

MASTER

Improving collaborative behavior through self-leadership training an empirical interventional study

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Master Thesis

Improving collaborative behavior through self-leadership
training: an empirical interventional study

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Abstract

This document is the result of research focused on examining the trainability and effectiveness of self-leadership strategies and its' positive outcomes for collaborative behaviors when these strategies are applied. Moreover, the mechanisms through which this relation is attained were explored. The study followed a quasi-experimental pre- and post-test study design with the inclusion of a control group. With this design, the intervention was held at a globally oriented commerce marketing company set in Barcelona, Spain and the control group was selected to match the participants in the experimental group. A training program was developed specifically for this study which revolved around the various strategies of self-leadership and was based upon the frameworks of experiential learning and the social cognitive theory. 30 participants completed the full program and 20 individuals made up the control group. When analyzing the data, it was found that participants following the designated training program increased their utilization of self-leadership strategies and this showed to have positive impacts in their general perceived self-efficacy and level of functional assertiveness. This also demonstrated the mediating capabilities that self-efficacy has on the relation between self-leadership and functional assertiveness. Furthermore, increase in work-engagement amongst participants was found to be dependent on the training although no significant direct relation was found between self-leadership and work-engagement. This could be a sign that work-engagement can be developed through training, regardless of the subject that is being treated. Finally a relation was found between work-engagement and knowledge sharing.

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Preface

Being that this section is likely to contain some of the last words written by me being a student, it is appropriate to reflect on the past seven years and the people involved to bring me to this point. Starting my career as a student I was blind to where my interests and capabilities lied, so taking the option which covered the widest range of domains seemed best to me. Along the road, which can hardly be described as straightforward, my ambitions and skills came to light bit by bit. Now, after almost completing the master's program "Innovation Management" I feel confident about both my strengths and weaknesses and ready for the next step in my life.

To get this far, several people provided their support and contributed to my progress for which I would like to thank them. Firstly, helping me throughout the whole process of this thesis is my mentor Sonja Rispens whom always was available for any questions that arose and providing guidance and motivation when either was lacking. Furthermore, I would like to express my gratitude to Marianne and Koos of Yellow-Training Barcelona for making me feel welcomed in their operations and helping me massively with the performed research. Their methods, techniques and personal care when performing the training program were super insightful and made me learn a lot (about myself as well). My period abroad did not always feel that great mentally and emotionally for various reasons but I always felt supported by them for which I'm thankful. Next to that, my family and friends were always there when I needed support or distraction where I'd like to mention both my mum and a special girl specifically for their care during the past months. Finally, I would like to mention my father which was and will always be on my mind and thank him for making me the person I am today.

Tommy van Beeck
Roosendaal, March 2020

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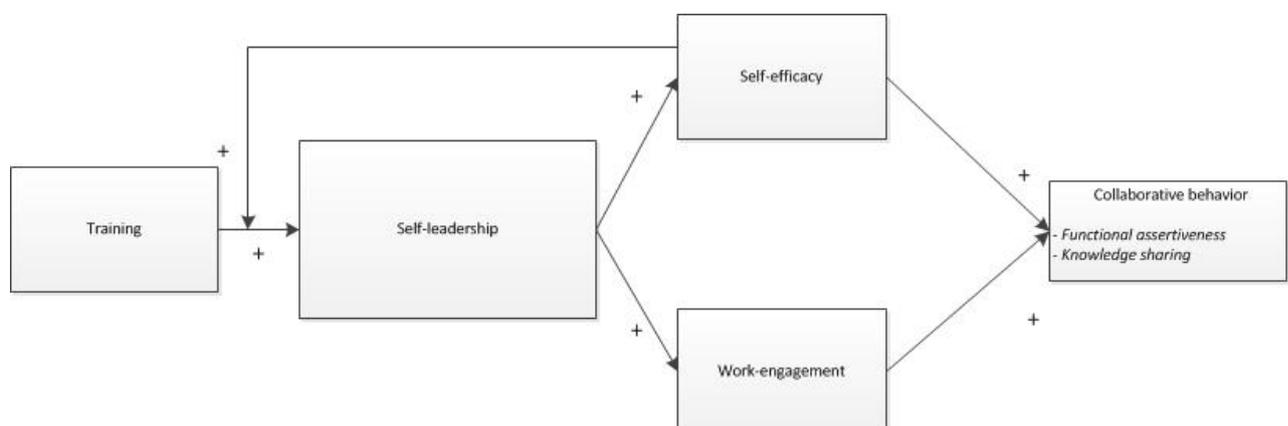
Executive Summary

As organisations need to be innovating on all domains to remain competitive, they are also looking into ways of organising their workforce and in particular on how they can incorporate innovative forms of leadership. A part of this development is to distribute leadership among its' employees and make them lead themselves in the way they organise their work and environment. This trend houses huge potential benefits for these organisations and its' members but at the same time put increased pressure and responsibility to their lower-level members. To make these employees ready and more capable to handle these new requirements, they should get acquainted with methods that transform them in more self-organizing individuals. One concept that is integral to this is self-leadership. Self-leadership is "a process through which people influence themselves to achieve self-direction and self-motivation to perform" [Houghton & Neck, 2002, p. 672].

This study investigated the effectiveness of a newly developed training program that included the strategies internal to the concept of self-leadership. Additionally, it was of importance to look whether such a training and/or self-leadership itself could have positive influence on collaborative behaviors, such as the level of functional assertiveness and knowledge sharing and certain beliefs of capability (self-efficacy) and fulfillment/motivation (work-engagement). This led to the main research question being;

"Can Self-leadership training effectively lead to an increased utilization of its' strategies and can it aid in increasing the self-efficacy, work-engagement and subsequently collaborative behavior of employees?"

To answer this question, a training program was developed by a consultancy firm specialized in training and coaching which helps developing human behavior that results in an increased focus and effectiveness. This specific program revolved around the strategies that are a part of self-leadership and furthermore was based on the premises of experiential learning, as developed by Kolb, and the social cognitive theory as developed by Bandura. This program was performed at and commissioned by a commerce marketing organisation set in Barcelona, Spain and was being given to their employees in the IT department. To determine the effectiveness of this training, a pre- and post-test survey was collected with the use of a control group which acted as baseline comparison. Furthermore, previous research gave the framework that this study operated in as well as gave a deepened understanding into the constructs and the mechanisms that drive these. After performing this literature study, hypotheses were developed which led to the following hypothesized research model:



Upon completion of the training program, the full data set consisted of 30 participants in the experimental group and 20 individuals made up the control group. Combining the respective pre- and post-test surveys made for a total of 100 completed surveys which were then used to test our research model. To test these hypotheses, various statistical analyses were performed with the use of SPSS version 23. To start, several preliminary analyses were performed to check for similarity of our experimental and control group on all the constructs. This was needed to ensure both groups could be compared in a statistically validated manner. When this yielded satisfying results, the hypotheses could be tested. Firstly the effectiveness of the training was analyzed with the use of a mixed model ANOVA. This analysis indicated that the experimental group significantly increased their utilization of the strategies of self-leadership, as opposed to the control group. Then, the analysis was proceeded with testing the various relations between the concepts that are given in the research model. This gave mixed results. For instance, self-leadership itself positively related to self-efficacy (confirming hypothesis 2) but this was not the case with work-engagement (not confirming hypothesis 3). Furthermore, it was found that self-efficacy positively related with functional assertiveness but not with knowledge sharing. Opposing to that, it was found that work-engagement positively related with knowledge sharing but not with functional assertiveness. Furthermore, it was found that self-efficacy mediated the relation between self-leadership and functional assertiveness. This exposed a pathway from skills to behavior through capability beliefs which can be remarked as an interesting insight. Hypothesis 7 was not confirmed indicating that self-efficacy did not moderate the learning effect of the participants. Finally, age and tenure seemed to interact with various relations which for instance meant that the relation between self-leadership and work-engagement was dependent on age.

To conclude, this study has shown that self-leadership strategies can be made trainable leading to an increased application of these strategies. This application not only makes individuals more self-directed, it also fosters an increased sense of self-efficacy which has a positive impact on how they interact with their environment. This insight can help transform employees to cope with a changed environment that asks them to be leaders over their own actions and behaviors.

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1 Introduction

An introduction is provided to deliver insights into the structure and process of the performed research. It describes the research area, purpose and justification of the research, developed research questions and the relevance in terms of the Msc. program Innovation Management.

1.1 Context of research

Recent times has seen a major shift in how (large) organizations operate and distribute leadership among its' members. Where in the previous decades many of these firms relied on a traditional top-heavy leadership structure, they are now slowly adopting new ways of leadership practices that empower and involve employees at all various organizational levels and encourage them to take more control and responsibility for their own work-related behaviors and actions [Neck and Manz, 2013]. This trend is nested in the "Innovation 3.0" concept which focuses on not only product, process and/or human capital related innovation but also looks into new ways of organizing a company, enabling co-creation and innovative forms of leadership [Volberda and Bosma, 2011]. In more detail, this concept goes beyond the traditional view of innovation being solely technology-focused and includes the domains of -amongst others- knowledge management, education and training of employees, internal collaboration and work organization into the innovation framework. As a result, there is an increased focus on the self-organizing capabilities of employees as a factor of innovation where upper-level management solely provides the framework and requirements to adhere to. These developments, although promising, put an increased pressure and responsibility on the current workforce which is why it is extremely useful to research tools and training methods which can aid the workforce in the transformation to becoming more self-organizing employees.

One concept which promises huge potential for making employees more competent to cope with these new circumstances is "self-leadership". This concept is in its broadest sense defined as "a process through which people influence themselves to achieve the self-direction and self-motivation needed to perform" [Stewart et al., 2011]. More specifically, self-leadership is a set of behavioral and cognitive strategies designed to enhance individual cognitive processes, behavior, and affective states. Self-leadership links together the concepts of internal motivation, goal-setting, self-management and self-observation. Learning about these strategies and subsequently adopting these into their work-related behavior, provides employees tools and skills to gain an increased control over their behavior which enables them to manage and lead themselves better [Stewart et al., 1996]. Generally it is viewed as an important antecedent to how an employee interacts with his/her environment and associates (behavioral) as well as being related with higher internal control and enhanced awareness (cognitive) [Manz, 1986].

To learn about these strategies and subsequently implement them in day to day professional life requires training. In an organizational context this means that training courses based on the concept of self-leadership need to be developed. Within this controlled training environment, employees can experiment with, experience and reflect on the new behaviors that the use of self-leadership strategies will produce. Such a method fully adheres to the experiential learning model developed by Kolb (1984). This model is a depiction of the phrase: "learning through reflection on doing". By doing this, the employees are directly and indirectly involved in the experiences and will after reflect

on this experience with the use of their analytical skills. This makes for an increased understanding of the new knowledge and produces sustainable changes in both behavior and cognition.

The development of such self-leadership training courses -however scarcely studied- gives promising results (see section 2.2). Therefore it was chosen in this research to develop a new self-leadership training program based on the literature of self-leadership, experiential learning, social learning theory (SCT) and the logical levels of change. The incentive for this development was the request by a multinational tech-based company to help the employees of their IT-department in Barcelona, Spain with becoming more able to cope with the perceived pressure by their colleagues in the sales-department. More specifically, the aim of the training sessions (from the company's side) was to make the employees of the IT-department influence themselves in such a way that they can change their (passive-aggressive) behavior and increase their sense of self-observation and self-management. This would enable them to better communicate their limits on what they can and can't do. Furthermore, this enhanced individual communication would ensure that knowledge is transferred within the organization leading to a stop to the ever increasing workload by having everybody familiar with ever returning problems and their adequate solutions. For this reason it was chosen to select functional assertiveness and knowledge sharing as the behavioral performance outcomes of this study. The company (online advertising) and its (IT) employees can be viewed as heavily tech-savvy which makes for possible interesting insights in how this specific demographic can be educated and transformed with the use of training. A full description of the outline of the program and justifications can be found in section 4.2.

1.2 Purpose of the research:

The purpose of this research was -amongst others- to perform an extensive analysis on the components that make the concept "self-leadership". The goal of this analysis was to deepen the understanding of the overall concept and the consequences it has on collaborative behaviors such as knowledge sharing and functional assertiveness. Furthermore, the possible mediating and moderating effects that self-efficacy and work-engagement have on the effects of the training and its relation with the team dynamics will be examined.

Additionally, the effectiveness of training on self-leadership concepts and strategies was examined through an intervention research with the use of a control group. This led to useful insights on the extent to which self-leadership strategies can be trained to employees in dedicated training sessions and consecutively applied in their day to day professional life. More specifically, a detailed look was had on which learning mechanisms are used, the conceptual models applied during the training sessions and which strategies are found to be most useful.

1.3 Research question(s)

To conclude, this research took an in-depth look in how self-leadership training can aid in improving an individual's collaborative performance within an organization set in a tech-savvy context. More specifically, the research examined the trainability of self-leadership strategies and through which mechanisms (self-efficacy & work-engagement) the possible positive outcomes in terms of assertive communication and sharing of knowledge can be reached. Furthermore, it also took a look at how the behavioral and cognitive changes can best be reached by implementing the various models and theories surrounding this subject existing in the literature such as experiential learning, social learning theory (SCT) and the logical levels of change.

With all this said, the main research question that is formulated for the upcoming research is:

"Can self-leadership training effectively lead to an increased utilization of self-leadership strategies and can self-leadership training aid in increasing the self-efficacy, work-engagement and subsequently collaborative behavior of employees?"

1.4 Innovation Management relevance:

This research is important scientifically as it is reasoned that the concept of self-leadership (and self-management in general) plays an ever increasing central role in the performance of individuals within organizations, teams and their individual professional life in general. As said in section 1.1, this type of development is part of the framework of "Innovation 3.0" making it relevant from an innovation management perspective as well. This concept gained a lot of scientific interest over the last years with considerable positive performance related outcomes. However, the effect these strategies have on the selected desirable behavioral attributes for this research is still lacking. Furthermore, this research focused on teams within tech companies which can contribute to the further validation of a general consensus on the various links surrounding the main concept of self-leadership.

Additionally, training methods focused on improving self-leadership of employees have currently been sparsely scientifically analysed in terms of their effectiveness and the subsequent results it has on said communication dynamics. This research gives initial insights on how such training methods work and through which mechanisms the taught strategies can be translated to day to day professional life of employees.

Lastly, the possible moderating effect self-efficacy has on the effectiveness of training is hypothesized by the literature on social cognitive theory but remains to be unstudied and validated in an experimental design and therefore this study could give very interesting insights and arguments for explaining the existing variations in learning effects across individuals.

