

Grit and Self-Leadership: Are gritty people better Self-Leaders?

A survey-based study on the correlation between Grit and Self-Leadership

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Zusammenfassung

Ziel dieser Masterarbeit ist die Erforschung der Beziehung zwischen Grit und Self-Leadership, mit einem sekundären Fokus auf die Prüfung einer Korrelation zwischen diesen Konstrukten und Growth Mindset. Für die Studie werden etablierte Skalen zur Messung von Grit (Grit-S), Self-Leadership (ASLQ) und Growth Mindset (ITIS) verwendet. In der Untersuchung werden zudem die interne Konsistenz, die Reliabilität und die Faktorenstruktur der ins Deutsche übersetzten Fragebögen zur Messung dieser psychologischen Konstrukte untersucht. Die Ergebnisse (n=160) zeigen eine positive Korrelation zwischen Self-Leadership und Grit sowie Growth Mindset, jedoch konnte keine Korrelation zwischen Grit und Growth Mindset festgestellt werden. Die Analysen der psychometrischen Eigenschaften der Testinstrumente legen nahe, dass die deutschen Übersetzungen eine angemessene interne Konsistenz und Reliabilität bieten. Schließlich werden praktische Implikationen sowie zukünftige Forschungsfelder diskutiert.

Schlüsselbegriffe: grit, self-leadership, selbstführung, growth mindset, implicit theories of intelligence, umfrage, korrelationsanalyse, struktur validierung, reliabilitätsanalyse

Abstract

This thesis aims to investigate the relationship between grit and self-leadership, with a secondary focus on examining the correlation between these constructs and growth mindset. The research utilizes well-established scales to measure grit (Grit-S), self-leadership (ASLQ), and growth mindset (ITIS). The study also assesses the internal consistency, reliability, and factor structure of the German-translated questionnaires used to measure these psychological constructs. The findings of this research (n=160) show that self-leadership correlates positively with grit and growth mindset, while no correlation could be found between grit and growth mindset. The analyses of test instruments' psychometric properties suggest that the German translations offer adequate internal consistency and reliability. Lastly, practical implications and future research fields are discussed.

Keywords: grit, self-leadership, growth mindset, implicit theories of intelligence, survey, correlation analysis, structural validity, reliability analysis

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List of Abbreviations

Abbreviation	Explanation
ASLQ	Abbreviated Self-Leadership Questionnaire
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CI	Consistency of Interest (Sub-Score of Grit-S)
EFA	Exploratory Factor Analysis
Grit-S	Short Grit Score
IQ	Intelligence Quotient
ISCED	International Standard Classification of Education
ITIS	Implicit Theories of Intelligence Scales
nArch	Need for Achievement
OCEAN	Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism
PE	Perseverance of Effort (Sub-Score of Grit-S)
UWES	Utrecht Work Engagement Scale
RMSEA	Root Mean Square Error of Approximation
RSLQ	Revised Self-Leadership Questionnaire
SDT	Self-Determination Theory
SRMR	Standardized Root Mean Square Residual
TLI	Tucker-Lewis Index
WEIRD	Western, educated, industrialized, rich, and democratic [countries]

1 Introduction

In an era marked by rapid changes, uncertainties, and dynamic challenges, the ability to successfully navigate one's personal and professional journey has gathered growing attention within psychology. Maneuvering through challenges with resilience and determination has become a significant topic of increasing interest. Two concepts that shed light on potential roles in shaping individual successes are 'grit' and 'self-leadership'. Grit has been explained as perseverance and passion for long-term goals and is proven to be a good indicator of success (Duckworth et al., 2007). Self-leadership describes various strategies individuals use to influence their behaviors and achieve desired outcomes (Manz, 1986). Both concepts represent psychological resources that contribute to personal development.

The intersection between grit and self-leadership opens paths for exploring the complex dynamics of individual achievement. Understanding how these constructs interact can offer valuable insights into the psychological mechanisms underlying sustained effort, goal attainment, and personal growth. This master's thesis aims to delve into the correlation between self-leadership and grit, employing the Short Grit-Scale (Duckworth & Quinn, 2009) and the Abbreviated Self-Leadership Questionnaire (Houghton, Dawley, et al., 2012) as instruments for measurement. Further, the Implicit Theories of Intelligence (Dweck, 1999) are used to check for any correlations, as growth mindset and grit are suggested to strengthen each other mutually (Zhang et al., 2022).

1.1 Background and Context

The concept of grit has gained prominence in academic literature, emphasizing the significance of perseverance and passion in achieving long-term objectives. Duckworth and her colleagues (2007, p. 1088) suggest that "Grit entails working strenuously toward challenges, maintaining effort and interest over the years despite failure, adversity, and plateaus in progress. The gritty individual approaches achievement as a marathon". Grit represents a trait-level characteristic that goes beyond traditional measures of cognitive ability (e.g., IQ) and talent, focusing on an individual's ability to maintain effort and interest over extended periods. As researchers and practitioners recognize the multifaceted nature of success, grit has emerged as a key predictor of achievement in various domains, including education, business, and personal development (Duckworth et al., 2007; Duckworth & Quinn, 2009; Robertson-Kraft & Duckworth, 2014).

Concurrently, self-leadership has become a focal point for understanding how individuals influence their behavior and enhance their personal effectiveness (Manz & Sims Jr, 1980). Self-leadership acknowledges the importance of knowing oneself, one's strengths and weaknesses, and the meaningful influence on one's emotions and behaviors (Browning, 2018). The self-leadership framework encompasses a range of strategies, from goal setting to self-motivation and self-reward, that individuals employ to proactively guide themselves toward desired outcomes (Manz, 1986). Specifically, Browning (2018, p. 2219) defines self-leadership as “having a developed sense of who you are, what you can do, where you are going coupled with the ability to influence your communication, emotions, and behaviors on the way to getting there“. Further, some authors claim that self-leadership can lead to top professional and personal performances and achievements (Furtner & Baldegger, 2016, p. 1).

1.2 Purpose of the Study and Problem Statement

While grit and self-leadership both contribute independently to the understanding of individual success (Duckworth, 2017; Duckworth et al., 2007; Furtner & Baldegger, 2016; Manz & Sims Jr, 1980), their potential interplay remains an underexplored area. Investigating the correlation between these constructs could provide a nuanced understanding of how perseverance and self-guidance mutually influence each other. It might further help to understand how these traits interact to contribute to personal and professional achievements or how individuals might develop these skills within themselves and others.

The implicit theories of intelligence are frequently discussed in grit literature, where a mutually strengthening relationship between grit and a growth mindset has been shown (Park et al., 2020; Zhang et al., 2022). Therefore, the implicit theories of intelligence scale (ITIS) is added to the questionnaire to measure whether individuals tend towards growth or fixed mindset (Dweck et al., 1995).

This study seeks to address the gap in the literature by examining the relationship between grit and self-leadership, utilizing established measures—the Grit Scale and the Abbreviated Self-Leadership Questionnaire (Duckworth & Quinn, 2009; Houghton, Dawley, et al., 2012). Lastly, the ITI score is used to check for correlations between self-leadership, grit, and mindset.

1.3 Research Questions

It might be argued that the ability to influence one's actions towards a defined goal (self-leadership) and stamina in the will and motivation to reach a defined goal over a long time period (grit) lie close to one another. Based on established literature (Duckworth et al., 2007; Manz, 1986; Neck & Houghton, 2006), the hypothesis proposed in this study is that these two capabilities might influence or mutually strengthen each other or simply enable and support an individual to work towards a defined goal. Intending to shed more light on this initial consideration, this master's thesis investigates the relationship between self-leadership and grit.

This thesis aims to investigate the potential correlations between self-leadership competency, grit, and growth mindset, as measured by the Implicit Theories of Intelligence Scale. Specifically, the research goal is to determine whether individuals with high levels of self-leadership exhibit correspondingly higher levels of grit and whether these traits are associated with a tendency toward a growth mindset. By exploring these relationships, the study seeks to contribute to a deeper understanding of the psychological factors influencing success, achievement, personal development, resilience, and attitudes toward learning and intelligence.

The research questions explored in this thesis are as follows:

RQ1: Do individuals with high self-leadership competency also exhibit a higher grit factor and vice versa?

RQ2: Do individuals with a high grit factor or a high self-leadership score also display a growth mindset according to the implicit theories of intelligence scale? (Park et al., 2020; Sigmundsson et al., 2020; Zhang et al., 2022)

In the following chapters, this thesis will start by thoroughly reviewing existing literature. It will then move on to presenting the hypotheses, explaining the research methods, analyzing findings, and finally discussing the implications for theory and practice. It will conclude by addressing limitations and providing an outlook for future research.

2 Literature Review

2.1 Grit

For decades, research has aimed to explain what makes people successful across various professions and fields of activity. The most elaborated-upon factor is intelligence, which is measured reliably by IQ assessments (Neisser et al., 1996). Many studies show a positive correlation between IQ and academic achievements, income, and job performance (Deary et al., 2007; Fergusson et al., 2005; Firkowska-Mankiewicz, 2002; Gottfredson, 1997; Herrnstein & Murray, 2010; Strenze, 2007). However, intelligence is not the only predictor for success. More than 100 years ago, William James already asked why some individuals are more successful than others despite being equally intelligent (William James, 1907, p. 322–323, cited by Duckworth et al., 2007, p. 1087). Grit is a concept that aims to answer this question (Duckworth et al., 2007).

2.1.1 Definition of Grit

In 1999, Howe (p. 15) argued that perseverance is just as essential for success as talent or intelligence. Therefore, Duckworth et al. (2007) investigated the relevance of noncognitive traits as a predictor for the success of individuals. The authors state that grit is a personality trait that describes perseverance and passion for long-term goals. Gritty individuals focus on long-term stamina on the way toward a goal rather than intense but short-term undertakings. Therefore, grit is characterized by working towards an objective and keeping interest and dedication high, regardless of stagnating results, boredom, downfalls, or hardships. Gritty individuals are in for a long but steady marathon, not for a fast sprint towards a particular goal (Duckworth et al., 2007).

Grit is not a static trait but a quality that can be cultivated and developed over time (Duckworth et al., 2007). Duckworth's research emphasizes the role of deliberate practice, dedication, and the cultivation of a growth mindset in fostering grit (Hochanadel et al., 2015; Park et al., 2018, 2020).

When measuring grit with the grit scale, literature by Duckworth and colleagues (Duckworth, 2017; Duckworth et al., 2007) differentiates between two key components: perseverance of effort (PE) and consistency of interests (CI) over time. Firstly, perseverance of effort refers to the determination an individual exhibits in the pursuit of a goal, even in the face of difficulties and impediments. Sustained effort and a maintained focus over an extended period of time, regardless of setbacks, describe the perseverance of effort. Secondly, consistency of interest emphasizes an individual's enduring passion and

dedication toward a selected activity or topic. It goes beyond initial enthusiasm, describing the ability to sustain an unwavering interest and commitment to long-term goals. This component recognizes passion's critical role in achieving success, fueling the persistence required to overcome challenges.

According to literature, achievement is the product of talent and effort, where the latter is weighted higher (Duckworth et al., 2007). Talent alone does not explain achievement, but talent combined with the investment of effort leads to the development of a skill. Investing more effort into an existing skill will likely result in achievement (Duckworth, 2017; Duckworth et al., 2007; John et al., 1999). Effort is described as the intensity, direction, and duration of the individual's actions towards a specific aim (Duckworth et al., 2007).

2.1.2 Delimitation from other concepts

Although grit has similarities with other constructs, it distinguishes itself by specifically prioritizing the enduring pursuit of challenging goals and placing emphasis on passion as a motivating force (Duckworth, 2017; Duckworth et al., 2007; Duckworth & Gross, 2014; Duckworth & Quinn, 2009). It is thus essential for this thesis to differentiate grit from other concepts.

Contrary to grit, self-control is not associated with consistent goals (Duckworth & Gross, 2014). Although the underlying psychological processes overlap, self-control and grit are distinct from one another. Self-control is often associated with the individual's ability to control and regulate emotion, attention, and own actions in times of desire (e.g., impulses), which is also a crucial factor for daily success. The capability to execute self-control is suggested to develop from childhood through adulthood, simultaneously with the development of the prefrontal brain areas. Duckworth et al. (2007) describe that "an individual high in self-control but moderate in grit may, for example, effectively control his or her temper, stick to his or her diet, and resist the urge to surf the Internet at work—yet switch careers annually" (S 1088). Research shows that self-control and grit are highly correlated, and both concepts can serve as predictors of successful outcomes beyond intelligence. However, they are still different from each other since they operate in distinct ways and across different time scales (Duckworth & Gross, 2014).

Self-discipline – like impulse control or willpower – is often used as a synonym for self-control (Bashant, 2014). The author describes that self-discipline is characterized by the ability to carry out desired actions, which involves adept management of emotions and thoughts, as well as strategic planning of behavior to achieve personal goals.

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Therefore, self-discipline is also related to grit and further might be a trait one must exhibit to be a 'gritty' individual. However, similar to self-control, the pursuit of long-term goals differentiates grit from self-discipline (Bashant, 2014).

Further, grit is related to, but different from, the concept of need for achievement (Duckworth & Quinn, 2009). People with a high need for achievement put more effort if moderate challenges are present as incentives, compared to situations without incentives or tasks that are too easy or too hard (McClelland, 1961). In contrast, gritty individuals set extremely long-term goals and do not stray away even if positive feedback is lacking (Duckworth et al., 2007). Thus, the main difference between the concept of 'need for achievement' and 'grit' is the enduring commitment to objectives and the non-necessity for immediate feedback (Duckworth et al., 2007; Duckworth & Quinn, 2009; McClelland, 1961).

Literature further discusses the similarities and differences between grit and conscientiousness (Duckworth et al., 2007). Conscientiousness is one of the five overarching dimensions employed to describe human personality within the context of the Big Five personality traits (Goldberg, 1990). The Big Five model has served as a descriptive framework in a significant portion of modern empirical research focusing on traits that forecast success. It includes the dimensions of Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism (OCEAN) (Duckworth et al., 2007; Goldberg, 1990; John et al., 1999). Conscientiousness pertains to the degree to which an individual demonstrates organization, responsibility, reliability, and goal-oriented behavior (Goldberg, 1990). Those with high conscientiousness exhibit diligence, thoroughness, and discipline in their task execution. They are recognized for their capacity to plan proactively, attend to details, and persevere in the pursuit of their objectives (Goldberg, 1990). While grit shares some similarities with conscientiousness, a personality trait marked by diligence and organization, it distinguishes itself through its focus on passion, perseverance, and stamina, specifically concerning long-term goals (Duckworth et al., 2007). Grit surpasses mere consistent effort and reliability, encompassing an enduring passion that may require overcoming challenges and setbacks (Duckworth et al., 2007).

Since embodying grit entails showcasing resilience when confronted with challenges, also the concepts of resilience and grit overlap partly (Duckworth, 2017). Research highlights that in defining the term resilience, one needs to differentiate between a trait, a process, or an outcome (S. M. Southwick et al., 2014). For this thesis, resilience is referred to as a trait, and the definition of Masten is used: "resilience refers to the capacity of a dynamic system to adapt successfully to disturbances" (S. M. Southwick et al., 2014,

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p. 4). So resilience describes the capacity to assess situations objectively, avoid distortions, and contemplate potential changes in one's life (Bashant, 2014). Resilience, by definition, is an intrinsic component of grit (Stoffel & Cain, 2018). Both grit and resilience encompass the ability to rebound from adversity, but grit particularly emphasizes the perseverance and passion essential for attaining long-term goals and remaining loyal to them over a long period (Duckworth, 2017; Perkins-Gough, 2013).

Similarly, while grit and motivation share some similarities, they also differ in significant ways (Von Culin et al., 2014). Personality traits like grit are stable patterns and show how an individual usually acts, thinks, and feels (Von Culin et al., 2014). On the other hand, motivational traits describe persistent individual differences in what a person typically wants and needs. While grit and motivation are linked, grit goes beyond a simple desire to achieve. Motivation by itself may only partially capture the enduring commitment to long-term goals and the sustained interest that grit embodies (Von Culin et al., 2014).

Lastly, it is essential to delimit talent from grit. Talent is often referred to as an aptitude or skill for performing a specific activity. Many dictionaries define talent as a natural ability to be good at something without being taught (Cambridge Dictionary, 2023; Merriam Webster Dictionary, 2023; Oxford English Dictionary, 2023). In contrast, Duckworth (2007) argues that talent is never inherent, but the disposition to nurture and grow this ability is acquired through learning. "All talents are developed through a complex interaction of nature and nurture." state Kaufman and Duckworth (2017, p. 1). Literature reasons that acquiring expertise is influenced by how quickly an individual learns, which is detached from the total effort one dedicates to learning (Duckworth, 2017; Kaufman & Duckworth, 2017). In essence, having talent in a particular field implies faster progress on the skill curve compared to other individuals who have put in the same effort. This is also the foundation for intelligence and cognitive ability, which can be partially measured and assessed with Intelligence tests (IQ tests) (Duckworth, 2017; Kaufman & Duckworth, 2017). Grit may also affect other personality traits related to success (Houston et al., 2021). Therefore, research by Houston et al. (2021) has examined the effect of grit on proactive personality, personal growth, and competitiveness. It was found that grit is positively correlated with these factors. Conversely, the study suggests that grit is negatively correlated with excessive competitiveness, personality traits centered around manipulativeness and indifference to morality, as well as most forms of narcissism.

2.1.3 Relevance of Grit

The empirical exploration of grit has yielded compelling evidence of its profound impact across diverse domains, shedding light on its role in fostering success, achievement, and well-being (Bashant, 2014; Chang, 2014; Duckworth et al., 2007, 2011; Eskreis-Winkler et al., 2014; Hochanadel et al., 2015).

Duckworth and her colleagues (Duckworth et al., 2007, 2011; Eskreis-Winkler et al., 2014; Robertson-Kraft & Duckworth, 2014; Von Culin et al., 2014) showed that grit may be as important as talent to high accomplishments. Although research agrees that intellectual strength as well as nonintellectual strength contribute to performance, literature shows that self-discipline has a significant effect on academic success (Duckworth & Seligman, 2005, p. 939). Across different studies, individuals with higher grit were less likely to drop out of their respective commitments and less likely to change defined objectives before completion (Duckworth et al., 2007; Duckworth & Eskreis-Winkler, 2013; Duckworth & Gross, 2014; Eskreis-Winkler et al., 2014). In 2007, researchers published the results of their study and showed that grit is highly correlated with different success outcomes. Among them are the educational attainment of adults, academic achievement among highly qualified students, retention in military training, and spelling competitions (Duckworth et al., 2007, p. 1087). Subsequent studies have validated these findings, revealing a consistent pattern whereby individuals with higher grit levels tend to outperform their peers (Chang, 2014; Duckworth et al., 2011; Dumfart & Neubauer, 2016; Eskreis-Winkler et al., 2014).

This sub-chapter delves into the relevance of grit in education, business, and personal development.

2.1.3.1 Relevance in Education

In educational environments, the possession of grit has been linked to academic success, with students exhibiting higher levels of grit demonstrating increased dedication to long-term objectives, resilience in overcoming setbacks, and an improved ability to navigate challenges (Chang, 2014; Duckworth et al., 2007; Duckworth & Seligman, 2005; Dumfart & Neubauer, 2016; Eskreis-Winkler et al., 2014; Gorin et al., 2023; He et al., 2021).

Research highlights the predictive power of grit in academic settings, showing its ability to forecast success just as reliable as traditional measures of talent or intelligence (Chang, 2014; Duckworth & Quinn, 2009; Eskreis-Winkler et al., 2014). Previous studies reveal that, despite the absence of a correlation with IQ, grit emerges as a superior

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predictor of academic success among high-achieving student samples (Duckworth et al., 2007; Duckworth & Seligman, 2005; He et al., 2021; Park et al., 2018). This is not only true for Western, educated, industrialized, rich, and democratic (WEIRD) countries, but research shows that these results are also replicable in rural Chinese schools (He et al., 2021). The study from 2021 shows that educational attainment is linked to both cognitive factors (general cognitive abilities like working memory and relational reasoning) as well as non-cognitive skills, often encompassing character attributes and personality traits like grit (He et al., 2021). This is crucial as international studies have shown that academic outcomes shape future schooling opportunities, job prospects, and income, thus emphasizing this relevance (Zax & Rees, 2002). It should be noted that grit is only a reliable predictor of academic success for students with average IQ and not for children with delayed cognitive development (He et al., 2021).

This principle extends beyond the realm of schools and is equally applicable to college students, where the possession of grit is positively linked to academic success (Chang, 2014; Duckworth et al., 2007; Wolters & Hussain, 2015). For this reason, some researchers argue that high school grades are better predictors of on-time college graduation than admission test scores since not only cognitive ability but also competencies around the regulation of self are required to succeed in tertiary education (Galla et al., 2019). According to this literature, both competencies are better depicted in high school grades than in admission tests, with grit as a requirement for successful self-regulation.

In the original grit study, Duckworth studied children and adults in challenging environments, researching what made them successful (Duckworth et al., 2007). Situated within the field of education and training, she revealed a positive correlation between grit and educational achievements, as evidenced by cadet retention in two classes at the United States Military Academy, West Point, and performance rankings in the National Spelling Bee.

Finally, grit plays an essential role not only for students but also for those who teach them (Robertson-Kraft & Duckworth, 2014). Teachers with higher grit levels demonstrated superior performance and lower midyear attrition rates compared to less gritty counterparts. Thus, grit is also known as a predictor for teaching effectiveness and, as a result, positive student learning outcomes.

2.1.3.2 Relevance in Business

Studies have investigated cognitive ability and personality traits not only in education but also within the domains of economics, management, and psychology. Research

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identified both components as potent indicators of economic outcomes, defined by wages and job assignment (Borghans et al., 2008).

The influence of grit goes beyond the academic sphere and extends into professional areas. Among adults, grit has been shown to be a predictor of goal attainment (Sheldon et al., 2015). Similarly, research investigating grit in the workplace reveals that individuals with a gritty mindset demonstrate elevated performance levels and an increased probability of achieving significant career milestones (Lee & Duckworth, 2018; D. A. Southwick et al., 2019; Suzuki et al., 2015).

Contrary to these findings, it must also be noted that other studies show no significant correlation between grit and career success (Clark & Plano Clark, 2019). The authors state that grit is necessary for success; however, it is not the only component required to be successful, as other cognitive and non-cognitive factors (e.g., social competence, leadership, ...) play an important role in career success (Clark & Plano Clark, 2019). Nevertheless, previous research seems to agree that individuals with high grit scores tend to work longer and put more effort into their work compared to people with lower grit scores, resulting in improved performances (Hogan & Larkin-Wong, 2013).

Since work engagement is considered a result indicator for work performance, the relationship between grit and work engagement has also been studied (Suzuki et al., 2015). Work engagement is mainly measured with the UWES (Utrecht Work Engagement Scale; Schaufeli et al., 2002) self-report questionnaire that surveys participants on positive emotions at work in three dimensions: vigor, dedication, and absorption (Schaufeli et al., 2002). The correlation between work engagement and grit does not seem consistent, as the strength of correlation has been measured to be moderate to low (J. Singh & Chopra, 2016; Suzuki et al., 2015). A later study showed that after controlling for demographic components (age, gender, education), work engagement was significantly predicted by meaningful work, consistency of interest, and perseverance (J. Singh & Chopra, 2018). This implies that in a business context, recruiting individuals with high grit levels might lead to increased work engagement when meaningful tasks are offered to them (J. Singh & Chopra, 2018). This might benefit not only the employer but also the employee, as studies show that Japanese individuals are most likely to be gritty when they seek happiness through meaning (Suzuki et al., 2015). At the same time, US people exhibit higher grit when pursuing happiness through engagement (Von Culin et al., 2014). In 2014, researchers suggested that differences in grit levels may partially arise from variations in their attitudes toward happiness. In this US study, grit displayed moderate connections with an orientation toward engagement, small-to-medium links with an

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orientation toward meaning, and small-to-medium (inverse) correlation with an orientation toward pleasure (Von Culin et al., 2014). The correlation of grit with an orientation toward meaning is higher than that of grit with an orientation toward engagement when Japanese people were studied (D. A. Southwick et al., 2019; Suzuki et al., 2015). These results imply that cultural background does seem to matter when investigating grit in the workplace, as also confirmed by a more recent cross-national study (Danner et al., 2020).

