

Håvard Hauge

# Exploring the relationship between grit, flow proneness and presence of meaning in life

Master's thesis in psychology, specialization in learning – brain, behavior, environment

Supervisor: Hermundur Sigmundsson

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Faculty of Social and Educational Sciences

Department of Psychology



Kunnskap for en bedre verden



## Preface

The completion of this thesis marks the end of my five-year education. It is strange to think about how quickly those five years have passed. I guess that is a good sign regarding my choice of education, or just that I am getting older. Either way, it has been five instructive and enjoyable years.

A huge thanks to my supervisor Hermundur Sigmundsson for all the feedback and helpful advice along the way. The meetings we have had have been instructive and always lifted my mood considerably, making me motivated to keep on working. I am very grateful for this. I would also like to thank Magdalena Elnes for the data collection help and for the feedback she has given me. Her help has been valuable in times when the flow literature did not provide clear answers.

A great thanks to all the participants for completing the questionnaire, without your help I couldn't have completed this work.

Thanks to my friends for always supporting me and finally a huge thanks to my family, I could not have asked for a better one.

## Abstract

The main aim of the present study was twofold: (1) to explore the relationship between grit and a recently developed general flow proneness scale and (2) to examine whether these constructs could predict presence of meaning in life. An online survey was conducted where the total sample consisted of 228 participants. Each participant completed (a) a novel general flow proneness scale (Elnes & Sigmundsson, 2022), (b) the short grit scale (Duckworth & Quinn, 2009), and (c) a short presence of meaning scale extracted from the meaning in life questionnaire (Steger et al., 2006). To obtain a better understanding of the novel general flow proneness scale, a principal component analysis was conducted (PCA). The final PCA model suggested a 12-item, three-component structure, labeled: (1) Task perception, (2) task immersion and (3) flow motivation. These components were also used to interpret the relationship between grit and flow proneness. A Pearson correlation analysis found a strong relationship between grit and general flow proneness ( $r = .54$ ). Based on the correlational findings and the existing literature, it was suggested that the relationship between grit and general flow proneness is bidirectional. In the regression analysis, grit was measured as a two-factor construct based on the findings from previous research (Disabato et al., 2019; Kwon, 2021). The hierarchical multiple regression revealed that grit's first facet, perseverance of effort, significantly predicted presence of meaning in life ( $\beta = .20$ ), whereas grit's second facet, consistency of interest, did not ( $p = .88$ ). The general flow proneness scale significantly predicted presence of meaning in life ( $\beta = .22$ ). The results are discussed, including methodological limitations and implications that the findings may have.

## Sammendrag

Formålet med oppgaven var todelt: (1) å utforske forholdet mellom grit og en nylig utviklet flyt-tilbøyelighetsskala og (2) å utforske om disse konstruktene kunne predikere følelsen av mening i livet. Det ble utført en spørreundersøkelse som besto av 228 deltakere. Alle deltakerne fylte ut en ny flyt-tilbøyelighetsskala (Elnes & Sigmundsson, 2022), en kort gritskala (Duckworth & Quinn, 2009) og en kort mening-i-livet-skala som er en nedskalert versjon av Steger et al.'s. (2006) sitt meningen i livet skjema. En prinsippal komponentanalyse (PCA) ble først gjennomført for å få en bedre forståelse av den nye flyt-tilbøyelighetsskalaen. Den endelige PCA'en viste en struktur bestående av 12 elementer fordelt på tre komponenter. Disse komponentene ble strukturert som: (1) oppgavepersepsjon, (2) oppgavefordypning og (3) flytmotivasjon. Komponentene ble også brukt i korrelasjonsanalysen. En Pearsons korrelasjonsanalyse viste en sterk sammenheng mellom grit og generell flyt-tilbøyelighet, ( $r = .54$ ). Det ble foreslått at forholdet mellom grit og generell flyt-tilbøyelighet er toveis. I regresjonsanalysen ble grit målt som et to-faktorkonstrukt basert på tidligere funn (Disabato et al., 2019; Kwon, 2021). Den hierarkiske regresjonsanalysen viste at grit sin første fasett, standhaftighet, var en signifikant prediktor for mening i livet ( $\beta = .20$ ), mens grit sin andre fasett, vedvarende interesse, ikke viste tilsvarende ( $p = .88$ ). Den generelle flyt-tilbøyelighetsskalaen predikerte mening i livet ( $\beta = .22$ ). Resultatene er diskutert, metodiske begrensinger trukket frem, og implikasjoner drøftet.

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## Introduction

Over two decades ago, Seligman and Csikszentmihalyi (2000) published an introduction to positive psychology, defined as the scientific study of what makes individuals thrive (or make life worth living). Since then, interest in potential constructs that explain how to make life more enjoyable has increased (Warren et al., 2017). Grit and flow have intrigued the scientific and pop-science community due to its associations to adaptive outcomes (Bonaiuto et al., 2016; Tewell, 2020). The constructs have been studied extensively in relation to education, performance and positive affect, both in vocational and avocational domains (Datu, 2021; Norsworthy et al., 2021). The phenomenology of the flow state has especially been of particular interest and thoroughly researched since the 1960's (Csikszentmihalyi, 1975). For this reason, researchers have acquired a good understanding of what it means to be in flow. However, individual differences in flow proneness have not gained nearly as much attention as flow in specific activities (Tse et al., 2020) and one way to acquire more knowledge is to explore its relationship to other constructs such as grit and meaning in life. This would also benefit the grit literature, due to researchers tendency to mainly apply grit as a predictor of educational achievement (Fernández-Martín et al., 2020) and neglect other potential construct correlates beside conscientiousness and self-control.

Further, grit and flow proneness' ability to predict one of the constructs that lies within the core of positive psychology – meaning in life, has neither been thoroughly investigated. Research suggests that presence of meaning in life is important across all life stages (Steger et al., 2009) , but also easily distorted by the complex nature of society (Schippers & Ziegler, 2019). Thus, gaining a clearer understanding of factors that contributes to a meaningful living is of general importance. Along these lines, the current thesis aims to investigate if grit and general flow proneness can explain the degree of individuals' perceived presence of meaning in life. The thesis will attempt to answer the following questions. (1) What is the relationship between grit and general flow proneness? (2) Can grit's facets predict presence of meaning in life? And (3) can general flow proneness predict presence of meaning in life?

## **Theoretical Background**

### **Grit**

Grit is in the literature defined as “perseverance and passion for long-term goals” (Duckworth et al., 2007, p. 1087). Grit has been termed as a noncognitive personality trait due to its orthogonal (and slight negative) correlation to intelligence measures (Duckworth & Quinn, 2009; Eskreis-Winkler et al., 2014). An individual with grit has stamina and interest in achieving long-term goals, despite setbacks and hardships (Duckworth et al., 2007).

Grit has attracted a lot of attention and its relation to academic performance has been of specific interest for scholars, where meta-analyses and systematic reviews find a weak to moderate relationship (Christopoulou et al., 2018; Credé et al., 2017; Fernández-Martín et al., 2020; Lam & Zhou, 2019). Grit has also been shown to predict physical performance (Martin et al., 2015; Reed et al., 2013), vocational success (Mueller et al., 2017; Suzuki et al., 2015; Zhong et al., 2018), increased well-being (Flanagan & Einarson, 2017; Kannangara et al., 2018; Renshaw & Bolognino, 2016) and reduced maladaptive functioning (Knauff et al., 2019; Pennings et al., 2015; White et al., 2017).

Despite its relation to adaptive outcomes, grit has also been associated with “blind persistence” (Baumeister, 2003). Lucas et al. (2015) demonstrated that grittier participants scored worse in a test where they had to give up on an unsolvable task to excel in the test. Further, Grit has also been associated with more reluctant help-seeking behaviour amongst student veterans (Wilson et al., 2021).

### **Developing and measuring grit**

Grit derives from researchers who recognized that mental abilities only partially explain why some people are more successful than others. Francis Galton, Catharine Fox and Charles Darwin all shared the same belief based on their research – a keen intellect only gets you so far. Zeal, determination and integration towards goals is also critical to become eminent within a field (Duckworth et al., 2007). Terman and Oden (1948) also discovered in a longitudinal study of gifted children that the difference between the least and most successful adult was only five IQ points.

Therefore, Duckworth et al. (2007) began investigating the possibility of a single personality trait that could explain the individual differences found in success. Numerous people across several domains (academia, banking, law etc.) were interviewed to generate a pool of descriptive characteristics of the most successful people within each respective domain. Multiple series of exploratory factor analysis revealed that grit could be measured as

a 12-item construct consisting of two subscales: Perseverance of effort and consistency of interest, each containing six items. This scale has been named the original grit scale (Grit-O). The perseverance aspect attempts to capture an individual's willingness to pursue and sustain effort to reach long-term goals despite setbacks and obstacles along the way (Duckworth & Gross, 2014). Consistency of interest is supposed to capture the degree of commitment and focus for long-term goals and represents the passion aspect baked into the definition of grit (Perkins-Gough, 2013).

Two years after the development of Grit-O, Duckworth and Quinn (2009) revised the scale to make a new version with more sound psychometric properties. In addition, the notion of one subscale being more predictive than the other had not been tested in the development of Grit-O. The final analysis revealed that the removal of two items on each subscale improved the overall data fit of the scale. This resulted in the 8-items short grit scale (Grit-S), which has become the standardized way of capturing grit.