2 Literature framework:

This section describes the review performed on existing literature regarding the subjects of self-leadership, self-leadership training, work-engagement, self-efficacy, knowledge sharing, functional assertiveness and learning behaviors. A discussion about the key definitions, antecedents and possible outcomes of these concepts will be given as well as a look at the various models and theories that exist in the literature. This section is outlined in two parts based on the division of the main research question in two distinct sub-questions, being:

1. Can Self-leadership training effectively lead to an increased utilization of its' strategies?
 - Self-leadership (section 2.1)
 - Self-leadership training (section 2.2)
 - Behavioral change (section 2.3)
2. Can Self-leadership training aid in increasing the self-efficacy, work-engagement and subsequently collaborative behavior of employees?
 - Self-efficacy (section 2.4)
 - Work-engagement (section 2.5)
 - Collaborative behavior (section 2.6)

Can Self-leadership training effectively lead to an increased utilization of its' strategies?

2.1 Self-leadership

Self-leadership is a concept which has received increasing attention over the years as it posits a different interesting perspective from traditional leadership literature and practices. Instead of focusing on how supervisors and leaders influence their followers, this alternative approach looks at how people manage and lead themselves. This focus on internal rather than external regulation historically originates from the **self-control** concept as developed by Thoresen and Mahoney (1974). They defined: "A person displays self-control when in the relative absence of immediate external constraints he or she engages in behavior whose previous probability has been less than that of alternatively available behaviors" (p. 12). This approach of deliberately influencing one-self's behavior and actions was found to be helpful in assisting individuals with structuring their environment (at work or elsewhere), establishing self-motivation, and facilitating behaviors appropriate for attaining performance standards [Manz, 1986]. This insight made that it led to a new stream of research which ultimately developed the concept into **self-management** and more specifically the practical strategies for this self-influence [Manz, 1986, Manz and Sims, 1980]. Such strategies include self-observation, self-management of cues, self-goal setting, self-reward/criticism, and rehearsal [Stewart et al., 2011]. This self-management was found to be beneficiary to numerous performance related outcomes such as individual effectiveness [Manz, 1992], motivation [Locke and Latham, 1990] and goal attainment [Mahoney and Arnkoff, 1979].

Manz then continued to perform research which led to the introduction of the concept **self-leadership** in 1992 [Manz, 1992]. He defined this new concept as "a comprehensive self-influence perspective that concerns leading oneself toward performance of naturally motivating tasks as well as managing oneself to do work that must be done but is not naturally motivating" [Manz, 1986]. This concept therefore differs from the existing self-control and self-management concepts because it "allows for addressing higher level standards that govern self-influence, more fully incorporating intrinsic motivation, and providing for a wider range of self-influence strategies" [Stewart et al., 2011, p 188]. More specifically, self-leadership is less driven by external forces (financial incentives etc.) but rather emphasizes the internal forces linked with certain behavior and actions such as natural rewards, emotion regulation and personality. Therefore, self-leadership cannot be seen as a discrete concept but rather as an expansion of self-management which makes it fall on a continuum which ranges from low to high internal control. This continuum can be seen in Fig. 1 [Stewart et al., 2011].



Figure 1: Continuum of Self-leadership

Building on the definition as given by Manz (1992) of self-leadership enabling motivation for even not naturally motivating tasks, an expanding perspective on the concept of self-leadership is that it can be seen as a skill-set of behavioral and cognitive strategies which acts as a cognitive resource that offers support for the completion of individuals' work-related goals [Houghton et al., 2016]. This enables it to be integrated as a personal cognitive resource in the Job demands-resources model as developed by Demerouti et al. (2001a). In short, this model posits that job (and personal) resources have a motivational potential which can act as a buffer against job demands and lead to work-engagement [Bakker and Demerouti, 2007]. For the sake of structure of this document, a more detailed analysis of this model can be found in section 2.5.

Self-leadership and the application of it's strategies has been found beneficiary for numerous performance related outcomes. Stewart et al. (2011) performed a meta-review on all existing researches done on the subject and found -amongst others- positive relations for productivity [Frayne and Geringer, 2000], job satisfaction [Neck and Manz, 1996] and career satisfaction [Raabe et al., 2007]. These positive relations with self-leadership can be rationalized in threefold. First, self-leadership strategies enable individuals to be "action-oriented, persistent and self-starting persons who tend to initiate and adapt work situations to foster and motivate their own higher performance" [Stewart et al., 2011, p. 197]. Second, they motivate individuals by incorporating natural or intrinsic rewards into tasks which leads to the experience of intrinsic motivation without changing the task [Houghton et al., 2003]. Lastly, "the mental imagery of performance, constructive self-talk, and identification of alternative beliefs to currently held dysfunctional beliefs can foster self-efficacy, the setting of challenging goals, and work persistence that can

enhance effectiveness” [Stewart et al., 2011, p. 197]. These are the three dimensions that make up the concept of self-leadership and are explained in further detail below.

2.1.1 Dimensions

The strategies linked with operating self-leadership can be divided in three distinct dimensions, being:

- Behavior-focused strategies: these strategies are designed to be increasing the self-consciousness and helping to deal with/alter required, perhaps troubling, behaviors [Carmeli et al., 2006]. These strategies include self-goal setting, self-reward, self-punishment, self-observation and self-cueing (i.e. behavioral rehearsal and planning)
- Natural reward strategies: strategies focused on the positive experience associated with a task and the process through which it is achieved [Carmeli et al., 2006]. With adopting these strategies individuals can motivate themselves by embedding tasks with intrinsic rewards. Additionally, ”they can purposely focus thinking on the natural rewards that are part of task performance and thereby cognitively experience intrinsic motivation without necessarily altering the physical nature of tasks [Houghton et al., 2003]. Gagné and Deci (2005) give as an example that ”nurses can more favorably connect with tasks that lack natural motivation, such as bathing patients, by focusing on how such tasks promote patient comfort. Another example is that of purposely focusing on those job features that are particularly enjoyable such as engaging customers in conversation or working outdoors [Houghton et al., 2003]. People are therefore likely to experience increased motivation, self-control and purpose [Manz, 1986].
- Constructive thought pattern strategies / Thought-self-leadership: these strategies focus on thought patterns that are constructive rather than destructive. These affect one’s emotional and behavioral state and reactions [Manz, 1992; Neck and Manz, 1992]. For instance, individuals may alter their thought patterns to focus on potentially available opportunities in times of difficulties, rather than thinking about the difficulties as obstacles. These individuals use optimistic thought patterns to create opportunities so that they can better cope with difficulties that may impede them from attaining their desired ends. The nature of an individual’s thought pattern affects her or his behaviors and outcomes [Neck and Manz, 1992]. Applications of these strategies include visualizing successful performance, self-talk, evaluating beliefs and assumptions. [Carmeli et al., 2006]

2.2 Self-leadership training

Training comes in all kinds of variations regarding the subject, context and method. However, for the purpose of this research the scope will be restricted towards existing literature focused on courses & workshops designed solely for learning about self-leadership strategies and the successful application of them into professional life. The insights of these studies were implemented in the training program which was developed for the upcoming study (see section 4.2). However, limited prior documentation about this is currently available outside of Neck and Manz (1996), Stewart et al. (1996) and Unsworth and Mason (2012). Manz & Neck (1996) focused on learning and subsequently applying

constructive thought patterns in an organizational setting with the use of a self-developed 6 week training program on the elements of the dimension constructive thought patterns within self-leadership (e.g. self-dialogue, mental imagery, dysfunctional beliefs). They found positive outcomes in terms of increased mental performance, self-efficacy and job satisfaction (as opposed to the control group). This study therefore provides evidence that cognitive patterns and processes can be effectively self-regulated and learned/developed with the use of training in an organizational setting [Neck and Manz, 1996]. Stewart et al. (1996) conducted a self-leadership training for a group of employees working in a hotel/resort. They failed to find an overall relationship between self-leadership training and self-directed behavior although finding a moderating effect of the level of conscientiousness on this relation. This means that trainees who pre-training scored low on conscientiousness (defined as the tendency to be organized, efficient, goal-oriented and persistent) improved their self-directed behavior significantly more than their high conscientiousness coworkers [Stewart et al., 1996]. They reasoned therefore that employees which were highly conscientiousness prior to training were already engaging in the desired self-directed behavior and felt little need for the training. This highlights the importance of a thorough needs-analysis prior to training [Stewart et al., 1996] and made for the thought of the hypothesized moderating role self-efficacy (however inversely) plays in our research. Finally, Unsworth (2012) carried out an experimental study where volunteers from a government health department took part in a 10 week self-leadership training course (or were randomly assigned to the control group). Results from their data demonstrated that self-leadership training had a negative effect on the levels of strain felt by employees and that self-efficacy and positive affect had mediating roles in this relation. The argument she used to explain this is that self-leadership training helps build psychological resources (self-efficacy and positive affect) that reduce and prevent strain [Unsworth and Mason, 2012] which can be viewed as a similar process to what the JD-R model proposes with regard to job resources. More specifically, self-leadership training helps increase positive affect (subjective experience of positive moods) which, for instance, can lead to a broader attentional focus and fostering experimentation and self-efficacy which in turn can lead to the confidence to persist in behavior and cognition even under difficult circumstances [Unsworth and Mason, 2012].

2.3 Behavioral change

As self-leadership is described as a set of behavioral skills which can be taught, it is useful to look into the various theories existing on how behaviors can be successfully altered. First the most dominant theory on cognitive and behavioral learning (Social Cognitive Theory) will be described and this will then be complemented by the two methodologies of experiential learning and the logical levels of change.

2.3.1 Social Cognitive Theory

The Social Cognitive Theory (from now on SCT) is developed by psychologist Bandura in order to establish a framework that leads to better understanding behavior (within organizations). SCT proposes that "learning occurs in a social context with a dynamic and reciprocal interaction of the person, environment, and behavior" [Lamorte, 2018]. More specifically it states that: "(1) the person influences behavior, (2) the environment influences behavior, (3) both the person and environment influence behavior, and (4)

behavior is a function of SCT” [Davis and Luthans, 1980]. This means that people at the same time are ”both products and producers of their motivation, their respective environments, and their behaviors” [Stajkovic and Luthans, 2002]. This triadic influence system can be seen in figure 2 below.

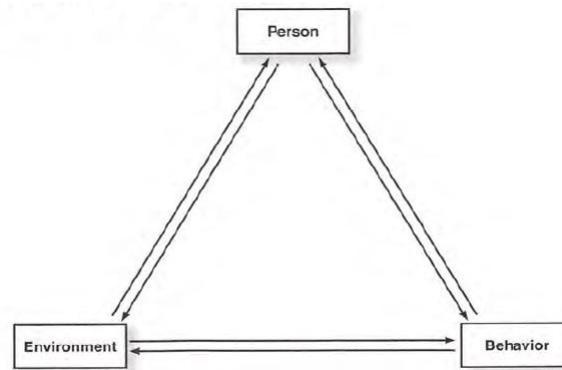


Figure 2: Bandura's triadic system of influence

The rationale behind using organizational self-leadership training to alter behavior and cognition (in other words; increased application of self-leadership strategies) can also be explained with the use of this theory. Training represents an environmental factor (change in E) which will -following this model- have an effect on both the person factor and the behavior factor. The person factor in this context resembles the cognitive processes within the person associated with self-leadership (constructive thought patterns) and the behavior factor resembles the display of the behavior-focused strategies of self-leadership.

Within the scope of this research, on top of this general framework as provided by Bandura (1991) the two most dominant methodologies in this domain are the experiential learning model developed by Kolb (1984) and the logical levels of change as constructed by Dilts (1990). Both of these theories reflect either environmental (E) or person (P) factors which makes them complementary to the SCT. More specifically, Dilts' levels of change gives an increased in-depth perspective on the hierarchy of personal factors that influence behavior while the experiential learning method captures environmental influences through learning by modeling and observing. Combining them gives insights on how alterations in behavior can best be developed in order to obtain the most sustainable changes. Following is a brief description of both theories:

2.3.2 Logical levels of change

Based on Maslow's hierarchy of needs, Dilts (1990) proposed a pyramid of neurological levels (see Fig. 3) which represent increasingly profound perceptive states of the brain [Sandu, 2016]. The function of each level is to accumulate, organise and direct the interactions on the levels below it. This means that changes made at a superior level in the pyramid produces a sustainable transformation in the inferior levels. Changes made at a lower level are more easily made and can also facilitate changes at a superior level through practical applications, which in reality explains the effect that training has on superior levels such as beliefs & values.

At the most basic level, the environmental factors represent external factors that individuals must react to; both actual work environment in terms of facilities and physical

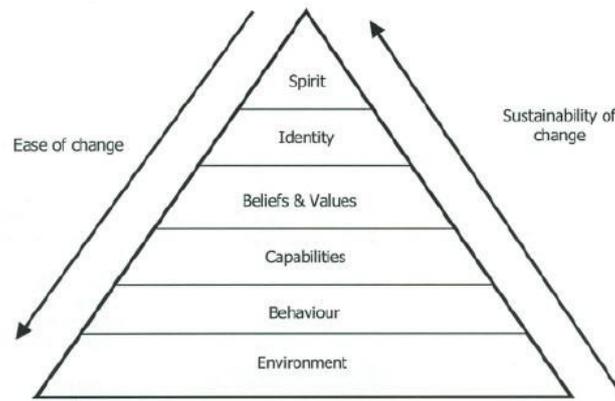


Figure 3: Dilts' pyramid of neuro-logical levels of change

resources as well as the human environment they operate in (i.e. team-composition and leadership structures).

The behavior level depicts the actions and behavior of individuals in a given situation. In other words, how does this individual interact with its environment?

Next, the level of capabilities is related to the strategies, skills, abilities and knowledge which lead to the actions and behaviors.

The level of beliefs & values represent what is most important to an individual and are the motivating forces which lead to acquiring certain competencies and displaying behaviors. The identity level relates to the mission individuals have in life and their sense of self.

Finally, the most superior level is that of purpose. This level reflects the meaning of life to each individual and tries to answer the reasoning behind someone's identity.

All of these levels combined generate an extensive insight on the possibilities of where changes can be made. It is important to acknowledge that the optimal level is always a result of the trade-off between the ease of change and the desired sustainability of the change.

2.3.3 Experiential learning

The experiential learning model is developed by Kolb to provide "a holistic model of the learning process" and centralizes the role experience has in this learning process. More specifically, it describes learning as "the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience" [Kolb et al., 2001]. This process is schematized as in Fig. 4 below.

