38-56	Edmondson TPS scale (four items were adapted). Team level.	TPS is positively related to individual learning.
Hu, J., Jiang, K., Erdogan, B., Bauer, T. N., & Liu, S. (2018). Leader Humility and Team Creativity: The Role of Team Information Sharing, Psychological Safety, and Power Distance. <i>Journal of Applied Psychology</i> , 313-323.	Edmondson TPS scale (four items were used). Team level.	TPS is positively related to team creativity.
Lee, H. W., Choi, J. N., & Kim, S. (2018). Does gender diversity help teams constructively manage status conflict? An evolutionary perspective of status conflict, team psychological safety, and team creativity. <i>Organizational Behavior and Human Decision Processes</i> , 187-199.	Van Ginkel & van Knippenberg (six-item scale, 2008). Team level.	Status conflict is negatively associated with TPS. However, TPS mediates the relationship between status conflict and team creativity.
Ou, Z., Chen, T., Li, F., & Tang, P. (2018). Constructive controversy and creative process engagement: The roles of positive conflict value, cognitive flexibility, and psychological safety. <i>Journal of Applied Social Psychology</i> , 101-113.	Edmondson TPS scale. Team level.	PS has an indirect effect on creative process engagement through positive conflict value and cognitive flexibility.
Subhakaran, S. E., & Dyaram, L. (2018). Interpersonal antecedents to employee upward voice: mediating role of psychological safety. <i>International Journal of Productivity and Performance Management</i> , 1510-1525.	Liang et al. (six-item scale, 2012). Individual level.	Manager pro-voice behaviour has an effect on employee upward voice when mediated by PS. In addition, PS mediated the relationship between co-workers' upward voice and employee upward voice.
Cauwelier, P., Ribiere, V. M., & Bennet, A. (2019). The influence of team psychological safety on team knowledge creation: a study with French and American engineering teams. <i>Journal of Knowledge Management</i> , 1157-1175.	Edmondson TPS scale. Team level.	TPS is positively associated with team knowledge creation and task knowledge creation.

<p>Kim, B.-J., Park, S., & Kim, T.-H. (2019). The effect of transformational leadership on team creativity: sequential mediating effect of employee's psychological safety and creativity. <i>Asian Journal of Technology Innovation</i>, 90-107.</p>	<p>Edmondson TPS scale. Individual level.</p>	<p>Employee's individual-level PS is positively associated with team-level transformational leadership and employee's individual-level creativity. Team-level transformational leadership has an effect on team-level creativity when mediated by employee's individual-level PS and creativity sequentially.</p>
<p>Tu, Y., Lu, X., Choi, J., & Guo, W. (2019). Ethical Leadership and Team Level Creativity: Mediation of Psychological Safety Climate and Moderation of Supervisor Support for Creativity. <i>Journal of Business Ethics</i>, 551-565.</p>	<p>Liang et al. (five-item scale, 2012). Team level.</p>	<p>PS climate is positively associated with ethical leadership. In addition, ethical leadership has an effect on team-level creativity when mediated by PS. "Supervisor support for creativity moderates the indirect effects of ethical leadership on team-level creativity through PS climate."</p>
<p>Xu, M., Qin, X., Dust, S. B., & DiRenzo, M. S. (2019). Supervisor-subordinate proactive personality congruence and psychological safety: A signaling theory approach to employee voice behavior. <i>The Leadership Quarterly</i>, 440-453.</p>	<p>Edmondson TPS scale. Team level.</p>	<p>Perceived PS is positively associated with subordinate voice behaviour. In addition, high levels of perceived PS means more subordinate and supervisor levels of proactive personality.</p>

Appendix B Questionnaire Qualitative Research

- Who are you?
- What is your function? How long have you been in this role?
- How long have you been working in your current organization?
- For how many companies have you worked over the last 10 years?
- What other functions/roles did you have in those companies?