### **Discord about the two-factor structure of grit**

Duckworth and Quinn (2009) concluded that neither of the subscales were more predictive than the other, a statement several scholars have questioned. Credé et al. (2017) showed in a meta-analysis that perseverance of effort exhibited a significantly stronger relation with academic achievement than consistency of interest. These results were also replicated in a more recent systematic-review by Lam and Zhou (2019). In both meta-analyses, consistency of interest did not provide any incremental value when the subscale was used alone as a predictor. The authors therefore concluded that there is lack of support for a two-factor structure, and that the main focus should be on perseverance of effort in order to maximize grit's utility.

### **Conceptual similarities**

Since grit became a part of the literature, its separability from conscientiousness has been questioned (Abuhassan & Bates, 2015). Conscientiousness is recognized as the most reliable predictor of performance out of the global factors in the big five model (Barrick & Mount, 1991; Judge et al., 1999). It encompasses a diverse set of traits divisible into two categories: proactive and inhibitive (McCrae & John, 1992). Proactive behaviour reflects effort towards a goal state, and inhibitive behaviour captures the suppression of undesirable impulses (Jackson et al., 2010). Duckworth et al. (2007) found a strong correlation ( $r = .77$ ) between Grit and conscientiousness, but that grit had unique predictive ability after

controlling for conscientiousness. They argued that conscientiousness did not capture the stamina aspect of grit needed to achieve long-term goals. However, several scholars have claimed that grit does not provide any incremental value over and beyond that of conscientiousness (Ivcevic & Brackett, 2014; Muenks et al., 2017; Ponnock et al., 2020; Rimfeld et al., 2016). Thus, there is still dispute regarding grit's discriminant validity.

Further, one of the six facets of conscientiousness – self-control, has also been questioned for its resemblance to Grit. It has been suggested that grit differs from self-control in its emphasis on long-term goals, and that self-control merely captures attainment of day-to-day challenges and temptations (Duckworth & Gross, 2014; Duckworth et al., 2007). According to Vazsonyi et al. (2019), this argument is merely conceptual and lacks theoretical support highlighting the distinction between the constructs. An important notion from Vazsonyi et al. (2019), regarding the strong correlation ( $r = .92$ ) research has found between grit and self-control (Schmidt et al., 2018).

### **Grit's domain-specificity**

Lately, scholars have discussed if Grit-S and Grit-O is applicable across any situation. Grit was developed as a domain general measure, which implicitly suggests that a high grit score will make an individual pursue a long-term goal across every aspect of life (Duckworth & Quinn, 2009). Grit's questionnaire lets individuals think of any situation to assess each item, which might be problematic (Sharma et al., 2020). Duckworth and Quinn (2009) acknowledged the possibility of grit not being domain general when they developed Grit-S and encouraged scholars to investigate the issue. In line with this, several studies have found results suggesting that academic grit scales are more reliable as a predictor of school performance than global measures of grit (Clark & Malecki, 2019; Cormier et al., 2019; Schmidt et al., 2019).

### **Flow**

In the book "Beyond boredom and anxiety", Csikszentmihalyi (1975) describes how he became interested in understanding why people were so drawn towards activities that did not provide any apparent external reward. Qualitative research across various disciplines including chess, rock climbing and dancing, made Csikszentmihalyi (1975) discover a recurring phenomenon amongst the interviewees, they were all experiencing flow; an effortless state of deep concentration and enjoyment.

Flow has been coined as the model of optimal experience and is commonly referred to as “being in zone” (Banks, 2014; Kennedy et al., 2014). The state is intrinsically rewarding and motivates the individual to re-engage in a given flow-elicited activity (Engeser & Rheinberg, 2008). Research also suggests that flow is not limited to specific activities or jobs, nor to one’s age, culture and socioeconomic status (Asakawa, 2004).

Flow has been measured in various areas from a wide range of samples, including gaming, yoga, business transactions, sports and daily chores (Norsworthy et al., 2021). Even though research has measured that certain activities are more flow conducive than others (Abuhamdeh, 2020), the phenomenon primarily seems to be elicited by other factors than what you do. This will be discussed further regarding individual differences found in flow.

Since flow can be experienced across almost every aspect of life, the phenomenon has been linked to several important outcomes. Flow has shown to enhance learning in school (Carli et al., 1988; Nakamura, 1988) and work (Moneta, 2017), increase motivation and long-term commitment (Csikszentmihalyi & Rathunde, 1993; Jackson et al., 1998), make individuals more satisfied and creative (MacDonald et al., 2006), and boost performance in various sport contexts (Harris et al., 2021). Thus, flow’s importance across a broad range of areas is widely accepted amongst scholars (Norsworthy et al., 2021).

However, flow has also been found to be an explanatory factor of engagement in high-risk activities (Hardie-Bick & Bonner, 2016; Schüler & Nakamura, 2013) and has been suggested to potentially evoke work-family related conflicts due to a unilateral job focus (Ramsey & Lorenz, 2019). Further, flow has also been associated with technology addiction (Duke & Montag, 2017; Hull et al., 2013), gambling addiction (Dixon et al., 2019) and the vast amount of time spent on social media (Stavropoulos et al., 2018). For instance, findings by Mauri et al. (2011) suggest that flow is a central component of Facebook’s success and time spent on the platform. The association between flow and time spent on low-cognitive tasks designed to make you addicted, is interesting and highlights the potential of flow as a cause to escape reality and ultimately make life less meaningful (Brailovskaia et al., 2018).

The association between addiction and flow also underlines the importance of studying flow’s neurological correlates and that the state is a highly physiological one as well (Gold & Ciorciari, 2020; Harmat et al., 2015).

### **The nine dimensions of flow**

In order to understand what it means to be in flow and how the state is elicited, nine dimensions of flow have been mapped. Csikszentmihalyi and Csikszentmihalyi (1988) divide

the nine dimensions into two overarching categories: Antecedents of flow and experiential experiences. The former category is prerequisites for entering flow and the latter is characteristics of how flow is experienced. A summary of the nine dimensions is presented below.

**Table 1.1**

Description of each dimension	Category
1. Perceived balance between one's skill set and challenge	Antecedent
2. Clear goals – knowing what you want and what to do to get there	Antecedent
3. Immediate, unambiguous feedback from internal and external sources	Antecedent
4. Deep concentration on the task/activity at hand	Experiential
5. Merging of action and awareness	Experiential
6. Sense of control – feeling of being able to respond to any challenge	Experiential
7. Loss of self-consciousness/evaluation of the self	Experiential
8. Distorted time perception – time seems to go slower or faster	Experiential
9. Feeling of intrinsic/autotelic reward from doing the task/activity	Experiential

The dimensions can be viewed as a framework for what it requires and means to be in flow and the two categories can serve as a way of understanding each dimension's place. A substantial amount of empirical work has been conducted to map the nine dimensions and they have a good consensus among researcher in describing flow (Nakamura & Csikszentmihalyi, 2014; Ross & Keiser, 2014). However, the dimensions should not be regarded as a “flow checklist” per se, since flow can be experienced without all characteristics being present (Hancock et al., 2019; Moneta, 2012). There are also some additional uncertainties tied to the dimensions. A recent scoping review revealed that there is still no consensus in literature regarding flow's category setup (Norsworthy et al., 2021). For instance, scholars have proposed that several of the dimensions should be regarded as a consequence of flow instead of a flow experience, such as autotelic experience and distorted time perception (Hancock et al., 2019). In addition, Engeser and Schiepe-Tiska (2012) have argued that even though the nine dimensions have been mapped, no theoretical model that explains the interactional relationship between the dimensions have been offered. These uncertainties related to the nine dimensions, highlight the challenges of theorizing a

subjective state like flow. According to Hancock et al. (2019), the only dimension that can be measured objectively is “distorted time perception”.

### **The challenge-skill balance**

Even though all nine dimensions have solid empirical work tied up to them (Nakamura & Csikszentmihalyi, 2014), the majority of the dimensions will not be discussed further since the scale used in this thesis is not about the flow state per se, but about flow proneness. In this regard, further elaboration of the first dimension – the challenge-skill balance - is necessary since it is a central component of the novel flow proneness scale used in this thesis.

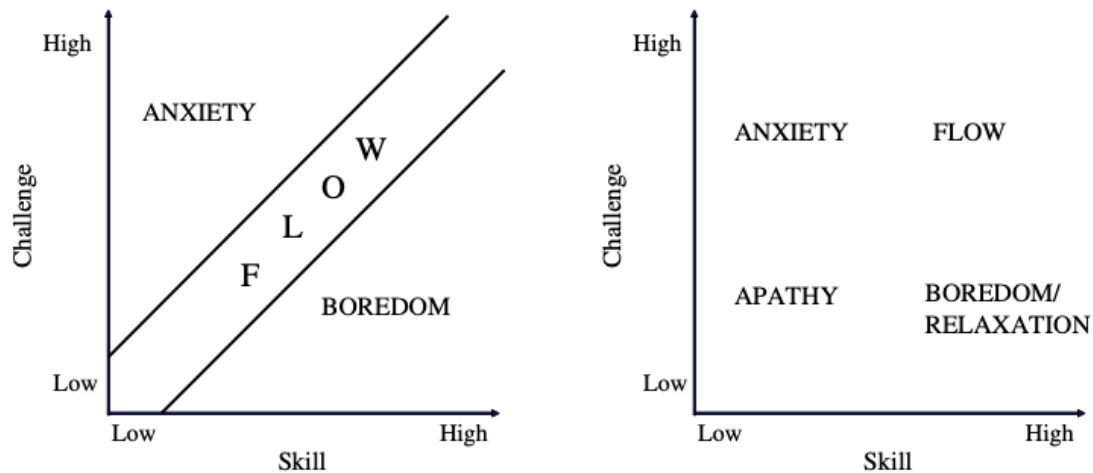
Csikszentmihalyi (1975) argued early that the interaction between *perceived* challenges and skills is a crucial component of the flow experience. Flow was actually operationalized by Csikszentmihalyi and his colleagues solely on the basis of the challenge-skill balance before the development of the most frequently used flow scales in the 90s (Abuhamdeh, 2020). Today, the current literature predominantly regards the challenge-skill balance as a prerequisite to elicit flow, but it is arguably still the most researched and important dimension of flow (Barthelmäs & Keller, 2021).