Continuing from the link between work engagement and grit, research also investigated how grit influences leadership performance (Caza & Posner, 2018). Leadership requires not only the ability to engage and motivate oneself but also to inspire and guide others toward shared goals (Furtner & Baldegger, 2016). Thus, gritty individuals might also make effective leaders, as the ability to set and pursue long-term goals, coupled with resilience, positively influences leadership effectiveness. This stable emphasis on long-term results mirrors the orientation towards the future that differentiates effective leaders (Ilies et al., 2006; Kouzes & Posner, 2006).

Leaders with high grit levels exhibit increased instances of applying role modeling and innovative actions (Caza & Posner, 2018). However, they engage less in inspiring behavior. Grit's impact on empowering behaviors is context-dependent, as it prompts leaders to empower others more in non-work settings but not in work-related situations. Individuals scoring higher grit levels tend to demonstrate a higher frequency in modeling and challenging behaviors, indicating that grit fosters leading by example and supporting others in challenging existing norms. However, there is no consistent correlation between grit and encouraging behaviors, suggesting that grit may play a more prominent role in the pursuit of personal goals compared to the role in interpersonal relationships (Caza & Posner, 2018).

Researchers further stated that the concept of grit, as well as the concept of positive leadership, are essential for exceptional performance. The findings of a study conducted in 2019 reveal a positive correlation, highlighting that perseverance has a more robust link than passion. Grit contributes to the variance in positive leadership, underscoring the importance of offering leaders developmental opportunities to strengthen both grit and positive leadership (Schimschal & Lomas, 2019).

In team settings, grit might contribute to a collaborative and determined approach to achieving collective objectives (Lee & Duckworth, 2018). This may start with recruiting gritty people who work with endurance towards a defined long-term goal, even in situations when setbacks arise. These individuals work towards short-term objectives, which

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support a high-level aim and provide direction and orientation. However, more than gritty employees are needed for a gritty organization. The goals and the passion of people contributing and working in the organization must be aligned, otherwise it might lead to a disorganized group of thriving individuals. For this reason, Lee and Duckworth (2018) argue that organizations should define a clear mission statement and prioritize mission alignment in the hiring process, assessing candidates for both skills, resilience, and values. Employees should then be offered a demanding and supportive work setting, which allows them to pursue their own and the organization's high-level goals.

Moreover, grit is also known as a predictor for retention (Credé et al., 2017). In military recruit studies, low grit levels were associated with increased attrition, while surgery residents with low grit levels in the United States were more inclined to consider withdrawal from their training program (Duckworth et al., 2007; Shakir et al., 2020). Retention is essential not only in the field of education (retention in higher education) but also in the workplace, allowing organizations to retain employees and their knowledge within the company (Credé et al., 2017). On the other side, it should be noted that grit might also enhance turnover in some cases, especially when the position or job is not aligned with the long-term goals of the respective individual (D. A. Southwick et al., 2019).

The capacity to maintain effort and concentrate on long-term goals emerges as a critical factor in the journey toward professional success, underscoring the importance of grit in shaping career paths (Eskreis-Winkler et al., 2014). All these findings are highly relevant for research as well as many practical application fields, as studies show that grittier individuals from different backgrounds (e.g., high-achieving population, sales representatives, students of high school, etc.) are successful and more likely to achieve their goals (Eskreis-Winkler et al., 2014).

2.1.3.3 Relevance in Personal Development and Relationships

Qualities like grit and resilience are viewed as routes to well-being (Clark & Plano Clark, 2019). A previous study investigated the relationship between subjective well-being, beliefs about well-being, and personality strengths with grit (Disabato et al., 2019). The results showed a positive relationship between these factors. In particular, perseverance and effort have been shown to have a strong correlation with grit across the globe. On the other hand, consistency of interests showed a weak link to grit (Disabato et al., 2019). This finding was also confirmed by a meta-analysis on grit, in which a significant association between life satisfaction and grit could be shown (Credé et al., 2017).

Research found that individual differences in grit may be a result of the difference in what makes humans happy. The three main categories or reasons for individual differences

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in grit are found to be “pleasure in immediately hedonically positive activities”, “meaning in activities that serve a higher, altruistic purpose” and “engagement in attention-absorbing activities” (Von Culin et al., 2014, p. 1). Grittier individuals are shown to be more likely to seek happiness through engagement and search for meaning. On the contrary, people who aim for pleasure in life are found to be less gritty (Von Culin et al., 2014).

Grit not only influences happiness but it also plays a vital role in individual growth and overall well-being (Credé et al., 2017). The capacity to sustain enthusiasm and persistence while striving for enduring objectives correlates with heightened life satisfaction and a profound sense of purpose. Individuals characterized by grit often encounter a more profound sense of contentment and achievement, thereby positively impacting their overall well-being (Credé et al., 2017).

The relationship between well-being and grit has been studied in association with the well-being of clinical residents in training to become surgeons (Salles et al., 2014). The data illustrates that grit is a predictor of later psychological well-being when measuring the risk for burnout (Maslach Burnout Inventory; Maslach et al., 1997) and general well-being (Psychological General Well-Being Scale; Dupuy, 1984). The individuals at risk for experiencing poor psychological well-being in the future might be identified by assessing the grit score and, thus, enabling preventive measures and additional support.

In line with this research, also a relationship between low perseverance and increased depressive symptoms (including suicide proneness) has been identified (Dvorak et al., 2013). Moreover, grit has been shown to be negatively correlated with fear and sadness (Sheridan et al., 2015). Research also found that the concepts of grit, positive affect, happiness, and life satisfaction are significantly positively correlated (K. Singh & Jha, 2008). Happiness, grit, and life satisfaction were negatively associated with negative affect (K. Singh & Jha, 2008). Grit nurtures resilience, empowering individuals to recover from setbacks and failures (Calo et al., 2019; Duckworth, 2017; Shakir et al., 2020; Stoffel & Cain, 2018). Gritty individuals exhibit a mindset marked by a commitment to overcoming challenges, extracting lessons from experiences, and adjusting to evolving circumstances. This resilience proves especially beneficial in navigating the uncertainties of life.

Initial research further suggests that grit has effects on physical health (Gorin et al., 2023). The research by Gorin and colleagues was conducted on weight management and healthy habits in association with self-control and grit. The results show that self-control and grit increased throughout the treatment and were linked to more frequent

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self-weighting habits within half a year. Only grit correlated with maintenance of weight loss, thus indicating that the factor might influence behavioral habits related to health.

Lastly, the effect of retention is also relevant in interpersonal relationships in private life. Persistence in marriage has been investigated in a study in which the overall association between grit and marital status has been examined (Eskreis-Winkler et al., 2014). The results showed a notable interaction between grit and gender, indicating that grit increased the likelihood of marital stability by 17% in men, while it did not have a similar effect for women.

Backed by robust empirical evidence, Duckworth's research, supported by many other researchers, has positioned grit as a valuable predictor of success, transcending traditional measures of talent and intelligence (Duckworth et al., 2007; Eskreis-Winkler et al., 2014; Robertson-Kraft & Duckworth, 2014; D. A. Southwick et al., 2019; Von Culin et al., 2014). As the exploration of grit continues, its practical implications for education, workplace and personal development underscore its enduring relevance in understanding the factors that drive exceptional achievement.

2.1.4 Measurement of Grit

Grit is commonly assessed through self-report measures, with the most widely used instrument being the Grit Scale, developed by Duckworth and colleagues (Duckworth et al., 2007). The scale comprises a two-factor structure based on the original 12-item self-assessment to measure the degree of grit. Participants rate their agreement with statements related to these dimensions, usually on a five-point Likert scale, and the cumulative score provides a quantitative measure of an individual's level of grit.

In 2009, this measurement of grit was investigated by Duckworth and Quinn, and the items with the highest overall validity were identified. Internal consistency, test-retest stability, consensual validity, and predictive validity have been examined in this research. This validation study used four diverse samples: West Point cadets from the class of 2008 ($n = 1,218$) and class of 2010 ($n = 1,308$), finalists in the 2005 Scripps National Spelling Bee ($n = 175$), and Ivy League undergraduates ($n = 139$). Through item-level correlations with outcomes such as retention in West Point, performance in the Scripps National Spelling Bee, and academic achievement, four out of twelve items from the initial Grit-O survey were eliminated. While the first sample group was used to identify the items for the shorter scale, the second study tested the factor structure and predictive validity. Study three validated an informant version, while study four measured test-retest stability over one year. Lastly, two more studies examined predictive validity in

specific samples. The result of this study is a more efficient measure for grit, which still retains the two-factor structure but was shortened and now includes eight items (Duckworth & Quinn, 2009).

The demonstrated increase in predictive validity of grit across diverse domains of mental and physical performance underscores its independence from inherent ability (Duckworth, 2017; Duckworth et al., 2007; Duckworth & Quinn, 2009; D. A. Southwick et al., 2019).

2.1.5 Cultivation of Grit

Grit is important to the journey of learning and improving skills, emphasizing the dedication to mastering abilities or gaining knowledge over a prolonged duration (Duckworth, 2017; Duckworth et al., 2007; Von Culin et al., 2014). As this is a desirable trait for many, the question of how to develop grit arises naturally (Duckworth, 2017).

Although less light has been shed on the sources and the cultivation of grit, some researchers also studied how grit can be fostered and grown in people (Duckworth, 2017). In her book, Duckworth (2017) differentiates between internal factors (“Growing grit from the inside out”) and external factors (“Growing grit from the outside in”) that help in becoming or developing a grittier individual (p. 111). Duckworth (2017) theorizes that individuals exhibit grit when possessing four psychological assets: purpose, practice, interest, and hope. These attributes, which can be nurtured by parents, teachers, and employers, collectively contribute to sustained effort and determination. Purpose serves as a motivational impulse, driving individual achievement as well as organizational success. The concept of ‘practice makes perfect’ underscores the importance of continuous improvement and skill acquisition. Interest, associated with passion, involves pursuing activities aligned with one's desires or goals. Lastly, hope reflects confidence in one's abilities, which is crucial for overcoming challenges.

According to Duckworth, cultivating grit in oneself involves developing and reinforcing key internal characteristics that contribute to sustained passion, perseverance, and resilience (Duckworth, 2017). Some of the activities suggested by her include self-reflection on interests and long-term aspirations, the clarification of values and the alignment of goals with these guiding principles, setting achievable but challenging goals, encouraging positive and constructive self-talk to foster a resilient mindset as well as the belief that abilities and intelligence can be developed through dedication and hard work (Duckworth, 2017). A study in 2014 showed that students exhibit greater grit when prompted to contemplate their life's purpose (Yeager et al., 2014).

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In her book, Duckworth further explains how to grow these psychological assets in children and thus grow it from the outside in (Duckworth, 2017). Parenting for grit involves creating an environment that supports the development of passion, perseverance, and resilience in children. Examples listed include encouraging passionate interests, setting high expectations encouraging to strive for continuous improvement, providing emotional support to navigate challenges, or breaking down larger goals into manageable steps.

This is especially important since research showed that grit grows substantially in early childhood and is influenced by parents' backgrounds (Sutter et al., 2022). Studies indicate that grit is significant for success across generations, as the grit of parents can impact their children's grit and thus might also influence their (academic) success (Joy et al., 2020). Another study showed that the evaluation of parents of their child's grit aligns with their child's observed behavior. The educational background of the parents was also shown to be a determining factor in shaping their child's capacity for perseverance (Sutter et al., 2022). This result was confirmed in 2023, showing that parenting approaches and family environment influence the individual development and growth of grit (Du et al., 2023). Thus, nurturing grit within families and communities has the potential to foster a beneficial cycle of persistence and achievement (Du et al., 2023; Joy et al., 2020; Sutter et al., 2022).

Literature also comprises studies in the field of education. Researchers conducting a cross-sectional analysis determined that students perceiving a mastery goal orientation in their schools demonstrated increased grit and achieved higher report card grades (Park et al., 2018). On the contrary, those perceiving a performance goal orientation exhibited lower grit levels and earned inferior grades. The study concludes that schools emphasizing the inherent value of learning facilitate lasting interest and effort toward long-term goals as well as the development of passion, thus laying the foundation for academic success.

Likewise, a reciprocal relationship between grit and a growth mindset has been found, suggesting that behavior influences beliefs and vice versa. This dynamic is displayed not only in adolescents but already from a very early age (elementary school), as evidenced in studies (Park et al., 2020; Zhang et al., 2022). These results indicate that while growing up, grit and a growth mindset are separate concepts yet mutually supportive of each other (Park et al., 2020). A study conducted among 180 children between four and six years old demonstrated that adopting an outsider's perspective on one's behavior can enhance perseverance, even when enjoyable interferences are present (White et al., 2017). Adopting the role of a different character (role play) had notable impacts on the

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level of perseverance observed. Bringing back one's wandering attention and applying self-regulatory skills to focus at the assigned task is an important ability for school achievement and professional success. This study found that the act of mentally distancing oneself from a situation assists children in maintaining perseverance despite entertaining distractions, which may help them in future and enable them to attain achievements (White et al., 2017).

A study among college students in North America examined positive affect and commitment to a purpose as two potential determinants of grit (Hill et al., 2016). Findings reveal that grit is associated with higher levels of positive affect and purpose commitment, with purpose being a more influential predictor over time. However, the long-term investigation showed that only purpose is a valid predictor for grit. In essence, the evidence suggests that possessing a clear life direction based on a purpose helps individuals to develop the abilities required to achieve their personal goal. Thus, purpose may be more influential than positive affect in forecasting the development of grit over the course of a college semester.

Focusing on the cultivation of grit in the workplace, a study emphasized the need to consider both individual and situational aspects in behavioral analysis (D. A. Southwick et al., 2019). Therefore, the authors of the article "Grit at Work" identified organizational features that encourage passion, perseverance, or both. Examples given in the study comprise ideas around leadership, culture, and job design, which can encourage grit at the workplace. Firstly, leadership responsibilities encompass motivating individuals to contribute their highest effort to organizational goals. One of the most obvious ways to do so is by leading by example and inspiring others to become gritty as well. Leaders might increase grit in individuals by setting demanding goals while still being supportive along the way. In essence, leaders need to combine motivating visions with practical strategies to drive the attainment of goals effectively. Secondly, the concept of organizational culture, encompassing workplace values and norms, is essential to understanding grit and its influence on employees. Organizational environments that cultivate grit are often marked by a firm agreement on shared values and norms, coupled with a profound commitment to these principles. This is especially true for cultures that prioritize adaptability and advocate for a mindset focused on growth. Thirdly, job design could foster passion when aligning an employee's personal values with the job and, at the same time, could enhance perseverance when offering continuous learning and development. Measures in job design that might be taken are task variety, necessary expertise, and social elements. Finally, Southwick et al. recommended prioritizing specialization rather

than job rotation to facilitate the cultivation of advanced skills and to uphold lasting motivation.

Dweck argued that a growth mindset (see Chapter 2.3 Implicit Theory of Intelligence) might be a crucial factor in developing grit (Dweck, 2017). In fact, the two ideas of grit and growth mindset might be pretty similar to each other, as “Grit is not just having resilience in the face of failure, but also having deep commitments that you remain loyal to over many years” (Perkins-Gough, 2013, p. 14). Several researchers explored the relationship between grit, growth mindset, and learning/academic success in school. The results indicate that grit is associated with higher engagement and better grades in school (Hochanadel et al., 2015; Park et al., 2020; Zhang et al., 2022). However, a growth mindset in earlier school years does not serve as a predictor for grit (Tang et al., 2019). Another study also found that there is a significant relationship between passion, grit, and mindset. The most robust relationship is noted between passion and grit, while the relationship between grit and mindset is also significant but less distinct (Sigmundsson et al., 2020, p. 4).

2.1.6 Limitations of Grit

Despite the vast research on grit, there are also critical voices concerning the grit framework and the grit approach. While grit has gained importance for its association with achievement and success, a detailed examination of its boundaries and potential constraints is essential to develop a comprehensive understanding of its applicability and effectiveness (Credé et al., 2017).

Many years after the initial research on grit, Duckworth et al. (2019) investigated the cognitive and noncognitive predictors of success. The study shows that cognitive and noncognitive determinants of achievement are independent of each other. While cognitive ability is a very good predictor of academic success, grit is a modest predictor of academic success. However, grit was the only reliable predictor for sustaining the initial and intense training and, thus, more prognostic of other achievement outcomes. Nevertheless, the largest effect sizes were noted for the forecast of academic and physical performance in a military school by cognitive and physical ability (Duckworth et al., 2019).

Further, a study by Zisman and Ganzach in 2021 investigated cognitive and non-cognitive determinants of achievement and found that intelligence contributes significantly more to academic and professional success than grit. The same is true for the factor conscientiousness of the Big Five Model, although the effect is less distinct than intelligence. The authors suggest that this might be the case due to the previous studies not

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examining a representative group of the general population (Zisman & Ganzach, 2021). This finding is supported by He et al. (2021), who propose that IQ and grit are both positively associated with academic success, but cognitive ability has a substantially higher link with academic achievement. Evidence from rural China suggests that both IQ and grit serve as predictors of academic achievement. However, the same study suggests that grit is not linked with achievement gains among students with low intelligence quotient test results. This finding proposes that grit does not lead to academic attainments for students with delayed cognitive ability (He et al., 2021). This is contrary to the findings of an earlier study in 2019, which reasons that grit compensates for students with low cognitive ability (Light & Nencka, 2019). He et al (2021) consider different test instruments, differences in the sample groups and different outcome measures (academic attainment vs. learning gains) as potential reasons for the contradicting results.

Traits such as grit, framed as psychological strengths, may be culturally influenced as they are rooted in the values and beliefs of a specific cultural context (Disabato et al., 2019). Some authors argue that grit research has been conducted mainly in Western, educated, industrialized, rich, and democratic (WEIRD) countries (Disabato et al., 2019). Thus, the sample may be very homogeneous. Concepts like grit might be affected by local culture, as psychological strengths are influenced by the values and beliefs of the environment and community in which a person lives. The study of Disabato et al. confirms the overall existence of grit in individualistic nations but not in collectivistic nations. A more recent meta-analysis (Lam & Zhou, 2022) showed that grit is positively correlated with student's academic success, irrespective of the individuals' sociocultural backgrounds. No difference was found between individualistic and collectivistic cultures as defined by Hofstede (1980).

In 2017, research with an international sample of individuals from various continents depicted a higher correlation between sub-scale perseverance of effort with well-being and personality strengths compared to overall grit (Disabato et al., 2019). Similarly, a meta-analytic synthesis of grit raised the limitation that the sub-scale perseverance of effort shows a substantially greater accuracy compared to the component related to consistency of interest. For this reason, the authors (Vazsonyi et al., 2019) question if the main validity of grit is found in the perseverance sub-scale. The two sub-scales, perseverance of effort and consistency of interest, are found not to represent unique dimensions within a cohesive construct. Instead, the findings of this study suggest that these factors may be a result of how the items are phrased with regards to positive or negative wording, calling for a unidimensional construct (Vazsonyi et al., 2019).

Furthermore, the study indicates that efforts to improve grit through different measures might yield minimal effects on outcome and achievement (Credé et al., 2017). Related to this limitation is the question of true distinctiveness of grit compared to other constructs. An analysis by Vazsonyi et al. suggests that self-control overlaps considerably with grit and is just as reliable in predicting long-term goal attainment. They concluded that they found no evidence for the distinctiveness of grit compared to self-control (Vazsonyi et al., 2019).

These limitations point toward the nuanced and context-dependent nature of grit, urging future research to delve deeper into these complexities for a more comprehensive understanding (Credé et al., 2017; Disabato et al., 2019).

2.2 Self-Leadership

Numerous definitions exist within the domain of leadership, demonstrating the various perspectives related to this concept (Stogdill, 1974). The distinctions among these definitions often vary significantly (Yukl & Van Fleet, 1992). Nevertheless, Yukl and Can Fleet found a prevailing theme that connects most interpretations, presenting leadership as a process in which deliberate influence is applied to guide, organize, or facilitate activities and relationships within groups or organizations. This shared understanding emphasizes the dynamic nature of leadership, highlighting its role in steering, organizing, and facilitating collective initiatives.

Self-leadership is an extension of the self-management approach and describes different strategies for how an individual may influence their own communication, thinking, and behavior to move towards a defined goal (Furtner & Baldegger, 2016). Around 40 years ago, management research changed direction, moving from supervisor and leader influence to the approach of focusing on how people manage and lead themselves (Manz & Sims Jr, 1980). This might be done by means of self-reflection, self-evaluation, and self-motivation. Researchers often argue that self-leadership is the basis for effective leadership of others, as an individual needs to influence him- or herself first (Furtner & Baldegger, 2016; Sims & Manz, 1991).

2.2.1 Definition of Self-Leadership

In 1986, Manz, who originally introduced the concept of self-leadership, defined it 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, p. 589). Thus, the concept of self-

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leadership aims to differentiate between the various aspects of self-influence (Manz, 1986).

Likewise, Neck and Houghton describe self-leadership as “a process through which individuals control their own behavior, influencing and leading themselves through the use of specific sets of behavioral and cognitive strategies” (2006, p. 270). The activities performed and strategies applied in self-leadership are intended to impact personal effectiveness positively (Neck & Houghton, 2006). Thus, self-leadership proposes that the individual controls his or her actions, although external forces might influence the situation (Manz, 1986). As shown in Figure 1 (Stewart et al., 2011), Manz argues that the individual regulates him- or herself by perceiving the current situation at hand (Cognition; left box in Figure 1) and comparing it with the desired state (Cognition; top box in Figure 1). This desired state might be an external or internal standard or norm that defines an individual’s goal for an activity or performance and can thus fulfill a primary control function (Manz, 1986, p. 590). Then, the identified discrepancy is addressed by the required behavior to reduce the gap (Behavior; right box in Figure 1). Subsequently, the impact on the situation is performed, and the environment reacts (Environment; bottom box in Figure 1). This process is continuous, and the feedback received is incorporated iteratively. Thus, the activities are monitored constantly to ensure the desired outcome is approached effectively (Manz, 1986; Stewart et al., 2011).

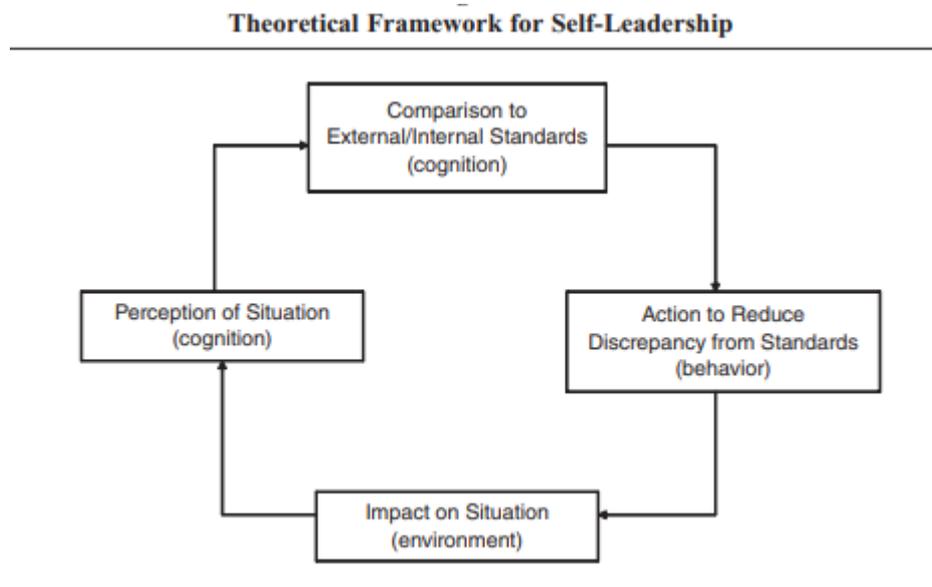


Figure 1: Theoretical Framework for Self-Leadership from Manz (1986); Figure from Stewart et al. (2011, p. 187)

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Therefore, the process of self-leadership involves applying a combination of systematic sets of strategies that enable individuals to regulate their behavior and use self-influence, facilitating the attainment of desired outcomes and behaviors (D'Intino et al., 2007).