The experiential learning model can be seen as a recursive process with four stages based on two continuum's called "Processing" & "Perception" Continuum's. The former describes the approach to a task (learning by doing vs. learning by watching) and the latter describes our emotional response. Based on this, the continuous cycle of experiencing, reflecting, thinking and acting is obtained. Or as Kolb (1984) states:

“Immediate or concrete experiences are the basis for observations and reflections. These reflections are assimilated and distilled into abstract concepts from which new implications for action can be drawn. These implications can be actively tested and serve as guides in creating new experiences.”

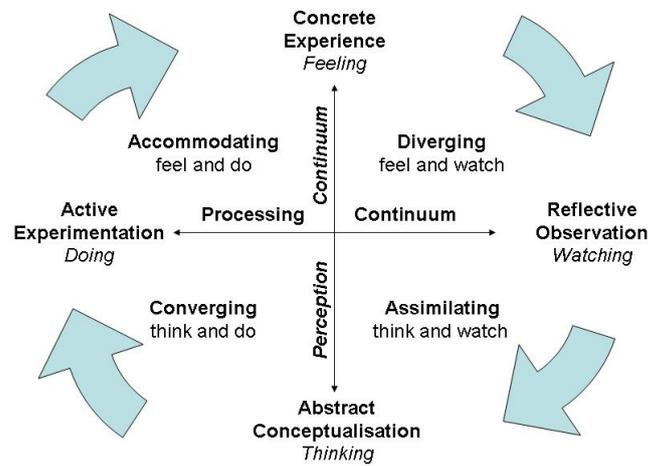


Figure 4: Kolb's experiential learning model

Can Self-leadership training aid in increasing the self-efficacy, work-engagement and subsequently collaborative behavior of employees?

In order to get a better insight as to how self-leadership training can help increase said variables, a literature background on these concepts is given with a focus on their relation with other relevant factors and performance outcomes. Their hypothesized relation with self-leadership (training) however will be explained in further detail in section 3.

2.4 Self-efficacy

Self-efficacy is defined as the personal belief in one's ability to accomplish a specific task [Bandura, 1986, Bandura, 1991]. Self-efficacy is an important component in the Social Cognitive Theory as seen in Figure 2 [Bandura, 1991]. The motor of this triadic system is assumed to be the self-efficacy beliefs that an individual has. These beliefs determine a person's choice of activities, how much effort they will expend in those activities, and how long they will sustain effort in dealing with stressful situations, obstacles, or setbacks [Bandura, 1997]. Furthermore, it also influences learning abilities, motivation and performance as people choose to learn and/or perform certain tasks that they believe are capable of accomplishing/attaining [Lunenburg, 1997]. Self-efficacy beliefs are formed by a person's specific capabilities and other individual factors, as well as by environmental factors (barriers and facilitators). More specifically, these factors/sources include:

- Mastery experience: the interpreted result of past performances
- Vicarious experience: observational learning of behaviors and consequences of similar models in similar situations
- Verbal persuasion: Encouraging or discouraging messages from others
- Physiological feedback: emotional arousal (enthusiasm vs. anxiety) when performing a task

Self-efficacy beliefs have been found to have significant influence on performance. For instance, Earley (1986) has conducted a study of employee beliefs in their capabilities, and the affect on their productivity and found higher levels of productivity associated with higher levels of self-efficacy. Furthermore, a study by Wood et al. (1990) found that perceived self-efficacy and personal goals have a direct effect on organizational performance [Wood et al., 1990]. The reasoning behind this was that perceived self-efficacy ensures the effective utilization of analytic strategies to find the level of personal goals and managerial rules that support these goals which ultimately leads to an increased organizational performance [Wood et al., 1990]. Finally, a study by Eden and Aviram (1993) found that "individuals with low self-efficacy were able to build higher self-efficacy through training." This study demonstrates the importance of self-efficacy and shows that self-efficacy perceptions can be changed with the use of training [Redmond, 2010].

2.5 Work-engagement

Work-engagement is a well studied concept that has gone through various definitions over the years. For the purpose of this research, the definition as constructed by Schaufeli et al. (2002) is used which states: "Engagement is a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption." These conceptual elements can be further defined as:

- Vigor is characterized by high levels of energy and mental resilience while working, the willingness to invest effort in one's work, and persistence also in the face of difficulties.
- Dedication is characterized by a sense of significance, enthusiasm, inspiration, pride, and challenge.
- Absorption is characterized by being fully concentrated and happily engrossed in one's work, whereby time passes quickly and one has difficulties with detaching oneself from work.

Work-engagement is found to be indicative to performance in numerous studies (e.g. Schaufeli and Bakker (2010); Xanthopoulou et al. (2008)). This can partially be explained by the role work-engagement plays on the allocation of job resources. Job resources are "physical, psychological, social, or organizational aspects of the job that offer support in achieving an individuals' goals on the job" [Neck, Houghton et al., 2016]. Even more so, the absence of these resources can lead to not reaching these work goals and personal growth. As follows from the definition, job resources may play an intrinsic motivational role because they foster employees' growth, learning and development. They may, however, also play an extrinsic motivational role because they are instrumental in achieving work goals by promoting the willingness of employees to put effort into their tasks [Schaufeli and Bakker, 2010]. Further we know that such resources buffer the negative effect of job demands [Bakker and Demerouti, 2007]

This all is combined and nested in the insightful general JD-R framework on work-engagement by Bakker and Demerouti (2007). This framework links the various job demands and resources with an increased level of work-engagement which ultimately leads to positive performance outcomes. In this model, self-leadership strategies in general would act as a skill set that is an additional cognitive personal resource as well as influence the physiological resource of self-efficacy and work-engagement directly. The JD-R model can be seen in Figure 5 below.

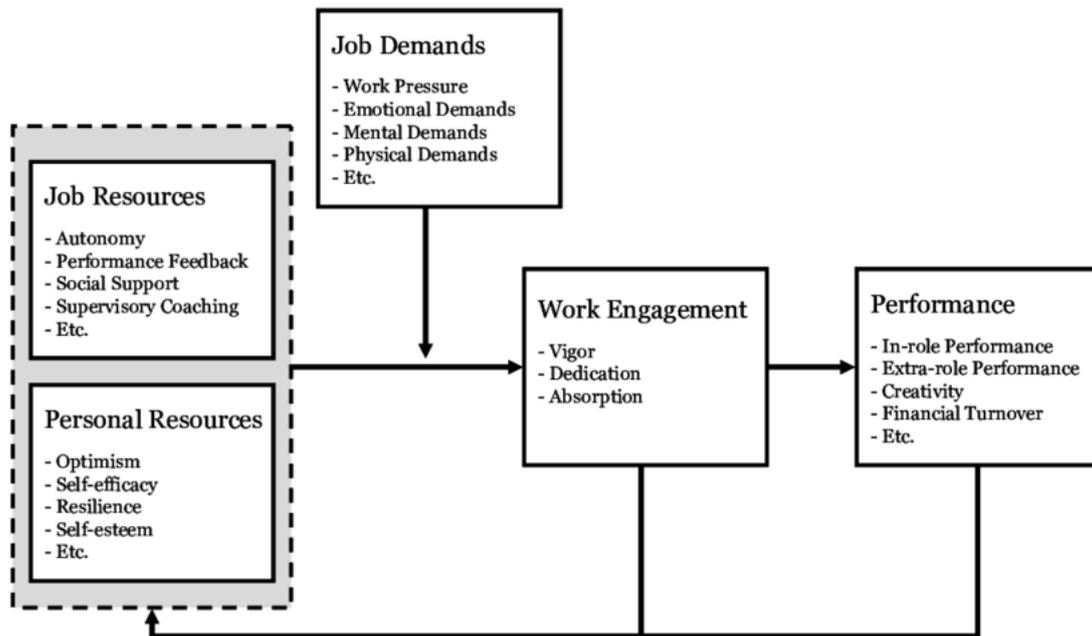


Figure 5: Demerouti and Bakker’s JD-R model of work-engagement

2.6 Collaborative behavior

2.6.1 Knowledge sharing

In order to get a full grasp of the concept of knowledge sharing, it is first of importance to look at the various forms of knowledge and the complexities they have in relation to the sharing of these knowledge forms.

Knowledge is a construct which has a long history of conflicting definitions. This is mainly because it is hard to separate the construct from other overlapping concepts such as information. Nonaka and Takeuchi (1995) therefore eventually identified three characteristics that distinguish information from knowledge:

- Knowledge is a function of a particular perspective, intention, or stance taken by an individual, and therefore, unlike information, it is about beliefs and commitment
- Knowledge is always about some end, which means that knowledge is about action
- Knowledge is context specific and relational, and therefore it is about meaning

Furthermore, knowledge can be classified into explicit and tacit knowledge [Polanyi, 1966]. The main difference between the two is the possibility to codify (words and writing) the knowledge. Explicit knowledge is easily transferred by using for instance formal language and can be codified such that it is available in forms of files, library collections and databases [Nonaka and Takeuchi, 1995]. On the contrary, tacit (i.e. implicit) knowledge is much harder to grasp and transfer. More specifically, tacit knowledge is in and bound to the mind of the individuals [Rutten et al., 2016] and the result of accumulated individual experiences, creativity and obtained skills which reside within individuals [Kim and Lee, 2006]. Ways of enabling the transfer of tacit knowledge are mentoring and the shadowing of experiences [Kim and Lee, 2006].

Moving on to the sharing aspect of the concept, there is a large body of research on the concept of knowledge sharing. This has accounted for numerous applications and definitions. For this research the definition of Gibbert and Krause (2002) was used as this fully incorporates the aspect of "willingness". They defined knowledge sharing as "the willingness of individuals in an organization to share with others the knowledge they have acquired or created". This willingness is important as part of existing knowledge is tacit and therefore cannot be transferred without active collaborative (often informal) interactions. Kim and Lee (2006) find that while informal knowledge exchange may not have clear organizational outcomes, they nevertheless are likely to lead to changes in behaviors when motivated individuals are involved in the exchange process. Furthermore, Gibbert and Krause state that "knowledge sharing cannot be forced, but can only be encouraged and facilitated". Motivational factors are therefore important for sharing knowledge.

2.6.2 Functional assertiveness

Assertiveness as a communicative style that encourages direct communication has been widely accepted as a desirable social skill [Delamater and McNamara, 1986]. This skill enables speakers to express one's desires in an appropriate manner and is conceptually distinct from passive and aggressive communication styles in the sense that it is both objectively effective as well as socially appropriate. This combination makes it fall in the

middle of the continuum between passive and aggressive communication. However, the borders between these concepts are subject to context-sensitivity and can vary amongst cultures.

This is why Mitamura and Tanaka-Matsumi (2009) proposed a new form called "Functional Assertiveness". The main distinct feature of this concept is that it determines the appropriateness and effectiveness only based on the speaker and listener's perspectives which makes it non-sensitive to cultural and contextual variations. This concept includes two dimensions being:

- Objective effectiveness: the degree to which the speaker obtains the results that he or she wants from others (listeners) [Mitamura and Tanaka-Matsumi, 2009]. This therefore resembles the effectiveness of the communication used.
- Pragmatic politeness: functional, not structural, politeness where the speaker's manner of speaking generates the feelings that the listener regards as appropriate.[Mitamura and Tanaka-Matsumi, 2009] This means that the communication used is perceived as appropriate and socially acceptable.

Functional assertiveness is therefore defined as "interpersonal communication that occurs when a speaker encounters interpersonal problems that should be resolved or has objectives that should be achieved, and the speaker's message is perceived as appropriate by the listener." [Mitamura and Tanaka-Matsumi, 2009]

3 Hypotheses & research model

In this section the various relations between the variables are briefly discussed and based on this the hypotheses are proposed. Finally, the hypothetical research model will be shown.

3.1 Self-leadership training & Self-leadership

The use of training to improve on self-leadership behavior can be rationalized with the use of the previously stated theoretical frameworks of behavioral change and the SCT. For instance, in the context of the triadic system by Banduras a training intervention will resemble a manipulation of the Environment (E) which will have an influence on Behavior (B). Furthermore, Kolb's experiential learning model posits that experiencing, experimenting and subsequently reflecting on these will lead to the creation of knowledge. Self-leadership training is therefore an environmental manipulation that enables individuals to learn with the use of transforming experiences and behavioral modeling. This led to the following hypothesis that focused on the effectiveness of the self-leadership training:

H1: Training on self-leadership strategies will have a positive effect on the utilization of self-leadership strategies by participants.

3.2 Self-leadership & Self-efficacy

Self-leadership consists of a set of behavioral and cognitive strategies that enable an individual to achieve the self-direction and self-motivation needed to shape their behaviors in positive ways in order to enhance their overall performance [Stewart et al., 2011]. By doing so, their capability perceptions will most likely also be influenced. Indeed, Prussia et al. (1998) found that self-efficacy perceptions are enhanced as a result of training on self-leadership strategies. This increase in general self-efficacy was reached with the use of both modeling (via self-instructional modeling and learning) and experience (via empowerment provided by increased self-leadership skills) [Unsworth and Mason, 2012]. Moreover, a conceptual article by Neck and Manz (2013) states that: "it is this assessment of an individual's capacity to do a given task that is central to self-leadership". Finally, several researchers found relations between individual self-leadership or self-management dimensions and self-efficacy [e.g. Latham and Frayne, 1989; Gist, 1989; Bandura and Cervone, 1986]; Unsworth and Mason, 2012. The latter exposed the role self-leadership training has in reducing strain felt by individuals. This effect was reached by building psychological resources (self-efficacy and positive affect) with the use of self-leadership training. To summarize, literature has shown that developing self-leadership skills through training will lead to a greater self-control which builds confidence in their fundamental abilities which will enhance their general self-efficacy perceptions. This is why a relation between general self-leadership and self-efficacy perceptions was proposed. The second hypothesis is therefore the following:

H2: Self-leadership strategies are positively related with self-efficacy perceptions.

3.3 Self-leadership & Work-engagement

As self-leadership is a skill-set of behavioral and cognitive strategies designed to enhance individual cognitive processes, behavior, and affective states, it can also be viewed as a personal resource which acts as a coping skill and functions as a self-regulator on the control of behavior [Houghton et al., 2016]. This perspective made for an interesting research gap as it could give insights whether self-leadership as a resource can bear the same motivational effects (e.g. increased work-engagement) that other job or personal resources have. [Schaufeli and Bakker, 2010]

There is to this date no empirical research that looked into this relation. However, Neck and Manz (2013) theoretically proposed this relation by implementing self-leadership into the well-known JD-R model by Demerouti et al. (2001). More specifically, they propose that the cognitive and behavioral elements of the self-leadership strategies can act as an antecedent to work-engagement that facilitates effective stress appraisal and stress coping and therefore moderate the effects of job -in their context entrepreneurial-demands and resources. Therefore, the third hypothesis was formulated as follows:

H3: Self-leadership is positively related with work-engagement

3.4 Self-efficacy & Collaborative behavior

Prior research has shown evidence that self-efficacy beliefs have positive effects on performance. Gist (1989) for instance found a positive relation with managerial idea generation and Wood, Bandura & Bailey (1990) proved that it positively effects managerial performance. These positive outcomes were accounted for by the capability of self-efficacy beliefs to influence; how much effort is put in tasks, how long individuals will persevere in the face of difficulties and whether their thought patterns are self-aiding [Bandura, 1991].