To understand the interaction between perceived challenges and skills as a prerequisite for flow, models have been developed. The original model by Csikszentmihalyi (1975) proposes that flow only appears when there is an equilibrium between perceived challenges and skills, and that a perceived imbalance will either lead to anxiety (challenges exceeds skills) or boredom (skills exceeds challenges). Subsequent theoretical work revealed inconsistent results regarding the original model of flow (Engeser & Rheinberg, 2008), which lead to the development of the quadrant model of flow (Csikszentmihalyi & Csikszentmihalyi, 1988). This model also includes the boredom and anxiety aspect of a challenge-skill imbalance, but proposes that an equilibrium on the lower end of a challenge-skill balance does not induce a significant flow state as the original model suggested, but that flow happens when challenges and skills are at a relatively high level. Thus, Nakamura and Csikszentmihalyi (2014) have argued that flow is premised upon earlier mastery of skills. A figure of the two models is presented below.



**Figure 1.1**

*Left: Original model of flow (Csikszentmihalyi, 1975). Right: The quadrant model of flow (Csikszentmihalyi & Csikszentmihalyi, 1988). Figure extracted from Engeser and Rheinberg (2008).*



Research findings have also uncovered contradictions regarding the challenge-skill balance. Løvoll and Vittersø (2014) conducted two qualitative studies and found that an equilibrium between challenge and skill could only predict 2-3% of the flow experience. Further, in a study investigating online chess, playing an opponent with a slightly higher rating was found to be a better predictor of enjoyment than playing an opponent at the same level (Abuhamdeh & Csikszentmihalyi, 2009).

Scholars have proposed that achievement models can be used as a moderator to explain the relationship between the skill-challenge balance and flow (Engeser & Rheinberg, 2008). These models propose that high-achievement-individuals perceive balance as positive, whereas individuals with a strong fear of failure will avoid challenges even if they possess an adequate skill set. Waterman (2011) also argues that people only strive for a challenge-skill balance when the activity is of importance to the individual or in accordance with “the self”.

In sum, there is some support that flow may also occur in a challenge-skill imbalance environment. These findings arguably suggest that the most important thing might not be if there is a challenge-skill balance present to experience flow, but rather the influence of individual differences found in flow proneness.

### **General flow proneness and autotelic personality**

Regarding individual differences in flow, research has suggested that flow proneness is associated with personality measures. More specifically, the most common measure of the

five-factor model (i.e., NEO-PI-R) explained 22% (Ullén et al., 2012), 38% (Ross & Keiser, 2014), and 50% (Johnson et al., 2014) respectively of the variance in flow proneness, although using different flow propensity measures. These studies found that conscientiousness is an important component of high flow proneness, and that neuroticism contrarily hinders flow. None of the studies found that the trait “openness to experience” was associated with flow proneness measures, which is surprising given that openness is linked to task immersion (Asakawa, 2010).

Further, scholars have also found moderate heritability coefficients ( $r = .29-.35$ ) in a Swedish flow proneness scale (Mosing et al., 2012). Along these lines, it has also been suggested that flow is associated with individual differences in dopaminergic activity in the dorsal striatum (de Manzano et al., 2013) and that people with a certain dopamine receptor gene have higher flow proneness for mandatory tasks such as studying and working (Gyurkovics et al., 2016).

The abovementioned findings support Csikszentmihalyi’s (1975) proposal that flow is not only governed by situational factors but also influenced by individual differences found in flow propensity. The term “autotelic personality” refers to these individual differences found in flow propensity. An individual with a high flow propensity who engages in activities in order to achieve a self-rewarding experience (autotelic = self-goal) has an autotelic personality (Csikszentmihalyi, 1975). Autotelic persons have the ability to “manage a rewarding balance between the «play» of challenge-finding and the «work» of skill-building” (Csikszentmihalyi, 1993, p. 80). According to the receptive-active model (Baumann, 2012), this combination allows autotelic people to adjust potential challenge-skill imbalances. If the challenge is more demanding than an autotelic individual’s skill set, they will not feel anxious and overwhelmed, but be able to enjoy the process by building skills diligently. When the challenge is low and skills high, autotelic individuals manage to find action for opportunities and adjust the challenge-skill imbalance. For instance, snow removal is by most considered as a simple, mundane task, but autotelic individuals will likely discover more challenging and efficient ways to remove snow, and thus have a higher chance of entering flow and attain a self-rewarding experience. The ability to transform both demanding and mundane activities to a positive, self-rewarding experience is a crucial part of an autotelic personality and is also reflected in several of the items used in the present general flow proneness scale.

Nakamura and Csikszentmihalyi (2002) have also suggested that autotelic individuals possess a set of traits that makes them more likely to enter flow. These traits include low self-

centeredness, intrinsic motivation, curiosity, and persistence. The current flow proneness scale has not particularly focused on this part of the literature, but has two items about interest (i.e., having many interest and developing interests easily), which might be closely related to the trait curiosity.

Finally, it has also been suggested that people who enter flow with ease have high attentional control, meaning that they can adapt their concentration to the situational requirements, either if a narrow- or a broad focus is needed (Tse et al., 2020). The flow proneness scale used in this thesis has items tapping into concentration.

### **Measuring general flow proneness**

There is a vast amount of flow scales available (Abuhamdeh, 2020; Moneta, 2012). In contemporary flow research, a distinction between *state scales* and *dispositional scales* can be made. The most cited state scale makes participants answer a self-reporting questionnaire right after finishing an activity, and captures the *extent* of flow experienced on a continuum (Jackson & Marsh, 1996). Conversely, dispositional flow scales capture the *frequency* of flow in a target activity (Jackson et al., 1998) and these scales are adjacent to the novel proneness scale used in this thesis. However, whereas the dispositional scales attempt to capture the frequency of flow in certain activities such as gaming (Cai et al., 2022), work (Moneta, 2017) and sports (Jackson & Eklund, 2002), the current scale in this thesis attempts to capture flow frequency across all situations, hence the name “general flow proneness scale”. Since the current scale is domain-general, it is also more related to autotelic personality than the other dispositional scales. As mentioned, an autotelic individual tends to be prone to experience flow regardless the situation, and to the author’s knowledge, there is only one quantitative autotelic-scale available – the autotelic personality questionnaire (Tse et al., 2020). This 26-item scale attempts to capture the attributes found in autotelic individuals by applying seven subscales where each represents a characteristic of an autotelic personality. Research on autotelic personality and dispositional flow is of great relevance to the current thesis because the recently developed general flow proneness scale has integrated components from both domains. This combination represents a novel way of assessing flow proneness. According to Tse et al. (2020), a limitation of domain-specific flow proneness measures is the lack of applicability they have across life. For instance, a high frequency of flow experienced while playing the piano might not be a good indicator of flow frequency in football due to domain specific differences in the degree of clear goals and immediate feedback. The current scale’s purpose is to overcome this limitation. By breaking the domain-specific boundary, the novel

scale should also in theory be a more reliable predictor of various life outcomes (e.g., meaning in life) compared to specific dispositional scales. However, scholars have shown that a dispositional flow scale developed specifically for sports can be used as a proxy for autotelic personality (Johnson et al., 2014), suggesting applicability beyond the sports domain.

### **Meaning in life**

Meaning in life derives from the work of Viktor Frankl (1905-1997), a Holocaust survivor who published several books and articles on the notion of meaning (Steger et al., 2009). Subsequent research has found results in line with Frankl's view on the importance of meaning in life, where the construct has been linked to numerous important life outcomes including adaptive health (Joaquín, 2015), positive affect (King et al., 2006) and better social connections (Stavrova & Luhmann, 2016), amongst others (see King et al., 2016 for a summary).

Meaning in life is a more difficult construct to get a grasp on than grit and flow. Grit is a personality trait characterized by certain observable patterns (e.g., consistently working long hours), which leads an individual closer to a long-term goal. Flow is more emotional driven than grit, and even though flow is about understanding the subjective experience, the state is still partly observable (e.g., task immersion). Meaning in life cannot be inferred to by objective circumstances (Klinger, 1977). It is an emotional- and mental state that is highly subjective (King & Hicks, 2021) and there is no generalizable, meaningful life that can fit everyone's narrative. However, the construct should not be seen as a rare experience or a paragon of all well-being constructs. A large group of participants ( $N > 5000$ ) in the US were asked to rate their presence of meaning in life on a 5-point Likert scale (Kobau et al., 2010). Nearly 60 percent of the participants answered four or five on the scale, which yielded a high average presence of meaning score among the participants. Thus, meaning in life should be regarded as a quotidian, inner state (King & Hicks, 2021). By only treating meaning in life as a subjective state, the construct will also not be fused with *meaning of life*, which refers to what is meaningful (or not) to the human species (Metz, 2007).