The goal of the self-leadership theory is to broaden the perspective of self-management and to investigate beyond discipline and a rigid self-management process (Stewart et al., 2011). Houghton and Neck (2002) state that self-leadership is based on behavior-focused strategies, which include self-regulation, self-control, and self-management. However, in addition, cognitive-oriented strategies developed from intrinsic motivation theories, social cognitive theory, and positive cognitive psychology are also used. Thus, self-leadership draws upon behavioral and cognitive strategies and aims to achieve individual performance outcomes (Houghton & Neck, 2002).

Literature divides these self-leadership strategies into three main categories, including behavior focus strategies, natural rewards strategies, and constructive thought strategies (Neck & Houghton, 2006). These three strategies are further elaborated in Chapter 2.2.4.

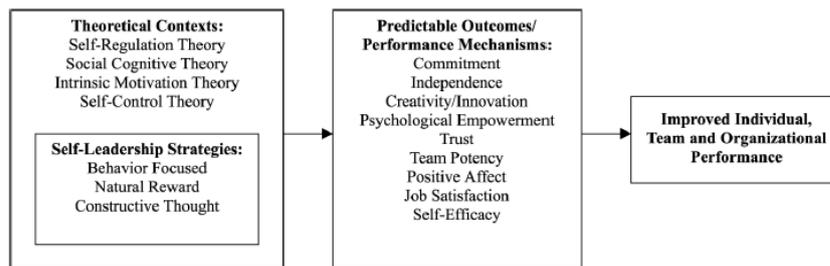


Figure 2: A model of self-leadership theoretical contexts and performance mechanisms from Neck & Houghton (2006, p. 285)

The illustration from Neck and Houghton (Figure 2) summarizes the concept. The authors suggest that the construct of self-leadership is embedded in the theoretical context of self-regulation theory, social cognition theory, intrinsic motivation theory, and self-control theory. When individuals apply self-leadership strategies (see Chapter 2.2.4.), this may lead to predictable outcomes and performance mechanisms (see Chapter 2.2.3). According to the authors, these outcomes may result in improved performances on individual as well as organizational level (Neck & Houghton, 2006).

2.2.2 Delimitation from other concepts

Although self-leadership might often sound similar to other theoretical and conceptual theories, literature has clearly distinguished it from related concepts (Furtner et al., 2015; Neck & Houghton, 2006), which are summarized in this sub-chapter.

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First, the delimitation of self-leadership and leadership is crucial. Contrary to leadership, which focuses on influencing others, self-leadership emphasizes influencing an individual's internal processes (Furtner, 2017; Furtner et al., 2015).

Second, self-leadership is also to be differentiated from self-management (Manz, 1991). While self-management-strategies refer to '*how*' an individual conducts a task to meet external goals and standards, self-leadership-strategies define '*what*' tasks should be done, '*why*' this is the case, and '*how*' the task is performed (Manz, 1991). Self-management does not shed light on what work should be done and why – this highlights the dependence on external motivation and emphasis on behavior (Manz, 1991; Stewart et al., 2011). On the other hand, in self-leadership, the '*what*' and '*why*' are also relevant, which leads to the inclusion of intrinsic motivation and draws attention to cognitive processes (Manz, 1991). Thus, self-leadership goes beyond the extrinsic motivation of self-management. Nevertheless, external motivators might play a vital role in self-leadership (Stewart et al., 2011). The definition of self-leadership also includes the influence on one's own internal processes and the objective of cultivating self-motivation and self-control, which are essential for achieving optimal performance (Neck & Manz, 2010; Sims & Manz, 1991). According to research (Manz, 2015), the more an individual engages in self-leadership rather than self-management, the less externally influenced the behavior would be.

Although the concept of self-leadership emerged from the research field of self-management and self-control, like self-management, self-control also needs to be distinguished from self-leadership (Stewart et al., 2011). Self-control is more discipline-oriented and focuses on self-influence strategies, which aim to diminish undesired behavior and enhance the behavior that is wanted. Self-leadership differentiates itself from self-control through higher-level standards that allow for influence on one's own processes by applying intrinsic motivation (Stewart et al., 2011).

Further, self-regulation theory displays close conceptual similarity to behavior-focused strategies of self-leadership, as it proposes that individuals have the ability to monitor, manage, and adapt their thoughts, emotions, and behaviors to achieve desired goals (Furtner et al., 2015). However, self-regulation processes are typically automatic and unconscious, while self-leadership is performed voluntarily and with full awareness (Furtner et al., 2015).

Lastly, need for Achievement (nAch) is a psychological concept suggesting that individuals possess an inherent desire to strive for success, achieve challenging goals, and

attain a sense of accomplishment (Furtner et al., 2015). Compared to self-leadership, nAch is a stable disposition, while self-leadership is suggested to be learnable.

Self-efficacy is a related but distinguishable concept to self-leadership. This is further elaborated in Chapter 2.4.3.

2.2.3 Relevance of Self-Leadership

Self-leadership holds significant relevance in various domains, encompassing personal development, professional success, and overall well-being (Neck & Houghton, 2006). Although most research has been conducted in the context of workplace and work performance, some researchers also examined self-leadership in the educational sector (Houghton, Wu, et al., 2012; Maykrantz & Houghton, 2020; Napiersky & Woods, 2018; Won, 2015), which will be presented in the following chapter.

2.2.3.1 Relevance in Business

The original and initial literature (Manz, 1986) found that self-leadership contributes positively to employee enthusiasm, commitment, and performance. During the last decades of research on the field of self-leadership, researchers have been able to shed more light on this topic from different angles and found many practical implications (Neck & Houghton, 2006). Those application topics include but are not limited to performance appraisals, organizational change, innovation, entrepreneurship and job satisfaction (Neck & Houghton, 2006).

Neck and Houghton (2006) argue that self-leadership leads to improved performances across different spheres (see chapter 2.2.1). This result was replicated in several studies that showed a positive relationship between self-leadership skills and individual performance (Andressen et al., 2012; Hauschildt & Konradt, 2012; Prussia et al., 1998). Likewise, Stewart, Courtright, and Manz (2011) published a literature review analyzing research from 30 years and found that higher self-leadership is associated with improved work performance for individuals. This result could not be replicated on a team level and is only valid on an individual level (Stewart et al., 2011).

In Neck & Houghton's study, they collected previously conducted research and showed that self-leadership is associated with predictable outcomes like commitment, job satisfaction, and psychological empowerment (Neck & Houghton, 2006). In 2006, the authors summarized that those who practice self-leadership frequently cultivate a profound sense of ownership over their work responsibilities, which leads to greater commitment to objectives, colleagues, and employers (Houghton & Yoho, 2005; Manz & Sims, 2001; Neck & Houghton, 2006). These findings are underlined by more recent research from

2021 and 2023, which shows that self-leadership is positively correlated with work engagement, commitment, and overall performance (Inam et al., 2023; Knotts & Houghton, 2021).

Expanding on the positive correlation between self-leadership, work engagement, commitment, and overall performance, it is evident that self-leadership plays a pivotal role not only in these aspects but also in fostering innovative behavior. Carmeli et al. (2006) found that self-leadership is essential also for innovative behavior: the set of the three complementary cognitive and behavioral strategies explained in Chapter 2.2.4 is positively associated with self and supervisor rating. Further research supports these findings, as they argue that people with strong self-leadership skills consider themselves more innovative and creative (DiLiello & Houghton, 2006, p. 319). Studies from 2011 and 2015 emphasize these findings by delivering more evidence for the positive relationship between self-leadership and individual innovation (Gomes et al., 2015; Kalyar, 2011).

Self-leadership not only benefits organizational success through higher commitment, performance, and innovation but also contributes to employees' overall job satisfaction and well-being (Neck & Houghton, 2006). Further empirical research demonstrated that the behavioral-focused strategies applied in self-leadership are significantly positively related to job satisfaction, which also leads to increased team performance (Politis, 2006). However, a study by Roberts and Foti raises the importance of person and situation combination, as the fit between person and environment might influence the interaction between self-leadership and job satisfaction (Roberts & Foti, 1998).

In a fast-moving world with information widely available, driven by technology and globalization, a more decentralized approach to leadership might be a competitive advantage due to faster decision-making and better knowledge-sharing opportunities (Scheuer et al., 2023). Instead of top-down structures, employees might have to take over more responsibility and contribute to making decisions (Norris, 2008, p. 43). This implies that the concept of self-leadership most likely still remains relevant.

2.2.3.2 Relevance in Education

Although less research has been conducted on self-leadership in the educational sector, some researchers have tapped into this field. A study from 2018 reported that self-leadership or employing specific strategies that belong to self-leadership could predict academic achievement among university students (Napiersky & Woods, 2018).

Further, studies among college students were conducted to investigate the role of self-leadership with regards to stress management and coping skills. The findings suggest

that engaging in self-leadership strategies could potentially reduce stress levels among students (Maykrantz & Houghton, 2020). In line with this result are studies at universities that propose the strategies of self-leadership are positively correlated with coping skills (Houghton, Wu, et al., 2012; Won, 2015).

To sum up, self-leadership is highly relevant for theory and practice, as studies found that high self-leadership skills are essential for enhancing innovative behavior in companies and individual performance in work and educational development (Furtner & Baldeger, 2016; Carmeli et al., 2006; Neck & Houghton, 2006; Napiersky & Woods, 2018).

2.2.4 Self-Leadership Strategies

Literature divides self-leadership strategies into three main categories, including behavior focus strategies, natural rewards strategies, and constructive thought strategies (Manz & Sims, 2001; Neck & Houghton, 2006, p. 271 f).

2.2.4.1 Behavior Focused Strategy

Behavior-focused strategies aim to increase self-awareness to manage one's own behavior towards a desired outcome (Neck & Houghton, 2006). These behavior-focused strategies include tasks like self-observation, self-goal setting, self-reward and self-correcting feedback (Houghton, Wu, et al., 2012; Houghton & Neck, 2002; Neck & Houghton, 2006). The goal is the enhancement of fruitful behavior and the removal of unfavorable actions (Neck & Houghton, 2006).

Self-observation is the foundation for optimizing the own behavior and changing towards a preferred way of acting (Houghton, Dawley, et al., 2012; Neck & Houghton, 2006, p. 271 f). Next, self-set goals in combination with self-set rewards contribute substantially to raising the efforts needed to achieve a goal. Self-correcting feedback contains self-examination to shift one's behavior towards productive outcomes. Self-punishment is mostly counterproductive and criticism should therefore be positively framed, as otherwise it might influence the performance negatively (Houghton, Dawley, et al., 2012; Neck & Houghton, 2006, p. 271 f).

Lastly, environmental influences (e.g., lists and notes) might help individuals to keep the focus (Houghton, Dawley, et al., 2012).

2.2.4.2 Natural Reward Strategy

Natural reward strategies create situations where individuals are motivated by pleasant aspects of the task at hand (Houghton, Dawley, et al., 2012; Neck & Houghton, 2006).

This can be achieved either by providing enjoyable features to a given task or by shaping perceptions and focusing on more rewarding aspects.

In other words, an individual might build pleasant features into a task, or one might withdraw attention from unpleasant aspects of work (Manz & Sims, 2001). The natural reward strategy builds upon intrinsic motivation, where rewards come naturally through enjoyable aspects of activities (Manz & Sims, 2001; Neck & Houghton, 2006).

D'Intino et al. summarize "natural reward strategies are designed to help create feelings of competence and self-determination, which in turn energize performance-enhancing task related behaviors" (2007, p. 107).

2.2.4.3 Constructive Thought Strategy

The constructive thought pattern strategies apply beliefs and assumptions that help the individual with desired performance achievements (Houghton, Dawley, et al., 2012; Neck & Houghton, 2006; Neck & Manz, 1992). The mental processes and optimistic thinking patterns can influence the individual performance positively. One dimension of constructive thought pattern strategies is self-talk, which refers to an internal dialogue or the stream of thoughts that individuals have with themselves and may involve messages, evaluations, instructions, and reactions (Houghton & Neck, 2002; Neck & Manz, 1992).

Dysfunctional beliefs should be replaced by positive habitual ways of thinking (Burns, 1980, Ellis, 1975 as cited by Houghton et al., 2012), while positive self-talk and constructive mental imagery are emphasized and should be performed (Houghton, Dawley, et al., 2012). This might be done by visualizing successful performances or by optimistic self-talk before a task is executed (Neck & Houghton, 2006; Sims & Manz, 1991).

2.2.5 Measurement of Self-Leadership

Self-Leadership has previously been measured frequently using the self-leadership questionnaire (SLQ) (Houghton, Dawley, et al., 2012). While Cox (1994) developed a questionnaire with 34 items to assess self-leadership, the unrestricted factor analysis resulted in a shorter eight-factor solution. This shorter version comprises self-problem solving initiative, efficacy, teamwork, self-reward, self-goal setting, natural rewards, opportunity thought, and self-observation/evaluation (Cox, 1994).

Later, Anderson and Prussia (1997) developed an alternative with 50 items, which was reduced to ten factors, from which six factors represent the self-leadership behavior focused strategies, one factor depicts the natural reward strategies, and three factors evaluate constructive through pattern strategies. Building upon the work of Anderson and

Prussia, the authors Houghton and Neck presented the revised Self-Leadership Questionnaire (RSLQ) (Houghton & Neck, 2002). The original version as well as the translated versions demonstrated good reliability and validity, also across a variety of national cultures (Houghton, Dawley, et al., 2012).

In 2012, the Revised Self-Leadership Questionnaire has been abbreviated, as a long questionnaire frequently leads to fatigue and inaccuracy for respondents (Houghton et al., 2012). The results presented a scale with nine items, which displays a shorter but still reliable and valid measure of self-leadership.

2.2.6 Limitations of Self-Leadership

While self-leadership holds promise in fostering personal achievement, it is not without limitations. The most prominent criticism of self-leadership is the conceptual overlap with classic theories of motivation and a lack of clear distinction (Neck & Houghton, 2006). In addition to the classic theories of motivation like self-regulation, also other existing psychological constructs, like the personality dimension of conscientiousness, are mentioned to be very similar and limit the uniqueness of self-leadership (Neck & Houghton, 2006). However, Neck and Houghton argue that self-leadership is a normative model and thus focuses on 'how' tasks are performed. Unlike descriptive or deductive theories, normative models seek to provide guidance for operative processes.

It should further be noted that researchers found that the national culture influences the understanding of the concept of self-leadership (Alves et al., 2006, p. 356). Even though the general concept of self-leadership is a valid concept, Hofstede's (1980) cultural dimensions of power distance (uncertainty avoidance, collectivism, masculinity, and long-term orientation) have been shown to affect the understanding and application of self-leadership. A meta-analysis from 2021 indicates that that self-leadership yields stronger job performance, job satisfaction and commitment in cultures characterized by high power distance (Harari et al., 2021). Although Hofstede (1980) defined six cultural dimensions, the dimension of power distance has received most attention in the context of self-leadership. This is since power distance is probably most crucial for understanding self-leadership and the strategies applied in practice (Stewart et al., 2011)

Thus, while self-leadership offers valuable tools for academics as well as applied practice, acknowledging and addressing these limitations is crucial for optimizing its benefits.

2.3 Implicit Theory of Intelligence (Dweck et al., 1995)

The most extensively examined implicit theories of Dweck in research refer to intelligence, morality, and one's overall character. They are called 'implicit' as the beliefs are hardly ever articulated explicitly (Yeager & Dweck, 2012). Implicit theory of Intelligence (ITI), as conceptualized by Carol Dweck, represents a fundamental framework for understanding individuals' beliefs about their own abilities, one's own intellectual capacity, and the nature of intelligence (Dweck, 1999, 2013; Dweck et al., 1995).

Rooted in decades of research, Dweck's work distinguishes between two primary mindsets: the fixed mindset and the growth mindset (Dweck, 2006). This two-part division in self-theory has profound implications for learning, motivation, and resilience, shaping individuals' efforts and responses to challenges, and thus, ultimately influencing one's path to success (Dweck, 1986).

2.3.1 Definition of Fixed and Growth Mindset

Mindsets can be defined as people's beliefs about the nature of human attributes (Dweck, 1986, p. 615). Dweck suggests that humans develop beliefs that help comprehend the environment we live in and how we react to the actions of people around us (Dweck, 2006).

The research of Carol Dweck distinguishes between two different kinds of mindsets: fixed and growth mindset. This concept is also referred to as entity theory (fixed mindset; intelligence is fixed) and incremental theory (growth mindset; intelligence is malleable). It is built upon the hypothesis that people make assumptions about the malleability or stability of human attributes (Dweck, 1986; Dweck et al., 1995).

On the one hand, individuals with a fixed mindset believe that human attributes are permanent and do not change. They view intelligence as inherent (Dweck, 2006). As Dweck explains in her article: "Some students are smart and some are not, and that's that." (2010, p. 26). On the other hand, individuals with a growth mindset believe in change and improvement through effort. They think it is possible to become more intelligent by working harder, practicing, and learning more (Dweck, 2006). As an example, Dweck says "A growth mind-set doesn't imply that everyone is the same or that anyone could be Einstein, but it does imply that everyone's intellectual ability can grow—and that even Einstein wasn't Einstein before he put in years of passionate, relentless effort" (2010, p. 26).

As described in a review of implicit theories, many different terms in this field have been used interchangeably across different fields of literature in academics and popular literature (Lüftenegger & Chen, 2017). Terms like 'implicit theories', 'implicit beliefs', 'worldviews', 'mindsets', 'self-theories' and 'meaning systems' describe the same thing.

2.3.2 Relevance of Fixed and Growth Mindset

Previous studies have demonstrated that the mindset plays a significant role in motivation and achievement (Dweck, 2006). This is due to the suggestion that the belief about malleability of intelligence substantially effects one's approach towards challenges, effort and as a result also accomplishment.

Research indicates that individuals with a fixed mindset often shy away from challenges, limiting their opportunities and avoiding risks to prevent the exposure of potential weaknesses (Dweck, 2006; Dweck et al., 1995). This often results in the feeling of helplessness when facing personal setbacks. Conversely, those with a growth mindset actively pursue challenges and often display mastery-oriented reactions when confronted with setbacks.

In line with this research, having a growth mindset has been associated with coping-oriented responses to challenges and well-being (Dweck, 2009; Dweck et al., 1995).

However, it is essential to note that mindsets can change when persons recognize the importance of these theories. Thus, an individual with a fixed mindset can develop towards a growth mindset (Dweck, 2006). In an article, Dweck cautions about common misperceptions about mindsets, pointing out that most people have both, a fixed as well as a growth mindset depending on life situations (Dweck, 2016).

2.3.2.1 Relevance in Education

In a meta-analytic review of implicit theories of intelligence and academic achievement, researchers found that individuals holding a growth mindset (incremental theorists) tend to have better academic outcomes in verbal and quantitative subjects as well as in overall achievement (Costa & Faria, 2018). However, the association between ITI and the academic outcomes of students was low to moderate. The study further suggests that there is a difference in cultural background. Students from Asia and Oceania showed a positive relationship between growth mindset and achievement, whereas European students presented a positive association between fixed mindset and achievement. Lastly, students from North America reported a negative link between fixed mindset and academic achievement.

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Research illustrates that embracing the notion of fixed and unchangeable intelligence may cause students to perceive academic challenges as indicators of potential intellectual shortcomings (Yeager & Dweck, 2012). This might lead to self-perceptions of being 'dumb' or fearing that others might view them as such (Yeager & Dweck, 2012). This finding about failure concern is in line with the individual's self-reports on higher procrastination behavior and more unfavorable school feelings (Mouratidis et al., 2017; Rickert et al., 2014; Troche & Kunz, 2020). Contrary to that, students who embrace a growth mindset exhibit increased academic success even during demanding school transitions (Yeager & Dweck, 2012).

These results propose that encouraging a growth mindset in children benefits all children. However, research shows that this is even more relevant for stereotyped groups (Aranson et al., 2002). Despite having comparable test scores upon entering college, African American college students often achieve lower marks than their White peers. When the stereotyped group adopts a growth mindset their academic performance more closely aligned with their non-stereotyped counterparts.

Even after years of attention towards this topic, standardized tests preserve gender and race disparities in academic achievement. Findings indicated that females who adopt a growth mindset achieved higher math standardized test scores compared to those in the control group (Good et al., 2003).

Dweck summarizes that negative stereotypes can have a demoralizing impact on students with a fixed mindset, hindering their progress (Dweck, 2010). However, those with a growth mindset believe in their ability to develop through personal effort and support from educators. Therefore, these individuals are inclined to employ more effort in challenging circumstances to master obstacles, leading to skill development or the attainment of new abilities (Costa & Faria, 2018). Setbacks do not discourage people with growth mindset and they aim for progress (Chan, 2016).

To sum up, mindsets and implicit beliefs about fixed or malleable intelligence seem to have a significant impact on academic achievement (Costa & Faria, 2018). Individuals holding an incremental theory do not care about failure much if learning and ability improvement are possible (Dweck & Leggett, 1988; Troche & Kunz, 2020).

2.3.2.2 Relevance in Business

In her research, Dweck found that organizations can also exhibit fixed or growth mindsets, influencing employee satisfaction, collaboration, innovation, and ethical behavior. Companies with a growth mindset value employees' potential for development. They

tend to have a more positive culture and possibly happier employees, indicating potential advantages in fostering growth-oriented organizational attitudes (Harvard Business Review Staff, 2014).

Dweck (2006) explains that in a growth mindset, it is the responsibility of leadership to drive employees as well as organizations toward their highest possible development. Leadership should challenge the belief that the status quo is an inherent limit. Similar to transformative and adaptive leadership, it emphasizes the importance of change, even if it involves discomfort. The key insight is that talent, although valuable, is just a starting point, and continual improvement is essential for unlocking untapped potential and fostering success (Dweck, 2006). In organizations, the leadership needs to accept and communicate failure and complications to promote a growth mindset (Lee & Duckworth, 2018). Duckworth calls leaders to explicitly talk about calculated risk taking and constant learning and development, as these people tend to inspire organizational growth.

In their conceptual review Murphy and Reeves mention that mindsets in the form of organizational mindsets play a crucial role on group, team, and organizational level. Those are “expressed through the policies, practices, norms, and leadership messages expressed by powerful individuals within an organization” (Murphy & Reeves, 2019, p. 1). The authors suggest that, just as on an individual level, also organizational mindsets are malleable. Organizational mindsets exist across various hierarchical levels and influence an organization's culture. While companies embodying a fixed mindset emphasize natural talent and foster strong competition between employees, organizations holding a growth mindset prioritize improvement, learning, and employee development (Murphy & Reeves, 2019).

2.3.3 Measurement of Implicit Theory of Intelligence (ITI)

Dweck's Implicit Theories of Intelligence Scale (ITIS) evaluates individuals' perceptions of their intelligence, distinguishing between the belief that intelligence is fixed (entity theory) or can be developed (incremental theory) (Dweck et al., 1995; Troche & Kunz, 2020).

In the original score developed in 1995 by Dweck and her colleagues, only three items were included: 1) "You have a certain amount of intelligence and you really can't do much to change it"; 2) "Your intelligence is something about you that you can't change very much" and 3) "You can learn new things, but you can't really change your basic intelligence" (Dweck et al., 1995, p. 269). According to Spinath et al. “Three items are sufficient for the assessment because of the narrow focus on perceived malleability of the attribute

in question” (2003, p. 930) and due to the fact that high internal consistencies and retest-reliabilities have been observed. These questions are answered by respondents using a 6-point Likert scale from 1 (strongly agree) to 6 (strongly disagree). Ultimately, the score is calculated with the average of the three items. A higher score indicates an incremental theory, whereas a lower score suggests an entity theory (Dweck et al., 1995).