However, as the purpose of this study is to delve into ways of behavioral performance amongst professionals, the generalizability of these findings is limited. Bandura (1977), although more than forty years ago still applicable, has indicated first that perceived self-efficacy has a positive relation with behavioral change. More recently, Le-Blanc et al. (2010) found that "efficacy beliefs predict collaborative practice" (amongst intensive care unit nurses). These researchers reasoned that "efficacious feelings fuel commitment to the work which in turn fosters the quality of working relationships within the team". Adding to this are the logical levels of change by Dilts (1990) which indicate that changes made in the level of beliefs and values (e.g. self-efficacy) will make for changes in the inferior levels of capabilities and subsequently the level of behavior. So, for this research it is hypothesized that increased self-efficacious feelings will foster a sense of capability and confidence which in turn will alter the way an individual will interact with its' direct environment in terms of collaboration and communication. This makes that there enough arguments to have the fourth hypothesis formulated as the following:

H4a: Self-efficacy is positively related with functional assertiveness

H4b: Self-efficacy is positively related with knowledge sharing

3.5 Work-engagement & Collaborative behavior

In a similar vein is the relation work-engagement has with performance. Numerous studies provide evidence for a positive relation between work-engagement and various performance indicators [e.g. Schaufeli and Bakker, 2010; Xanthopoulou et al., 2008]. The main consensus across these studies is that an increased work-engagement plays a positive role in the allocation of job resources and the dismissal of job demands. This leads to both intrinsic and extrinsic motivation which fosters employees' willingness to exert effort to grow, learn and develop [Schaufeli and Bakker, 2010, p 12]. This mechanism can be used in the same manner to hypothesize a relation between work-engagement and our selected outcome variables. Further substantiating on this, Welch (2011) described the importance and impact of tone and message strategy (which roughly resemble the essence of functional assertiveness) on the level of engagement felt by the listener (in a corporate internal communication setting). She reasoned that engagement is related to communication because it is this communication which promotes commitment, sense of belonging and the understanding of the goals and values of the organisation which enables the employees to identify with them. Furthermore, Schaufeli (2012) in his meta-analysis on the concept of work-engagement states that "engaged workers exhibit prosocial behavior (e.g., helping others, being kind, and cooperative) and that this prosocial behavior subsequently likely creates a positive social climate that fosters collaboration, information sharing, and mutual assistance – and thus team performance.

Therefore, for this study it is reasoned that work-engagement is central to building job resources and buffering job demands which enables a motivational process within employees which translates to increased collaborative behavior as part of a general positive social climate. So, hypotheses 5 are formulated as:

H5a: Work-engagement is positively related with functional assertiveness

H5b: Work-engagement is positively related with knowledge sharing

Following from the logical levels of change as proposed by Dilts (1990), self-leadership strategies resemble skills that -through practical application- can potentially enable changes in the upper tier of beliefs in capability (self-efficacy) and motivation (work-engagement). Based on this model, it was proposed that changes at this superior level lead to sustainable transformations at an inferior level. Practically, this means that the self-leadership strategies will be translated into actions by altering an individual's beliefs which will eventually lead to -desirable- behavioral changes (i.e. collaborative behavior).

Further substantiating, self-efficacy has been found to have mediating influences in a variety of studies. Bandura (1997) reported that self-efficacy mediates the impact of distress on performing threatening tasks. Additionally, Pieper and Johnson (1991) demonstrated the mediating capabilities of self-efficacy on the effects of feedback on performance in an experimental simulation of a space shuttle mission. Finally, Prussia et al. (1998) reported similar findings as they found that self-leadership strategies influence self-efficacy perceptions which subsequently affect performance outcomes and that self-efficacy fully mediated the relation between self-leadership and performance in an educational setting. Building on these findings it is reasoned that self-leadership strategies resemble behavioral strategies that alter the perception of one's capabilities which subsequently lead to performance outcomes.

As said before, work-engagement has been found to have important mediating capabilities on the relation that job demands (-) and resources (+) have with performance. This is best captured by the JD-R framework by Demerouti et al. (2001a) which states that work-engagement mediates the effect of job (e.g. autonomy, social support etc.) and personal resources (e.g. optimism, resilience etc.) on performance because these resources foster motivational processes which has a positive effect on performance. For job demands this process is mirrored; job demands have a negative effect on the level of work-engagement felt by an individual which has a negative effect on performance. Spiegelaere et al. (2014) demonstrated this process in an organizational setting (sample from five different industries) where they found that job insecurity leads to decreased innovative work behavior through it's negative effect on work-engagement. Furthermore, A. Bakker and Xanthopoulou (2013) found work-engagement to be an important mediating variable in the relation between job characteristics and employee outcomes. As self-leadership strategies can be viewed as cognitive personal resources which, amongst others, will likely lead to more constructive thought patterns and "an enhanced perception of work" [Houghton et al., 2016] which will mediate the effect of these behavioral strategies on performance.

In sum, this study proposes a process where self-efficacy and work-engagement act as mechanisms through which self-leadership can be translated into performance. Where self-leadership resembles a specific set of cognitive and behavioral strategies, self-efficacy and work-engagement both are phenomenon that depict perceptions of personal capabilities (i.e. self-efficacy) and motivation (i.e. work-engagement). Through altering these perceptions sustainable changes in behavioral performance are expected. This made for the following hypotheses that state that the link between self-leadership and collaborative behavior is mediated by both self-efficacy and work-engagement. Hypotheses 6 and 7 were therefore:

H6a: Self-leadership's positive relation with functional assertiveness is mediated by self-efficacy

H6b: Self-leadership's positive relation with functional assertiveness is mediated by work-engagement

H7a: Self-leadership's positive relation with knowledge sharing is mediated by self-efficacy

H7b: Self-leadership's positive relation with knowledge sharing is mediated by work-engagement

3.6 Moderation of training effectiveness

Finally, a moderating effect of self-efficacy on the relation between self-leadership training and self-leadership (i.e. training effectiveness) is proposed. This was based on the premise that high self-efficacy beliefs foster a sense that the individual is capable of changing his/her behavior and subsequently their environment [Bandura, 1997]. Bandura (1988) is an article on the organisational application of social cognitive theory. In this article Bandura focuses on "the personal factors that can be altered to improve the level of organisational functioning". This article further strengthens above mentioned argument by stating: "success requires not only skills but also strong self-belief in one's capabilities to exercise control over events to accomplish desired goals. This depends on whether their

self-beliefs of efficacy enhance or impair their motivation and problem-solving efforts” [Bandura, 1988]. Furthermore, it stresses that individuals with a strong sense of efficacy focus their attention on how to master tasks and mentions a study by Collins (1982) that found students that were highly self-efficacious in terms of mathematical ability solved more problems and attributed failures to lack of effort instead of deficient ability. Finally, previous research by Gist et al. (1989) showed the moderating effect of initial self-efficacy on the relation of training method and post-training performance in computer software training. Highly self-efficacious participants reported greater success in training than those low in self-efficacy.

Therefore, when individuals are faced with a training program aimed at changing certain cognitive and behavioral processes (i.e. self-leadership training), it is expected that the level of self-efficacy determines their approach, persistence and belief of success which will lead to a higher learning effect. So, individuals that score high on self-efficacy beliefs prior to training will show a higher learning effect of the training (as measured by latent change scores of self-leadership) as opposed to trainees that score low on initial self-efficacy beliefs. The last hypothesis was thus formulated as:

H8: The effect training has on the utilization of self-leadership strategies will be moderated by self-efficacy

3.7 Research model

With all hypotheses formulated, the final hypothetical research model is shown below. Within this model, the two distinct pathways between self-leadership and collaborative behavior can be seen. These pathways respectively resemble: (1) perceived sense of capability and (2) motivation. Indeed, performance is a multiplicative function of ability and motivation [Stewart et al., 1996].

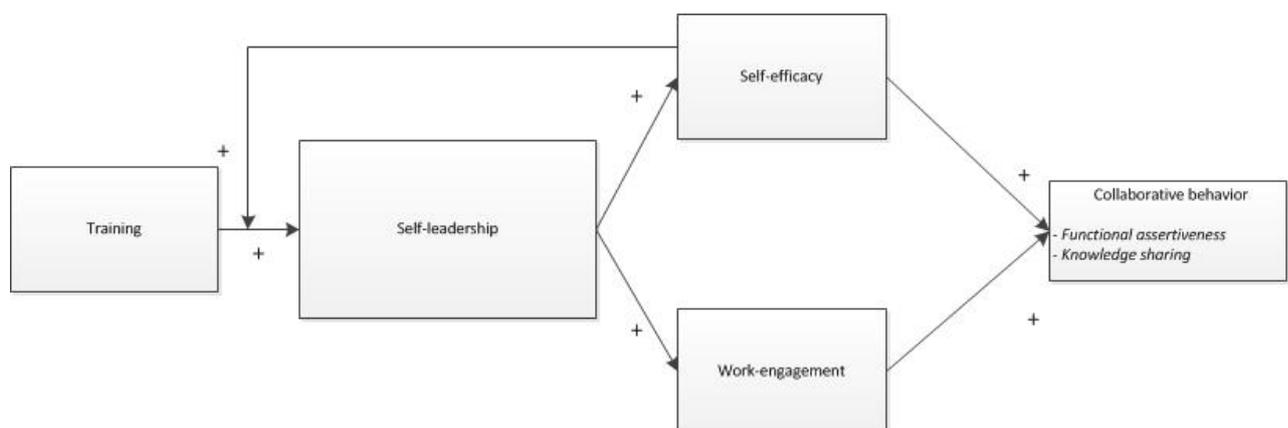


Figure 6: Hypothetical research model

4 Method:

The following section describes the methodology that was used in order to answer the priorly developed research questions. This includes the design type of the study, the study’s procedure of data collection and participant selection, the content of the training

program and a brief explanation about the measurements used. To conclude, the strategy of analysis is described in order to give more insight to the general procedures and tools used for exploring the hypotheses and overall research model.

4.1 Procedure and participants

The study was based on a self-reported questionnaire with participants divided in two distinct groups, being the group receiving the intervention and a control group. This non-random selection into groups and the fact that there were both pre- and post measures collected makes that the design type of this study is categorized as a "quasi-experimental, pretest-posttest study". Because of the non-random nature of this research design, this type of study has been proven to be sensitive to internal validity. Ways in which these threats were analyzed and mitigated can be found in section 5.2.

The questionnaire was made digitally accessible for numerous reasons but mainly because it could be easily incorporated in the training program and would ensure a higher response rate amongst the control group as they weren't centered in one organization. The pretest data collection for both the intervention and the control group was held immediately after a brief speech introducing ourselves and the outline of the upcoming weeks. This made that there was no preliminary knowledge about the concepts before pretest that could confound the results but did enable the communication about the goals of the research, privacy and confidentiality issues etcetera. The post-test data collection was done after the final session with content was completed. At this same timepoint, an e-mail was sent to the control group as a remembrance for them to complete the second questionnaire. Finally, a wrap-up session was organised in which the participants that had received the intervention were asked to write down various behaviors that were stopped, started or further enhanced. This was done to gain a deeper insight in how the self-leadership strategies are implemented (and which are proven most beneficiary) in day-to-day professional life. In brief, the process of data collection is depicted in Table 1:

	T1 (pre-intervention)	T2 (post-intervention)	T3 (3 weeks after intervention)
Measurements	<ul style="list-style-type: none"> - Self-leadership - Self-efficacy - Work-engagement - Functional assertiveness - Knowledge sharing 	<ul style="list-style-type: none"> - Self-leadership - Self-efficacy - Work-engagement - Functional assertiveness - Knowledge sharing 	Qualitative wrap-up session to discover perceived effectiveness of the training
Controlling variables	<ul style="list-style-type: none"> - Age - Tenure 	<ul style="list-style-type: none"> - Age - Tenure 	

Table 1: Representation of data collection

The intervention (self-leadership training program) integral to this research was held at a globally oriented commerce marketing company with one of its' locations in Barcelona, Spain. There were 46 trainees from different IT-teams (Analytics, Technical Support and Creative Solutions) taking part in the self-leadership training. There were four sessions over the course of a month (always 1 week between sessions) in mixed groups of roughly 10 trainees. Out of these 46 initial attendees in the intervention group, 30 completed the full training program and submitted both pre- and post-test measures, resulting in a response rate of 65%.

Moreover, a control group of 22 people was formed amongst individuals working for similar organizations and roughly sharing the same demographics as the participants of

the training. These individuals were found with the use of the network of my organizational supervisor, head of the consultancy firm that developed and executed the training program. To form this group, several HR-managers and other executives were contacted to approach their respective IT and software departments with the request to take part in this study. The sectors that these organisations mostly operate in are financial technology, information technology and e-commerce. Out of the 22 employees that were willing to participate and therefore submitted the pre-test survey, two of them failed to submit their post-test questionnaire on time and were therefore subtracted from the control group, indicating a response rate of 91% for the control group.

4.2 Development of training program

In the context of this research, a new self-leadership training program was developed following the guidelines and strategies as developed by Manz (1986). The development of this program was done in-house by a consultancy firm with its main areas of expertise covering social innovation and human behavioral change. This firm is set in Barcelona, Spain and consists of various professional consultants with a background in teaching and coaching in business schools and multiple multinationals. This new program was made suitable for and directed at the various problem definitions that were acquired during meetings with supervisors of the company that the training was set in, prior to training. Based on this initial needs analysis, it was reasoned that the employees lacked certain aspects of self-leadership, specifically self-observation and evaluating beliefs and assumptions (on an interpersonal level). Working on these strategies would be beneficial to altering certain troublesome behaviors. Being more specific, it was reasoned that currently there was a lack of expressing limits on what the IT department can and can't do which led to passive-aggressive behavior towards the -amongst others- sales department. Furthermore, there were several remarks made that knowledge was not shared within the organisation which led to returning problems for which a solution was already available. This made for an unnecessary increase in the workload of the IT department. For these reasons, functional assertiveness and knowledge sharing were selected as the behavioral performance outcomes in this study.