Meaning in life is defined by Steger et al. (2012, p. 165) as: "The web of connections, understandings, and interpretations that help us comprehend our experience and formulate plans directing our energies to the achievement of our desired future. Meaning provides us with the sense that our lives matter, that they make sense, and that they are more than the sum of our seconds, days, and years". Even though there are several definitions on meaning in

life, they all consist of three core facets: Comprehension, purpose and existential mattering (King & Hicks, 2021), where each facet is found in the definition above, respectively.

Of special interest to the current thesis is the Meaning in Life Questionnaire (MLQ) developed by Steger et al. (2006). This is because the three items used in the thesis to measure meaning in life is an adaption from the MLQ. The 10-item MLQ contains two subscales - presence of meaning in life and search for meaning in life – each having five items. The search for meaning subscale captures the existential mattering facet (degree of perceived life matter). Researchers have suggested that this facet is an important factor of perceived meaning in life (Dezutter et al., 2013; Steger et al., 2006; Yek et al., 2017). However, the 3-item presence of meaning scale used in the current thesis does not include items that tap into the search-subscale of meaning. The current scale is an adaption of the 5-item presence subscale of MLQ and captures comprehension and purpose. Further discussion will therefore only focus on the presence of meaning in life, including its two facets: comprehension and purpose.

### **Comprehension**

Research has several decades suggested that humans have an innate need to make sense of our lives and surroundings (Baumeister, 1991; Heine et al., 2006; Heintzelman et al., 2013). Comprehension can be regarded as the cognitive component of meaning in life due to the mental processing acquired to “connect the dots” (King & Hicks, 2021). Heintzelman and King (2019) found that people experience more presence of meaning when they engage in regular activities as opposed to unfamiliar ones, which might explain why people who live a habit driven life report high meaning in life (King & Hicks, 2021). Further, as a more specific example, research suggests that questionnaires that apply larger font-sizes, facilitating more fluent processing (degree of ease information is processed with), leads to increased meaning in life (Trent et al., 2013). Along these lines, an experiment with a photograph that had a more intuitive ordering structure (i.e., trees in order) also promoted significantly more meaning in life compared to a picture with a more chaotic structure (Heintzelman et al., 2013). According to the meaning-as-information theory (Schwarz, 2012) an environment filled with rich and systematic associations are likely to be perceived as meaningful, whereas a more diffuse environment leads to a lack of meaning and makes the individual seek out information. Thus, our need to perceive and understand our surroundings is not only an important factor of meaning in life, but also serves adaptive functions in form of cues for when it is necessary to acquire information. Drawing on this information, it may be possible

that individuals high in comprehension, due to a lack of perceived necessity to acquire information (i.e., presence of non-existing patterns), are more prone to ignore important environmental cues. This may lead to sub-optimal decision-making and other hardships along the way (e.g., intra- and interpersonal challenges). However, this possible downside is merely anecdotal and does by no mean trump the adaptive outcomes that research has found comprehension to be associated with.

### **Purpose**

Considering the different presence of meaning in life facets, purpose may be the most important one since two of the three items in the current scale attempt to capture purpose (i.e., *my life has a clear purpose; I have recently discovered a satisfying life purpose*). McKnight and Kashdan (2009) define purpose as a life-aim that directs and organizes our behaviors, thoughts, and feelings in a certain direction. Purpose can arguably be understood as a motivational component that influences our way of living (Costin & Vignoles, 2020) and has been shown to increase goal commitment and engagement (George & Park, 2016), be an important contributor to good health (Hill et al., 2019; Musich et al., 2018) and work as a buffer against pathology (Kim et al., 2021). The importance of purpose can be argued to lie in its broad manifestation of our subjective experiences (King & Hicks, 2021). For instance, findings suggest that feelings of purpose make activities worthwhile themselves (Scheier et al., 2006) and that daydreaming about a higher order life-aim affects subsequent thoughts and actions (Klinger & Cox, 2011). In comparison to grit, purpose does not have a terminal nature. Thus, McKnight and Kashdan (2009) argue that purpose is an overarching lynchpin for goal-directed behavior.

### **Factors that make life meaningful**

King and Hicks (2021) have identified the five most empirically supported factors that make life meaningful. (1) *Positive affect* has shown in numerous studies to enhance meaning in life, also above and beyond the immediate effect of mood induction procedures. Research actually suggests that positive affect may be sufficient to experience meaning, but it is also possible to experience meaning in life without positive affect with for instance a strong faith, however it is considerably less likely. (2) *Sosial connections* in form of belonging, support and interdependence on others provide a clearer context for comprehension and purpose. (3) *Mental time travel* provides meaning in peoples life by retrospectively tapping into nostalgic experiences and by imagining future aspects of subjective importance. (4) Having a clear

connection with *the self* is also a reliable predictor of a meaningful living. Finally, research has shown that (5) *morality awareness* enhances meaning in life by providing more adaptive time allocation (i.e., what is perceived important) and bringing people closer to their intrinsic values. These factors are not an exhaustive list of all the potential underpinnings of meaning in life, but demonstrate that there are several paths to experience presence of meaning (Von Culin et al., 2014).

### **Relationship between the constructs**

The next sections will focus on previous findings from the literature regarding the: (1) Correlational relationship between grit and flow proneness, (2) grit predicting presence of meaning in life, and (3) flow proneness' predictive ability of presence of meaning in life.

### **Grit and flow proneness**

To the authors' knowledge, there are only a couple of studies that have investigated the relationship between grit and flow proneness. Miksza and Tan (2015) found a strong correlation between the constructs in a group of musicians. A recent study also found that grit was a significant predictor of dispositional flow in musicians but that this effect vanished when practice hours and music performance anxiety were controlled for (Tan et al., 2021), which may suggest that a possible correlation found in the present study could be mediated by non-measured factors. Further, Von Culin et al. (2014) discovered that people who scored high in grit also tend to engage in flow conducive activities more frequently, which suggests a positive relationship between grit and flow proneness.

Ralph et al. (2017) also conducted a study where they investigated the relationship between grit and different measures of attention in a momentary task (i.e., attentional control, attentional error, attentional lapse, mind wandering). They found that grit was negatively correlated with measures on inattention, also after conscientiousness had been controlled for. These findings were also replicated by Smith et al. (2020). The current general flow proneness scale has items that taps into measures of attention (e.g., "*I have difficulties concentrating*"), and it has been argued that *focusing* on short-term tasks in order to reach long-term goals is an important part of grit (Duckworth & Gross, 2014), ultimately suggesting that there might be a positive correlation between grit and the general flow proneness scale due to the shared variance found in attentional aspects.

Finally, one may also assume that there will be a correlation between grit and flow proneness due to conceptual similarities. Grit consists of the subscale "perseverance of

effort”, that attempts to capture someone who is diligent and not discouraged by setbacks. The current flow scale includes items that measures the degree of being able to persevere despite difficult challenges. As previously mentioned, being able to work hard in order to adjust perceived challenges that initially surpasses an individual’s perceived skill-level, is an important part of having an autotelic personality. As such, the hard-working mentality seems to be present in both measurements.

### **Grit and presence of meaning**

A recent study tested grit’s predictive ability on each subscale of the meaning in life scale. The study found that grit predicted presence of meaning in life and that presence of meaning was associated with lower levels of depression (Datu et al., 2019). Further, Kleiman et al. (2013) found similar results regarding grit’s association to meaning in life, but the authors only measured meaning in life as a global factor (i.e., presence- and search for meaning). This was also the case in a recent study conducted on a large sample of Chinese nurses, where the results suggested that grit positively predicted meaning in life ,and that hope and social support played a mediating role in the relationship, which weakened the grit-meaning relationship (Yang & Wu, 2021).

Scholars have also found results suggesting that grit may enhance positive affect (Jin & Kim, 2017), which can arguably be relevant due to the role positive feelings have on meaning in life (King & Hicks, 2021). Li et al. (2018) found that grittier people were more satisfied with life since they possess more positive attitudes towards themselves, with positive correlations between grit and self-esteem, self-efficacy and self-control, all above  $r > .5$ .

### **Flow proneness and presence of meaning in life**

Nakamura and Csikszentmihalyi (2014) stated that frequent flow experiences are the recipe for a good life. Thus, a person who scores high on the general flow proneness scale is supposed to have higher life quality than low scorers according to this statement. Along these lines, a recent study showed that people with high (vs. low) autotelic personality reported higher levels of well-being due to the regularity of flow experiences in everyday life (Tse et al., 2021). Further, Fritz and Avsec (2007) found that challenge-skill balance, autotelic experience, and attention were all important factors in explaining positive affect in young musicians. These factors (challenge-skill, autotelic and attention) are all present in the current flow scale. Even though the current presence of meaning in life scale does not measure



positive affect directly, research has shown that positive affect is an important underlying factor in experiencing presence of meaning (King & Hicks, 2021).

Further, according to eudaimonistic identity theory (Waterman, 2011), spending time on self-defining activities (i.e., in accordance to one's identity, values and beliefs) are important for experiencing meaning in life. Given that people high in flow proneness are motivated by frequently engaging in activities due to the attained, self-rewarding experience, they might be more likely to have discovered self-defining activities and in addition be more invested in them.