- How would you describe your current organization climate?
 - What kind of atmosphere is there?
 - Is this organizational climate better than your previous employers? Why?
- Are you open to each other? In what way?
 - Do you think this is important? Why?
- Do you trust each other? Why?
 - Did you ever had the feeling you could not trust somebody? Please tell me more.
 - How about previous jobs? Did you ever experience you could not trust somebody? Please tell me more.
- Do you feel safe at work? Why?
 - Are you confident to take risks within your organisation? Why?
 - How did you feel at previous jobs? Why?
 - What do you value as most important to feel safe at work? Why?
- How does your current working environment relate to your personal well-being?
 - What could your organisation do to make you feel more safe? Why?
- Is your work environment willing to be helpful to each other? Please give an example.

- Are you working in teams within your organization?
 - Are these teams working together within the organisation?
 - Are there moments that teams have a meeting with each other to discuss certain things?
 - Do you have any contribution on these meetings? Why?
 - Is it possible to contribute to these teams as an individual? Why?
- Do you also have general meeting within your organization?
 - Are teams providing insights to these meetings?
 - Are individuals providing insights to these meetings?

- Have you ever had an idea that you were not comfortable sharing information? Why?
 - Are you sharing important information with your colleagues? Why?
- Have you ever experienced a moment that you could not ask or tell someone something because you did not feel safe at that moment? What made you feel that way?
- Do you ever feel fear when thinking about the consequences of certain actions?
 - What types of consequences did you fear?
 - How do you react on this feeling?

- What motivates you to express your opinion and/or concern about an organizational issue? Why?
 - Do you ever feel restricted in doing so? Why?
- Do you ever speak up to someone?
 - What makes you feel comfortable about doing it?
 - Does that go well?
- Do you pay attention to the other when giving feedback? Why?

- How do you give feedback?

- Are you confident in your own capability to teach other employees within the organization something?
 - In what kind of situation would you mostly do so?
- Are you still learning new things within this organization?
 - Why is that?
 - Do you still provide learnings for other employees? Can you give an example?
 - Are you comfortable growing in your current organization? Why?
- How do you feel when there are changes happening in your organization? Why do you feel this way?

- After answering these questions. Do you have anything else to contribute to this interview that might be interesting?

Appendix C Initial Scale of Individual Psychological Safety

Please indicate the extent to which you agree or disagree with each statement.

1. I can be myself (**Environment 1**)
2. I can safely express my concerns (**Speak 1**)
3. I am not afraid to admit a mistake (**Risk 1**)
4. There are no restrictions in telling my opinion (**Consequences 2**)
5. I am not afraid to take a risk (**Risk 2**)
6. I feel comfortable in my current work environment (**Environment 2**)
7. When I tell my opinion it is appreciated (**Respect 1**)
8. I can safely disagree with my co-worker(s) (**Speak 2**)
9. I am not concerned about the consequences if I make mistakes at work (**Consequences 1**)
10. I feel valued when sharing ideas (**Respect 2**)

(7-point Likert scale)

Appendix D Questionnaire

Demographic questions

1. What is your age? _____ (in years)
2. What is your gender? a) Male b) Female c) other
3. What is your current employment status? (full-time, part-time, temporary)
4. What is the highest degree or level of school you have completed? (Less than a high school diploma, High school degree or equivalent, MBO degree, Bachelor's degree, Master's degree, Doctorate, Other (please specify))
5. Which of the following categories best describes the industry you primarily work in? (Agriculture, Computer and Software, Construction, Education, Entertainment, Finance and Insurance, Food, Government, Health care, Manufacturing, Media, [Real Estate, Rental and Leasing], Retail, Telecommunications, Tourism, Transportation and Warehousing, Other (please specify))

Individual Psychological Safety

Please indicate the extent to which you agree or disagree with each statement.