On top of incorporating the strategies of self-leadership, the ideology of experiential learning was also implemented. This means that "learning by doing" was encouraged by incorporating real life situations in a controlled experimental environment through role-playing. In this way, positive experiences/behaviors were rewarded and reinforced, negative experiences/behaviors were analyzed and "punished" by showing the consequences of these behaviors. This form of training intervention is also in line with the social cognitive theory by Bandura. Bandura (1988) describes three elements through which behavioral competencies can be developed. Firstly, the skills and competencies are modelled by the trainer so the trainees learn how to apply the general strategies successfully. Secondly, the trainees receive guided practice under simulated conditions so they can experience and perfect the skills themselves. This is mainly achieved by role-playing in which they can practice without fear of mistakes. Informative feedback by the trainer is crucial for making the corrective changes. Lastly, when the competencies are acquired by the trainees, they need to be applied in real life work situations. In doing so, the trainees experience success by using the new skills which will lead to increased confidence on the skill and a validation of the value of the new competence. This entire process which is called "guided mastery modelling" [Bandura, 1988] is fully incorporated in our training

program which can also be seen in our the conceptual model of the training sessions in appendix B. In a broad sense, the program was outlined as follows:

Session 1

- Self-goal setting: Defining specific goals on what the trainees want to improve as it comes to the work-related objectives of this training program: E.g. Less stress, better control of their workflow, better relationships within and across departments.
- Self-observation: Defining specific goals on what specific behaviors they need to develop in order to reach these goals.
- Visualizing successful performance: After setting goals it is asked to visualize the positive outcomes both on behavioral and emotional level.
- Self-cueing: Participants are encouraged to practice with new behavior and prepare for real-life situations during all workshops. Role-playing and group practice are central to the set-up of the training. Moreover, they practice in between workshops. This practice is then evaluated in the beginning of the next session

Session 2-4:

- Self-reward/punishment: How can you reward yourself if you accomplish improving your behavior? In every next session we will ask about their progress and take time for self-rewarding elements. How do you keep yourself motivated? Exchange some ideas.
- Focusing thoughts on natural rewards of tasks: We take time to ask people what they like about their work, and ask them to name important elements for them. Exchange. What makes a good day at work? The WHY and purpose of their work? What makes it fulfilling?
- Self-talk: While practicing we will encourage them to use positive self-talk. Transmit the value of positive thinking to reach your goals.
- Evaluating beliefs and assumptions: We work on their limiting beliefs during the sessions. In the last session we ask explicitly which beliefs are still limiting them and do the arrow exercise.

4.3 Measures

The questionnaire used for data collection was the result of a research among existing measures surrounding the concepts and altering them slightly for a better fit with the context of the research. All statements were to be answered on a 5-point Likert scale ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree"). Additionally, some demographic questions about age and tenure were added for -amongst other reasons- baseline group comparison. The resulting questionnaire can be found in Appendix A. An explanation about the various measures, their internal scale reliability's and sample questions are given below.

4.3.1 Self-leadership

Manz (1993) was the first to develop scales and items to measure self-leadership at an individual level. These scales were then subjected to validation by Anderson and Prussia (1997). They found through confirmatory factor analysis that there were three underlying dimensions / factors (as described above). Ultimately, Houghton et al. (2003) further refined the Anderson and Prussia (1997) measures. They empirically supported the continuum as seen in Fig. 1 ranging from just behavioral aspects (self-management) to more advanced strategies related to cognitive aspects of true internal control with this measurement instrument [Stewart et al., 2011]. For timing purposes of the research, an abbreviated 9-item (ASLQ) measurement was used [Houghton et al., 2012]. An exemplary statement is: "I try to mentally evaluate the accuracy of my own beliefs about situations I am having problems with". Cronbach's alpha was found to be 0.689 which is below the widely used rule of thumb cut-off point of 0.7 [Hair et al., 2010]. After further analysis it was found that the deletion of the item "I often mentally rehearse the way I plan to deal with a challenge before I face the challenge." led to a Cronbach's alpha of 0.71 which is considered sufficient with regards to the rule of thumb. Therefore, it was decided to drop this item from the data set resulting in an 8-item measure of self-leadership.

4.3.2 Self-efficacy

For the measurement of the self-efficacy beliefs the 6-item General Self-Efficacy (GSE-6) tool developed by Romppel et al. (2013) was used. They found that this shortened version is a reliable and valid instrument that may be useful for the assessment of general self-efficacy. Indeed, Cronbach's alpha was found to be 0.74 which is found to be sufficient. Example items from this measurement are "It is easy for me to stick to my aims and accomplish my goals" and "No matter what comes my way, I'm usually able to handle it". [Romppel et al., 2013]

4.3.3 Work-engagement

For the measurement of work-engagement the shortened version of the Utrecht Work Engagement Scale (UWES-9) as developed by Schaufeli, Bakker and Salanova (2006) was used. This scale has been checked for validity, consistency and reliability. Example items are "At my work, I feel bursting with energy" and "My job inspires me" [Schaufeli et al., 2006]. Cronbach's alpha was found to be 0.89 in the used data set.

4.3.4 Functional assertiveness

Mitamura (2018) developed an instrument to measure both dimensions of functional assertiveness. This instrument is a 12-item tool with two 6-item sub-scales for both Objective Effectiveness and Pragmatic Politeness which has been validated over numerous studies so that it can be implied that it has good reliability and validity. As the measurement includes two sub-scales, it is important to consider that a balance between the two is critical. As Mitamura (2018) states: "If functional assertiveness were to be divided into OE and PP and viewed from only one perspective, it would be considered as either aggressive (i.e., OE is very high, and PP is very low) or as non assertive (i.e., OE is very low, and PP is very high) rather than as assertive. A relatively high FAS total score does not always ensure that the person displays optimal functional assertiveness"

[Mitamura, 2018]. For this reason it is chosen to take the average of both scores to get an accurate representation of the importance of balance of the concept. Confirmatory factor analysis (CFA) was used to check this assumption and this process showed two distinct dimensions with all items significantly loading on either one of those, confirming that there are indeed two separate factors, confirmed further by a non-significant chi-square value and an acceptable RMSEA value of 0.07 [Hair et al., 2010]. Furthermore, scale reliability analysis indicated a Cronbach's alpha of 0.73 for 'Functional Assertiveness'. Some example items are: "I can get colleagues to change their behavior in case they are being disruptive." and "I don't needlessly embarrass coworkers when I try to get them to improve their manners."

4.3.5 Knowledge sharing

The measurement tool which was used in the research for measuring the construct knowledge sharing is the one developed by Kim and Lee (2006). This tool consists of three items with a resulting Cronbach's alpha of 0.8. An example item of this tool is: "I voluntarily share my know-how, information, and knowledge with other employees". This scale was chosen because it represents the concept of knowledge sharing as adopted in this research, and is focused on the individuals' involvement in knowledge sharing.

4.4 Strategy of analysis

The statistical analysis for this research was performed primarily with the use of IBM SPSS version 23. As the data was collected at two time points and was distributed among both an experimental group and a control group, it was of importance to initially do a group comparison to check for validity of baseline characteristics amongst groups and potentially mitigate the selection bias. This was done by first testing for; normality of pre- and post-intervention scores, outliers and homogeneity of variance. Next, an independent t-test was performed in order to test for equality of means on all measured constructs across groups. Furthermore, to test for possible multicollinearity of the independent variable(s) the Variance Inflation Factor's (VIF) were checked. These had to adhere to the rule of thumb that they should be above 1 and below 10. The results of these tests can all be found -along with a comparison of demographic data among groups- in the preliminary analysis section.

The approach for testing the proposed hypotheses was in threefold. First, the impact that self-leadership training had on the increase of application of self-leadership strategies was analyzed with the use of a so-called mixed model ANOVA (hypothesis 1). This tested whether there is a significant difference in increase (or decrease) of the utilization of self-leadership across the experimental and control group. Afterwards, hypotheses 2 to 5 were tested with the use of hierarchical regression analyses to detect the proposed relations between given constructs. Hypotheses 6 and 7 were tested with a mediation analysis with the use of the PROCESS v3.4 macro [A. F. Hayes, 2019]. This analyzed the mediating properties of self-efficacy and work-engagement on the relation between self-leadership and both functional assertiveness and knowledge sharing which gave insights in underlying processes between the taught strategies and performed behavior. Finally the MEMORE v2.1 macro was used to test the moderating effects in hypothesis 8 [Montoya, 2018] In all these analyses, age was controlled for by including it as either a covariate or by including it in the hierarchical regression model as an additional independent variable.

4.4.1 Mixed model ANOVA

For analysing hypothesis 1 a mixed model ANOVA was used. This is a modern analytic approach that allows to test whether there are main effects to be found for both independent variables, being "Training" (yes/no) and "Time" (pre- and posttest). This main effect resembles "the effect of a particular independent variable, averaging across all levels of the other independent variable(s)" [Murrar and Brauer, 2018]. Furthermore, it allows testing whether an interaction between the two independent variables is present. "This interaction is present when the effect of one independent variable is stronger at one level of the other independent variable than at the second level of that same independent variable" [Murrar and Brauer, 2018]. This implies causality between the training and self-leadership itself; the intervention leads to a higher level of self-leadership. The building of our mixed model ANOVA was done with the use of a between-subjects factor (being the dichotomous independent variable "Training") and a within-subjects factor (being the dichotomous variable "Time"). Finally, the control variable "age" was added as a covariate to the model. The statistical equations corresponding to this model and its three effects are:

$$(Y_1 + Y_2)/2 = b_0 + b_1X + e$$

$$(Y_1 - Y_2) = b_2 + b_3X + e$$

where Y_1 in our case reflects the pretest score on self-leadership, and Y_2 the score of post-test self-leadership (such that the first equation demonstrates the average of self-leadership along the two time points, and the second equation the difference between the two). X then resembles the centered score of training (-0.5 for control and 0.5 experimental group), b_0 is the mean of all scores (not used), b_1 is the main effect of "Training", b_2 the main effect of "Timepoint" and b_3 the interaction effect between "Training" and "Timepoint". These main effects can only be interpreted if found significant.

4.4.2 PROCESS macro

Hypotheses 6 and 7 test the mediating properties of self-efficacy and work-engagement on the relation between self-leadership and both functional assertiveness and knowledge sharing. For this reason, the PROCESS v3.3 macro for SPSS as developed by A. F. Hayes (2019) was implemented and used. This macro is excellent for testing the indirect mediational effects in research and is widely accepted as a reliable tool. Through non-parametric resampling (i.e. bootstrapping) the indirect effect can be tested for significance. As opposed to the traditional causal steps approach for mediation analysis that was developed by Baron & Kenny (1986), this method is not contingent on the significance of the relations between the independent and dependent variable (direct effects). This is especially beneficiary to research that relies on small sample sizes (as is the data set used in this study). So, adopting the bootstrapping method in this study with the use of the PROCESS macro and the use of the settings of model 4 enabled us to estimate the indirect effect with the use of a large number (>5000) of random samples that result in a 95% confidence interval where the absence of the value 0 in the domain concludes there is a significant indirect effect [A. Hayes, 2013].

4.4.3 MEMORE macro

Hypothesis 8 sought to test whether among the participants of the training program, those with higher self-efficacy scores prior to training, benefited more from the training than those with low pre-training self-efficacy scores. For this reason only the data for the experimental group was used for the analysis. Another macro add-on for SPSS v23 was implemented for the sake of testing this final hypothesis. This MEMORE macro v2.1 as developed by A. Montoya (2017) enables to run a multiple moderator analysis in a so-called two-instance repeated measures design (similar to this study). The independent variable (i.e. predictor) self-leadership is measured twice over time before and after the experiment and is therefore a within-subject factor. The moderating variable was the level of self-efficacy measured prior to training which act as a constant between-subject variable. This means that testing the interaction (i.e. the dependence on the moderating variable for the slope of the relationship between the predictor and outcome variable) resulted in two equations/models; one for each instance.

$$SL_{i1} = b_{01} + b_{11}SE_i + e_{i1}$$

$$SL_{i2} = b_{02} + b_{12}SE_i + e_{i2}$$

To test the moderation hypothesis, the difference between b_{11} and b_{12} needed to be significant, indicating that the relationship between SL_{i1} (pre-training self-leadership) and SL_{i2} (post-training self-leadership) depended on the moderating variable ($SE_1 =$ pre-training self-efficacy). The output of MEMORE gave detailed insights in these relations.

5 Results

This section contains the results of the analyses that have been performed on the data collected from the questionnaires. First, some insights in the descriptive statistics will be shown, followed by all preliminary analyses needed to test the proposed hypotheses in a validated and reliable fashion. The results of this hypotheses testing along with elaboration on the outcomes can be found hereafter.

5.1 Descriptive statistics

An initial exploratory overview of the collected data can be found in Table 2. This table consists of the mean (M), standard deviation (SD) and correlations of the measured constructs, respectively. It was chosen to divide the measured constructs in both pre- and post-intervention scores thus combining the data of both the intervention and control group. This was done to have better insights in the various relations that were proposed in both theory in this research. Further insights in discrepancies in mean, variance across the groups are given in the preliminary analysis. Some interesting initial comments can be made based on the results shown in the table below. For instance, self-leadership, both pre- and post-intervention, significantly correlated with both self-efficacy scores which is in line with the findings from for instance Prussia et al. (1998). Furthermore, self-efficacy seemed to correlate significantly with functional assertiveness (though not with knowledge sharing). Surprisingly however, work-engagement doesn't correlate significantly with self-leadership as opposed to our hypothesis. There is a significant correlation to be found with knowledge sharing though (though hardly none with functional assertiveness) which makes it in that sense the opposite of self-efficacy.