In 1999, Dweck presented the Implicit Theories of Intelligence Scale (ITIS), which comprises eight items. The questionnaire aims to measure the implicit theories of intelligence with four items on each sub-scale: the entity theory and the incremental theory (Dweck, 1999). The score calculation follows the procedure of the original score developed in 1995 (Troche & Kunz, 2020). Research has indicated that ITIS has good reliability (α from 0.82 to 0.97) and construct validity (Dweck et al., 1995).

Assessments of implicit theories in various domains commonly utilize the standardized measure adapted from the original scale for implicit theories of intelligence developed by Dweck (Lüftenegger & Chen, 2017).

Further, the meta-analytical review showed that both incremental and entity subscales have previously been included separately (Troche & Kunz, 2020). In other studies, one of the subscales was reverse-coded, resulting in a single measure for incremental theory (Troche & Kunz, 2020). The ITIS suggests a one-dimensional concept, yet investigations utilizing confirmatory factor analyses distinguish the two theories as distinct constructs. The authors suggest that this discovery might be influenced by the negative phrasing present in half of the ITIS items. This seems plausible since an individual might not be able to hold both theories at the same time.

2.3.4 Cultivation of a Growth Mindset

In a study, Rheinberg et al. investigated the teachers' mindsets concerning the malleability of intelligence (Rheinberg, Vollmeyer & Rollett, 2000, as cited in Dweck, 2008 and Dweck, 2010). At the start of the school year, teachers' mindsets were assessed regarding the intelligence of their students. The research showed that students labeled as low achievers at the beginning, under the guidance of teachers with fixed mindsets, continued to perform poorly. In contrast, those with growth mindset teachers progressed to become moderate or high achievers. This underscores how people in charge for children's education influence student success, stressing that embracing a growth mindset involves a dedication to assisting each student in their learning and growth.

Further research shows that students seem to develop a fixed mindset when adults praise them for their intelligence (Mueller & Dweck, 1998). On the contrary, students who

receive praise for their effort or the strategies applied to solve a problem are suggested to develop a growth mindset. This study depicts implications for how achievement can be encouraged in children and youths.

Messages that help encourage a growth mindset in children might include statements like “We believe in your potential and are committed to helping everyone get smarter”, “We value (and praise) taking on challenges, exerting effort, and surmounting obstacles more than we value (and praise) ‘natural’ talent and easy success” or “Working hard to learn new things makes you smarter— it makes your brain grow new connections” as stated by Dweck (2010, p. 28).

Dweck's research has profound implications for education, organizational development, and personal growth, fostering a nuanced understanding of how mindset influences behavior and performance (Burnette et al., 2013; De Kraker-Pauw et al., 2017; Dweck, 2006; Lee & Duckworth, 2018; Yeager & Dweck, 2012).

2.4 Further Related Concepts

This section elaborates on further related concepts surrounding the central themes of grit, self-leadership, and growth mindset and explores the interplay with established psychological frameworks, including motivational theories, the big five personality traits, and self-efficacy. These theories and frameworks provide essential contextualization and theoretical grounding for the study within the broader field of psychology. Delimitating these constructs helps in developing a more nuanced understanding of how these theories and frameworks interact, overlap and distinguish each other.

2.4.1 Motivational Theories

Grit draws upon the motivational principles explained in various theories, showing the interplay between intrinsic and extrinsic motivators (Karlen et al., 2019). Self-leadership is inherently intertwined with motivational constructs, as it involves the regulation of one's behavior, thoughts, and emotions to sustain motivation and foster personal growth (Houghton, Dawley, et al., 2012). By considering motivational theories, valuable insights into the dynamics that enhance individual goal pursuit are gained. In this way, this thesis aims to improve the understanding of grit and self-leadership in the broader psychological context.

Dictionaries define motivation as “for doing something”, “the need or reason for doing something” (Cambridge Advanced Learner's Dictionary & Thesaurus, 2023), or as “the

impetus that gives purpose or direction to behavior and operates in humans at a conscious or unconscious level“ (American Psychological Association, 2023).

Feeling motivated to undertake a task involves being prompted to take a specific action (Ryan & Deci, 2000). When a person senses the inspiration to act, they are recognized as being motivated (Ryan & Deci, 2000). Individuals do not uniformly react in every circumstance, as each person possesses unique motives that influence their preparedness for action (Ryan & Deci, 2000). Motivations are categorized into biological drives, addressing fundamental organism needs like sleep and nutrition, and psychological motivations, which center around desires such as social recognition, knowledge, or security (Becker-Carus & Wendt, 2017).

Self-Determination Theory (SDT) differentiates between types of motivation based on the objectives to be achieved for which we pursue an action (Ryan & Deci, 2000). Extrinsic motivation refers to influences outside an individual that drive behavior and often result in a distinguished outside result. It often involves rewards or punishments, which motivates the individual. In contrast, intrinsic motivation is characterized by an individual's internal desire or personal commitment to engage in an activity. It is guided by factors such as personal interest, enjoyability, values, or a sense of accomplishment (Ryan & Deci, 2000).

The importance of intrinsic motivation is highlighted in the context of employing the potential of natural reward approaches (Manz & Sims, 2001). Activities are naturally rewarding when they evoke feelings of competence, foster a sense of self-control, and deliver purpose. According to the cognitive self-leadership theory, the combination of natural reward strategies and intrinsic rewards can serve as means of self-motivation. For example, individuals can achieve this by shifting their focus to the positive attributes of an activity. Deliberately concentrating on natural rewards mentally allows individuals to encounter intrinsic motivation without making changes to the task.

Theories of motivation are often distinguished into content theories and process theories (Dinibutun, 2012). Content Theories aim to describe what motivates humans, while process theories explain how motivation arises.

2.4.1.1 Content Theories

Content theories aim to identify the specific factors or needs that drive motivation (Dinibutun, 2012). The following section introduces Maslow's hierarchy of needs, Alderfer's ERG theory, Herzberg's two-factor theory and McClelland's Achievement Motivation Theory.

2 Literature Review

Maslow's Hierarchy of Needs Theory was developed in 1943 and describes a framework that categorizes human needs into a hierarchical structure. The theory proposes that individuals are motivated by a set of five distinct needs arranged in a pyramid: physiological needs, safety needs, social needs, esteem needs, and self-actualization needs. The fulfillment of lower-level needs is considered a prerequisite for the pursuit of higher-level needs, with self-actualization representing the highest level of personal development and fulfillment (Maslow, 1943). Maslow's theory has had a profound impact on psychology and remains influential in understanding human motivation and behavior (Dinibutun, 2012).

Alderfer's Modified Need Hierarchy Model is an extension of Maslow's theory and revisits the categorization of human needs. This model summarizes Maslow's five needs into three core categories: Existence Needs, Relatedness Needs, and Growth Needs (ERG). Existential needs include the fulfillment of physiological and safety necessities, whereas relational needs center around interpersonal connections and social engagement. Growth needs to concentrate on individual development and self-enhancement. In contrast to Maslow's rigidly structured hierarchy, Alderfer's model permits individuals to pursue needs from various categories concurrently, acknowledging the dynamic dimensions of human motivation (Alderfer, 1969; Dinibutun, 2012).

Herzberg's (1959) Two-Factor Theory suggests that job satisfaction and dissatisfaction are influenced by separate sets of factors. Hygiene factors (dissatisfiers), such as working conditions and salary, prevent dissatisfaction but do not significantly contribute to job satisfaction. On the other hand, motivator factors (satisfiers), like recognition and achievement, directly impact job satisfaction. Herzberg argued that enhancing motivator factors is crucial for cultivating job satisfaction and motivation, emphasizing the importance of intrinsic job elements in creating a positive work environment (Dinibutun, 2012; Herzberg et al., 1959).

The Achievement Motivation Theory focuses on individuals' psychological needs that drive them toward success and excellence in their pursuits (McClelland, 1988). This theory outlines three primary needs: the need for achievement (N-Ach), the need for affiliation (N-Aff), and the need for power (N-Pow). McClelland states that people possess varying degrees of these needs, influencing their actions and accomplishments. Notably, the need for achievement stands out, indicating a strong inclination toward challenging goals and feedback (Dinibutun, 2012; McClelland, 1988).

2.4.1.2 Process Theories

Process theories of motivation focus on understanding the psychological processes involved in motivating behavior (Dinibutun, 2012). Outlined in this section are Vroom's theory of expectancy, Porter and Lawler's equity theory, and Locke's goal-setting theory.

Vroom's Expectancy Theory (1964) centers on individuals' personal convictions, particularly their beliefs about the connection between their effort, performance, and the desirability of outcomes. The theory proposes that people strive to act based on their expectations that exerting effort will lead to successful performance and that this performance will result in outcomes they find appealing. In essence, individuals are inclined to engage in tasks they believe they can accomplish when they have a strong desire for the anticipated rewards (Dinibutun, 2012; Vroom, 1964).

Porter and Lawler's Equity Theory (1975) is a psychological model that examines the relationship between motivation and perceived equitable rewards. The theory posits that individuals assess the fairness of their treatment in comparison to others and are motivated based on these perceptions. When an individual recognizes an unfairness or imbalance, it triggers psychological tension, leading the person to lessen or remove the perceived inequality. Moreover, the model suggests that individuals consider the relationship between input (effort) and the attainment of desired outcomes when evaluating the fairness of their rewards (Adams, 1965; Dinibutun, 2012; Porter & Lawler, 1975).

Locke's goal-setting theory suggests that upon choosing to pursue a goal, an individual governs their actions to achieve the specified goal (Locke, 1968). It emphasizes that individuals are motivated by clear and challenging objectives and that goal-setting enhances task performance through increased effort, persistence, and focus. Unmet needs drive individuals to explore means of fulfilling those needs, leading them to establish goals that spark subsequent actions.

Summing up, motivational theories play an important role in understanding and contextualizing the concepts of grit and self-leadership (Manz & Sims Jr, 1980; Muenks et al., 2018; Stewart et al., 2011). These theories provide a theoretical framework for exploring the psychological underpinnings of human motivation, shedding light on the factors that drive individuals to persist in the face of challenges and take charge of their own development (Dinibutun, 2012).

2.4.2 Big Five Personality Traits

Previous research on personality traits that predict success has provided a framework which is called the Big Five model (Cattell, 1943, cited in Goldberg, 1990, p. 1216 ff.). Five factors have been proven to be reliable and replicable across various studies. These Big Five factors have commonly been marked and labeled as follows: (I) Surgency (or Extraversion), (II) Agreeableness, (III) Conscientiousness (or Dependability), (IV) Emotional Stability (vs. Neuroticism), and (V) Culture (or Intellect) (Goldberg, 1990). Recurring intercorrelations led to the development of higher-order traits: Alpha (Big Five trait dimensions Agreeableness, Conscientiousness, and Emotional Stability) and Beta (Extraversion and Intellect) (Digman, 1997).

Further studies elaborated on the correlation between these five personality traits and job performance (Barrick & Mount, 1991). These studies were reviewed and combined in a meta-analysis in 1991 by Barrick and Mount, where the five trait factors were investigated in relation to job proficiency, training proficiency, and personnel data across different professions. The results of the study showed that the third trait, Conscientiousness, relates robustly to all three job performance criteria.

Although these studies provide essential insights into the field of personality traits and success, Duckworth et al. (2007) do not support the Big Five model as a predictor for success. They argue “Conscientious individuals are characteristically thorough, careful, reliable, organized, industrious, and self-controlled. Whereas all of these qualities bear a plausible contribution to achievement, their relative importance likely varies depending upon the type of achievement considered.” (2007, p. 1089). Therefore, grit is considered distinct from the facets of this framework, as grit focuses on stamina and describes the ability to maintain effort as well as interest over a long timeframe. However, various studies found that grit and conscientiousness might overlap or are highly correlated (Credé et al., 2017; D. A. Southwick et al., 2019; Vazsonyi et al., 2019; Zhang et al., 2022).

Nonetheless, studies also report the validity of grit with respect to achievement over and above conscientiousness (Duckworth et al., 2007; Duckworth & Quinn, 2009; Eskreis-Winkler et al., 2014; Park et al., 2020).

Not only grit but also the construct of self-leadership has been investigated in its relationship to the big five personality model (Furtner & Rauthmann, 2010). It was observed that self-leadership and its components exhibited stronger associations with Beta (Agency: Extraversion and Intellect) than Alpha (Communion: Agreeableness, Conscientiousness, and Emotional Stability). The study's outcomes underscore the distinct yet interconnected nature of self-leadership dimensions and specified personality traits.

While positive correlations were prevalent, also other studies emphasized that self-leadership should be differentiated from the big five personality traits (Houghton et al., 2004).

2.4.3 Self-Efficacy

Self-efficacy theory is a more recent concept in the long history of theories around one's personal competence and belongs to the social cognitive theory (Bandura, 1977; Trusz & Babel, 2016). Self-efficacy refers to an individual's belief and trust in their own capability to organize and execute the courses of action required to accomplish a certain behavior or task. Based on the principle that individuals' perceptions of their own competence shape their behavioral responses, the study of self-efficacy explores the interplay between belief systems and human potential (Bandura, 1977; Trusz & Babel, 2016).

Research has been conducted on the influence of self-efficacy on self-leadership. Prussia et al. (1998) showed that self-leadership strategies have a major effect on self-efficacy. The researchers argue that self-leadership strategies influence the individual's capability perceptions regarding performance in a specific field of tasks. The higher the self-efficacy of a person is, the more confident they are about the successful outcome of the given task at hand. Therefore, self-efficacy is somewhat similar to the concept of constructive thought pattern strategies in self-leadership. The study showed that self-leadership strategies have a substantial effect on self-efficacy evaluation, which directly affects performance. As a result, the authors suggest that self-efficacy has a mediating influence on the relationship between self-leadership and performance, and a positive relation between self-efficacy and performance can be found (Prussia et al., 1998).

Further, Furtner et al. state, "self-leadership and self-efficacy exert a positive influence on self-regulatory processes, but self-leadership may affect (perceptions of) self-efficacy [...] and thus both constructs should not be equated" (2015, p. 109).

Previous literature also examined the relationship between self-efficacy and grit. A recent study indicates positive correlations between grit dimensions and self-efficacy, highlighting their combined impact on goal orientations and academic performance (Alhadabi & Karpinski, 2020). The authors propose that the establishment of a supportive learning atmosphere for grit and self-efficacy proves invaluable in enhancing instructional efforts and contributing to academic success.

Similarly, grit and self-efficacy displayed a positive correlation in a study with over 2,400 elementary and middle school students (Usher et al., 2019). The study found that grit alone, specifically perseverance in school, did not directly predict reading and math achievement. Rather, success in academics was more closely tied to students' self-

2 Literature Review

efficacy. The authors conclude by pointing out the importance of interventions that not only enhance grit but also foster students' belief in their academic abilities for success in core academic subjects (Usher et al., 2019). The significant positive relationship between grit and self-efficacy was replicated and confirmed in further studies (Attia & Abdelwahid, 2020; Fabelico & Afalla, 2020; Wolters & Hussain, 2015).

3 Hypothesis Development

Literature defines that people who are self-aware and positively influence their behavior and emotions toward a particular goal have high self-leadership capability (Furtner & Baldegger, 2016; Manz, 1986; Stewart et al., 2011). Moreover, individuals who demonstrate passion and perseverance toward a goal have a high grit factor (Duckworth et al., 2007). Those two concepts both contribute to the fact that a person works consciously towards a defined goal (Duckworth et al., 2007; Furtner & Baldegger, 2016). Further, both constructs involve self-regulation (Duckworth et al., 2007; Manz, 1986), and a positive attitude (Duckworth, 2017; Neck & Houghton, 2006). Therefore, this thesis proposes that individuals with high self-leadership competency might also display high grit factors.

H1: Individuals with high self-leadership competency also display a higher grit factor.

Defining a specific goal, working towards this goal, and keeping track of the progress throughout the way are three dimensions that influence high self-leadership competency (Stewart et al., 2011). Likely, the grit test assesses the long-term orientation and perseverance when working towards a defined goal (Duckworth et al., 2007). Since these two categories seem to cover similar dimensions of goal-setting and perseverance, this thesis suggests that the results might correlate with each other.

H2: There is a positive correlation between 'self-goal setting', 'self-observation', and 'consistency of interest'.

Literature claims that grit can be determined as a factor that influences success across all different industries, personal backgrounds, and ages (Duckworth et al., 2007). Nevertheless, established literature also states that self-leadership and perseverance, when working toward a goal, can be trained, learned, or improved over time (Duckworth, 2017; Ross, 2014). Therefore, the next hypothesis aims to assess if age, professional working experience, highest education obtained, and employment status influence the outcome of the individual self-leadership competency and grit factor. Moreover, the correlation between self-leadership and a leadership position in the job is tested.

H3: Personal experience positively correlates with Self-Leadership and Grit.

H3.1: Higher age positively correlates positively with Self-Leadership and Grit.

H3.2: A higher level of education positively correlates with Self-Leadership and Grit.

3 Hypothesis Development

H3.3: Employment status influences Self-Leadership and Grit.

Although self-leadership is the basis for the successful leading of others (Browning, 2018, p. 2220), not all people with leadership responsibilities must be good at leading themselves. Therefore, this thesis investigates whether professional responsibilities influence Self-Leadership scores.

H3.4: There is no correlation between self-leadership and possessing a leadership position in the current job.

H3.5: There is no correlation between self-leadership and possessing a professional position with strategic decision-making responsibility.

Literature argues that growth mindset is positively associated with grit (Park et al., 2020; Sigmundsson et al., 2020; Zhang et al., 2022). The belief that intelligence is malleable (incremental theory) might also correlate with self-leadership. This might be because the belief that one can change and influence one's own behavior is the foundation of self-leadership.

H4: Grit and Self-leadership both show a positive correlation with Growth Mindset (incremental theory).

Lastly the gender difference in self-leadership and grit is tested. Previous research suggests a gender difference in self-leadership scores, as women achieved significantly higher scores than men (Norris, 2008). Further, previous research demonstrated no gender differences in grit and growth mindset (Sigmundsson et al., 2020).

H5: There are significant differences in grit, self-leadership, and implicit theory of intelligence scores between people who identify as men and women.

4 Method

The research goal of this thesis is to investigate the potential correlations between self-leadership competency, grit, and growth mindset. This study adopts a quantitative research approach to examine the relationship between these concepts. The following chapter outlines the methodological framework, encompassing the selection of instruments, target sample, and data collection procedures. Further it addresses the statistical analyses employed to address the research questions.

4.1 Research Design

The study employs a cross-sectional research design, capturing a snapshot of individuals' levels of grit, self-leadership, and growth mindset at a specific time. This design allows for the examination of the concurrent relationship between these constructs. The choice of a cross-sectional approach aligns with the primary goal of assessing the correlation between self-leadership and grit in a diverse sample.

Participants are invited to complete the online survey, which includes the Grit-S Scale (Duckworth & Quinn, 2009), Abbreviated Self-Leadership Questionnaire (Houghton, Dawley, et al., 2012), Implicit Theories of Intelligence Scale (Dweck et al., 1995), and some demographic questions.

The Grit-Scale items are presented in a randomized order to mitigate order effects. Using a five-point Likert scale, participants responded to each item based on their agreement or disagreement. Similarly, the Abbreviated Self-Leadership Questionnaire items follow a randomized order. Participants rated the frequency of engaging in self-leadership behaviors using a five-point Likert scale. Thirdly, the Implicit Theories of Intelligence Score items were presented in a randomized order, to which respondents chose agreement or disagreement.

Following the literature's suggestion, demographic items are positioned toward the conclusion of the questionnaire (Schnell, 2019). As discussed in the limitations section, this arrangement could be considered a drawback. Nevertheless, demographic questions are placed at the end to reduce potential priming effects or biases that participants may experience when answering subsequent questions. The purpose of these questions was twofold: First, the aim was to enhance the understanding who responded to the survey and to control if the target sample is reached. Second, information that may serve as independent variables for analysis and hypotheses testing is gathered. Consequently,

information regarding the respondent's age, gender, highest educational attainment, professional background, and current job responsibilities was collected.

The survey is available in both English and German to ensure accessibility for participants across diverse educational backgrounds and age groups. This multilingual approach aims to eliminate language barriers, fostering inclusivity, and enabling a broader and more representative range of respondents to engage with the survey content. By providing options in both languages, the present research follows two goals. First, it seeks to enhance the participation experience and to encourage individuals from various backgrounds to contribute to the research. Second, it aims to analyze the internal consistencies, reliability, and factor structures of the German questionnaire translations. For the German questionnaire, German translations from previous academic research have been used (Andreßen & Konradt, 2007; Schmidt et al., 2019; Spinath & Stiensmeier-Pelster, 2001), which are outlined in Chapter 4.3.

4.2 Participants and Target Sample

The study targets a diverse sample of individuals from various demographic backgrounds to enhance the impact of its findings. The planned sample is a stratified random sampling considering current demographic distributions in Austria. This aims for representation across genders, different age groups, and educational backgrounds.

Educational background is defined according to the joint Eurostat-OECD guidelines on the measurement of educational attainment in household surveys (Eurostat, 2014): Primary education or lower secondary education (ISCED 1 & 2), secondary education (ISCED 3 & 4) and tertiary education (ISCED 5 – 8). Examples of secondary education in Austria are AHS (Allgemeinbildende Höhere Schule), BHS (Berufsbildende Höhere Schule), BMS (Berufsbildende Mittlere Schule), and PTS (Polytechnische Schule). Tertiary education involves advanced learning and research, for example, universities, universities of applied sciences, or equivalent qualifications (Eurostat, 2014; Statistik Austria, 2023b).

The stratified random test sample (see Table 1 and Table 12 in Appendix A) does not exhibit an equal distribution across age groups. This is due to its alignment with the demographic age distribution in Austria (Statistik Austria, 2023a) while maintaining gender parity with an equal representation of both men and women.

4 Method

Male																	
55																	
Under 24			25 - 34			35-44			45 - 54			55-64			over 65		
7			10			10			10			9			9		
ISCE D 1/2	ISCE D 3/4	ISCE D 5-8	ISCE D 1/2	ISCE D 3/4	ISCE D 5-8	ISCE D 1/2	ISCE D 3/4	ISCE D 5-8	ISCE D 1/2	ISCE D 3/4	ISCE D 5-8	ISCE D 1/2	ISCE D 3/4	ISCE D 5-8	ISCE D 1/2	ISCE D 3/4	ISCE D 5-8
3	3	1	3	4	3	3	4	3	3	4	3	3	3	3	3	3	3
Female																	
55																	
Under 24			25 - 34			35-44			45 - 54			55-64			over 65		
7			10			10			10			9			9		
ISCE D 1/2	ISCE D 3/4	ISCE D 5-8	ISCE D 1/2	ISCE D 3/4	ISCE D 5-8	ISCE D 1/2	ISCE D 3/4	ISCE D 5-8	ISCE D 1/2	ISCE D 3/4	ISCE D 5-8	ISCE D 1/2	ISCE D 3/4	ISCE D 5-8	ISCE D 1/2	ISCE D 3/4	ISCE D 5-8
3	3	1	3	4	3	3	4	3	3	4	3	3	3	3	3	3	3

Table 1: Stratified random target sample

The number of participants (see Table 1 and Table 12 in Appendix A) selected from each stratum will be proportionally allocated based on the stratum's share of the overall population. This approach aims to ensure that each subgroup is adequately represented in the final sample. Slightly fewer people are surveyed with tertiary education because only 19,2 % of the Austrian population have completed tertiary education successfully. Further, slightly fewer people with the highest educational attainment “mandatory school” are surveyed because only 17 % of the Austrian population hold this educational status (Statistik Austria, 2021).

Within the group of people aged below 24 years, the number of people targeted with tertiary education completed is lower because tertiary education is, on average, completed at the age of 27 (Unger, 2015).

By utilizing stratified random sampling, this study aims to capture diverse perspectives and experiences within the sample. This allows for more robust analyses and nuanced interpretations of the relationship between grit and self-leadership across different demographic groups.

4.3 Measures/Instruments

The utilization of the grit scale (Duckworth & Quinn, 2009), the Abbreviated Self-Leadership Questionnaire (Houghton, Dawley, et al., 2012), and the Implicit Theories of Intelligence Scale (Dweck et al., 1995) serve as the foundation of this study. These instruments provide reliable and validated measures for assessing grit, self-leadership, and mindset, respectively. This sub-section introduces these instruments and outlines potential limitations.