1. I can be myself (**Environment 1**)
2. I can safely express my concerns (**Speak 1**)
3. I am not afraid to admit a mistake (**Risk 1**)*
4. There are no restrictions in telling my opinion (**Consequences 2**)*
5. I am not afraid to take a risk (**Risk 2**)*
6. I feel comfortable in my current work environment (**Environment 2**)
7. When I tell my opinion it is appreciated (**Respect 1**)
8. I can safely disagree with my co-worker(s) (**Speak 2**)
9. I am not concerned about the consequences if I make mistakes at work (**Consequences 1**)*
10. I feel valued when sharing ideas (**Respect 2**)

Note: *item was removed during the scale purification process; $\alpha = 0.848$, CR = xx, AVE = xx (6-item scale; n = 172)

Employee Engagement

Please indicate the extent to which you agree or disagree with each statement.

1. I focus hard on my work
2. I concentrate on my work
3. I pay a lot of attention to my work
4. I share the same work values as my colleagues
5. I share the same work goals as my colleagues
6. I share the same work attitudes as my colleagues
7. I feel positive about my work
8. I feel energetic in my work
9. I am enthusiastic in my work

Note: $\alpha = 0.903$, CR = 0.819, AVE = 0.496 (n = 172)

Employee Voice Behavior

Please indicate the extent to which you agree or disagree with each statement.

1. I develop and make recommendations to my supervisor concerning issues that affect my work.
2. I speak up and encourage others in my work unit to get involved in issues that affect our work.

3. I communicate my opinions about work issues to others in my work unit, even if their opinions are different and they disagree with me.
4. I keep well informed about issues at work where my opinion can be useful
5. I get involved in issues that affect the quality of life in my work unit
6. I speak up to my supervisor with ideas for new projects or changes in procedures at work

Note: $\alpha = 0.868$, CR = 0.820, AVE = 0.534 (n = 172)

Interpersonal Trust

Please indicate the extent to which you agree or disagree with each statement.

1. Management at my firm is sincere in its attempts to meet the workers' point of view.
2. Our firm has a great future with the current managers.
3. If I got into difficulties at work I know my workmates would try and help me out.
4. Management can be trusted to make sensible decisions for the firm's future.
5. I can trust the people I work with to lend me a hand if I needed it.
6. Management at work seems to do an efficient job.
7. I feel quite confident that the firm will always try to treat me fairly.
8. Most of my workmates can be relied upon to do as they say they will do.
9. I have full confidence in the skills of my workmates.
10. Most of my fellow workers would get on with their work even if supervisors were not around.
11. I can rely on other workers not to make my job more difficult by careless work.
12. Our management would not deceive their workers to gain an advantage.

Note: $\alpha = 0.923$, CR = 0.877, AVE = 0.496 (n = 172)

Team Psychological Safety

Please indicate the extent to which you agree or disagree with each statement.

1. If you make a mistake on this team, it is not held against you.
2. Members of this team are able to bring up problems and tough issues.
3. People on this team accept others for being different.
4. It is safe to take a risk on this team.
5. It is not difficult to ask other members of this team for help.
6. No one on this team would deliberately act in a way that undermines my efforts.
7. Working with members of this team, my unique skills and talents are valued and utilized.

Note: $\alpha = 0.846$, CR = 0.793, AVE = 0.431 (n = 172)

Inclusive Leadership

Please indicate the extent to which you agree or disagree with each statement.

1. The manager is open to hearing new ideas.
2. The manager is attentive to new opportunities to improve work processes.
3. The manager is open to discuss the desired goals and new ways to achieve them.
4. The manager is available for consultation on problems.
5. The manager is an ongoing 'presence' in this team-someone who is readily available.
6. The manager is available for professional questions I would like to consult with him/her.
7. The manager is ready to listen to my requests.
8. The manager encourages me to access him/her on emerging issues.
9. The manager is accessible for discussing emerging problems.

Note: $\alpha = 0.944$, CR = 0.894, AVE = 0.643 (n = 172)

Appendix E SEM using AMOS