Variable (N=50)	M	SD	Age	Ten	Trai	SL1	SL2	SE1	SE2	WE1	WE2	FA1	FA2	KS1	KS2
Age (years)	28.3	3.9	1												
Tenure (years)	1.2	0.9	0.32*	1											
Training (dummy)	0.6	0.49	0.35*	0.22	1										
Self-leadership	3.76	0.50	-0.16	0.05	0.06	1									
Pre-test (SL1)															
Post-test (SL2)	4.09	0.46	-0.26	-0.08	0.03*	0.79**	1								
Self-efficacy	3.88	0.57	-0.13	-0.11	0.08	0.38**	0.30*	1							
Pre-test (SE1)															
Post-test (SE2)	4.11	0.51	-0.05	-0.05	0.08	0.37**	0.41**	0.71**	1						
Work-engagement	3.65	0.71	0.29*	-0.11	-0.16	-0.05	-0.04	0.18	0.19	1					
Pre-test (WE1)															
Post-test (WE2)	3.91	0.60	0.28*	-0.17	0.05	0.02	0.08	0.12	0.32*	0.80**	1				
Functional assertiveness	3.48	0.45	0.16	0.33*	-0.06	0.29**	0.31*	0.31*	0.49**	0.20	0.14	1			
Pre-test (FA1)															
Post-test (FA2)	3.87	0.41	0.18	0.19	0.15	0.30*	0.28*	0.11	0.45**	0.11	0.21	0.66**	1		
Knowledge sharing	3.75	0.71	0.27	0.13	0.04	-0.23	-0.13	0.12	0.01	0.34*	0.20	0.30*	0.23	1	
Pre-test (KS1)															
Post-test (KS2)	4.15	0.54	0.31	0.08	0.06	-0.12	-0.07	0.05	0.09	0.41*	0.36*	0.34*	0.43**	0.71**	1

Note: *= $p < 0.05$, **= $p < 0.01$, Variable training is measured as a dichotomous dummy variable with 0 indicating participants in control group and 1 represents participation in full training program

Table 2: Descriptives and correlations

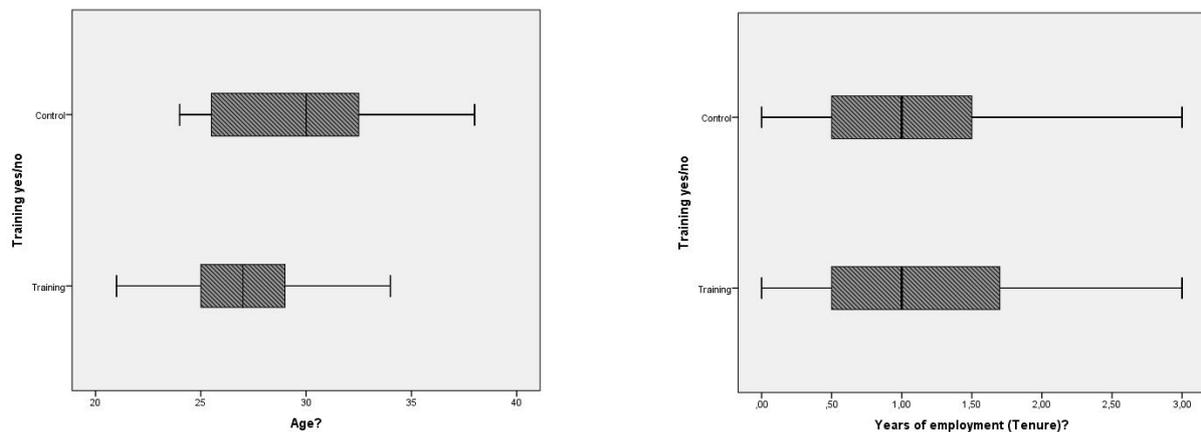
5.2 Preliminary analysis

Preliminary analysis was needed before proceeding with hypotheses testing. This was because group comparison between the experimental group and control group can only be valid if certain assumptions about the data had been met. The results are given below.

5.2.1 Validity of baseline characteristics

As the design type of this study was quasi-experimental, it was of utmost importance to consider the possible effects this non-random selection to groups could have to the results of the research. One of the risks that can occur within this type of study is selection bias, e.g., sampling bias and/or pre-screening bias. This can occur when, for whatever reason, the data samples used for the study deviates from the intended representation of it's target population. While this study's design prohibited the possibility of random selection (which would eliminate these biases), care has been taken to ensure comparable statistics of the two groups. As the experimental group was fixed from the start, the control group had to reflect the same population. The selection of the control group, as described in the method section, has been made by carefully seeking candidates in similar organizations, roles and reflecting the same demographics. Analysis of these demographic statistics of the two groups gave some insight in the comparability of the two groups.

In terms of demographic statistics, both groups could be regarded as similar, although a comment can be made about the deviation that existed in the means of age. Indeed, an independent sample t-test showed that there is a significant difference in mean age between the experimental and control group ($t_{48} = 2.58, p < 0.05$) with a mean age of 29.9 for the control group and 27.2 for the experimental group. The distribution of both age and tenure amongst both groups can be seen in Figure 7 below (with the top box representing the control group). This difference made that age was entered as a control variable in the analyses so it could not have a confounding impact on the various relations. Possible reasoning for the discrepancy is provided in the discussion section.



(a) Boxplot of age of both groups

(b) Boxplot of tenure of both groups

Figure 7: Boxplots of descriptive statistics

More importantly, in order to test for equality of means and variances of the pre-intervention scores across given groups, assumptions about the data had to be checked. To start, the normality of the constructs was tested with the use of the Shapiro-Wilk test. This test was chosen over for instance the Kolmogorov-Smirnov test as it's found to be more adequate to handle smaller sample sizes [Ltd, 2018]. The results of this test indicate that all constructs for both pre- and post-test adhere to the normal distribution as all were found to be non-significant ($p > 0.05$), meaning that the null hypotheses indicating that the data is not normally distributed were rejected. Furthermore, looking at the generated boxplots of the constructs did not reveal any outliers in the data set. The assumption of homogeneity of variances was tested for with the use of Levene's test. This was needed as our sample sizes for the two independent groups were not equal. Levene's test showed that the variances for all pre-intervention constructs for both groups were equal; $F(1,48)=3.12$, $p=0.08$ for self-leadership, $F(1,48)=0.26$, $p=0.62$ for self-efficacy, $F(1,48)=1.57$, $p=0.22$ for work-engagement, $F(1,48)=0.42$, $p=0.52$ for functional assertiveness and $F(1,48)=1.41$, $p=0.24$ for knowledge sharing. Additionally, to test for possible multicollinearity of the independent variable(s) the Variance Inflation Factor's (VIF) were checked. Although this is mostly important for the likes of self-efficacy and work-engagement as they both act as independent variables on the dependent variables functional assertiveness and knowledge sharing, also self-leadership was included in this analysis for the sake of completeness. This multicollinearity analysis indicated that there were no bias effects as all VIF values were strictly above 1 and below 10 (below 1.5 even) which means that the assumption that no multicollinearity of independent variables exists, has been met [Hair et al., 2010]. Finally, sphericity didn't need to be tested as our within-subjects variable (i.e. Time) only contained two levels which implies that the variance of the differences is by definition equal to itself. Therefore, the sphericity assumption is always met.

With all required assumptions met, an independent sample t-test was performed. The results of this are given in Table 3 below. These results indicate that for all pre-intervention constructs, the mean (and variance) were equal among the experimental and control group.

Construct	M		Sig.	t-value	SD		Sig. Levene's test
	Exp.	Control			Exp.	Control	
Self-leadership	3.78	3.72	0.68	0.41	0.42	0.60	0.08
Self-efficacy	3.84	3.93	0.59	-0.44	0.60	0.52	0.62
Work-engagement	3.55	3.79	0.26	0.29	0.74	0.67	0.22
Functional assertiveness	3.46	3.52	0.66	-1.14	0.43	0.49	0.52
Knowledge sharing	3.78	3.72	0.77	-0.55	0.76	0.66	0.24

Note: based on pre-training data

Table 3: Independent samples t-test

5.3 Hypotheses testing

As all preliminary requirements have been tackled and assumptions have been met, the hypotheses as proposed could be tested.

Hypothesis 1 supposes that the training on self-leadership strategies has a positive impact on the utilization of those strategies by the participants of the training. As can be seen in the method section (section 4.4.1) a mixed model ANOVA was built in order to test for an interaction effect between "Time" and "Training". After establishing this mixed model ANOVA, it was found that there was a non-significant main effect of "Training"; $F(1,47) = 0.78, p=0.38$. This means that if we ignore the presence of "Time", the experimental and control group had similar scores on self-leadership. Moreover, there was a significant main effect found for "Time"; $F(1,47) = 0.75, p = 0.03$. Meaning that, while ignoring "Training" (difference between groups), the scores at the two time points (i.e. independent variable "Time") were found to be significantly different. Finally, there was a significant "Time" * "Training" interaction effect; $F(1,47) = 6.92, p < 0.01$. This means that the self-leadership scores across the two time points differ significantly in the experimental and control group.

Combining these findings makes that hypothesis 1 was confirmed. Indeed, the effect of "Training" which represents the between-subjects factor, i.e., the division between the experimental and control group, significantly interacted with the within-subjects variable "Time", resembling the pre- and post-test time points, resulting in a significant difference of self-leadership scores over time. In other words, training on self-leadership strategies has a significant effect on the utilization of self-leadership over time. This indicates that the self-leadership training program is found to be effective in transferring the knowledge to the participants as well as making these participants use the strategies in their respective professional life's. The main effect sizes as well as the interaction effect size can also be obtained from the output of SPSS although utility is limited. The effect sizes result in the following statistical equations:

$$(SL_1 + SL_2)/2 = 3.91 + 0.12X + e$$

$$(SL_1 - SL_2) = 0.31 + 0.30X + e$$

A profile plot which depicts the estimated marginal means of self-leadership at both time points of both groups is also given below. From this profile plot it can be obtained that although both the experimental and the control group showed an increase in the utilization of self-leadership strategies over time, the increase clearly is stronger for the experimental group.

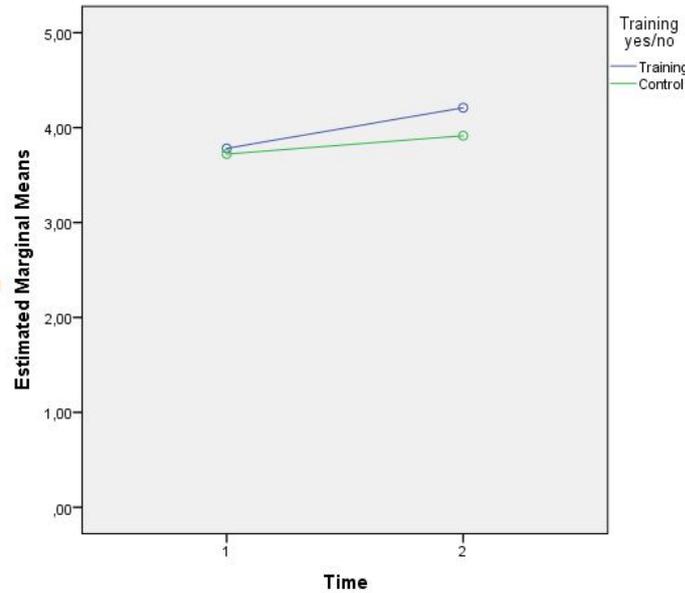


Figure 8: Profile plot of pre- and post-test scores of self-leadership

For hypotheses 2 to 5 hierarchical linear regression analyses were performed. These analyses were each done twice; first the associations in the pretest measures were analyzed and afterwards the same regression was done to discover the effect in the post-test measures. A significant relation at both time points would fully confirm the respective hypothesis, other options are partial confirmation (a significant relation at only one time point) or the full rejection of the hypothesis when no significant effect has been found. As age is controlled for, it was chosen to not include the division of our data with the use of our between-subjects variable "Training" for our hypotheses testing as the overall relation should be present across both groups to be considered significant. Post-hoc analysis however was performed after this hypothesis testing to look whether a rejected hypothesis was the result of a significant difference that is to be found across both groups. This acted as an elaboration which could give additional and potentially interesting insights in the way both groups acted.

Hypothesis 2 proposed that self-leadership is positively related with self-efficacy. The regression analyses resulted in significant overall models and therefore showed that there is a positive relation between self-leadership and self-efficacy. In both pre- and post-test, a significant relation existed between self-leadership and self-efficacy which confirms hypothesis 2 meaning that self-leadership and its strategies are positively related to the level of general self-efficacy felt.

<i>(Independent Variable): Self-leadership</i>				
<i>(Dependent variable)</i>	F(2,47)	β	R	R^2
Self-efficacy (pre-test)	4.03**	0.41**	0.38	0.15
Self-efficacy (post-test)	4.77**	0.47**	0.41	0.17

Note: *= $p < 0.05$, **= $p < 0.01$

Table 4

For hypothesis 3 (i.e., self-leadership is positively related with work-engagement), the relation between self-leadership and work-engagement was tested. It was proposed that self-leadership could act as a personal resource and coping skill in the same way job- and personal resources act in the work-engagement framework. However, this relation was found to be non-significant at both time points ($p=0.13$ and 0.08 , respectively) meaning that hypothesis 3 is not confirmed. Self-leadership and its strategies are not related with the level of work-engagement of individuals.

<i>(Independent variable):</i> Self-leadership				
<i>(Dependent variable)</i>	F(2,47)	β	R	R^2
Work-engagement (pre-test)	2.11	-0.01	0.29	0.08
Work-engagement (post-test)	2.74	0.21	0.32	0.10

Note: $*=p<0.05$, $**=p<0.01$

Table 5: Regression of self-leadership on work-engagement

The relation between self-efficacy and functional assertiveness (i.e. hypothesis 4a) was found to be significant at pretest ($p<0.05$) and post-test ($p<0.01$), leading to the confirmation of hypothesis 4a, e.g. self-efficacy has a significant positive relation functional assertiveness. However, hypothesis 4b was not confirmed as at both time points the relation was found to be non-significant ($p=0.09$ and $p=0.08$, respectively). This means that levels of general self-efficacy felt by individuals is positively related to their functional assertiveness but not with their willingness and capability to share knowledge.

<i>(Independent variable):</i> Self-efficacy				
<i>(Dependent variable)</i>	F(2,47)	β	R	R^2
Functional assertiveness (pre-test)	3.6*	0.27*	0.37	0.13
Functional assertiveness (post-test)	7.4**	0.37**	0.49	0.24
Knowledge sharing (pre-test)	2.57	0.20	0.31	0.10
Knowledge sharing (post-test)	2.71	0.11	0.32	0.10

Note: $*=p<0.05$, $**=p<0.01$

Table 6: Regression of self-efficacy on functional assertiveness and knowledge sharing

A non-significant relation was found at pretest and post-test between work-engagement and functional assertiveness ($p=0.30$ and 0.23 , respectively) leading to the rejection of hypothesis 5a. Work-engagement did however significantly relate to knowledge sharing at both pretest ($R=0.39$ and $R^2=0.15$, $p<0.05$) and post-test ($R=0.42$ and $R^2=0.17$, $p<0.05$) which means that hypothesis 5b is confirmed. These results indicate that the work-engagement which individuals have is not significantly related with their functional assertiveness but however is related with their willingness and capability to share knowledge.