### **The current study**

In the current study, the main aim is to gain an understanding of the relationship between grit and general flow proneness, and to assess if these constructs can predict presence of meaning in life. As mentioned, several researchers have not found support for a two-factor structure in grit (Credé et al., 2017; Ivcevic & Brackett, 2014; Lam & Zhou, 2019; Muenks et al., 2017). These authors have suggested that grit's facets should be measured separately to maximize the construct's capability to predict achievement. Further, Disabato et al. (2019, p. 207) found results suggesting that this notion stretches beyond the achievement-domain and stated that "grit researchers interested in studying well-being and strengths should report separate results for perseverance of effort and consistency of interests due to acceptable subscale score reliability and substantial prediction differences between the two facets". A recent study also found that perseverance of effort (and not consistency of interest) causes higher levels of reported subjective well-being (Kwon, 2021), which lead the author to the same conclusion as Disabato et al. Thus, when exploring the relationship between grit and flow proneness in the current study, grit's facets will also be included. When investigating grits' predictive ability of presence of meaning in life, grit's facets will be measured separately. Previous studies that have investigated the relationship between grit and meaning in life have only used the total score of Grit-S (Datu et al., 2019; Kleiman et al., 2013; Yang & Wu, 2021). Measuring the facets separately therefore represents a novel way of investigating grit's relation to presence of meaning in life.

Further, in the novel general flow proneness scale, no lower-order facet structure has been established as per now. Thus, a component analysis will be applied in the study in order to investigate possible, underlying components of the general flow proneness scale. An identified component structure will also allow for a more thorough exploration of the relationship between grit, its facets and general flow proneness.

Finally, based on the mentioned relationships found between the constructs, the current hypotheses are:

**H1:** There is a positive correlation between grit and general flow proneness.

**H2:** Perseverance of effort and consistency of interest will positively predict presence of meaning in life.

**H3:** General flow proneness will positively predict presence of meaning in life.

## Method

### Participants

The total sample consisted of 230 participants. Most participants were women ( $N = 158$ ), ranging from 18 to 67 years of age ( $M = 35.01$ ,  $SD = 14.05$ ). 69 participants were men, ranging from 19 to 76 years of age ( $M = 34.01$ ,  $SD = 13.90$ ), whereas the last participant identified oneself as “other”. 54.3 % of the participants ( $N = 124$ ) were students, 43 % were employed ( $N = 98$ ), and the remaining 2.6 % ( $N = 6$ ) were unemployed.

### Procedure

The self-reporting questionnaire was made and conducted on <http://nettskjema.no>. Participants were recruited through various social media platforms. The survey did not ask for any sensitive information; thus, no application was sent to the Norwegian Data Protection Authority (NTNU, 2022). All participants were informed that their contribution was voluntary and anonymous, and that they could withdraw at any time (see appendix). Every response alternative was possible to skip and no compensation for the participation was given.

### Test Materials

In addition to filling out demographic variables of interest (age, gender, occupation), the participants also filled out the implicit intelligence scale, passion for achievement scale, the very short need for cognition scale, and the Swedish flow proneness scale.

### Grit

To assess grit, the Norwegian version of the short grit scale (Grit-S) was applied (Sending, 2014). The 8-item scale has proven to have sound psychometric properties and is

considered to be a more cost- and time efficient version of the longer grit scale (Duckworth & Quinn, 2009). The items were answered on a Likert scale, and ranged from 1: "Not me at all" (*Ikke typisk meg*), to 5: "Very typical me" (*veldig typisk meg*). As mentioned, the scale is divided into perseverance of effort and consistency of interest. Four items attempt to capture the perseverance aspect of individuals with items such as "I am a hard worker" and "I finish whatever I begin". The other four items are supposed to measure long term (consistent) interest on a general level with items such as "new ideas and projects sometimes distract me from previous ones", and all items on this subscale are reversed. To calculate perseverance of effort and consistency of interest, the mean score of each respected subscale was used.

### **General flow proneness**

The novel 13-item general flow proneness scale by Elnes and Sigmundsson (2022) was used to measure flow. The Scale deploys a 5-point Likert scale, ranging from 1- "totally disagree" (*helt uenig*) to 5 – "totally agree" (*helt enig*) where 5 is considered as high flow proneness and a score of 1 as low flow proneness. The scale showed good internal consistency ( $\alpha = .78$ ) and high test-retest reliability ( $ICC = .96$ ; Elnes and Sigmundsson, 2022).

The current scale was validated by comparing it to the Swedish flow proneness scale (SFPS) by Ullén et al. (2012). The SFPS measures flow proneness in several areas of people's life (i.e., work, leisure and chores) and was preferred to other dispositional flow scales for its ability to measure flow proneness across several domains. The general flow proneness scale displayed strong correlations with the SFPS regarding studying ( $r = .70$ ) and working ( $r = .57$ ), and moderate correlations to chore- ( $r = .38$ ) and leisure activities ( $r = .32$ ). To calculate flow proneness, the mean score of the scale was used. A description of each variable in the scale is given in the table below.

**Table 2.1**

*Items in the general flow proneness scale used in the principal component analysis.*

Item number	Item description
1	I enjoy challenging tasks/activities that require a lot of focus
2	When I am focused on a task/activity, I quickly tend to forget my surroundings (other people, time, place)
3	I usually experience a good flow when I do something (things are neither too easy nor too difficult for me)
4	I have several different areas of interest.
5	It is difficult for me to walk away from or quit a project I am currently working on.
6	I become stressed in the face of difficult/challenging tasks (R)
7	It is difficult for me to maintain concentration over time (R)
8	I quickly become tired of things I do (R)
9	I am usually satisfied with the results of my efforts across various tasks (I experience feelings of mastery).
10	When I focus on something, I often forget to take a break.
11	I get bored easily (R)
12	My daily tasks are exhausting rather than stimulating (R)
13	I develop an interest for most of the things I do in life

*Note.* Reversed-scored items are denoted with a R.

### **Presence of Meaning in Life**

A short presence of meaning in life scale, extracted from Steger et al. (2006) 10-item Meaning in Life Questionnaire (MLQ) was used. The scale has only been used once in an Icelandic survey to assess the life quality of individuals (landlækni, 2017) and attempts to capture purpose and sense of coherence in one's life. To calculate presence of meaning in life, the mean score of the 3-items was used. A table of the items is presented below.

**Table 2.2***Items in the short presence of meaning in life scale.*

Item number	Item description
1	My life has a clear sense of purpose
2	I have a good sense of what makes my life meaningful
3	I have discovered a satisfying life purpose

**Statistical analysis**

The IBM SPSS 27.0.1.0 software was used to conduct the statistical analysis. First, a principal component (PCA) analysis was conducted for the general flow proneness scale. The aim of the PCA was to obtain a better understanding of the underlying components of the general flow proneness scale. Insight into these underlying components may also contribute to a better understanding of the relationship between grit and the novel flow proneness scale. Further, descriptive statistics were obtained to acquire an understanding of participants' total mean score and standard deviation for the measured variables. Cronbach Alpha values ( $\alpha$ ) were also included in the descriptive statistics to test if each scale had adequate internal consistency over .7 (Field, 2018). Secondly, a Pearson correlation analysis was conducted to investigate the relationship between grit (including its facets) and general flow proneness (including the possible underlying components attained in the PCA). The correlational relationships will be referred to using the guidelines of Cohen (1988), where a small, medium and large effect size is classified as .10, .30 and .50, respectively.

Further, a multiple hierarchical regression analysis was performed to investigate perseverance of effort's-, consistency of interest's- and general flow proneness' predictive ability on the short presence of meaning in life scale. Grit-S was not included as an independent variable as this would violate the assumptions of multicollinearity due to its high correlations with perseverance of effort and consistency of interest. To control for the possible influence of confounding variables, the demographic variables age, gender, student, and education level were entered in step 1 of the hierarchical regression model. In the variable gender, men were coded as 0 and women as 1, being a student was coded as 1 and not being a student was coded as 2. Education level was dummy coded where the participants who had completed primary school and elementary school were coded as 0 and those who had completed a bachelor's degree or higher were coded as 1. The significant level was set to  $p < .05$  in both analyses.

## Assumptions

Before the analyses were conducted, the variables were first screened and missing values were replaced with the series mean of each respected item. Next, the variables of interest were investigated to check if the statistical assumptions were met. To test the assumptions, general guidelines by Pallant (2020) were employed. According to these guidelines, skewness and kurtosis should be investigated to check for normality using a histogram if the sample size is large ( $N > 200$ ). The histograms looked somewhat normally distributed, but all variables were slightly, negatively skewed, which was also reflected in the skewness values. However, all skewness and kurtosis values were between -1 and 1, which is within the accepted range (Pallant, 2020). To further assess normality, a Shapiro-Wilk test was conducted for each variable of interest. This test was preferred to other normality tests due to its suitability for sample sizes between 50 and 300 participants (Kim, 2013) and since previous research has found the test to have superior psychometric properties over other normality tests (Mohd Razali & Yap, 2011). The Shapiro-Wilk test displayed significant p-values for all variables, suggesting normality violations. Researchers have however argued that a sample size over 30 is minimally affected by variable deviation from normality, due to the effects of the central limit theorem (Kwak & Kim, 2017). Kim (2013) has also argued that the assumption of normality can be met if the skewness and kurtosis is acceptable despite a significant Shapiro-Wilk test.