4.3.1 Grit Scale (Duckworth & Quinn, 2009)

The Grit-Scale, a widely accepted instrument for measuring perseverance and passion for long-term goals, comprises two subscales: Consistency of Interest and Perseverance of Effort. Participants respond to items on a 5-point Likert scale (1 = not at all like me to 5 = very much like me), providing a quantitative index of their overall grittiness (Duckworth et al., 2007).

The original Grit Scale (Grit-O) consists of 12 items, of which six items each are included in the subscales “Consistency of Interest” and “Perseverance of Effort” (Duckworth et al., 2007). In contrast, the Short Grit Scale (Grit-S) is a shorter version of the Grit-O scale and was developed to provide a more concise measure while still capturing the essential elements of grit. The Grit-S includes eight items, four items in each subcategory (Duckworth & Quinn, 2009).

The first subcategory, ‘Consistency of Interest’, comprises reverse-coded items. Participants are prompted to indicate their level of agreement with statements reflecting wavering commitment and fluctuating attention toward goals and projects. Participants are asked to indicate their agreement with statements such as ‘I often set a goal but later choose to pursue a different one’, ‘I have been obsessed with a certain idea or project for a short time but later lost interest’, ‘I have difficulty maintaining my focus on projects that take more than a few months to complete’, and ‘New ideas and projects sometimes distract me from previous ones’ (Duckworth & Quinn, 2009).

Conversely, the subcategory ‘Perseverance of Effort’ is evaluated through statements that assess one's persistence and determination in completing tasks and overcoming obstacles. Participants are instructed to express their agreement with statements including ‘I finish whatever I begin’, ‘Setbacks don’t discourage me’, ‘I am diligent’, and ‘I am a hard worker.’ These statements collectively aim to capture the individual's resilience and commitment to sustained effort (Duckworth & Quinn, 2009).

Both the original and the short grit scale are self-report measures, meaning individuals respond to items based on their own perceptions of their grit-related behaviors and attitudes (Duckworth et al., 2007). This study draws upon the Short Grit Scale.

4.3.2 Self-Leadership Questionnaire (Houghton & Neck, 2002)

The Self-Leadership Questionnaire assesses various dimensions of self-leadership, including behavior-focused strategies (e.g., self-goal setting, self-reward, self-observation), natural reward strategies (e.g., self-reward), and constructive thought pattern strategies (e.g., visualizing successful performance and self-talk). Respondents rate the frequency of engaging in these behaviors on a Likert scale. The questionnaire offers a comprehensive measure of self-leadership practices (Houghton & Neck, 2002).

The revised self-leadership questionnaire RSLQ comprehends 35 items structured in three sub-scales. Behavior-focused strategies include 18 items, natural reward strategies include five items, and constructive thought pattern strategies include 12 items (Houghton & Neck, 2002). The Abbreviated Self-Leadership Questionnaire ASLQ (Houghton, Dawley, et al., 2012) shortened the original 35-item RSLQ to nine items. From this research, three factors emerged: Behavioral Awareness and Volition (3 items), Task Motivation (3 items), and Constructive Cognition (3 items) (Houghton, Dawley, et al., 2012).

Behavioral Awareness and Volition encompasses three items aimed at gauging individuals' self-regulation and proactive goal-setting strategies. Participants were asked to indicate their agreement with statements such as 'I establish specific goals for my own performance' (self-goal setting), 'I work toward specific goals I have set for myself' (self-goal setting), and 'I make a point to keep track of how well I'm doing at work' (self-observation), reflecting self-goal setting and self-observation practices (Houghton, Dawley, et al., 2012).

Task Motivation, another factor identified, comprises three items focused on individuals' motivation enhancement techniques. Participants are prompted to express their agreement with statements including 'I visualize myself successfully performing a task before I do it' (visualizing successful performance), 'Sometimes I picture in my mind a successful performance before I actually do a task' (visualizing performance), and 'When I have successfully completed a task, I often reward myself with something I like' (self-reward). Those items highlight visualizing successful performance and self-reward strategies (Houghton, Dawley, et al., 2012).

Lastly, Constructive Cognition is characterized by three items addressing individuals' cognitive strategies for problem-solving and self-reflection. Participants are asked to indicate their agreement with statements such as 'Sometimes I talk to myself (out loud or in my head) to work through difficult situations' (evaluating beliefs and assumptions), 'I think about my own beliefs and assumptions whenever I encounter a difficult situation' (evaluating beliefs and assumptions), and 'I try to mentally evaluate the accuracy of my own beliefs about situations I am having problems with' (self-talk). These items reflect evaluating beliefs, assumptions, and self-talk practices (Houghton, Dawley, et al., 2012).

The ASLQ has been supported by several studies and has displayed scientifically valid levels of reliability and validity (Houghton, Dawley, et al., 2012; Mahembe et al., 2017; Nel & Van Zyl, 2015). This study uses the Abbreviated Self-Leadership Questionnaire.

4.3.3 Implicit Theories of Intelligence Scale (Dweck, 1999)

The Implicit Theories of Intelligence Scale assesses individuals' beliefs about the nature of intelligence (Dweck, 1999). The scale measures whether a person holds a fixed mindset (entity theory), viewing intelligence as static and unchangeable, or a growth mindset (incremental theory), perceiving intelligence as malleable and capable of development through effort.

This tool has been widely used in research to explore the impact of mindset on various aspects of cognition, behavior, and achievement and comprised the following items: 'You have a certain amount of intelligence, and you really can't do much to change it.', 'Your intelligence is something about you that you can't change very much.', and 'You can learn new things, but you can't really change your basic intelligence.' (Dweck et al., 1995, p. 269).

The more recent questionnaire from 1999 comprises eight items and is structured to capture whether individuals lean toward a fixed mindset or a growth mindset (Dweck, 1999). Among the eight items, there are four incremental and four entity theory items. Respondents rate their level of agreement or disagreement with these statements.

Fixed Mindset, represented by four reverse-coded items, delves into beliefs regarding the malleability of intelligence. Participants were presented with statements such as 'You have a certain amount of intelligence, and you really can't do much to change it.', 'Your intelligence is something about you that you can't change very much.', 'You can learn new things, but you can't really change your basic intelligence.', and 'To be honest, you can't really change how intelligent you are.' (Dweck, 1999).

In contrast, growth mindset encompasses beliefs centered around the potential for intelligence development. Participants were prompted to express their agreement with statements including 'No matter who you are, you can change your intelligence a lot.', 'You can always greatly change how intelligent you are.', 'No matter how much intelligence you have, you can always change it quite a bit.', and 'You can change even your basic intelligence level considerably.' (Dweck, 1999).

Previous research reports that the scale demonstrates strong internal consistency with Cronbach's alpha ranging from .82 to .97, and it exhibits reliable test-retest reliability over a two-week period (Dweck et al., 1995).

This study was planned using the newer scale with eight items from Dweck (Dweck, 1999) with the German translation verified by Troche and Kunz (Troche & Kunz, 2020). However, during the pre-tests, various persons expressed difficulty in understanding and questioned the negative wording as well as the redundancies. This is precisely why the original scale was kept short, as argued by Dweck: "repeatedly rephrasing the same idea may lead to confusion and boredom on the part of the respondents" (Dweck et al., 1995, p. 269). Since the German translation also appeared to be a significant source of this confusion, further research has been conducted. There seems to be more extensive research on the German version of the original three-item scale (Rammstedt et al., 2022; Spinath & Stiensmeier-Pelster, 2001). The German version of the three-item questionnaire was tested and validated among adolescents and adults (Rammstedt et al., 2022). Both researchers collaborated with translation experts to derive the German version. While Rammstedt et al. (2022) used the German formal 'Sie' for adults and informal 'Du' for adolescents, Spinath and Stiensmeier-Pelster (2001) used the word 'Ich' (see Table 2). The latter argue that the aim is to measure the respondent's attitude towards one's own intelligence, which is crucial for one's achievement behavior (Rammstedt et al., 2022).

Original by Dweck 1995	Troche & Kunz, 2020	Rammstedt, Grüning & Lech- ner, 2022	Spinath & Stiensmeier-Pel- ster, 2001
You have a certain amount of intelligence, and you really can't do much to change it.	Sie besitzen ein bestimmtes Ausmaß an Intelligenz und können nicht wirklich viel daran ändern	Sie haben ein bestimmtes Maß an Intelligenz und können nicht wirklich viel daran ändern.	Ich besitze ein bestimmtes Ausmaß an Intelligenz, das ich nicht verändern kann.
Your intelligence is something about you that you can't change very much.	Ihre Intelligenz ist ein Teil von Ihnen, den Sie nicht allzu stark verändern können.	Ihre Intelligenz ist eine Eigenschaft, die Sie nicht groß verändern können.	Meine Intelligenz ist etwas, das ich kaum verändern kann.
You can learn new things, but you can't really change your basic intelligence.	Sie können neue Dinge lernen, aber Ihre grundlegende Intelligenz können Sie nicht wirklich verändern	Sie können neue Dinge lernen, aber Ihre grundsätzliche Intelligenz können Sie nicht wirklich verändern.	Ich kann zwar neue Dinge lernen, aber meine Intelligenz kann ich dadurch nicht wirklich verändern.

Table 2: German translations of the three-item ITIS

For the pre-test concerns outlined above and the presence of more extensive research on German questionnaires, the three-item scale (original version) is used in this research instead of the eight-item scale. In line with the argumentation of Spinath & Stiensmeier-Pelster, who state that the English 'you' might be translated with 'man'/'du'/'ich' in this case, this research uses the 'ich' version. The use of 'ich' ('I') as the personal reference pronoun was chosen deliberately in alignment with the consistent approach adopted by the other two test instruments utilizing self-report measures. This decision ensures uniformity throughout the survey and facilitates a seamless integration of responses. Furthermore, the emphasis on the individual's personal viewpoint, rather than soliciting evaluations of others, aligns with the primary objective of the research to capture subjective experiences and perspectives.

The results of the three studies (Rammstedt et al., 2022; Spinath & Stiensmeier-Pelster, 2001; Troche & Kunz, 2020) outline that the German translation of the ITIS shows a similar construct validity as the original English version developed by Dweck (1995).

All three items are reverse coded, so higher scores indicate greater endorsement of incremental beliefs about intelligence (Dweck et al., 1995). For reasons of questionnaire uniformity, three ITIS items are also offered with a five-point Likert scale. Overall, across all items in this study's questionnaire (Grit-S, ASLQ, and ITIS), one's own perspectives are asked for, which are answered using a five-point Likert scale.

4.4 Procedures

In the subsequent chapter, the procedures of data collection and the calculation of scores (Grit-S score, Abbreviated Self-Leadership Score, and Implicit Theories of Intelligence Score) are outlined as well as their interpretation.

4.4.1 Data Collection

The data collection for this quantitative research study is conducted through an online survey platform, specifically Qualtrics. Clear instructions and informed consent precede the survey to uphold ethical standards. Participants are assured that their data will be anonymized and used solely for research purposes. The survey was programmed and configured within the Qualtrics platform, where features such as required items, survey flow logic, and question clarity were utilized to enhance the validity of responses and reduce potential biases.

Before the full-scale launch, the survey underwent a pilot testing phase to identify any unclarity, wording confusion, or functionality issues. A small sample of individuals not participating in the main study provided feedback on the survey's clarity and user-friendliness. The feedback obtained has been incorporated into the final version of the questionnaire. Specific attention has been given to the ITIS items, as various people showed confusion during the pre-test. This is further elaborated upon in Chapter 4.3.3.

The survey was open for data collection through Qualtrics for three weeks (30th December 2023 to 20th January 2024).

4.4.2 Calculation of Scores

This sub-chapter outlines the methodology employed for calculating scores within the context of Grit, Self-leadership, and ITIS, providing a comprehensive overview of the process.

4.4.2.1 Calculation of Grit-Score

The Grit Scale (Duckworth & Quinn, 2009) comprises eight items designed to measure individuals' perseverance and passion for long-term goals. Respondents rate each item on a five-point Likert scale based on their agreement or disagreement (1 = strongly disagree to 5 = strongly agree). Half of the items are reverse-coded. The total Grit-Score is obtained by summing the scores across all items, with higher scores indicating higher grit levels.

Participants provided ratings on a Likert scale ranging from "Very much like me" (1 point) to "Not like me at all" (5 points) for each of the following four statements 'New ideas and projects sometimes distract me from previous ones', 'I have been obsessed with a certain idea or project for a short time but later lost interest', 'I often set a goal but later choose to pursue a different one' and 'I have difficulty maintaining my focus on projects that take more than a few months to complete'. Conversely, statements assessing traits like resilience and diligence are reverse-coded and scored accordingly from "Not like me at all" (1 point) to "Very much like me" (5 points). Reverse-coded items include 'Setbacks don't discourage me', 'I am a hard worker', 'I finish whatever I begin' and 'I am diligent'.

For example, a participant might score a 4 (=Mostly like me) on an item indicating agreement with the statement "I am a hard worker". This process is repeated for all items, and the scores are aggregated to provide a comprehensive Grit-Score.

4.4.2.2 Calculation of Self-Leadership Score

The Abbreviated Self-Leadership Questionnaire (Houghton, Dawley, et al., 2012) consists of nine items assessing various dimensions of self-leadership. Participants respond to each item using a five-point Likert scale (1 = Strongly disagree to 5 = Strongly agree) to indicate the frequency with which they engage in specific self-leadership behaviors. The overall Self-Leadership Score is derived by summing the scores across all items.

For instance, a participant might rate their engagement in goal-setting behaviors as a 3 (=Neither agree nor disagree) on a particular item. The process is repeated for all items, and the cumulative scores yield the total Self-Leadership Score, representing the extent to which individuals actively guide and influence their own behaviors.

4.4.2.3 Calculation of Implicit Theories of Intelligence Scale (ITIS)

The Implicit Theories of Intelligence Scale (Dweck, 1999) consists of three items measuring fixed and growth mindset tendencies. Respondents answer each question with a five-point Likert scale to express their agreement or disagreement (1 = strongly disagree to 5 = strongly agree). All answer scales are reverse coded and cumulated to retrieve

the total score. Then, an average score (ranging from 1 to 5) is calculated, with a lower score indicating a stronger entity theory.

For example, a respondent might answer the item “You can learn new things, but you can’t really change your basic intelligence.” with the answer “Strongly disagree”. This would lead to five points, which are added to the total score.

4.4.2.4 Interpretation of Scores

All three scores provide quantitative indicators of participants' levels of grit, self-leadership, and mindset, respectively. Higher scores on the grit scale suggest a greater tendency for perseverance and passion for long-term goals. A higher self-leadership score indicates more frequent engagement in self-guidance behaviors. Lastly, a higher ITI score points towards a growth mindset.

It is important to note that these scores are not diagnostic but serve as numerical representations of participants' self-reported tendencies. The interpretation of scores will be further analyzed in conjunction with statistical analyses, exploring potential correlations between grit and self-leadership in the subsequent sections.

4.5 Data Analysis

The data collected via Qualtrics were exported securely for subsequent statistical analysis. The exported dataset included anonymized responses, allowing for the confidential handling of participant information. Scores have been calculated using the Qualtrics tool, and the calculation of subscales is carried out using JASP 0.18.2.0.

The exclusion of unfinished responses provides a solid foundation for analysis and interpretation. The use of estimation methods for missing values is not necessary, due to the low occurrence of missing data (< 5%).

Data modifications involve combining the age groups "Under 18" and "18-24 years old" into a single category. Additionally, the secondary school answers (lower and higher secondary school) are merged for a more efficient and reliable representation of educational backgrounds in the study.

4.5.1 Hypotheses Testing

First, a thorough demographic analysis is made to understand the composition of the sample. Variables such as age, gender, education level, and work responsibilities may influence the relationship between grit and self-leadership. This is followed by the

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computation of descriptive statistics for each variable, including mean, standard deviation, and range. This provides an initial overview of the data distribution. For the three scales, corrected item-total correlations (Cronbach α) are computed.

The Likert scales applied in the questionnaire are ordinal in nature, which means they follow a well-defined hierarchy where the order is clear. However, the intervals between individual categories are non-metric and, consequently, not uniform. Moreover, initial data review shows signs of data not normally distributed. The analysis of Shapiro-Wilk tests (Table 13 in Appendix A) presents descriptive statistics for three different scales: ASLQ (Abbreviated Self-Leadership Questionnaire), Grit S (Short Grit Scale), and ITIS (Implicit Theories of Intelligence Scale). For each of these three scales, the mean and standard deviation of responses for individual items are provided, offering insights into the central tendency and dispersion of participant ratings. Additionally, the Shapiro-Wilk test for normality is reported, along with the corresponding p-values, indicating the degree to which the data deviates from a normal distribution. A lower p-value, and thus a significant Shapiro-Wilk test result, indicates that data deviate from normality. These results help in understanding the distribution characteristics of responses for each item within the respective scales and guide further statistical analyses, ensuring appropriate analyses and interpretation of the data. As deviation from normality can be observed in every item as shown in Table 13 (Appendix A), non-parametric tests were used in this study (Reuschenbach, 2009).

Utilizing ordinal-scaled scores derived from Likert variables and implementing a non-parametric rank sum test, like the Wilcoxon/Mann-Whitney U-Test, is beneficial for assessing whether the rank sums of two groups exhibit a significant difference (Reuschenbach, 2009). Similarly, for correlation analyses, non-parametric tests are performed. This approach reduces the need to adhere to specific assumptions (Reuschenbach, 2009; Smeeton & Sprent, 2016).

Spearman's Correlation Analysis was employed to examine Hypotheses 1, 2, and 4, investigating the relationships between self-leadership competency, grit factors, and growth mindset. For Hypothesis 3, which explores the correlation between personal experience and assessments from the Abbreviated Self-Leadership Questionnaire (ASLQ) and GRIT-S, multiple statistical tests were utilized. The Kruskal-Wallis Test was utilized to analyze sub-hypotheses 3.1, 3.2, and 3.3, investigating the impact of age, education level, and employment status on ASLQ and GRIT-S scores, respectively. Furthermore, the Mann-Whitney U-Test was employed to examine sub-hypotheses 3.4 and 3.5, assessing the relationship between self-leadership and holding a leadership position or

strategic decision-making responsibilities in the current job. Finally, Hypothesis 5, focusing on gender differences in grit, self-leadership, and implicit theory of intelligence scores, was analyzed using the Mann-Whitney U-Test.

Table 14 in Appendix A shows an overview of the statistical instruments applied to test the hypotheses developed in Chapter 3.

4.5.2 Review of Internal Consistencies and Reliability

To assess the unidimensional reliability of grit (Grit-S), self-leadership (ASLQ), and ITIS, Cronbach's Alpha is employed as a widely recognized measure (Adamson & Prion, 2013). Through this method, the study aims to evaluate the extent to which the items within each scale consistently measure the same underlying construct.

4.5.3 Review of Factor Structures

To examine the factor structure of the German translations of Grit and Self-leadership, both exploratory and confirmatory factor analyses were employed to identify and validate latent factors within the respective constructs. Survey participants were given the opportunity to select their preferred language using the survey tool Qualtrics, with the standard language setting of the device used by default. Out of all survey respondents, those who completed the survey in English were excluded from this analysis. Therefore, only the responses to the German questionnaire (n=138) are included in this analysis to analyze the factor structure of the German translations.

The statistical instruments used to investigate the factor structure of Grit follow the method presented by Schmidt et al. (2019), who analyzed the German translation of the short Grit scale (Grit-S).

An exploratory and confirmatory factor analysis was performed to test the three-factor model of the abbreviated self-leadership questionnaire (Houghton, Dawley, et al., 2012). Statistical instruments applied follow the Confirmatory Factor Analysis presented by Houghton et al. on page 224 (Houghton, Dawley, et al., 2012).

5 Results

In the following section of the thesis, the results of the data analysis will be presented. Following a descriptive depiction of the examined variables, the outcomes of the regression analyses conducted to test the hypotheses empirically will be presented.

5.1 Presentation of Sample Group and Findings

A total of 187 individuals accessed the survey link, with 160 providing valid and complete responses. Notably, 27 participants terminated the survey prematurely. A detailed analysis of the survey termination patterns indicates that the majority of terminating respondents (19 individuals) only opened the link without progressing any further, while a small fraction (5 individuals) completed 30%, and 3 individuals completed 75% of the questionnaire before terminating. The survey termination predominantly occurred at the initial stage, with 70% of participants terminating after opening the first page. This termination may be attributed to either the presence of discouraging elements within the introductory text or participants opening the survey link but becoming distracted and failing to return to initiate the survey. Only complete responses are considered as explained in section 4.5.

Demographically, the sample comprised 93 (58%) females and 64 (40%) males (1 Diverse, 2 did not reveal gender), with the vast majority residing in Austria (146 respondents). Additionally, the demographic profile of participants in this study reveals valuable information about the sample composition. In terms of age, most respondents fell within the 25-34 age range (88 participants), followed by those below 24 years (20 participants), 35-44 years (18 participants), 45-54 years (17 participants), 55-64 years (10 participants), and over 65 years (7 participants). The employment status of participants varied, with a substantial portion working full-time (102 participants; 64%) and others engaged in part-time work (23 participants; 14%). Notably, no participants identified as unemployed or stay-at-home parents, while 22 participants identified as students (14%), and 7 participants were retired (4%). The educational background of respondents showed a diverse range with a focus on people with tertiary education. In total 101 participants (63%) have completed tertiary education, 39 completed secondary school (24%), 13 with an apprenticeship background (8%), 4 with compulsory school education, and 3 indicated no finished education.

The survey also gathered insights into participants' professional roles, revealing that 38 respondents (24%) hold leadership positions where one or more individuals report to them. An additional 18 participants indicated a mostly affirmative stance on holding such

positions. In terms of strategic decision-making, 77 participants (48%) reported actively engaging in this aspect, 14 expressed uncertainties, and 57 indicated a negative response.

These demographic details contribute to a comprehensive understanding of the participant characteristics in the study context, enhancing the interpretability of the research findings.

A total of 160 valid responses were included for each variable. The median Grit-Sum-Score was 28.000, with a mean of 27.594 and a standard deviation of 4.942. For the ASLQ-Sum-Score, the median was 33.000, with a mean of 32.725 and a standard deviation of 5.496. The ITIS-Sum-Score had a median of 11.000, a mean of 10.088, and a standard deviation of 3.345. The Shapiro-Wilk test for normality yielded p-values of 0.011 for the Grit-Sum-Score, 0.048 for the ASLQ-Sum-Score, and less than 0.001 for the ITIS-Sum-Score, indicating non-normal distributions. The range of scores varied, with minimum values of 16.000 for Grit-Sum-Score, 19.000 for ASLQ-Sum-Score, and 3.000 for ITIS-Sum-Score, and maximum values of 38.000, 45.000, and 15.000, respectively. The total sum score overview of Grit-S, Abbreviated Self-Leadership Questionnaire, and ITIS are presented in Table 15 in Appendix A.

5.2 Descriptive Statistics

This section offers a first overview of average scores and a comparison with the original literature. Further, the internal consistencies and reliabilities, as well as the factor structures of Grit-S and the Abbreviated Self-Leadership Questionnaire, are investigated. This is performed by replicating procedures from previous literature.

5.2.1 Average Scores

The average grit score of the total sample lies at 3.45 (SD 0.62), while the score measured in the original literature of Duckworth and Quinn (2009, p. 168) was found to be at 3.4 (SD 0.7). This depicts comparable average results between the present study and previous research. The average self-leadership score of this research is measured at 3.64 (SD 0.61), which is difficult to compare to established literature, as the original and most prominent study (Houghton, Dawley, et al., 2012) does not report this value. The summary for the Implicit Theory of Intelligences shows a mean value of 3.36 (SD 1.11), which is slightly lower than the value found in the original literature of Dweck (1995, p. 270) between 3.57 (SD 1.49) and 3.97 (SD 1.28). When comparing the ITIS values, it must be noted, that the original scale used a six-point Likert scale, while the present

study applied a five-point Likert scale for confirmatory reasons with Grit and ASLQ. Therefore, the ITIS results offer limited comparability and should only be compared with caution.