As can be found in the method section (section 4.4.2), the PROCESS macro by A. Hayes (2013) was implemented to test hypotheses 6 and 7 which proposed several mediating capabilities of self-efficacy and work-engagement on the relation between self-leadership and the collaborative performance outcomes. The analyses were done 2^3 times

Independent variable: Work-engagement

<i>(Dependent variable)</i>	F(2,47)	β	R	R^2
Functional assertiveness (pre-test)	1.23	0.11	0.22	0.05
Functional assertiveness (post-test)	1.51	0.12	0.25	0.06
Knowledge sharing (pre-test)	4.09*	0.29*	0.38	0.15
Knowledge sharing (post-test)	4.96**	0.27*	0.42	0.17

*Note: *= $p < 0.05$, **= $p < 0.01$*

Table 7: Regression of work-engagement on functional assertiveness and knowledge sharing

in total with the control variable "age" added as a covariate. Furthermore, the whole data set (experimental & control group) was used as these relations should be relevant and considered to be apparent in both groups. Two significant indirect effects were exposed. These effects (0.083 and 0.31 respectively) were found in the pathways of the pre- and post-test data regarding the mediation self-efficacy has on the relation between self-leadership and functional assertiveness. This means that self-efficacy mediated the relation between self-leadership and functional assertiveness. This interesting finding didn't lead to the confirmation of hypothesis 6 and 7. Being more specific, hypothesis 6 can be viewed as partially confirmed as self-efficacy mediated the relation between self-leadership and functional assertiveness (but not with knowledge sharing). Hypothesis 7 regarding the mediating capabilities of work-engagement on the relations between self-leadership and functional assertiveness or knowledge sharing was not confirmed.

The final hypothesis proposed a moderating effect of self-efficacy prior to training on the effectiveness of the training program. In other words, it was tested whether among the participants of the training program, those with higher self-efficacy scores prior to training, benefited more from the training than those with low pre-training self-efficacy scores. The MEMORE macro by Montoya (2018) was implemented into SPSS version 23 for this reason. The results of the analysis showed that although pre- and post-test self-leadership differed significantly, this was not found to be dependent on the inclusion of pre-training self-efficacy. Only a small non-significant effect ($t(28)=0.10$, $p=0.32$) was found which means that hypothesis 8 is not confirmed.

5.4 Additional analyses

Analysing the validity of the proposed hypotheses resulted in several additional questions regarding the data. An effort was made to answer these questions to enhance the utility of this study.

Learning effect of training

It is of course useful to have elaborate insights as to whether participants of the training benefited from the training. These insights were found by performing an independent samples t-test as well as a mixed model ANOVA in the same manner as this was done in hypothesis 1 to discover whether the potential increase was dependent on the training. The results of these are given below.

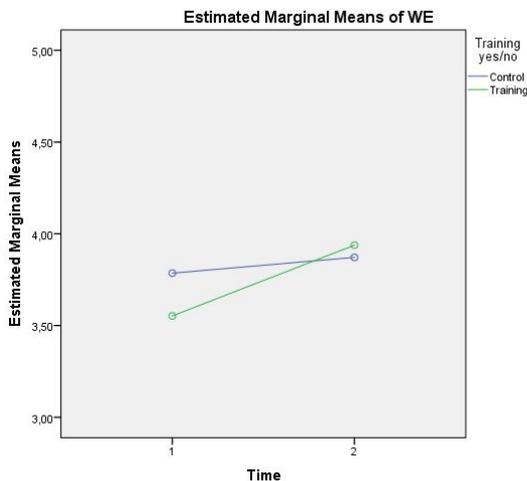
When looking at these post-training results, although all measures had higher means for the experimental group versus the control group, these differences were - except for

Construct	<i>M</i>		t-value	Sig.	SD		Sig. Levene's test
	Intervention	Control			Intervention	Control	
Self-leadership	4.21	3.91	2.13	0.04	0.35	0.55	0.03
Self-efficacy	4.15	4.06	0.57	0.56	0.47	0.56	0.45
Work-engagement	3.94	3.87	0.38	0.70	0.59	0.63	0.96
Functional assertiveness	3.92	3.79	1.03	0.29	0.37	0.46	0.21
Knowledge sharing	4.18	4.12	0.39	0.70	0.59	0.63	0.95

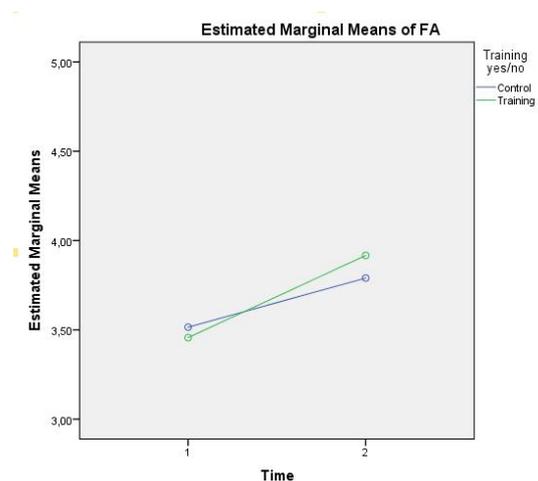
Note: based on post-training data

Table 8: Independent sample t-test results of post-test data

self-leadership - not significant. This means that when looking solely post-training, the experimental group reported no higher scores on the constructs as opposed to the control group. These findings however are uni-dimensional because the potential increase from pre- to post-training is neglected. Therefore, a mixed model analysis of variance was also performed to check whether a potential significant interaction effect exists between "Time" and "Training" (see hypothesis 1 for the details of this method). The results of this analysis showed a significant interaction effect between "Time" and "Training" for work-engagement ($F(1,47) = 6.05, p < 0.05$) and a near significant effects for functional assertiveness ($F(1,47) = 3.86, p = 0.056$) and self-efficacy ($F(1,47) = 3.83, p = 0.055$). This means that an increase from pre-training to post-training for these measured constructs was dependent on the binary dummy variable "Training". This increase in work-engagement, functional assertiveness and self-efficacy is visualized with the graphs below. When looking at the graphs, one can clearly deduct that although both groups showed increases on given concepts over time, this said increase is much more evident for the experimental group (green lines) when compared to the control group (blue lines). As the control group was not subject to any external manipulations, the increases they showed are assigned to repeated testing effects.



(a) Profile plot of pre- and post-test scores on work-engagement



(b) Profile plot of pre- and post-test scores on functional assertiveness

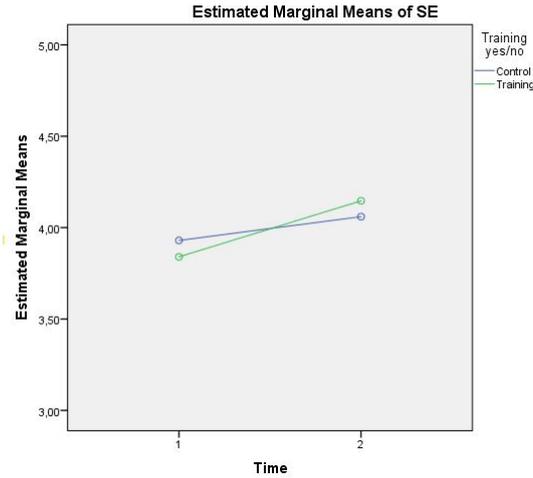


Figure 10: Profile plot of pre- and post-test scores on self-efficacy

5.4.1 Wrap-up session

As mentioned before, qualitative data was gathered from the participants in the training program by organising an interactive wrap-up session where the participants were asked to write down the behaviors they were planning on either starting, continuing or stopping. These self-reported data gave further insights in the way the trainees perceived the training and what they felt were the most important learning outcomes of the training. As these data could not be linked to individuals due to confidentiality, the data can not be incorporated in the analyses of the research model but rather act as a general sense of the perceived effectiveness of the training from the participant’s perspective. The results reflect clearly that the majority of the participants are planning on performing more self-directed and pro-active behavior with capability of expressing limits the main new acquired skill that is expected to have the most effect. This adds strength to the argument that the training program indeed achieved it’s intended outcomes and was regarded as effective by the participants that completed the program.

	Start	Continue	Stop	% out of 30 trainees
Establishing specific goals (self-goal setting)	7	9		53
Self-observation	9	4		50
Voluntarily sharing information with colleagues	12	5		57
Passive-aggressive behavior		4	11	50
Expressing limits	18	6		80
Taking things personal / making assumptions about intentions		1	7	27
Evaluate existing beliefs	10	5		50
Focus on positive aspects of work (natural rewards of tasks)	8	10		60

Table 9: Qualitative data of wrap-up session

6 Discussion

This study had two main purposes. Firstly, it was to analyse the theoretical framework that self-leadership resides in. Secondly, it was to study the effectiveness and trainability of self-leadership's internal strategies and positive outcomes regarding professional behavior. Therefore, this section serves as a linkage between both objectives and provides theoretical insights and additions based on the findings of the performed empirical study. Firstly, the findings of this research are given and compared with similar existing findings in the literature. Secondly, some theoretical contributions that this study offers are proposed. Afterwards, practical implications of these findings are given, the limitations of this study and consequent suggestions for future research are described. Finally, the conclusion and the major findings of the complete study are given.

Effectiveness of self-leadership training

This study tried to discover whether the strategies, dimensions and skill-set associated with self-leadership could be effectively trained and applied into professional life. The theoretical foundation of the concept was mostly developed by Manz (1986) and focused on behavioral and cognitive strategies that "lead oneself toward performance of naturally motivating tasks as well as managing oneself to do work that must be done but is not naturally motivating" [Manz, 1986]. More specifically, self-leadership comprises three distinct dimensions categorized as; behavior-focused, natural reward and constructive thought pattern strategies. With the development of our training program, an effort was made to make the experimental group familiar with these dimensions as well as how these can aid them in real professional situations where self-directed behavior is needed to cope with demands better. The study with its sample of employees of an international IT department showed that the training indeed significantly increased their application of self-leadership behavior and strategies after training, as opposed to a control a group. This finding further substantiates the empirical evidence that self-leadership strategies can be taught/trained. For instance, previous research by Neck and Manz (1996) found that a training that involved teachings about the cognitive strategies of self-leadership (i.e. constructive thought patterns) was associated with higher levels of optimism and mental performance. Additionally, Unsworth and Mason (2012) found that self-leadership training led to a significant increase in the use of self-leadership strategies. This finding is therefore replicated with this study. However, both of these studies also found evidence that said self-leadership training increased general self-efficacy after training. In more detail, it was found that "participants who completed the training reported significantly higher self-efficacy perceptions in comparison to those not receiving the training" [Neck and Manz, 1996]. This effect could not be replicated with the present study. A mixed (multilevel) analysis of variance showed non-significant ($p=0.14$) differences between the experimental and control group. An explanation for the lack of this difference can be found in the design limitations of this study. First, the sample size of both groups ($N=30$ for experimental and $N=20$ for control group) limited the statistical power of the study meaning less conclusive and validated results. Hair et al. (2010) suggests 5 persons per group per measured variable, indicating that the control group wasn't large enough. Second, it could be hypothesized that the post-test measurements were collected too soon. As it was constrained by organizational setting, these were collected at the end of last training session. It could be reasoned that if the study allowed for a longer duration between the end of the training (and thus meaning all participants are fully familiar with

all concepts of the training) and the post-test measure collection, it could've given more opportunities for application of said strategies in real life situations, leading to more positive experiences and outcomes which enforces self-efficacy. Indeed, the study by Gist (1989) confirms that fostering self-efficacy is the result of practice and reinforcement (e.g. experiential learning as developed by Kolb (1984)). This means that it could very well be hypothesized that collecting the same measures several weeks later could have given significantly different results for the experimental and control group. Lastly, an interesting remark can be made based on the findings by Stewart et al. (1996). They failed to find a significant increase in self-directed behavior after training in comparison to their control group. However, they found a significant interaction between conscientiousness (which they defined as "a stable tendency to be organized, efficient, goal-oriented, and persistent) and self-leadership training. They reasoned that participants who are conscientious prior to training already have the ability to engage in self-directed behavior and therefore feel they have a lower need for self-leadership training, hence are less motivated to change their behavior as a result of the training. This fits within the triadic framework of the social cognitive theory (see section 2.3.1) where the relation between a change in environment (training) and behavior (application of self-leadership strategies) is dependent/moderated by personal factors. This reasoning could be used in a similar fashion in the way self-efficacy interacts with self-leadership training in this study. Indeed, when looking at the descriptive statistics of self-efficacy, one could reason that the self-efficacy scores can be considered high at both time-points and groups which could have led to a lack of motivation to persist in the training. This argument was further strengthened by observing the initial sessions of the training program where several attendees expressed feelings of being unmotivated to persist in the training as they didn't see direct benefits for their professional life. This was also reflected in a bigger dropout rate after the first session.

Furthermore, no direct link was found between self-leadership and work-engagement as was proposed by hypothesis 3. Reasoning for the lack of finding this association can be found in the possible confounding impact that other job and personal demands had during the intervention. Various other resources and demands such as autonomy, supervisor contact, work pressure etcetera were not tested for and could therefore have impacted the work-engagement felt by participants, regardless of the impact self-leadership had on this. Indeed, work-pressure and lack of social support were, amongst others, expressed by participants prior to training in the experimental group as being detrimental to their current motivation and energy levels in their professional life. However, this result was interestingly countered by the finding that there was a significant increase from pre- to post-training in the experimental group, as opposed to the control group. This indicates that although there is no direct relation found between self-leadership and work-engagement, the training itself did prove to have a positive effect on the work-engagement felt by the participants. Whether this effect is due to the content of the training or something else such as the Hawthorne effect (increase in work-engagement could be assigned to an increased attention to the individual which makes them feel valuable and important to the organisation) can't be isolated due to the nature of this study [et al., 2007]. In sum, there was no direct relation between self-leadership and work-engagement found in our data but the training did contribute to an increased level of work-engagement by the participants. Therefore, this study still provides a potential interesting perspective on how training on personal skills and behaviors (self-leadership strategies) can be beneficial to the level of engagement with the organization.

Collaborative behavior

In terms of the performance outcomes regarding the collaborative behavior, some interesting insights have been exposed. Regression analyses revealed that functional assertiveness and knowledge sharing acted as two distinct measures of collaborative behavior and even more interesting is the fact that they're both positively and significantly related with either self-efficacy or work-engagement; people who scored higher on self-efficacy also scored higher on functional assertiveness. People who are highly engaged at work indicated higher levels of knowledge sharing. This makes for the two distinct pathways which were proposed at the research model (section 3.7) being more apparent and validated. These pathways resemble in a broad sense the two main aspects making up performance; motivation (work-engagement) and a sense of capability (self-efficacy). This last pathway was confirmed by the found mediating effect of self-efficacy on the relation between self-leadership and functional assertiveness both pre- and post-test. Additionally, it was found that the increase in functional assertiveness was dependent on whether or not the training had been followed. These results shed light in the mechanisms that occur within individuals in order to display more assertive behavior. Self-leadership's behavioral and cognitive strategies foster a level of confidence in one's capability which eventually translates to being more able to express needs and wishes as well as the things you can and can't do. This is also congruent with the logical levels of change as developed by Dilts (1990) as influencing on the level of capabilities will trickle down and make sustainable changes to the level of behavior. In this manner, training skills can lead to new behavior that eventually leads to a positive impact on how an individual interacts with his/her environment.