Concerns have also been raised of not reporting the confidence intervals in correlation matrices since a large confidence interval makes the potential, significant correlation inconclusive (Schober et al., 2018). For instance, Nishimura et al. (2016) found a significant correlation of 0.42, but the 95% confidence interval ranged from 0.03 to 0.70, which did not allow for a definite conclusion. Thus, a two-tailed 95% confidence interval for each significant correlation of interest was investigated where the estimations were based on a Fisher r-to-z transformation. The 95% confidence intervals discovered in the correlation analysis did not raise any subsequent concerns.

To test if the variables had equal residual distribution (homoskedasticity), a visual inspection of the scatterplots of the variables of interest was done. The data points in the scatterplot should primarily be clustered around 0 and not display any systematic residual patterns. The grit and flow proneness variables displayed residuals resembling homoskedasticity, but the residuals in the presence of meaning in life variable were slightly clustered to the right side in the scatterplot. To test if this was a problem in the regression model, a Breusch-Pagan test was conducted. The test came out non-significant in the

regression model ( $\chi^2(1) = 3.95, p = .26$ ), where a p-value over .05 suggests that the assumption of homoscedasticity is met (Mehmetoglu & Jakobsen, 2017).

To assess outliers, box plots were first evaluated for the variables of interest. The box plot for grit revealed four outliers. These outliers were investigated further in the raw data set and did not raise any initial concern as they appeared to be answered legitimately. Thus, none of these outliers were removed from subsequent analyses. Further, Mahalanobis distance values were evaluated to check for the possible influence of outliers in the regression analysis (Pallant, 2020). In Tabachnick and Fidell's (2013) table of Mahalanobis distance values, the critical value for three independent variables is 16.27. In the analysis, the highest derived value was 11.87, well below the critical value. However, the casewise diagnostics output showed one participant who had a standardized residual value of -3.22 on the variable presence of meaning in life, which is below the recommended standardized values of -3 (Pallant, 2020). To assess if this outlier has an influence on the data set, it is possible to use Cook's distance where a score above 1 is considered to be problematic (Pallant, 2020). The highest cook's distance value was well below 1, suggesting no major problems.

To test for multicollinearity in the regression analysis, tolerance- a measure of how much of each independent variable is not explained by other variables, was assessed. A value under .10 is according to Pallant (2020) problematic. The tolerance values were all  $> .63$ , suggesting that the independent variables are sufficiently distinct from each other.

Before the principal component analysis (PCA) was conducted, a few criterions were checked. The intercorrelation matrix of the items were all above .3, which indicates adequate item relationships (Pallant, 2020) The Kaiser-Meyer-Olkin test was .81, which indicates adequate sample size and the Barlett's test of sphericity came out significant, suggesting desirable covariance amongst the items (Pallant, 2020).

## **Results**

### **Principal component analysis**

An exploratory principal component analysis (PCA) was conducted to investigate the component structure of the novel 13-item general flow proneness scale. An oblique rotation method was chosen because it was assumed that the items would correlate with each other. As a result, a three-component structure was extracted based on an evaluation of the eigenvalues (retained values over 1), visual inspection of the scree plot, and a parallel analysis derived from a standalone simulation program recommended by Pallant (2020). In

the initial PCA model, item 1 had a factor loading of .35, which is below the recommended 0.4 threshold (Mehmetoglu & Jakobsen, 2017). Thus, this item was removed from subsequent analysis<sup>1</sup> and the PCA was repeated without item 1. In the new PCA model, item 3 and 12 cross-loaded quite strongly (see table 3.2). However, since the items loaded substantially stronger on their respective component, these items were retained. The Final PCA model's components explained 28.7%, 12.4% and 10.0% of the variance, respectively. The three-component solution explained a total of 51.1% of the variance.

**Table 3.1**

*Comparison of eigenvalues from PCA and criterion values from parallel analysis. Actual eigenvalues from the final model that were higher than the criterion values were accepted.*

Component number	Actual eigenvalue from PCA	Criterion value from parallel analysis	Decision
1	3.48	1.42	Accept
2	1.53	1.32	Accept
3	1.30	1.23	Accept
4	0.90	1.16	Reject
5	0.83	1.01	Reject

*Note.* The criterion values are based on a Monte Carlo simulation with 100 random samples.

<sup>1</sup> This also includes subsequent analysis in the correlation- and regression analysis.



**Table 3.2**

*PCA from the general flow proneness scale with the removal of item 1 resulting in a 12-item scale with a three-component structure.*

General flow proneness scale	Factor loading		
	1	2	3
<b>Component 1: Task perception</b>			
7. It is difficult for me to maintain concentration over time (R)	<b>.77</b>		
8. I quickly become tired of things I do (R)	<b>.76</b>		
11. I get bored easily (R)	<b>.69</b>		
6. I become stressed in the face of difficult/challenging tasks (R)	<b>.65</b>		
12. My daily tasks are exhausting rather than stimulating (R)	<b>.51</b>		.41
<b>Component 2: Task immersion</b>			
10. When I focus on something, I often forget to take a break.		<b>.76</b>	
2. When I am focused on a task/activity, I quickly tend to forget my surroundings (other people, time, place)		<b>.71</b>	
5. It is difficult for me to walk away from or quit a project I am currently working on.		<b>.67</b>	
<b>Component 3: Flow motivation</b>			
13. I develop an interest for most of the things I do in life			<b>.74</b>
4. I have several different areas of interest.			<b>.73</b>
3. I usually experience a good flow when I do something (things are neither too easy nor too difficult for me)	.41		<b>.51</b>
9. I am usually satisfied with the results of my efforts across various tasks (I experience feelings of mastery)			<b>.44</b>

*Note.* factor loadings under 0.3 are not displayed. Reverse-scored items are denoted with an (R).

### Descriptive statistics

Cronbach Alpha values were derived to check the internal reliability of each scale. Most scales displayed good internal consistency with values ranging from .72 to .86. However, the two underlying components; task perception and task immersion displayed a Cronbach's alpha of .62, which is below the recommended threshold of .7. However, it has been suggested that lower reliability scores may be acceptable in early exploratory scale development (Field, 2018) Thus, the two components were used in subsequent analysis. A summary of the other values is presented below.

**Table 3.3**

*Cronbach's alpha-, mean and standard deviation values for the variables used in subsequent analysis (N =228).*

Scale	$\alpha$	Mean	SD
Grit	.81	3.25	0.69
Perseverance of effort	.72	3.48	0.76
Consistency of interest	.77	3.02	0.82
General flow proneness	.78	3.40	0.62
Component 1: Task perception	.72	3.01	0.87
Component 2: Task immersion	.62	3.55	0.89
Component 3: Flow motivation	.62	3.85	0.67
Presence of meaning in life	.86	5.03	1.49

*Note.*  $\alpha$  = Cronbach alpha, SD = Standard deviation.

### Correlation analysis

A Pearson product-moment correlation was conducted to investigate the relationship between the variables of interest. Grit was strongly correlated to perseverance of effort,  $r(220) = .86, p > .001$ , consistency of interest,  $r(220) = .88, p > .001$ , and general flow proneness,  $r(220) = .54, p < .001$ . Grit also exerted significant positive correlations with all components of the general flow proneness scale ranging from weak,  $r(220) = .16, p = .04$ , to strong,  $r(220) = .62, p < .001$  relationships. Further, perseverance of effort was strongly correlated with consistency of interest,  $r(220) = .52, p < .001$  and general flow proneness,  $r(220) = .55, p < .001$ . Perseverance of effort was also positively correlated with all components in the general flow proneness scale ranging from weak,  $r(220) = .22, p = .02$  to

moderate,  $r(220) = .46, p < .001$  relationships. Consistency of interest was positively correlated with two components of the general flow proneness scale ranging from weak,  $r(220) = .21, p < .001$ , to strong,  $r(220) = .59, p < .001$  relationships, but did exert a significant correlation with the component task immersion ( $p = .43$ ). All variables exerted a moderate to weak relationship with presence of meaning, except the component task immersion ( $p = .36$ ).

**Table 3.4**

*Pearson product-moment correlation (N = 228).*

Scale/component	1	2	3	4	5	6	7	8
1. Grit	-							
2. Perseverance of effort	.86**	-						
3. Consistency of interest	.88**	.52**	-					
4. Flow proneness	.54**	.55**	.53**	-				
5. Task perception	.62**	.46**	.59**	.85**	-			
6. Task immersion	.16*	.22**	.05	.58**	.21**	-		
7. Flow motivation	.35**	.40**	.21**	.73**	.43**	.31**	-	
8. Presence of meaning	.33**	.34**	.24*	.33**	.29**	.06	.31**	-

*Note.* \*\* =  $p < .01$ , \* =  $p < .05$ .

### Regression analysis

Hierarchical multiple regression was used to assess the ability of three control measures (perseverance of effort, consistency of interest and general flow proneness) to predict meaning in life (presence of meaning in life) after controlling for the influence of age, gender, student (or not), and education completed. Age, gender, student (or not), education level was entered at step 1, explaining 4% of the variance in presence of meaning in life. After entry of perseverance of effort, consistency of interest and general flow proneness, the total variance explained by the model as a whole was 15%,  $F(7, 219) = 5.61, p < .001$ . The three control measures explained an additional 12% of the variance in presence of meaning in

life after controlling for age, gender, student (or not), and education level,  $R$  square change = .12,  $F$  change (3, 219) = 10.2,  $p < .001$ . In the final model, only two control measures were statistically significant, with general flow proneness recording a slightly higher standardized beta coefficient ( $\beta = .22$ ,  $p < .001$ ) than perseverance of effort ( $\beta = .20$ ,  $p = .04$ ). Consistency of interest was a non-significant control measure in the final model ( $p = .88$ ).