5.2.2 Internal Consistencies and Reliability

The reliability of the test instruments is assessed through reliability analysis, which aims to determine how consistently individual indicators measure the same construct (Bortz & Döring, 2007). Literature analyzed in Chapter 2 shows that the calculation of internal consistency commonly involves using Cronbach's Alpha coefficient, reflecting the degree of intercorrelation among items (Adamson & Prion, 2013). The exact threshold is controversial, but the present study refers to Schmitt (1996) and Blanz (2021), where values above .9 are considered excellent, while values greater than .7 are still regarded as acceptable.

5.2.2.1 Grit-S Reliability

The internal consistency of Grit-S is acceptable with Cronbach's $\alpha = .780$ (details per item in Table 16).

The details in Table 16 (Appendix A) display statistics related to the Grit-S items in the questionnaire. Cronbach's α , a measure of internal consistency reliability, ranges from 0.728 to 0.786 across the items. The item-rest correlation, which indicates the correlation between each item and the total score excluding that item, varies from 0.297 to 0.629. Mean and standard deviation (sd) values provide insight into the distribution of responses for each item. For instance, item Q4.7 has the highest mean score of 4.153, with a relatively low standard deviation of 0.778, suggesting more uniform responses. In contrast, item Q4.2 has a mean score of 2.653 and a higher standard deviation of 1.161, indicating greater variability in responses. It's worth noting that items Q4.1, Q4.2, Q4.3, and Q4.4 were reverse scaled, implying that higher scores on these items represent lower levels of the measured construct.

This overall result (Cronbach's $\alpha = .780$) is the same for the total sample ($n=160$) as well as for German responses only ($n=138$).

5.2.2.2 Abbreviated Self-Leadership Questionnaire Reliability

The internal consistency of the Abbreviated Self-Leadership Questionnaire is acceptable with Cronbach's $\alpha = .717$ (details per item in Table 17).

The details in Table 17 (Appendix A) present statistics regarding items in the abbreviated self-leadership questionnaire. Cronbach's α ranges from 0.663 to 0.734 across the

items. The item-rest correlation varies from 0.177 to 0.532. Mean and standard deviation (sd) values offer insights into the distribution of responses for each item. For example, item Q3.3 has the highest mean score of 3.958, with a relatively low standard deviation of 0.930, suggesting more consistent responses. Conversely, item Q3.4 has a mean score of 3.479 and a higher standard deviation of 1.229, indicating greater variability in responses.

This overall result ($\alpha = .717$) is the same for the total sample ($n=160$) and for German responses only ($n=138$).

5.2.2.3 *Implicit Theories of Intelligence Reliability*

The internal consistency of the Implicit Theories of Intelligence items is excellent with Cronbach's $\alpha = .901$ (details in Table 18). This result is the same for the total sample ($n=160$) as well as for German responses only ($n=138$).

Table 18 in Appendix A shows statistics related to items in the implicit theories of intelligence questionnaire. The item-rest correlation ranges from 0.759 to 0.839. Mean and standard deviation (sd) values provide insight into the distribution of responses for each item. For instance, item Q5.2 has the highest mean score of 3.465, with a standard deviation of 1.217, suggesting a moderate level of variability in responses. It should be noted that all items were reverse scaled, implying that higher scores on these items represent lower levels of the measured construct.

5.2.3 Factor Structures

As presented by Schmidt et al. (2019), the present study examines the root mean square error of approximation (RMSEA), the Tucker-Lewis Index (TLI), the Comparative Fit Index (CFI), and the standardized root mean square residual (SRMR). Usually, TLI and CFI values exceeding .90 or .95 are considered indicative of an acceptable or excellent fit to the data. RMSEA measures the discrepancy between the observed data and the model, with lower values indicating a better fit. SRMR calculates the average absolute difference between the observed and model-implied correlation or covariance matrices. RMSEA values below .05, .06, or .08, and SRMR values below .08 or .10 are generally seen as a close or reasonable fit to the data (Schmidt et al., 2019; West et al., 2012).

5.2.3.1 *Exploratory Factor Analysis (EFA) of German Grit-S*

The overall MSA (Measure of sampling adequacy) value of 0.779 indicates that the sample is adequate for conducting a factor analysis, while the significant result of Bartlett's Test ($p < .001$) shows that the correlation matrix is not an identity matrix. Therefore, the

assumption tests support the suitability of the data for factor analysis. The exploratory factor analysis reveals a 2-factor solution with a Factor Correlation of -0.52.

In Table 19 (Appendix A) the details for the results from PC-based parallel analysis are presented. It compares real data component eigenvalues with simulated data mean eigenvalues to determine factors that should be retained. Factor 1 and Factor 2 exhibit real data component eigenvalues of 3.286 and 1.390, respectively, surpassing their corresponding simulated data mean eigenvalues of 1.368 and 1.237. Hence, both Factor 1 and Factor 2 are recommended for retention. Factors 3 through 8 show real data component eigenvalues ranging from 0.289 to 0.810, compared to their simulated data mean eigenvalues ranging from 0.676 to 1.125. These factors do not surpass their corresponding simulated data mean eigenvalues, suggesting they may not be essential for retention based on the parallel analysis method.

This overall result is consistent with the factors described in the literature (Duckworth & Quinn, 2009), summarized as Consistency of Interest (Factor 1) and Perseverance of Effort (Factor 2).

5.2.3.2 Confirmatory Factor Analysis (CFA) of German Grit-S

The significant reduction in the chi-square value from the Baseline Model to the Factor Model ($p < 0.001$) suggests that the specified factor model provides a significantly better fit to the data than the baseline model (Table 3). As cited by Schmidt et al. (2019), the X^2 -difference test tends to be unreliable in larger sample sizes. However, the sample of the present study is significantly smaller than the original study by Duckworth ($n=525$ compared to $n=136$).

Chi-square test				
	Model	X²	df	p
	Baseline model	827.928	28	
	Factor model	74.921	19	< .001

Table 3: Chi-square test of CFA for Grit-S

While the CFI value (.093) can be considered a reasonably good fit, the TLI (0.897) value is below the acceptance threshold of 0.9. The RMSEA value of 0.143 suggests a less-than-ideal fit, as values below 0.05, 0.06, or 0.08 are typically considered good (Schmidt et al., 2019). The standardized root mean square residual (SRMR) of 0.084 is generally considered reasonable, as values below 0.10 are often indicative of an acceptable fit. The Factor Loadings are illustrated in Figure 3.

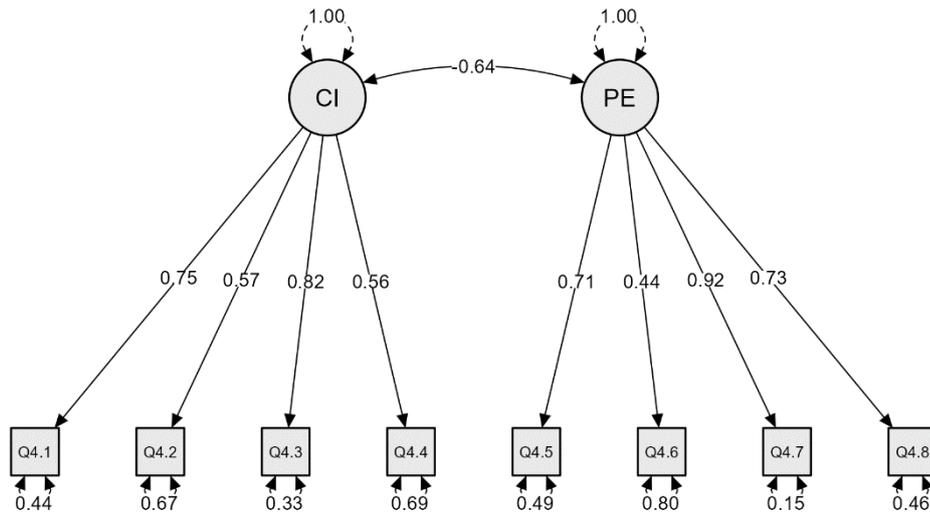


Figure 3: Model Plot of Two-Factor Confirmatory Factor Analysis of Grit-S

For the reason of validation, a unidimensional factor analysis for grit was conducted. The factor model of the chi-square test shows X^2 137.032, df 20, and $p < 0.001$. The additional fit measures amount to CFI 0.852, TLI 0.795, RMSEA 0.202, and SRMR 0.116. The model with two factors fits the data better.

5.2.3.3 Exploratory Factor Analysis of German ASLQ

The chi-squared value (85.363), degrees of freedom (27), and the p-value ($< .001$) indicate that there is a statistically significant difference between the observed and expected data, suggesting that the model may not fit the data well. The analysis shows only one factor with an eigenvalue greater than one (2.92). The fit indices (RMSEA 0.122, SRMR 0.082, TLI 0.646, CFI 0.736) all suggest a less-than-optimal fit of the model to the data. Although the significant Bartlett's Test result ($p < 0.001$) indicates a strong correlation between variables and thus suggests data may be appropriate for factor analysis, the proposed one-factor model of the EFA does not fit the data well.

5.2.3.4 Confirmatory Factor Analysis of German ASLQ

As outlined in the literature of Houghton et al. when they first introduced the abbreviated self-leadership questionnaire, the nine items are labeled for three dimensions: 1) Behavior Awareness and Volition (BAV), 2) Task Motivation (TM), and 3) Constructive Cognition (CC) (Houghton, Dawley, et al., 2012).

The significant decrease in the chi-square value (p 0.003) from the Baseline Model to the Factor Model indicates that the specified factor model offers a markedly improved fit to the data compared to the baseline model (Table 4).

Chi-square test

Model	X ²	df	p
Baseline model	482.309	36	
Factor model	47.275	24	0.003

Table 4: Chi-square test for three-factor CFA of ASLQ

The CFI value of 0.948, as well as the TLI value of 0.922, indicate a good fit. Further, the SRMR value (0.073) is within an acceptable range. However, the RMSEA value (0.082) is slightly above the suggested threshold of 0.08. To sum up, the CFI and TLI values indicate a good fit, while only the SRMR value supports the overall adequacy of the model.

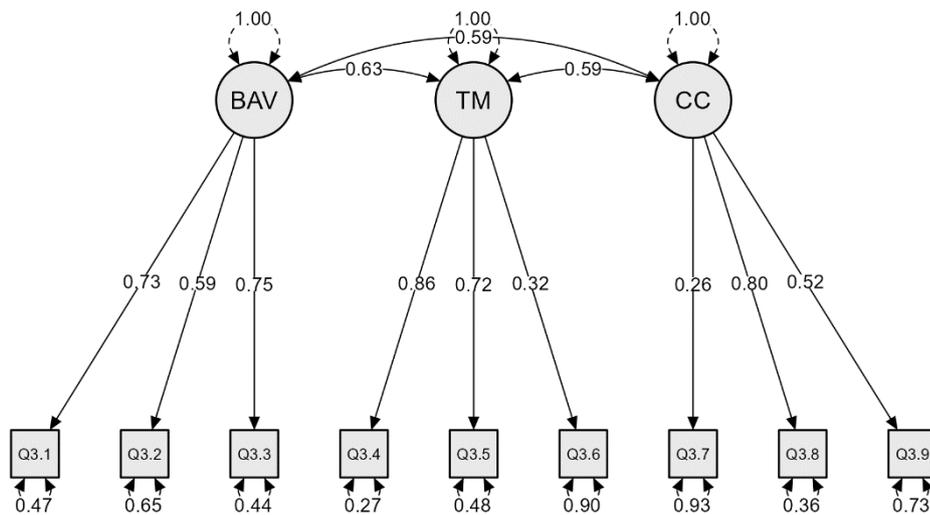


Figure 4: Model Plot of Three-Factor Confirmatory Factor Analysis of ASLQ

For validation purposes, a unidimensional model of the ASLQ is assessed to investigate the psychometric properties associated with the abbreviated self-leadership questionnaire. The chi-square tests show a chi-square value of 83.697 relative to 27 degrees of freedom ($p < 0.001$), as shown in Table 5.

Chi-square test			
Model	X ²	df	p
Baseline model	482.309	36	
Factor model	83.697	27	< .001

Table 5: Chi-square test for unidimensional CFA of ASLQ

5 Results

The fit indices are measured with CFI (0.873), TLI (0.831), RMSEA (0.121) and SRMR (0.093). None of the fit measures for the unidimensional model lie within an acceptable range. Factor Loadings are displayed in Figure 5.

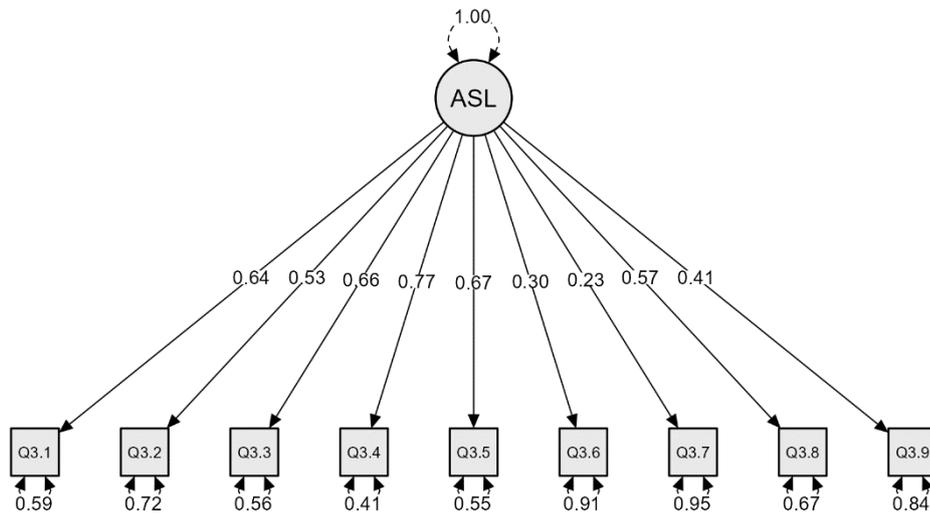


Figure 5: Model Plot of unidimensional Confirmatory Factor Analysis of ASLQ

5.3 Inferential Statistics

In this sub-chapter, the outcomes of the statistical tests are revealed, aiding in the answering of the research questions. Through close examination of the data, relationships between different constructs and correlation with demographic characteristics are uncovered.

The test results show a positive correlation between the Grit-S Score (Mean) and Self-Leadership Score (Mean), which is moderate in strength (Spearman's rho 0.244) but significant (p 0.002). Thus, the first hypothesis, H1 (Individuals with high self-leadership competency also display a higher grit factor), can be confirmed.

Correlation Analysis between self-leadership (ASLQ) and the factors of Grit-S (PE and CI) show that only perseverance of effort correlates positively with self-leadership (rho 0.369) as shown in Table 6.

Further, the sub-scores "self-goal setting" and "self-observation" from the abbreviated self-leadership questionnaire and the category "consistency of interest" from the short grit scale are analyzed. Data in Table 6 show a weak but significant correlation between Self-Goal-Setting and Consistency of Interest Scale (rho 0.220, p 0.005) as well as

between Self-Observation Sub-Scale and Consistency of Interest Scale (ρ 0.205, p 0.009).

Spearman's Correlations					
			n	Spearman's rho	p
H1	Grit-Score	- ASLQ-Score	160	0.244 **	0.002
	Grit-CI-Sub-Score	- Grit-PE-Sub-Score	160	0.432 ***	< .001
	Grit-CI-Sub-Score	- ASLQ-Score	160	0.103	0.194
	Grit-PE-Sub-Score	- ASLQ-Score	160	0.369 ***	< .001
H2	Grit-CI-Sub-Score	- ASLQ-Self-Goal-Setting-Sub-Score	160	0.220 **	0.005
	Grit-CI-Sub-Score	- ASLQ-Self-Observation-Sub-Score	160	0.205 **	0.009
	ASLQ-Self-Goal-Setting-Sub-Score	- ASLQ-Self-Observation-Sub-Score	160	0.319 ***	< .001

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 6: Correlation Test Results for Hypothesis 1 and 2

Hypothesis 3 tests if personal experience correlates with the test results of the ASLQ and GRIT-S assessments (Table 7). First, the Kruskal Wallis Test for age shows a borderline significant result for Grit (p 0.05) and no significant result for self-leadership (p 0.447). Details on the borderline-significant grit result are illustrated in Table 8. Second, there seems to be a difference in mean score Grit values between people with different educational levels attained (p 0.043). The post-hoc test shows significant differences between people who completed only compulsory school and people with apprenticeship (p 0.029) and tertiary education (p 0.039). There is no significant difference in self-leadership scores regarding education (p 0.108). Third, the data suggests a difference in grit-means between people with different employment status (p 0.012). People working full-time (mean 14.26) or part-time (mean 14.65) show a significantly higher (p 0.009 / p 0.033) grit factor than students (mean 10.5). Details are presented in Table 8. However, employment status does not influence the self-leadership score (p 0.125).

Kruskal-Wallis Test					
	Factor	Variable	Statistic	df	p
H3.1	Age	Grit-S Score	11.054	5	0.05
	Age	ASLQ Score	4.750	5	0.447
H3.2	Highest education obtained	Grit-S Score	9.851	4	0.043
	Highest education obtained	ASLQ Score	7.591	4	0.108
H3.3	Employment Status	Grit-S Score	12.814	4	0.012
	Employment Status	ASLQ Score	7.224	4	0.125

Table 7: Test Results for H3.1, H3.2 and H3.3

		Descriptives - Grit-Score				Coefficient of variation
		N	Mean	SD	SE	
Age (Q2.1)	Under 25	20	3.131	0.652	0.146	0.208
	25-34	88	3.511	0.611	0.065	0.174
	35-44	18	3.264	0.661	0.156	0.203
	45-54	17	3.669	0.574	0.139	0.157
	55-64	10	3.425	0.593	0.187	0.173
	65+	7	3.554	0.249	0.094	0.070
Employment Status (Q2.4)	Other	6	3.125	0.586	0.239	0.188
	Retired	7	3.304	0.352	0.133	0.107
	Student	22	3.063	0.673	0.144	0.220
	Working full-time	102	3.532	0.613	0.061	0.174
	Working part-time	23	3.582	0.501	0.104	0.140
	Other	6	3.125	0.586	0.239	0.188

Table 8: Grit score per age group and employment status (H3.1 and H3.3)

Further, H3.4 and H3.5 suppose that there is no correlation between self-leadership and professional responsibilities. Therefore, the Mann-Whitney U test was performed to check for differences in grit and self-leadership scores between people who possess a leadership position and / or strategic decision making responsibility in their current job and those who do not.

Hypothesis 3.4 suggests there is no correlation between self-leadership and possessing a leadership position in the current job. Participants answered the questions "Are you currently in a professional position where one or more people report to you?". Group descriptives for ASLQ-Score and Grit-Score are categorized by participants' responses of "Yes" or "No". For ASLQ-Score, among participants who responded "Yes," the mean score is 3.645 with a standard deviation of 0.534, a standard error of 0.071, and a coefficient of variation of 0.146. Among those who responded "No," the mean score is 3.600 with a standard deviation of 0.641, a standard error of 0.068, and a coefficient of variation of 0.178. Regarding Grit-Score, participants who responded "Yes" have a mean score of 3.592 with a standard deviation of 0.605, a standard error of 0.081, and a coefficient of variation of 0.168. For participants who responded "No," the mean score is 3.367 with a standard deviation of 0.620, a standard error of 0.066, and a coefficient of variation of 0.184.

5 Results

The results confirm the suggestion of the hypothesis, as there is no difference regarding self-leadership ($p = 0.683$). However, there seems to be a significant difference in grit scores ($p = 0.021$), as explained in Table 21 (Appendix A). The data shows that people who have a leadership position (supervising others) have, on average, a higher grit score.

Lastly, Hypothesis 3.5 investigates if people who have strategic decision-making responsibilities present a different grit score or self-leadership score than their counterparts who do not participate in strategic decision-making. The table in Appendix A (Table 20) presents group descriptives for ASLQ-Score and Grit-Score, categorized by whether participants responded "Yes" or "No" to the question "Are you currently in charge of taking strategic decisions (long-term decisions to reach the organizations' goal)?".

For ASLQ-Score, among participants who responded "Yes," the mean score is 3.733 with a standard deviation of 0.586, a standard error of 0.067, and a coefficient of variation of 0.157. For those who responded "No," the mean score is 3.512 with a standard deviation of 0.616, a standard error of 0.073, and a coefficient of variation of 0.176. Similarly, for Grit-Score, participants who responded "Yes" have a mean score of 3.557 with a standard deviation of 0.582, a standard error of 0.066, and a coefficient of variation of 0.164. For those who responded "No," the mean score is 3.324 with a standard deviation of 0.638, a standard error of 0.076, and a coefficient of variation of 0.192.

The findings show a significant result for both grit ($p = 0.019$) and self-leadership ($p = 0.029$) in the Mann-Whitney U Test, suggesting a meaningful distinction between the groups. Table 20 (Appendix A) shows that people who engage in strategic decision-making are generally significantly higher in grit and self-leadership.

Hypothesis 4 assumes that grit and self-leadership both show a positive correlation with a growth mindset (incremental theory). Statistical findings suggest that only self-leadership is weakly and positively correlated with a growth mindset, while grit does not show any significant correlation (Table 9). A detailed analysis of the sub-scores of self-leadership shows a significant association between ITIS and Self-Talk (Table 9).

Spearman's Correlations			n	Spearman's rho	p
H4	Grit-Score	- ASLQ-Score	160	0.244**	0.002
	Grit-Score	- ITIS-Score	160	0.057	0.471
	ASLQ-Score	- ITIS-Score	160	0.193*	0.015
ASLQ Sub-Scores (H4)	ITIS-Score	- ASLQ-Self-Goal-Setting-Sub-Score	160	0.126	0.113
	ITIS-Score	- ASLQ-Self-Observation-Sub-Score	160	0.093	0.244
	ITIS-Score	- ASLQ_Visualizing-Performance-Sub-Score	160	0.126	0.111
	ITIS-Score	- ASLQ-Self-Rewards-Sub-Score	160	0.081	0.307
	ITIS-Score	- ASLQ-Evaluating-Beliefs-Sub-Score	160	0.111	0.160
	ITIS-Score	- ASLQ-Self-Talk-Sub-Score	160	0.230**	0.003

* p < .05, ** p < .01, *** p < .001

Table 9: Test Results for H4

Lastly, the grit, self-leadership, and growth mindset scores are investigated regarding differences between people who identify as men and women. The analysis depicts no significant difference between males and females for any of the scores, based on the Mann-Whitney U tests (Table 22 in Appendix A). For Grit-Score, the test yielded a W value of 3238.000, with an associated p-value of 0.349. Similarly, for ASLQ-Score, the W value is 3290.000, with a p-value of 0.262. Lastly, for ITIS-Score, the W value is 3302.000, with a p-value of 0.241.

The table below (Table 10) provides group descriptives for Grit-Score, ASLQ-Score, and ITIS-Score, categorized by participants' gender.

Group Descriptives						
	Group	N	Mean	SD	SE	Coefficient of variation
Grit-Score	Male	64	3.504	0.660	0.082	0.188
	Female	93	3.413	0.593	0.062	0.174
ASLQ-Score	Male	64	3.712	0.531	0.066	0.143
	Female	93	3.590	0.634	0.066	0.177
ITIS-Score	Male	64	3.469	1.098	0.137	0.317
	Female	93	3.276	1.124	0.117	0.343

Table 10: Descriptive statistics for H5

The table below (Table 11) provides a summary of the hypotheses and analyses presented in this chapter. It outlines the hypotheses tested in this study, the corresponding statistical instruments utilized, the results of the statistical tests conducted, and the

determination of whether each hypothesis was confirmed or rejected based on the results obtained.