The pathway between self-leadership, work-engagement and knowledge sharing however requires a more detailed look. This study didn't confirm an existing link between work-engagement and self-leadership and neither did it support the claim that knowledge sharing was increased due to the training program. There was however a direct positive link between work-engagement and knowledge sharing. So, engaged workers are more willing to share knowledge with their colleagues. This is congruent with previous research by Schaufeli (2012) that states that engagement in the workplace leads to a positive social climate where engaged workers display pro-social behavior such as helping others and being cooperative.

The lack of finding a direct link of self-leadership on work-engagement and subsequently knowledge sharing was surprising. It was reasoned that self-leadership could act as a personal resource which could facilitate stress coping and motivation in the same manner other job and personal resources act in the job demands-resources model by Demerouti et al. (2001a). Although this study did not provide evidence for this reasoning, integral to self-leadership and its strategies are the motivational capabilities which, when truly implemented and embraced, have the possibility to impact all three of the dimensions that make up work-engagement; vigor, dedication and absorption. It is therefore discussed that additional research is needed to explore the mechanisms and possible mediators through which self-leadership can have an effect on work-engagement. A possible direction could be the way in which can job-crafting behavior of individuals interacts with work-engagement. Dubbelt et al. (2019) performed an interventional study in a university context where participants followed a workshop on job crafting. The results indicate that mainly seeking resources behavior (e.g. asking for feedback,) leads to increased work-engagement. This behavior is a form of proactive behavior that enables employees

”to arrange the conditions at work such that they create a motivating work environment for themselves” [Bakker Demerouti, 2018]. The training program that was used for this study also covered this aspect of job crafting theory (although not explicit) through experiential learning on natural reward strategies (embedding tasks with intrinsic rewards) and pro-active behavior (expressing needs, boundaries and taking charge in conversations). Therefore, an increased self-leadership could lead to seeking more resources which would mediate on the relation between self-leadership and work-engagement. Further research is needed to validate this assumption.

6.1 Theoretical contributions

This present study delivers several interesting insights and implications. First of all, the main focus of this study has been to highlight and examine the effectiveness of self-leadership training to individuals within an organizational setting. The trainability of these strategies and the subsequent adoption of these into professional life has been sparsely studied by previous research. However, literature focusing on human performance and training development can’t and shouldn’t jump to conclusions before properly analyzing them in an experimental design. Therefore, this study acts as a confirmation that self-leadership strategies can be transferred and taught with the use of experiential learning in a controlled environment. Furthermore, this study exposes the mediating capabilities of self-efficacy. In more detail, it was found that self-efficacy mediates the relation between self-leadership and functional assertiveness. This pathway from personal skills to collaborative behavior through the development of capability beliefs is a newly found addition to the existing body of literature on social learning, human performance and work psychology. This contribution is important as it highlights the possibilities of increasing collaborative behavior through behavioral skill development on an individual level. Therefore, such an intervention as the self-leadership training program used in this study has huge value in enabling employees’ self-direction and self-motivation which eventually fosters a collaborative environment within the organization. Finally, it was found that work-engagement felt by the participants increased during the training. Although the mechanisms through which this happened are unclear (content of training versus Hawthorne effect), this delivers a highly interesting starting point to discover whether work-engagement can be build with the use of small scale training programs. Previous research such as the aforementioned interventional study on job-crafting behavior by Dubbelt et al. (2019) give promising results. Their workshop also adhered to the experiential learning theory which makes that the current study is a further substantiation on the value that experiential learning brings in effectiveness of training/intervention programs.

6.2 Practical implications and managerial directions

In terms of contributions this study has to organizations, managers and social consultants around the world, some suggestions can be made. These mainly revolve around the insights gained from testing the effectiveness of the developed training program that implemented the strategies of self-leadership as the core concept. This study not only showed the possibility of transferring knowledge on these concepts, it also demonstrated the positive effect in building belief in one’s capability and a fulfilling state-of-mind of the participating individuals. Furthermore, it once again showed the positive effects of

incorporating the experiential learning theory [Kolb, 1984] in training programs. Sustainable behavioral change is best obtained through a recursive process of experience and reflection. The results of this study again stressed the benefits of such a framework. Moreover, one of the goals of this program (from the external organization's perspective) was to make individuals more proactive and assertive in their communication. This goal was accomplished as the findings clearly show an increase over time regarding their functional assertiveness. Therefore one can conclude that building one's belief in its own capabilities by implementing self-directed strategies in their professional life, can and will be transferred to their behavior and interaction with their environment. More specifically, this increased sense of capacity to execute necessary behaviors leads to actual better performance within a team. This insight should always be included when proceeding with building the right tools and methods for training program development.

In sum, organizations emphasizing self-direction and employee empowerment (through leadership distribution) could make use of training programs adhering to the experiential learning theory focusing on personal skill development and practice of the self-leadership strategies. By enabling employees to apply self-leadership strategies in a controlled environment, their sense of ability and motivation and therefore their collaborative performance can be enhanced.

6.3 Limitations

The present study is not without limitations which will now be discussed. This study was one of a quasi-experimental design with non-random group selection in both an experimental and control group. This design allowed for group comparison both pretest, post-test and in their respective differences over time. Using a quasi-experimental design has several benefits such as the strengthening of causal inferences when random assignment is not possible and the ability to facilitate collaboration with practitioners/trainers [Grant and Wall, 2019], both of which were the main reasons this design type was selected for this study. However, also part of the nature of this type of design is selection bias which leads to the possibility of the experimental group being different from the control group. As the experimental group and control group were not part of the same organizations this could indicate that contextual factors such as culture could have a confounding impact on the results. A careful selection of the control group was made based on shared aspects of career positions, organisation size and demographics. Additionally, a pretest group comparison was performed in an effort to resolve this concern which delivered satisfying results. A minor difference in age was found between the two groups which could be assigned to the fact that the organization that sent their employees to the training (experimental group) especially wanted their younger employees to increase on the learning goals which would make a more sustainable impact on the organization itself.

This same perspective can be used to explain the findings on knowledge sharing. The lack of knowledge sharing was explicitly given as a problem by the trainees prior to training, however it did not seem to significantly benefit from the training. Reasoning for this could be that either the questionnaire was not able to capture the true nature of these (practical versus ideological) or the training failed to treat the problems accordingly. Additionally, the group sizes for both groups (30 for experimental and 20 for control group) were considered small which weakens the statistical external validity of the study. This

is partly due to the fairly high attrition rate for the experimental group as participation was not made mandatory and the training was set during company hours. This made for several trainees missing one of the sessions and making them ineligible for the sample. Although the reasons for them not completing the program are unknown and could be assigned to sickness, workload and other contextual factors, it could also be hypothesized that these participants were not motivated to participate as they felt they already were applying self-leadership strategies and felt self-efficacious. Including these participants in the sample could have impacted the results. Furthermore, it is advised to include triangulation in a study to strengthen its validity. By including multiple sources of information it is possible to test validity through convergence [Carter and Bryant-Lukosius, 2014]. This was done with the inclusion of qualitative data with the use of a wrap-up session however all data was self-reported which naturally is subject to subjectivity. So an additional step could have been taken by including reported measures by the trainers on the success of the behavioral changes due to the program. Finally, post-test data were collected after completion of the final session. This made that there was no room for the participants to apply the content of this session and let them internalize the full grasp of the concepts over time. This maturation period (although not possible because of contextual factors) ideally would've been extended.

6.4 Suggestions for future research

Some interesting insights, paths and results have been exposed by this study. Future research could follow up on these to add to the ever expanding body of research on, amongst others, behavioral psychology. Firstly, the confirmation of being able to teach, transfer and adopt self-leadership strategies opens up new possibilities to research to what extent these strategies lead to sustainable changes in various other outcomes in a professional context. Interesting insights could be drawn from if possibly self-leadership strategies affect innovative behavior in a similar vain as work-engagement does as reported by Spiegelaere et al. (2014). Additionally, as self-leadership strategies are found to affect efficacy perceptions of individuals, it could be interesting to see whether this also translates to an increased group efficacy within larger teams at organizations. Furthermore, the results of this study reveal the mechanisms on how self-leadership strategies make individuals more capable to resolve their interpersonal problems in an appropriate manner (as perceived by the listener) by increasing their sense of general capability in accomplishing specific tasks. This pathway from skills to behavior through capability beliefs is a highly interesting one which should be examined and validated in other contexts and with the use of different training programs and concepts/performance outcomes. Replicating this finding in a university context for instance could lead way for educational applications where under-performing students due to a lack of confidence in one's abilities could benefit from increasing their self-leadership. Finally, the relations connecting the concepts of self-leadership, work-engagement and knowledge sharing combined with the influence of age on these remain to an extent undiscovered. Future research should try to discover the mechanisms that are apparent within this framework as this could possibly reveal ways to make individuals more engaged to their work and willing to share their knowledge which will both naturally have positive impacts on performance and efficiency of an organization. As before mentioned, job crafting theory could possibly turn out to be the missing link in this pathway and should therefore be incorporated in future research.

6.5 Conclusion

In this final section an effort is made to answer our formulated research question which was divided in two sub-questions, being:

1. *Can Self-leadership training effectively lead to an increased utilization of its' strategies into professional life?*
2. *Can Self-leadership training aid in increasing the self-efficacy, work-engagement and subsequently collaborative behavior of employees?*

Answering sub-question 1 is relatively straightforward in that the definitive answer is yes, self-leadership training does lead to an increased utility of it's strategies after training which demonstrates the trainability of self-leadership strategies. More specifically, the study indicated that the experimental group increased their use of self-leadership over time as opposed to the control group. This argument is strengthened by the qualitative self-reported data of the participants as well which indicate that, amongst others, they are more capable of evaluating their own (troubling) beliefs and assumptions and perceive a greater control over their work.

Regarding sub-question 2 which looked at the beneficial aspects self-leadership training has on perceived general self-efficacy, work-engagement and subsequent collaborative behaviors conclusive statements can also be made. The self-leadership training program as developed for this study showed to be impacting the perceived sense of capability of accomplishing specific tasks (self-efficacy) which led to participants being more assertive while maintaining appropriateness in their communication. This exposed a pathway from skills to certain collaborative behavior through a development of capability beliefs. Furthermore, an effect of this training program on work-engagement was found albeit influenced by the age of the participants. Work-engagement positively related to knowledge sharing which can be interpreted in a manner that individuals that experience a positive fulfilling state-of-mind are more likely and motivated to share their knowledge with peers which has a positive effect on a organization.

To conclude, this study highlights the importance of training programs in organizational settings as these develop the workforce in numerous important ways. Specifically training programs focused on the individual (e.g. self-leadership) rather than on a group-level that are based on the experiential learning model and social cognitive theory can increase the sense of capability combined with motivational aspects which ultimately transforms these participants in being more self-organized and leaders over their own actions and behaviors. As was discussed in the introduction of this study, this is essential for making the workforce capable of handling the increased pressure and responsibility of current work trends and innovation where leadership is distributed among its' members.

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A Questionnaire

Hello, this survey will take about 8 minutes to complete. The next 34 questions are aimed to get an understanding about the way you practice self-leadership strategies and the resulting team dynamics in your professional life. Please select the most appropriate answer for each statement by choosing from the scale ranging from Strongly Disagree (1) to Strongly Agree (5). The results will be used for evaluating the effectiveness of the training and the development of my thesis at the TU/e. The survey is completely anonymous and your answers will be taken care of in a responsible manner. Additionally, none of the individual data will be transferred to your superiors. I hope this gives you enough incentives to complete the survey in a truthful manner. Thanks in advance, Tommy van Beeck

Self-leadership

1. I establish specific goals for my own performance. (self-goal setting)
2. I make a point to keep track of how well I'm doing at work. (self-observation)
3. I work towards specific goals I have set for myself. (self-goal setting)
4. I often mentally rehearse the way I plan to deal with a challenge before I face the challenge. (self-cueing)
5. Sometimes I picture in my mind a successful performance before I start a task. (visualizing successful performance)
6. When I have successfully completed a task, I often reward myself with something I like. (self-reward)
7. Sometimes I talk to myself (out loud or in my head) to work through difficult situations. (evaluating beliefs and assumptions)
8. I try to mentally evaluate the accuracy of my own beliefs about situations I am having problems with. (self-talk)
9. I focus my thinking on the pleasant rather than the unpleasant aspects of my job. (Focusing thoughts on natural rewards of tasks)

Functional Assertiveness

1. I can get colleagues to change their behavior in case they are being disruptive.
2. I can get people to understand my own ideas even if my ideas are different from theirs.
3. I can get colleagues to improve their manners if I feel their manners are not OK.
4. I can get people to understand that they are being unjust if they point out my failures due to a misunderstanding.
5. I can get my colleagues to stop their annoying or troublesome actions.

6. I don't offend a disruptive colleague when I try to get that person to change his or her behavior.
7. I never make people feel bad when I try to get them to understand my own ideas.
8. I don't needlessly embarrass coworkers when I try to get them to improve their manners.
9. I don't get on people's nerves more than necessary when I try to get them to understand that they are being unjust in pointing out my failures.
10. I don't carelessly insult my colleagues when I try to get them to stop annoying or troublesome actions.

Knowledge sharing

1. I voluntarily share my know-how, information, and knowledge with my coworkers.
2. I cooperate or communicate easily in teams or groups for sharing information and knowledge.
3. I share my experience or know-how from work with my colleagues frequently.

Work-engagement

1. At my work, I feel bursting with energy
2. At my job, I feel strong and vigorous
3. I am enthusiastic about my job
4. My job inspires me
5. When I get up in the morning, I feel like going to work
6. I am proud on the work that I do
7. I am immersed in my work

Self-efficacy

1. It is easy for me to stick to my aims and accomplish my goals
2. I am confident that I could deal efficiently with unexpected events
3. Thanks to my resourcefulness, I know how to handle to unforeseen situations.
4. I can remain calm when facing difficulties, because I know I can rely on my coping capabilities
5. No matter what comes my way, I'm usually able to handle it.

B Conceptual model of training sessions