**Table 3.5**

*Hierarchical multiple regression analysis summary predicting presence of meaning in life with age, gender, student (or not), education level, perseverance of effort, consistency of interest and general flow proneness.*

Step and predictor variable	$B$	SE $B$	$\beta$	$sr$	Change in $R^2$	$R^2$
Step 1					.04	.04
Age	.01	.01	.13	.09		
Gender	.40	.22	.12	.12		
Student (or not)	.04	.30	.01	.01		
Education level	-.04	.21	-.01	-.01		
Step 2					.12**	.15
Age	.01	.01	.03	.02		
Gender	.28	.22	.09	.09		
Student (or not)	.01	.28	.01	.01		
Education level	-.21	.20	-.07	-.07		
Perseverance of effort	.38	.16	.20*	.16		
Consistency of interest	.02	.14	.01	.01		
General flow proneness	.53	.20	.22**	.17		

*Note.*  $B$  = unstandardized beta coefficient, SE = standard error,  $\beta$  = standardized beta coefficient  $sr$  = semipartial correlation coefficient. \*  $p < .05$ , \*\*  $p < .001$

## Discussion

The main aim of the present study was twofold: (1) to investigate the relationship between grit (including its facets) and the novel general flow proneness scale and (2) to assess grit's facets- and the flow proneness scales' predictive ability on a short, 3-item presence of meaning in life scale. In addition, a principal component analysis was also conducted in order to attain a better understanding of the possible, underlying components of the novel general flow proneness scale.

The results from the correlation analysis showed that grit was strongly correlated with general flow proneness ( $r = .54$ ) and was also related to all the underlying components of grit, although to varying degrees. Perseverance of effort and consistency of interest also exerted strong relationships with general flow proneness ( $r > .5$ ). Perseverance of effort was positively correlated to all three components. Consistency of interest was positively correlated with two out of the three components, where a nonsignificant relationship with task immersion was discovered ( $p = .43$ ). The hierarchical regression analysis revealed that perseverance of effort ( $\beta = .20$ ) and general flow proneness ( $\beta = .22$ ) were both significant predictors of presence of meaning, however, general flow proneness being the slightly stronger one. The regression model also showed that consistency of interest did not significantly predict presence of meaning ( $p = .88$ )

The first part of the discussion will (based on the correlational findings) try to address how grit is related to the general flow proneness scale including the three components (1) task perception, (2) task immersion and (3) flow motivation extracted from the principal component analysis. The second part of the discussion will elucidate possible reasons for why perseverance of effort and general flow proneness predicted presence of meaning in life as well as possible reasons for why consistency of interest was a non-significant predictor. Further, limitations and implications regarding the present study will be discussed. Finally, some conclusions are drawn.

### Grit and general flow proneness

In line with the hypothesis, grit and general flow proneness were strongly correlated ( $r = .54$ ), as supported by previous research. More specifically, one study found a strong correlation between grit and flow proneness (Miksza & Tan, 2015) and a more recent study found grit to be a moderately strong predictor of flow proneness in a group of musicians (Tan et al., 2021). According to Miksza and Tan (2015), the challenge-skill balance may account

for the relationship between grit and flow proneness. Several studies have found that grit is related to deliberate practice (Duckworth et al., 2011; Tedesqui & Young, 2017) which may increase gritty individuals' skill level. As discussed, the quadrant model of flow posits that a higher level of skills and challenges leads to the greatest frequency of flow experiences (see figure 1.1). Thus, it may be that grit is an important contributor in developing a high challenge-skill balance, which increases the probability of frequent flow experiences. This argument may also explain why grit was so strongly related to the first component in the general flow proneness scale: task perception ( $r = .62$ ). This component concerns the ability to handle challenging and mundane tasks in order to transform them into a desired challenge-skill equilibrium. It is reasonable to assume that being gritty is required to transform tasks that initially are difficult or mundane. Regarding mundanity, a recent study found a moderately negative correlation between grit and external boredom (i.e., boredom when doing tasks) (Sung et al., 2020). Interestingly, Sung et al. also discovered a strong, positive association between grit and internal boredom (i.e., task-free situations). Thus, it appears that gritty individuals may have an internal need to set goals and occupy themselves with task activities, which in turn may contribute to more frequent opportunities for flow.

Further, it should also be noted that a high score on the general flow proneness scale may also contribute to a grittier lifestyle. As discussed, the flow experience is intrinsically rewarding and motivates us to pursue the given flow-elicited activity again (Engeser & Rheinberg, 2008). According to the broaden-and-build theory by Fredrickson (2001), positive emotions are crucial because they have effects that outlast the transient experience of that given, uplifting emotion. Research has shown that feelings of authentic pride is a significant predictor of grit (Gilchrist et al., 2018). Thus, feelings of flow may also manifest in a grittier task approach. This can also explain why perseverance of effort exhibited a stronger relationship with flow motivation ( $r = .40$ ) than consistency of interest ( $r = .20$ ). More specifically, it is possible that feelings are more relevant to perseverance of effort, because being diligent, hardworking, finishing whatever one begins and having to cope with setbacks, are all related to doing tasks and will therefore always have affective mechanisms involved. Contrarily, one might argue that consistency of interest is more of a life approach in terms of living more rigidly (Disabato et al., 2019). How one approaches life is also aligned with one's inner, emotional life, but possibly not to the same degree as perseverance of effort. In sum, grit may contribute towards spending more time on activities (both challenging and mundane), which in turn increases the probability of frequent flow experiences. The motivation provided by frequent flow experience may also make an individual grittier.

Therefore, it may be plausible to assume that the relationship between grit and flow proneness is bidirectional.

Further, grit and the second component in the general flow proneness: Task immersion, exerted a weak relationship ( $r = .16$ ), and it was only grit's first subscale: Perseverance of effort that was related with task immersion ( $r = .22$ ). This component appears to be the one most closely related to the flow state itself (i.e., flow intensity) out of the three components. Conceptually, it makes sense that grit – a personality trait measuring perseverance and consistency toward long-term goals - to a lesser degree is related to a component that taps into the phenomenology of flow than the previously discussed components. Task perception measures how one approaches tasks, and overlaps with grit in terms of determinacy towards tasks (either boring or challenging). Being gritty also means having a certain incentive to complete tasks over time, which may relate grit to flow motivation. Intuitively, it is conceptually more challenging to connect grit and task immersion. The weak relationship between perseverance of effort and task immersion might however be explained by acknowledging differences in the flow state. Wright et al. (2007) discussed the difference between “macroflow” and “microflow”, where the former refers to deep, memorable experiences and the latter to more subtle and frequent states such as social media scrolling. Thus, it may be that more frequent, deep memorable situations to a small degree lead to a greater task approach incentive, or that a grittier everyday approach prompts deeper flow experiences.

As mentioned, consistency of interest did not exert a significant relationship with task immersion. This lack of relationship may also have its roots in conceptual differences. Task immersion in the general flow proneness scale measures the degree of being engrossed in tasks (e.g., “*when I am doing something, I often forget to take breaks*”), whilst consistency of interest aims to measure one's relationship to goals (e.g., “*I often set a goal but later choose to pursue different one*” [reversed item]).

Finally, the relationship between grit and general flow proneness may also have been impeded by a couple of factors beyond conceptual differences. Both scales are domain-general, but still may be prone to task specificity. Sheldon et al. (2015) found results suggesting that grit is more strongly related to self-concordant goals than other (external) goals. The challenge-skill balance has also been suggested to be moderated by the degree of which a given activity is in accordance with “the self” (Waterman, 2011). Thus, there may be a mismatch between activities that elicit flow in a person's life and the activities necessary to reach a long-term goal and vice versa. Further, grit may not always lead to favorable

outcomes (e.g., more flow) and flow may not lead to more grit. As discussed, grit has been linked to poorer task performance in certain settings (Lucas et al., 2015) and more reluctant help seeking behavior (Wilson et al., 2021) whereas flow has been linked to addiction (Dixon et al., 2019; Duke & Montag, 2017; Hull et al., 2013) and family related conflicts (Ramsey & Lorenz, 2019). These outcomes will most likely impede well-being and weaken the relationship between grit and flow proneness.