ID	Hypothesis	Statistical Instrument	Implication Hypothesis	Result Value
H1	Individuals with high self-leadership competency also display a higher grit factor.	Spearman's Correlation Analysis	Confirmed	Rho 0.244, p .002
H2	There is a positive correlation between the categories "self-goal setting" and "self-observation" from the abbreviated self-leadership questionnaire and the category "consistency of interest" from the short grit scale.	Spearman's Correlation Analysis	Confirmed	Goal Setting: rho 0.220, p 0.005 Observation: rho 0.205, p 0.009
H3	Personal experience positively correlates with the test results of the ASLQ and GRIT-S assessments.			
H3.1	Higher age positively correlates with the test results of the ASLQ and GRIT-S assessments.	Kruskal Wallis Test	Grit: borderline ASLQ: rejected	Grit: p 0.05 ASLQ: p 0.447
H3.2	Years of schooling positively correlate with the test results of the ASLQ and GRIT-S assessments.	Kruskal Wallis Test	Grit: confirmed ASLQ: rejected	Grit: p 0.043 ASLQ: p 0.108
H3.3	Employment status has an effect on grit- and self-leadership scores.	Kruskal Wallis Test	Grit: confirmed ASLQ: rejected	Grit: p 0.012 ASLQ: p 0.125
H3.4	There is no correlation between self-leadership and possessing a leadership position in the current job.	Mann-Whitney U-Test	<i>Grit: rejected</i> ASLQ: confirmed	<i>Grit: p 0.021</i> ASLQ: p 0.683
H3.5	There is no correlation between self-leadership and possessing a professional position with strategic decision-making responsibility.	Mann-Whitney U-Test	<i>Grit: rejected</i> ASLQ: rejected	<i>Grit: p 0.019</i> ASLQ: p 0.029
H4	Grit and Self-leadership both show a positive correlation with Growth Mindset (incremental theory).	Spearman's Correlation Analysis	Grit: rejected ASLQ: confirmed (self-talk)	Grit: rho: 0.057, p 0.471 ASLQ: rho 0.193, p 0.015
H5	There are significant differences in grit, self-leadership, and implicit theory of intelligence scores between people who identify as men and women.	Mann-Whitney U-Test	Grit: rejected ASLQ: rejected ITIS: rejected	Grit: p 0.340 ASLQ: p 0.262 ITIS: p 0.241

Table 11: Overview: Rejected and confirmed hypotheses

6 Discussion and Implications

This chapter presents key insights into the relationship between grit, self-leadership, and growth mindset, highlighting the importance of the findings. The intersections of these constructs add one piece to understanding the complex dynamics of achievement and individual performance better. The study's distinctiveness is underscored by comparing the results with prior research, offering theoretical enrichment and practical implications.

6.1 Interpretation and Comparison with Previous Research

This sub-section examines the findings presented in Chapter 5 through the lens of interpretation, focusing first on the results of psychometric test properties (reliability analysis and factor structure analysis) and then on hypothesis tests. The results are compared to prior research.

6.1.1 Interpretation of Psychometric Properties

The findings of the reliability analyses show that the Grit-S scale is acceptable ($\alpha = .780$), also for the German translation used in this study. This value is in line with previous studies, where the model showed adequate internal consistency of $\alpha = .80$ in the German translation (Schmidt et al., 2019) and $\alpha = .82$ in the original English version (Duckworth & Quinn, 2009). The exploratory factor analysis of Grit-S discloses two factors, representing Consistency of Interest (Factor 1) and Perseverance of Effort (Factor 2), which have been explained previously in research by Duckworth and Quinn (2009). The CFA for the two-dimensional higher-order model, first suggested by Duckworth and Quinn (2009), did not fit the data sufficiently. This result confirms the findings by Schmidt et al. (2019) on the factor analysis of the German Grit-S questionnaire. This discrepancy between German and English results might be explained by the suggestion that the internal factor structure of tests may differ when applied in another context (Flake et al., 2017; Flora & Flake, 2017), as in this case translated to German and with a predominantly Austrian population.

The Abbreviated Self-Leadership Questionnaire reports an adequate internal consistency ($\alpha = .717$), which is similar to the value of $\alpha = .73$ presented in previous research (Houghton, Dawley, et al., 2012, p. 224). In the current investigation, EFA yielded a one-factor model that inadequately captured the particulars of the dataset and represented a suboptimal fit. Notably, the literature states that EFA facilitates the exploration of latent structures among variables, while CFA emerges as a more fitting framework for theory testing and validating existing research propositions (Hair et al., 2010). Thus, the

conducted CFA hypothesized that the specified factor structure of Houghton et al. (2012), with three dimensions of Self-Leadership, provides a better representation of the data. The results of the Confirmatory Factor Analysis offer support for the a priori specified three-dimensional structure of Self-Leadership as proposed in the literature of Houghton and his colleagues (2012). The RMSEA value slightly exceeds the suggested threshold of 0.08, but the SRMR value falls within an acceptable range. In sum, the original literature reported excellent fit indices, meeting established thresholds (Houghton, Dawley, et al., 2012). While the EFA was rejected, the CFA on ASLQ of the present study also demonstrated a good fit overall, with somewhat conflicting results concerning the RMSEA value but an acceptable fit according to other indices. Therefore, the comparison of EFA and CFA highlights the diverse utility of factor analysis methodologies, emphasizing CFA's proficiency in validating theories and examining empirical evidence. For validation purposes, a unidimensional structure model was tested in addition to the three uncorrelated factors model of self-leadership as previously established by Nel and Van Zyl (2015). The three-factor model with a lower chi-square value relative to the degrees of freedom and a higher p-value indicates a better fit (Alavi et al., 2020). This is supported by more adequate fit indices in the three-factor model. To sum up, the current study confirms the findings of Houghton et al. (2012) proposing a three-factor model, while the results of Nel and Van Zyl (2015) from a South African sample supporting a unidimensional model cannot be replicated with the data set collected.

6.1.2 Interpretation of Hypotheses Tests

The main hypothesis proposed in the present study is that the two capabilities of grit and self-leadership correlate. Although correlation does not allow the drawing of conclusions for causation, it might allow the suggestion that the constructs influence each other, mutually strengthen each other, or simply enable and support an individual to work towards a defined goal. Therefore, the link between grit and self-leadership was investigated, and the results show a positive correlation moderate in strength (Spearman's rho 0.244, $p < 0.002$). Hence, the hypothesis (H1) that individuals with high self-leadership competency also display a higher grit factor or vice versa can be confirmed. In the literature review no previous literature could be found that has investigated this relationship. However, a conceptual model proposed by Eng and Knotts (2021) argues that self-leadership might stimulate grit. Further, researchers have shed light on the interplay between grit and positive leadership (Schimschal & Lomas, 2019) and transformational leadership (Caza & Posner, 2021; Davidson, 2014). All studies presented a positive correlation between the non-cognitive trait grit and the leadership aspect analyzed. Davidson (2014)

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presented that grit was found to be a positive predictor of transformational leadership behavior. Finally, research by Caza and Posner (2019) examined the influence of grit on leaders' self-reported behavior and found that leaders strong in grit indicated a higher occurrence of demonstrating role modeling and engaging in innovative behaviors.

Investigating the relationship between self-leadership and grit in more detail, the second hypothesis proposed a positive correlation between the categories 'self-goal setting' and 'self-observation' from the ASLQ and the category 'consistency of interest' from the short grit scale. Self-Goal Setting and Consistency of Interest ($\rho = 0.220$, $p = 0.005$), as well as Self-Observation and Consistency of Interest ($\rho = 0.205$, $p = 0.009$), show a weak but significant correlation. This finding could be explained by considering that grit assesses an individual's ability to persist with a long-term goal. This aligns with the capability to set a clear goal, work toward it, and monitor progress along the way.

Previous studies have displayed that perseverance (PE) reveals a stronger relationship with positive leadership than passion (CI) (Schimschal & Lomas, 2019). Therefore, the correlation between perseverance and consistency of interest in the context of self-leadership was assessed. Like this preceding research on positive leadership, the results of the present study demonstrate that perseverance exhibits a robust, positive correlation to self-leadership ($\rho = 0.369$, $p < 0.001$), while there is no significant correlation to the factor 'consistency of interest' ($\rho = 0.103$, $p = 0.194$).

The finding on the correlation between grit and self-leadership indicates that gritty individuals might unconsciously employ strategies that belong to self-leadership. Self-leadership leads to higher commitment (Neck & Houghton, 2006) and is positively associated with coping skills (Houghton, Wu, et al., 2012; Won, 2015), which might play a role especially in perseverance (PE). This potentially explains a stronger correlation. Previous studies also found that people from the United States express a higher grit score when searching for contentment with engagement (Von Culin et al., 2014). Engagement is related to the concept of flow developed by Csikszentmihalyi (1991), which is described as "the state of complete absorption and full mastery in highly challenging, highly skilled activities [...] in diverse fields" (Von Culin et al., 2014, p. 309). Self-Leadership might be a form of engagement that increases grit and enables an individual to find situations where a flow-like state becomes possible. As a normative model, self-leadership aims to give orientation for thought processes to achieve a goal (Neck & Houghton, 2006). Therefore, the question of how self-leadership is applied plays an important role and might be a subject for future studies.

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Hypothesis 3 tests if personal experience impacts the test results of self-leadership and grit. The findings suggest that years of formal schooling (measured with the highest educational level obtained) and employment status impact the grit score significantly. More specifically, significant differences between people who completed only compulsory school and individuals with a finished apprenticeship ($p = 0.029$) and tertiary education degree ($p = 0.039$). The finding should be interpreted with care, as the sample of people having only completed mandatory school is very small ($n=4$). Nevertheless, the result aligns with prior research, supporting established insights in the existing literature that grit significantly differs according to years in school (Credé et al., 2017; Jeong & Lee, 2023). There is a lack of literature exploring variations based on employment levels in the existing research. The data of the present study suggest that individuals working either part-time or full-time exhibit significantly higher scores than students. Age is borderline significant ($p = 0.05$). However, the post-hoc test (tukey-test) reveals no significant difference when all possible comparisons are conducted. These findings present a contradiction to the majority of existing literature, which implies variations according to age (Credé et al., 2017; Jeong & Lee, 2023). Nonetheless, a recent study proposes that grit shows no association with age, even after controlling for other demographic factors (Rhodes & Giovannetti, 2022). While existing literature posits an expected increase in grit with age (Duckworth et al., 2007), the present study's diverging results might suggest that employment status, rather than age, may play a more pivotal role in shaping individuals' grit levels. Further research needs to be done to investigate whether grit is truly associated with age or employment status.

Further, the data shows that people with a leadership position (supervising others) or strategic decision-making responsibility deliver, on average, higher grit scores. Earlier investigations have delved into a comparable construct, disclosing that position and professional experience significantly influence the grit scores of emergency department nurses (Jeong & Lee, 2023). This consideration is supported by empirical results, which indicate a negative correlation between grit and decision fatigue in the healthcare sector (Fernández-Miranda et al., 2023; Tyler-Viola, 2019). It appears plausible that the insights gained from these studies could be applicable in the current context across various professions. The effect explored in the healthcare sector might be generalized in that people high in grit can approach leadership and strategic decision-making responsibility with a sense of challenge instead of fear.

No differences regarding age, educational level, employment status or leadership position could be found when investigating the self-leadership scores. Earlier studies did not extensively explore demographic variables and their associations with self-leadership.

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Politis (2006) controlled for age, education, and sex in his research and found that only age correlated significantly with self-leadership. Also, a recent study on emergency department nurses found that self-leadership was significantly different according to demographic variables like age, education, position, and professional experience (Jeong & Lee, 2023). The data of this study cannot replicate this finding. However, the data analyzed disclose a notable distinction in self-leadership scores between individuals with strategic decision-making responsibilities and those without such responsibilities. This could imply that those in charge of making strategic decisions apply more self-leadership strategies, like behavior-focused strategy, natural reward strategy, and constructive thought strategy. Further exploration of the impact of self-leadership on strategic decision-makers is needed to understand the implications of this difference and its potential impact on leadership effectiveness or personal development.

When examining the relationship between grit and growth mindset (H4), a positive relationship was expected based on previous studies (Park et al., 2020; Sigmundsson et al., 2020; Zhang et al., 2022). However, this finding cannot be replicated in this study ($\rho = 0.057$, $p = 0.471$). This might be because the present study considered adults only, while previous studies focused primarily on children and adolescents. Self-leadership weakly and positively correlates with growth mindset ($\rho = 0.193$, $p = 0.015$). Further, exploring the relationship between grit and growth mindset in a particular setting might be helpful as literature shows that individuals tend to possess both fixed and growth mindsets, which can change depending on their life circumstances (Dweck, 2016). Little scholarly investigation has been conducted on this subject, with a limited body of existing research addressing the interplay between growth mindset and self-leadership. A study in 2019 presented similar findings, where a positive correlation between self-leadership and growth mindset was exposed (Kujawa & Kamiński, 2019). This might show that people who believe in the malleability of intelligence also apply strategies to positively influence themselves. Studies suggest that individuals with a fixed mindset tend to avoid challenges (Dweck, 2006; Dweck et al., 1995). Considering this, an examination of self-leadership sub-scores in conjunction with the ITIS score was conducted. The results revealed no significant correlation across most dimensions, except for the noteworthy exception of self-talk ($\rho = 0.230$, $p = 0.003$). This might indicate that positive self-talk and a growth mindset impact each other, encouraging individuals to take on challenges and believe in their own capabilities. Cultivating positive self-talk and fostering a growth mindset might go hand in hand with supporting personal and professional growth. Houghton et al. report vast research on the positive effect of self-talk on performance and achievement across numerous disciplines (2012, p. 219).

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As self-talk is positively associated with growth mindset, the relationship between self-talk and grit might also reveal interesting insights. Data shows a significant correlation between self-talk and grit ($\rho = 0.245$, $p = 0.002$), which is noteworthy in both sub-scores perseverance of effort (PE; $\rho = 0.280$, $p < 0.001$) and consistency of interest (CI; $\rho = 0.164$, $p = 0.038$). Previous research by Caza and Posner (2019) reported no consistent association between encouraging behaviors and grit. The present findings might indicate that this only holds true for externally encouraging behavior, while internally encouraging behavior in the form of self-talk shows a significant correlation with grit. This consideration is supported by the findings of White et al. (2017) who suggest that private speech from a self-distanced perspective may enhance the perseverance of children. Numerous research studies have highlighted the significance of verbal and non-verbal self-dialogue in the process of tackling challenges (Al-Namlah et al., 2006; Fahy, 2014; Fernyhough, 2009).

Finally, the empirical findings of this study deviate from established literature, as no significant distinctions between genders were identified for self-leadership. Particularly when employing gender as a variable rather than focusing on biological sex (male and female). Research presented by Norris (2008), where women reported higher self-leadership scores compared to men, cannot be confirmed. The study by Sigmundsson and his colleagues (2020) found no difference between females and males in grit and mindset factors (implicit theories of intelligence). The present findings validate the reported result of Sigmundsson (2020) but contradict the data analyzed in a meta-analytic synthesis of the grit literature, which found very weak but significant differences between genders (Credé et al., 2017).

Summing up, the positive correlation between grit and self-leadership derives from perseverance of effort (PE) rather than consistency of interest (CI). Nevertheless, there is a significant correlation between consistency of effort with the factors 'self-goal setting' and 'self-observation' of the self-leadership construct. Personal experience (age, years of schooling, employment status, leadership responsibility) seems to influence the grit score but not the self-leadership score. The only exception is strategic decision-making responsibility, which correlates with higher grit and self-leadership scores. No differences between male and female respondents could be observed. Finally, growth mindset is positively correlated with the aspect 'self-talk' of self-leadership.

6.2 Implications of Findings

This is one of the first studies to examine the correlation between grit and self-leadership. Thus, this thesis has gone some way towards enhancing our understanding of the intersection between grit and self-leadership, showing how perseverance and self-influencing strategies correlate with each other. The insights collected in the present study, combined with evidence from previous researchers, display several theoretical and practical implications.

For theory, the internal structure of the grit-s and abbreviated self-leadership questionnaire was validated with primarily Austrian participants who conducted the survey in the German language. Utilizing and validating standardized questionnaires in multiple languages (German and English in this study) allows researchers to assess the generalizability and robustness of test instruments across different linguistic and cultural groups. This study enhances the investigation of the reliability and validity of the grit, self-leadership and ITIS measure used in the questionnaire. This offers further insights for theory, as the internal structure of a test is dependent on the population and might differ when applied in a different manner (e.g., translation into another language) (Flora & Flake, 2017). This might contribute to a deeper understanding of how language and cultural factors influence the measurement of constructs.

Further, the findings begin to fill a research gap. Understanding that grit and self-leadership, as well as self-leadership and growth mindset, positively correlate, offers valuable insights into the psychological mechanisms underlying sustained effort, passion, goal attainment, and personal growth. It is well-established that non-cognitive traits influence leadership results (Caza & Posner, 2019). The findings of this study show that grit does not only influence leadership but also shows a correlation with self-leadership.

For practice, this holds implications for development and education. The results suggest that grit and self-leadership, as well as self-leadership and growth mindset, positively correlate with each other. Literature shows that all three constructs are beneficial for achievement and can be developed and cultivated (Duckworth, 2017; Dweck, 2006, 2010; Ross, 2014). This underscores the importance of offering leaders as well as students developmental opportunities to strengthen both grit and self-leadership. The significant correlation observed between grit and self-leadership emanates predominantly from the grit sub-score of perseverance of effort (PE) rather than consistency of interest (CI). In the realm of self-leadership, it appears that the capacity to endure and remain dedicated to personal objectives is the crucial factor, suggesting a reciprocal influence between perseverance and self-leadership.

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For businesses and organizations, this has practical implications for hiring practices and when identifying, developing, and supporting leaders. Moreover, understanding how grit and self-leadership interact can also be important to management practice in team-building processes and the development of a gritty workplace. In today's rapidly changing world, empowering employees to think independently, regardless of hierarchies, is crucial for enabling the organization to keep pace with its dynamic environment. Both grit and self-leadership are linked to high levels of motivation and drive. Individuals with these qualities are more likely to take ownership of their work, set ambitious goals, and persistently pursue them.

Lastly, the findings might be dependent on context, suggesting that the applicability of the results may not be universal (Caza & Posner, 2019). This emphasizes the need to consider implications beyond educational and workplace settings, extending to areas like voluntary work, engagement in associations and personal development.

7 Limitations and Future Research

This section discusses the limitations encountered during the course of the study and proposes potential avenues for future research.

7.1 Limitations of the Study

In exploring grit, self-leadership, and growth mindset, it is crucial to acknowledge and critically examine the inherent limitations that shape this study's boundaries.

7.1.1 Limitations of Instruments

While this research strives to contribute valuable insights to the field, it is essential to acknowledge certain limitations that may impact the interpretation of the findings.

First, there is a potential tendency toward the middle in response scores, as a five-point Likert scale is used. Answers in the middle (“Neither agree nor disagree” and “somewhat like me”) could suggest a general bias or hesitation among participants to express extreme viewpoints. This tendency might influence the variability of responses and might lead to a reduced validity for evaluation and interpretation. As the original questionnaires from literature used a five-point Likert scale (Duckworth & Quinn, 2009; Houghton, Dawley, et al., 2012), those are also used in this study for better comparability of findings. Nonetheless, it should be considered when assessing the robustness of the results obtained.

Additionally, the translation of standardized English scales into German introduces a layer of complexity, given the linguistic nuances and the various forms of address (‘you’ translated to ‘Du’/‘Sie’/‘man’/‘ich’) in German. Despite efforts to maintain accuracy and development upon existing literature, subtle variations in translation may affect the precise interpretation of questionnaire items, potentially influencing participant responses. Participants may interpret questions differently based on their cultural background. Translation and cultural adaptation challenges present substantial obstacles. Thus, further research is required to assess the validity of test instruments and ensure cultural fairness in cross-linguistic and cross-cultural applications.

Furthermore, this study utilized the older version of the Implicit Theory of Intelligence questionnaire (Dweck et al., 1995) rather than the more recent iteration (Dweck, 1999). This decision might introduce the limitation of missing out on refinements or updates made in the later version. However, as explained in Chapter 4.3.3, the original version

was used after pre-tests indicated confusion among participants when presented with the German translation of the more recent version.

These limitations underscore the need for cautious interpretation and highlight areas for improvement in future studies on grit, self-leadership, and implicit theories of intelligence.

7.1.2 Limitations of Results

In addition to the instrument-specific limitations outlined in Chapter 7.1.1, some other factors may influence the precision and scope of the study's conclusions.

One limitation of the study is the discrepancy between the number of individuals who opened the survey link (187 people) and those who completed the entire survey (160 people). Unfortunately, the study lacks information about the characteristics of participants who terminated early, as demographic questions were positioned at the end of the survey. This does not allow a comprehensive analysis of potential biases caused by early survey termination.

The use of an online survey poses a limitation as it may not have reached all target demographics, particularly individuals from older age groups who may be less inclined to engage with online platforms. Consequently, the study may not fully represent the perspectives of these age groups (55-65 and over 65 years old). Further, the study's sample may not be fully representative of the general Austrian population, as the target sample could not be reached entirely. Especially individuals with lower formal educational attainment may be underrepresented, as the majority of participants (63%) holds a tertiary educational degree. This limitation restricts the generalizability of findings to broader populations with diverse educational backgrounds. Given the predominantly Austrian sample (91% of respondents are living in Austria), the study's findings may lack international applicability. While this ensures reliability within the studied context, caution should be exercised when applying the results to different cultural and national settings.

Self-assessment questionnaires may be limited by respondents' subjective biases, leading to inaccurate self-perceptions. Additionally, they may lack the depth and nuance necessary to capture complex psychological traits or behaviors accurately. However, the test instruments have been replicated many times in academic research and are well established in psychological literature, offering test instrument validity, reliability, and objectiveness.

The study may also be vulnerable to social desirability bias, where participants may have provided responses that align with societal expectations rather than expressing their genuine opinions. Despite repeated assurances throughout the survey that there are no

right or wrong answers and that respondents' input is entirely anonymous, this bias could impact the accuracy and authenticity.

In spite of these limitations, the study contributes valuable insights within its defined scope. Future research endeavors should consider addressing these constraints to enhance the robustness and generalizability of findings.

7.2 Suggestions for Future Research

A set of recommendations for future studies emerge from this thesis, aiming to guide future investigations toward a more comprehensive understanding of the investigated constructs in adult populations.

Building upon current research, future studies should consider conducting a cross-cultural analysis to explore potential variations in the relationship between grit and self-leadership, as both constructs are influenced by culture. Further, extending beyond the prevalent focus on children and adolescents, researchers are encouraged to explore the dynamics of grit and growth mindset in adults. This expansion will provide valuable insights to understand if a growth mindset and grit are mutually strengthening each other also in adult populations. Future research might also investigate the interplay between the responsibility of making strategic decisions and the application of self-leadership strategies. Understanding how individuals navigate leadership roles through self-leadership will contribute to a more nuanced comprehension of decision-making processes. To clarify the associations between grit and demographic variables, researchers are recommended to investigate whether grit is truly linked with age or if employment status might play an influential role. Lastly, testing the hypothesis that individuals high in grit approach leadership and strategic decision-making responsibilities with a sense of challenge rather than fear should be tested across all professions in future research. By addressing these research gaps, scholars can contribute to the refinement of self-leadership theories and the understanding of grit and growth mindset across diverse adult populations.

8 Conclusion

In conclusion, this thesis has successfully shed light on various aspects of self-leadership, grit, and growth mindset, contributing valuable insights to the field. The findings reveal several significant correlations: notably, a positive association between self-leadership and both grit and growth mindset. Furthermore, the robust correlation between perseverance of effort and self-leadership emphasizes the importance of this trait in effective self-leadership practices. Moreover, the thesis identifies differences in grit levels among individuals with leadership and strategic decision-making responsibilities, underscoring the relevance of grit in leadership roles. However, the absence of a correlation between grit and growth mindset highlights the complexity of these constructs and warrants further investigation.

Additionally, the reliability analyses of the German translation instruments demonstrate acceptable psychometric properties, particularly in the assessment of grit and self-leadership. While the German translation of the Grit-S instrument was initially hypothesized to align with a two-dimensional higher-order model proposed by Duckworth and Quinn (2009), the collected data did not provide sufficient support for this model. However, the three-factor model proposed by Houghton et al (2012) could be replicated in the German translation.

Overall, this thesis advances our understanding of self-leadership, grit, and growth mindset, providing valuable insights for researchers, practitioners, and organizations aiming to foster personal and professional development.

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Appendix

Appendix A: Additional Tables and Figures

Gender	male	55 Participants	110 Participants
	female	55 Participants	
	divers	n.a.	
Age			
	Under 24	14 Participants	110 Participants
	25 - 34	20 Participants	
	35-44	20 Participants	
	45 - 54	20 Participants	
	55-64	18 Participants	
	over 65	18 Participants	
Highest educational attainment level			
	Mandatory education (ISCED 1 & 2)	36 Participants	110 Participants
	Secondary education (ISCED 3 & 4)	42 Participants	
	Tertiary education (ISCED 5 - 8)	32 Participants	

Table 12: Demographic distribution of the target sample

Appendix A

		Descriptive Statistics			
		Mean	Std. Deviation	Shapiro-Wilk	P-value of Shapiro-Wilk
ASLQ	Q3.1	3.494	1.133	0.886	< .001
	Q3.2	3.587	1.157	0.864	< .001
	Q3.3	3.944	0.940	0.811	< .001
	Q3.4	3.431	1.257	0.877	< .001
	Q3.5	3.506	1.171	0.859	< .001
	Q3.6	3.413	1.146	0.886	< .001
	Q3.7	3.781	1.222	0.825	< .001
	Q3.8	3.700	0.976	0.858	< .001
	Q3.9	3.869	1.023	0.834	< .001
Grit S	Q4.1	2.563	0.943	0.859	< .001
	Q4.2	3.294	1.185	0.897	< .001
	Q4.3	2.612	1.182	0.900	< .001
	Q4.4	3.038	1.081	0.903	< .001
	Q4.5	3.763	0.850	0.833	< .001
	Q4.6	3.400	0.998	0.901	< .001
	Q4.7	4.112	0.832	0.824	< .001
	Q4.8	3.825	0.908	0.871	< .001
ITIS	Q5.1	2.719	1.224	0.900	< .001
	Q5.2	2.531	1.213	0.858	< .001
	Q5.3	2.642	1.244	0.874	< .001

Table 13: Shapiro-Wilk Test for normality distribution (ASLQ, Grit-S, ITIS)

Appendix A

ID	Hypothesis	Statistical Instrument
H1	Individuals with high self-leadership competency also display a higher grit factor.	Spearman's Correlation Analysis
H2	There is a positive correlation between the categories "self-goal setting" and "self-observation" from the abbreviated self-leadership questionnaire and the category "consistency of interest" from the short grit scale.	Spearman's Correlation Analysis
H3	Personal experience positively correlates with the test results of the ASLQ and GRIT-S assessments.	
H3.1	Higher age correlates positively with the test results of the ASLQ and GRIT-S assessments.	Kruskal Wallis Test
H3.2	Higher level of education positively correlate with the test results of the ASLQ and GRIT-S assessments.	Kruskal Wallis Test
H3.3	Employment status has an effect on grit- and self-leadership scores.	Kruskal Wallis Test
H3.4	There is no correlation between self-leadership and possessing a leadership position in the current job.	Mann-Whitney U-Test
H3.5	There is no correlation between self-leadership and possessing a professional position with strategic decision-making responsibility.	Mann-Whitney U-Test
H4	Grit and Self-leadership both show a positive correlation with Growth Mindset (incremental theory).	Spearman's Correlation Analysis
H5	There are significant differences in grit, self-leadership, and implicit theory of intelligence scores between people who identify as men and women.	Mann-Whitney U-Test

Table 14: Overview of statistical Instruments applied to test the Hypotheses

Appendix A

Descriptive Statistics			
	Grit-Sum-Score	ASLQ-Sum-Score	ITIS-Sum-Score
Valid	160	160	160
Median	28.000	33.000	11.000
Mean	27.594	32.725	10.088
Std. Deviation	4.942	5.496	3.345
Shapiro-Wilk	0.978	0.983	0.940
P-value of Shapiro-Wilk	0.011	0.048	< .001
Minimum	16.000	19.000	3.000
Maximum	38.000	45.000	15.000

Table 15: Total Sum Scores of Grit, ASLQ and ITIS

Item	If item dropped		mean	sd
	Cronbach's α	Item-rest correlation		
Q4.1	0.748	0.535	3.438	0.951
Q4.2	0.764	0.447	2.653	1.161
Q4.3	0.728	0.629	3.396	1.166
Q4.4	0.769	0.410	2.965	1.060
Q4.5	0.740	0.600	3.736	0.844
Q4.6	0.786	0.297	3.424	1.001
Q4.7	0.747	0.568	4.153	0.778
Q4.8	0.761	0.452	3.799	0.920

Note. The following items were reverse scaled: Q4.1, Q4.2, Q4.3, Q4.4.

Table 16: Frequentist Individual Item Reliability for Grit-S (n=160)

Item	If item dropped		mean	sd
	Cronbach's α	Item-rest correlation		
Q3.1	0.683	0.435	3.444	1.139
Q3.2	0.690	0.402	3.597	1.161
Q3.3	0.680	0.471	3.958	0.930
Q3.4	0.663	0.532	3.479	1.229
Q3.5	0.677	0.469	3.521	1.146
Q3.6	0.707	0.312	3.403	1.155
Q3.7	0.734	0.177	3.757	1.230
Q3.8	0.678	0.481	3.694	0.963
Q3.9	0.709	0.290	3.868	1.033

Table 17: Frequentist Individual Item Reliability for ASLQ (n=160)

Item	If item dropped		mean	sd
	Cronbach's α	Item-rest correlation		
Q5.1	0.853	0.810	3.229	1.239
Q5.2	0.828	0.839	3.465	1.217
Q5.3	0.895	0.759	3.392	1.239

Note. The following items were reverse scaled: Q5.1, Q5.2, Q5.3.

Table 18: Frequentist Individual Item Reliability for ITIS (n=160)

Parallel Analysis		
	Real data component eigenvalues	Simulated data mean eigenvalues
Factor 1*	3.286	1.368
Factor 2*	1.390	1.237
Factor 3	0.810	1.125
Factor 4	0.687	1.033
Factor 5	0.613	0.940
Factor 6	0.494	0.860
Factor 7	0.431	0.762
Factor 8	0.289	0.676

Note. '*' = Factor should be retained. Results from PC-based parallel analysis.

Table 19: Exploratory Factor Analysis for Grit-S

Group Descriptives						
	Group	N	Mean	SD	SE	Coefficient of variation
ASLQ-Score	Yes	77	3.733	0.586	0.067	0.157
	No	71	3.512	0.616	0.073	0.176
Grit-Score	Yes	77	3.557	0.582	0.066	0.164
	No	71	3.324	0.638	0.076	0.192

Table 20: Descriptive statistics for H3.5

Group Descriptives						
	Group	N	Mean	SD	SE	Coefficient of variation
ASLQ-Score	Yes	56	3.645	0.534	0.071	0.146
	No	89	3.600	0.641	0.068	0.178
Grit-Score	Yes	56	3.592	0.605	0.081	0.168
	No	89	3.367	0.620	0.066	0.184

Table 21: Descriptive statistics for H3.4

Independent Samples T-Test			
	W	df	p
Grit-Score		3238.000	0.349
ASLQ-Score		3290.000	0.262
ITIS-Score		3302.000	0.241

Note. Mann-Whitney U test.

Table 22: Test Results for H5

Appendix B: Survey Export (German and English)

Start of Block: Intro

Q1.1 Dear participants,

I am currently writing my Master Thesis in which I aim to gain more insights about the relationship between consistency of interest, perseverance of effort and self-leading strategies among individuals.

The survey should take around 5-10 minutes, consisting of 30 questions with closed answer options (single choice). **Please respond to the following items honestly and intuitively - there are no right or wrong answers!** Of course, all responses are completely anonymous and will be reported only in aggregate. Individual responses are not shared.

Thank you for taking your time! If you have any questions you can contact me via anna.mayr@mail.fernfh.ac.at

Best regards,

Anna Mayr

Q1.1 Liebe Teilnehmer*nnen,

ich schreibe gerade an meiner Masterarbeit, in der ich Erkenntnisse über die Beziehung von Beharrlichkeit, Ausdauer und Strategien der Selbstführung bei Einzelpersonen gewinnen möchte.

Die Umfrage sollte maximal 5-10 Minuten in Anspruch nehmen. Sie besteht aus 30 Fragen mit geschlossenen Antwortmöglichkeiten (single choice). **Bitte beantworten Sie die folgenden Fragen ehrlich und intuitiv - es gibt keine richtigen oder falschen Antworten!** Selbstverständlich sind alle Antworten völlig anonym und werden nur in aggregierter Form veröffentlicht. Individuelle Antworten werden nicht weitergegeben.

Vielen Dank, dass Sie sich die Zeit nehmen! Wenn Sie Fragen haben, können Sie mich über anna.mayr@mail.fernfh.ac.at kontaktieren.

Mit freundlichen Grüßen,

Anna Mayr

End of Block: Intro

Appendix B

Start of Block: ASLQ

Q40 The following questions explore individuals' ideas about self-influencing strategies. There are no right or wrong answers. We are just interested in your views. Using the scale below, please indicate the extent to which you agree or disagree with the following statements.

Q40 Die folgenden Fragen untersuchen die Vorstellungen der Einzelperson über Strategien zur Selbstbeeinflussung. Es gibt keine richtigen oder falschen Antworten. Ich bin lediglich an Ihren Ansichten interessiert. Bitte geben Sie anhand der nachstehenden Skala an, inwieweit Sie den folgenden Aussagen zustimmen oder nicht zustimmen.

Q3.1 I establish specific goals for my own performance.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

Q3.1 Ich setze mir ständig spezifische Ziele für meine eigene Arbeitsleistung.

- Stimme überhaupt nicht zu (1)
- Stimme eher nicht zu (2)
- Unentschieden (3)
- Stimme eher zu (4)
- Stimme voll und ganz zu (5)

Appendix B

Q3.2 I make a point to keep track of how well I'm doing at work.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

Q3.2 Ich mache mir in der Regel bewusst, wie gut ich gerade in meiner Arbeit bin.

- Stimme überhaupt nicht zu (1)
- Stimme eher nicht zu (2)
- Unentschieden (3)
- Stimme eher zu (4)
- Stimme voll und ganz zu (5)

Q3.3 I work toward specific goals I have set for myself.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

Appendix B

Q3.3 Ich arbeite auf spezifische Ziele hin, die ich mir selbst gesetzt habe.

- Stimme überhaupt nicht zu (1)
- Stimme eher nicht zu (2)
- Unentschieden (3)
- Stimme eher zu (4)
- Stimme voll und ganz zu (5)

Q3.4 I visualize myself successfully performing a task before I do it.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

Q3.4 Bevor ich eine Arbeitsaufgabe angehe, stelle ich mir vor, wie ich sie erfolgreich durchführe.

- Stimme überhaupt nicht zu (1)
- Stimme eher nicht zu (2)
- Unentschieden (3)
- Stimme eher zu (4)
- Stimme voll und ganz zu (5)

Appendix B

Q3.5 Sometimes I picture in my mind a successful performance before I actually do a task.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

Q3.5 Manchmal male ich mir die erfolgreiche Durchführung einer Arbeitsaufgabe aus, bevor ich sie angehe.

- Stimme überhaupt nicht zu (1)
- Stimme eher nicht zu (2)
- Unentschieden (3)
- Stimme eher zu (4)
- Stimme voll und ganz zu (5)

Q3.6 When I have successfully completed a task, I often reward myself with something I like.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

Appendix B

Q3.6 Wenn ich eine Arbeitsaufgabe erfolgreich abgeschlossen habe, belohne ich mich mit etwas, das mir Spaß macht.

- Stimme überhaupt nicht zu (1)
- Stimme eher nicht zu (2)
- Unentschieden (3)
- Stimme eher zu (4)
- Stimme voll und ganz zu (5)

Q3.7 Sometimes I talk to myself (out loud or in my head) to work through difficult situations.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

Q3.7 In schwierigen Situationen diskutiere ich mit mir selbst (laut oder in meinem Kopf), um mit ihnen fertig zu werden.

- Stimme überhaupt nicht zu (1)
- Stimme eher nicht zu (2)
- Unentschieden (3)
- Stimme eher zu (4)
- Stimme voll und ganz zu (5)

Appendix B

Q3.8 I try to mentally evaluate the accuracy of my own beliefs about situations I am having problems with.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

Q3.8 In Situationen, in denen ich auf Probleme treffe, prüfe ich, ob meine Überzeugungen angemessen sind.

- Stimme überhaupt nicht zu (1)
- Stimme eher nicht zu (2)
- Unentschieden (3)
- Stimme eher zu (4)
- Stimme voll und ganz zu (5)

Q3.9 I think about my own beliefs and assumptions whenever I encounter a difficult situation.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

Appendix B

Q3.9 In schwierigen Situationen denke ich über meine eigenen Überzeugungen und Sichtweisen nach.

- Stimme überhaupt nicht zu (1)
- Stimme eher nicht zu (2)
- Unentschieden (3)
- Stimme eher zu (4)
- Stimme voll und ganz zu (5)

End of Block: ASLQ

Start of Block: Grit-S

Q39 The following questions explore individuals' ideas about interest and perseverance. There are no right or wrong answers. We are just interested in your views. Using the scale below, please indicate the extent to which degree you feel the following statements apply to you .

Q39 Die folgenden Fragen erkunden die Vorstellungen von Einzelpersonen über Interesse und Ausdauer. Es gibt keine richtigen oder falschen Antworten. Ich bin lediglich an Ihren Ansichten interessiert. Bitte geben Sie auf der nachstehenden Skala an, inwieweit die folgenden Aussagen Ihrer Meinung nach auf Sie zutreffen.

Q4.1 I often set a goal but later choose to pursue a different one.

- Not like me at all (1)
- Not much like me (2)
- Somewhat like me (3)
- Mostly like me (4)
- Very much like me (5)

Appendix B

Q4.1 Ich setze mir oft ein Ziel, entscheide mich dann aber später doch ein anders Ziel zu verfolgen.

- Trifft überhaupt nicht zu (1)
- Trifft eher nicht zu (2)
- Teils-Teils (3)
- Trifft eher zu (4)
- Trifft voll und ganz zu (5)

Q4.2 I have been obsessed with a certain idea or project for a short time but later lost interest.

- Not like me at all (1)
- Not much like me (2)
- Somewhat like me (3)
- Mostly like me (4)
- Very much like me (5)

Q4.2 Ich war schon einmal für eine kurze Zeit von einem Projekt oder einer Idee besessen, habe später aber das Interesse verloren.

- Trifft überhaupt nicht zu (1)
- Trifft eher nicht zu (2)
- Teils-Teils (3)
- Trifft eher zu (4)
- Trifft voll und ganz zu (5)

Appendix B

Q4.3 I have difficulty maintaining my focus on projects that take more than a few months to complete.

- Not like me at all (1)
- Not much like me (2)
- Somewhat like me (3)
- Mostly like me (4)
- Very much like me (5)

Q4.3 Ich habe Schwierigkeiten auf Projekte fokussiert zu bleiben, wenn diese mehrere Monate dauern.

- Trifft überhaupt nicht zu (1)
- Trifft eher nicht zu (2)
- Teils-Teils (3)
- Trifft eher zu (4)
- Trifft voll und ganz zu (5)

Q4.4 New ideas and projects sometimes distract me from previous ones.

- Not like me at all (1)
- Not much like me (2)
- Somewhat like me (3)
- Mostly like me (4)
- Very much like me (5)

Appendix B

Q4.4 Neue Ideen und Projekte halten mich manchmal von vorherigen ab.

- Trifft überhaupt nicht zu (1)
- Trifft eher nicht zu (2)
- Teils-Teils (3)
- Trifft eher zu (4)
- Trifft voll und ganz zu (5)

Q4.5 I finish whatever I begin.

- Not like me at all (1)
- Not much like me (2)
- Somewhat like me (3)
- Mostly like me (4)
- Very much like me (5)

Q4.5 Alles was ich beginne, bringe ich auch zu Ende.

- Trifft überhaupt nicht zu (1)
- Trifft eher nicht zu (2)
- Teils-Teils (3)
- Trifft eher zu (4)
- Trifft voll und ganz zu (5)

Appendix B

Q4.6 Setbacks don't discourage me.

- Not like me at all (1)
- Not much like me (2)
- Somewhat like me (3)
- Mostly like me (4)
- Very much like me (5)

Q4.6 Von Rückschlägen lasse ich mich nicht entmutigen.

- Trifft überhaupt nicht zu (1)
- Trifft eher nicht zu (2)
- Teils-Teils (3)
- Trifft eher zu (4)
- Trifft voll und ganz zu (5)

Q4.7 I am diligent.

- Not like me at all (1)
- Not much like me (2)
- Somewhat like me (3)
- Mostly like me (4)
- Very much like me (5)

Q4.7 Ich bin fleißig.

- Trifft überhaupt nicht zu (1)
- Trifft eher nicht zu (2)
- Teils-Teils (3)
- Trifft eher zu (4)
- Trifft voll und ganz zu (5)

Q4.8 I am a hard worker.

- Not like me at all (1)
- Not much like me (2)
- Somewhat like me (3)
- Mostly like me (4)
- Very much like me (5)

Q4.8 Ich bin ein hart arbeitender Mensch.

- Trifft überhaupt nicht zu (1)
- Trifft eher nicht zu (2)
- Teils-Teils (3)
- Trifft eher zu (4)
- Trifft voll und ganz zu (5)

End of Block: Grit-S

Start of Block: ITIS

Appendix B

Q38 The following questions explore individuals' ideas about intelligence. There are no right or wrong answers. We are just interested in your views. Using the scale below, please indicate the extent to which you agree or disagree with the following statements.

Q38 Die folgenden Fragen erkunden die Vorstellungen einer Einzelperson über Intelligenz. Es gibt keine richtigen oder falschen Antworten. Ich bin lediglich an Ihren Ansichten interessiert. Bitte geben Sie anhand der unten stehenden Skala an, inwieweit Sie den folgenden Aussagen zustimmen oder nicht zustimmen.

Q5.1 You have a certain amount of intelligence, and you really can't do much to change it.

- Strongly disagree (1)
- Disagree (2)
- Neither agree nor disagree (3)
- Agree (4)
- Strongly agree (5)

Q5.1 Ich besitze ein bestimmtes Ausmaß an Intelligenz, das ich nicht verändern kann.

- Stimme überhaupt nicht zu (1)
- Stimme eher nicht zu (2)
- Unentschieden (3)
- Stimme eher zu (4)
- Stimme voll und ganz zu (5)

Appendix B

Q5.2 Your intelligence is something about you that you can't change very much.

- Strongly disagree (1)
- Disagree (2)
- Neither agree nor disagree (3)
- Agree (4)
- Strongly agree (5)

Q5.2 Meine Intelligenz ist etwas, das ich kaum verändern kann.

- Stimme überhaupt nicht zu (1)
- Stimme eher nicht zu (2)
- Unentschieden (3)
- Stimme eher zu (4)
- Stimme voll und ganz zu (5)

Q5.3 You can learn new things, but you can't really change your basic intelligence.

- Strongly disagree (1)
- Disagree (2)
- Neither agree nor disagree (3)
- Agree (4)
- Strongly agree (5)

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Q5.3 Ich kann zwar neue Dinge lernen, aber meine Intelligenz kann ich dadurch nicht wirklich verändern.

- Stimme überhaupt nicht zu (1)
- Stimme eher nicht zu (2)
- Unentschieden (3)
- Stimme eher zu (4)
- Stimme voll und ganz zu (5)

End of Block: ITIS

Start of Block: Demographics

Q2.1 How old are you?

- Under 18 (1)
- 18-24 years old (2)
- 25-34 years old (3)
- 35-44 years old (4)
- 45-54 years old (5)
- 55-64 years old (6)
- 65+ years old (7)

Appendix B

Q2.1 Wie alt sind Sie?

- Unter 18 (1)
- 18-24 Jahre (2)
- 25-34 Jahre (3)
- 35-44 Jahre (4)
- 45-54 Jahre (5)
- 55-64 Jahre (6)
- Ab 65 Jahre (7)

Q2.2 How do you describe yourself?

- Male (1)
- Female (2)
- Divers (3)
- Prefer not to say (4)

Q2.2 Welchem Geschlecht ordnen Sie sich selbst zu?

- Männlich (1)
- Weiblich (2)
- Nichtbinär/drittes Geschlecht (3)
- Keine Angabe (4)

Appendix B

Q2.3 What is your country of permanent residence?

- Austria (1)
- Germany (2)
- Other (please add) (3) _____

Q2.3 In welchem Land haben Sie Ihren ständigen Wohnsitz?

- Österreich (1)
- Deutschland (2)
- Anderes (bitte ergänzen) (3)

Q2.4 What best describes your employment status over the last three months?

- Working full-time (1)
- Working part-time (2)
- Unemployed / looking for work (3)
- Stay-at-home parent (4)
- Student (5)
- Retired (6)
- Other (7) _____

Appendix B

Q2.4 Wie lässt sich Ihr Beschäftigungsstatus in den letzten drei Monaten am Besten beschreiben?

- In Vollzeit erwerbstätig (1)
 - In Teilzeit erwerbstätig (2)
 - Arbeitssuchend (3)
 - Hausfrau-/mann oder nicht berufstätiger Elternteil (4)
 - Schüler*in / Student*in (5)
 - Im Ruhestand (6)
 - Sonstige (7) _____
-

Q2.5 What is the highest level of education you have completed?

- No finished education (1)
- Compulsory school (2)
- Apprenticeship (3)
- Lower Secondary School (excl. Matura/Abitur/A-levels) (4)
- Upper Secondary School (incl. Matura/Abitur/A-levels) (5)
- Tertiary Education (university, university of applied sciences, etc.) (6)

Appendix B

Q2.5 Was ist der höchste Bildungsabschluss, den Sie haben?

- Keine abgeschlossene Ausbildung (1)
- Pflichtschule (2)
- Lehrabschluss (3)
- Sekundäre Schulstufe ohne Matura/Abitur (z.B. BMS/HAS) (4)
- Sekundäre Schulstufe mit Matura/Abitur (z.B. AHS/BHS) (5)
- Tertiäre Ausbildung (z.B. Universität, FH, PH & ähnliche Abschlüsse) (6)

Q2.6 Are you currently in a professional position where one or more people report to you?

- Yes (1)
- Mostly Yes (2)
- No (3)
- Not applicable (4)

Q2.6 Sind Sie derzeit in einer beruflichen Position, wo Ihnen eine oder mehrere Personen unterstellt sind?

- Ja (1)
- Großteils ja (2)
- Nein (3)
- Nicht anwendbar (4)

Appendix B

Q2.7 Are you currently in charge of taking strategic decisions (long-term decisions to reach the organizations' goal)?

- Yes (1)
- Not sure (2)
- No (3)
- Not applicable (4)

Q2.7 Sind Sie derzeit mit strategischen Entscheidungen betraut (langfristige Entscheidungen zur Erreichung der Organisationsziele)?

- Ja (1)
- Nicht sicher (2)
- Nein (3)
- Nicht anwendbar (4)

Q2.8 What was your total yearly income before taxes during the past 12 months in Euros?

- Less than 25,000 Euros per year (1)
- 25,000 - 49,999 Euros per year (2)
- 50,000 - 99,999 Euros per year (3)
- 100,000 - 199,999 Euros per year (4)
- More than 200,000 Euros per year (5)
- Prefer not to say (6)

Appendix B

Q2.8 Wie hoch war Ihr jährliches Brutto-Gesamteinkommen in den letzten 12 Monaten in Euro?

- Weniger als 25,000 Euro pro Jahr (1)
- 25.000 bis 49.999 Euro pro Jahr (2)
- 50.000 bis 99.999 Euro pro Jahr (3)
- 100.000 bis 199.999 Euro pro Jahr (4)
- Mehr als 200.000 Euro pro Jahr (5)
- Keine Angabe (6)

End of Block: Demographics