### **Grit's facets and presence of meaning**

It was hypothesized that both subscales would be a significant predictor of presence of meaning in life. The regression analysis showed that perseverance of effort was a significant predictor presence of meaning in life ( $\beta = .20$ ), whereas consistency of interest was a non-significant predictor ( $p = .88$ ). Several researchers have found similar results where perseverance of effort was the only significant predictor (Credé et al., 2017; Lam & Zhou, 2019; Muenks et al., 2017; Ponnock et al., 2020). These studies investigated perseverance as a predictor of achievement outcomes, and the grit literature as a whole supports the notion that this subscale is important in explaining high performance. Thus, high achievement may work as a mediating factor in explaining why perseverance of effort predicts presence of meaning in life. Further, studies have also revealed that perseverance of effort predicted subjective well-being, whilst consistency of interest did not (Datu et al., 2016; Disabato et al., 2019; Kwon, 2021). Subjective well-being has been shown to be related to presence of meaning in life (Jebb et al., 2020; Li et al., 2020). Thus, these researchers' arguments for why perseverance managed to predict subjective well-being may be valuable for understanding the relationship between perseverance of effort and presence of meaning in life found in the current study. Disabato et al. (2019) argue that perseverance of effort is an important contributor to well-being because it acts as an aid to give hope along the way towards a long-term goal. To reach a long-term goal, one needs to successfully cope with difficulties to achieve short-term goals (Duckworth & Gross, 2014). According to grit theory, high levels of perseverance allow for that. Thus, it may be argued that short-term goal attainment boosts levels of hope and contributes to higher levels of life satisfaction (Disabato et al., 2019). Along these lines, Yang and Wu (2021) found that hope was a significant mediator in explaining the relationship between grit and meaning in life. Thus, having perseverance of effort might predict presence of meaning because of the affective benefits produced along one's way to attain a long-term goal.



It may also be possible that perseverance of effort is associated with higher feelings of meaning due to a more straightforward approach to everyday life. According to Schwartz (2004), an increasingly complex society has resulted in a vast amount of everyday choices. An abundance of choices is what we cherish and view as a hallmark of freedom. Schwartz (2004) however argues that a myriad of choices is in fact destructive to our well-being due to the paralyzing uncertainty it may produce. Drawing on this argument, it may be that high perseverance individuals are less prone to be affected by the abundance of choices that may cause high levels of rumination and a lot of self-debate for less gritty counterparts. For instance, one of the items in the perseverance scale: “*I finish whatever I begin*” could potentially work as a protective buffer against pondering over all the feasible options, because finishing is more or less “non-negotiable”. It is fair to assume that such an approach to life will lead to less switching between the available choices, and thus lead to a more habit driven lifestyle. Research suggests that gritty individuals are more likely to stick to their exercise regimen (Reed et al., 2013) and they have also been associated with higher scores on a scale measuring good habits in a selection of US students (Feldman & Freitas, 2016). Heintzelman and King (2019) discovered that behavior of a habitual nature was related to elevated feeling of meaning life. Previous research has also shown that structure in life is associated with presence of meaning due to its enhancing effect on coherence (Heintzelman et al., 2013). As previously mentioned, coherence is a central aspect of presence of meaning, and is enhanced by the ability to “connect the dots” in one’s life. Thus, perseverance of effort may lead to a perception of less choices and a more habit driven lifestyle (i.e., elevated coherence), which potentially enhances presence of meaning.

Another interesting angle is how a more straightforward approach to everyday life might affect experiences on a broader basis. For instance, evidence suggests that an abundance of experiences impairs subsequent savoring (Quoidbach et al., 2015). This research is in line with what has been found regarding novelty and dopaminergic activity. More specifically, frequent spikes of dopamine levels alter an individual’s threshold-level for subsequent dopamine release (Berke, 2018). Perseverance of effort is about being diligent, hardworking and finishing whatever one begins, which presumably lessens the room for novelty and frequent dopamine spikes. Thus, it may be that individuals with high perseverance of effort manage to enjoy experiences more than those who always pursue novelty. This line of reasoning is relevant because positive affect (elicited by everyday experiences) is closely aligned with meaning in life, and as mentioned, positive affect may actually be sufficient to experience meaning in life (King & Hicks, 2021).

To explain why consistency of interest was not a significant predictor of presence of meaning, it could be relevant to include the conceptual concerns of Disabato et al. (2019) regarding the subscale. They argue that the consistency of interest subscale includes items which are reflecting rigidity across any situation, which again may impede well-being. To highlight this concern, an example of addiction is used, where persons high in consistency of interest may have trouble quitting because they exert commitment to that given substance. To experience presence of meaning in life, one needs to choose a purposeful and coherent pathway, which may be difficult for individuals with high consistency of interest.

Another possibility for why consistency of interest did not manage to predict meaning in life, is that the subscale does not necessarily capture passion. Even though consistency of interest has been operationalized by Duckworth and her colleagues (2007) as being passionate, scholars have argued that the four items in the consistency subscale is not in accordance with the passion literature (Jachimowicz et al., 2018). For instance, both Sigmundsson et al. (2020) and Vallerand et al. (2003) define passion as an affective gravitation towards an activity or task, which emphasizes that the given activity or task is important and valuable for the individual. In Sigmundsson's (2020) 8-item passion scale, an example item highlighting the notion that subjective value must be assigned to the items, is "*my passion is important for me*". By assessing the four items in consistency of interest, one might argue that such an affective component is missing in this subscale. Adding to this, a Chinese study found a moderate correlation between harmonious passion and meaning in life ( $r = .38$ ) and found that positive affect elicited from a passionate leisure activity partially mediated this relationship as well (Zhang et al., 2014). However, to the author's knowledge, Zhang et al.'s. study is the only one that has investigated the relationship between passion and meaning in life, thus more research is required.

Even though the current study and several researchers have found consistency of interest to be a suboptimal predictor, it should be noted that the consistency subscale has shown to be negatively associated with depression measures (Disabato et al., 2019). In addition, the subscale has also proven to be inversely related to thinking about switching from one sport to another, or even quitting, which in the same studies were argued to be an important part of developing sport expertise (Tedesqui & Young, 2017, 2018).

### **Flow proneness and presence of meaning**

The hierarchical regression found as expected that general flow proneness was a significant predictor of presence of meaning in life ( $\beta = .22$ ). Csikszentmihalyi (1975, 1997)

has repeatedly stated that those who are able to frequently experience flow will live better lives. A line of reasoning from this notion derives from research stating that flow produces a self-rewarding experience of a highly positive valence (i.e., autotelic experience). Tse et al. (2021) found that autotelic individuals reported higher levels of well-being due to the frequent flow experiences in everyday life. An earlier study also found that autotelic experiences were a significant factor in explaining positive affect for young musicians (Fritz & Avsec, 2007). According to King and Hicks (2021) living a life with frequent experiences that produces a good mood may be sufficient to experience meaning in life. Thus, general flow proneness possibly increases presence of meaning due to the self-rewarding, frequent flow experiences.

Further, it has also been suggested that spending time on self-defining activities (i.e., activities in accordance with one's identity, values and beliefs) are important for experiencing meaning in life (Waterman, 2011). This reasoning derives from research on eudemonistic feelings (i.e., meaningful feelings such as engagement, interest and enthusiasm), which occur when one is engaging in activities in line with one's true self (Waterman, 1993). Baker and MacDonald (2013) discovered that for a group of song creators, the degree of flow achieved while making a song predicted how meaningful the song was perceived post-creation. Thus, it appears that flow experiences stretch beyond positive affect, a line of argument in accordance with the aforementioned broaden-and-build theory. The current finding in the thesis may for that reason be due to flow experiences being perceived as meaningful on their own. However, it should be noted that there is no consensus in the literature whether a collection of meaningful experiences results in a meaningful life (King & Hicks, 2021).

Assessing the items of the general flow proneness scale, it could also be argued that individuals with a high score also has other tendencies to experiences eudemonistic feelings frequently, such as having a proactive approach towards tasks (engagement), experiencing mastery, and having many interests. This may be an important notion since the flow experience is intrinsically fragile (Csikszentmihalyi, 1975) and even an individual who has formidable levels of flow proneness will most likely spend the majority of a day in a normal state of consciousness. Thus, high flow proneness individuals do not necessarily need to experience meaning in life due to frequent flow experiences, but simply because they possess traits that may produce more wholesome feelings. For instance, Asakawa (2004) found that autotelic individuals were more engaged in passive activities such as watching TV even though they were not experiencing more flow than non-autotelic individuals in such cases.

An alternative route to understanding presence of meaning in life is to assess which experiences lead to low levels of meaning. According to King and Hicks (2021), feelings of boredom might be such an experience. A recent study found that boredom proneness is associated with numerous negative outcomes such as decreased life satisfaction and elevated levels of depression (Tam et al., 2021). Boredom proneness reflects a tendency of not being able to engage in activities in a meaningful way (Tam et al., 2021). Thus, the flow proneness items (8, 11) measuring the absence of boredom in the current flow proneness scale may explain why flow proneness predicted presence of meaning.

Finally, it is also worth considering possible factors that may have impeded the strength of the relationship between general flow proneness and meaning in life. As previously mentioned, flow is not tantamount to good outcomes, and may be “used for both positive and destructive ends” (Csikszentmihalyi & Rathunde, 1993, p. 93). The current flow proneness scale is general, which means that in theory a high scorer will gravitate towards any experience which may produce flow. In modern society this may cause some issues of concern for individuals high in flow proneness since we are surrounded with products specifically designed to induce flow. As discussed, Mauri et al. (2011) found that flow is an important explanatory factor of Facebook’s success and why people spend time on the platform. One may argue that the major concern lies in the reinforcing, self-rewarding experience flow produces. As such, a high score on the general flow proneness scale might increase the probability of gravitating towards activities with a destructive outcome and ultimately lead to a host of trouble and a less meaningful life.

### **The total contribution from perseverance of effort and flow proneness**

Even though the current findings suggest that perseverance of effort and general flow proneness lead to a more meaningful presence, it should be noted the addition of these variables only added 12% of the explained variance in presence of meaning in life (change in  $R^2 = .12$ ). Thus, the current findings suggest that there are other factors of greater significance when explaining meaning in life such as individual genetic differences and the five previously discussed factors by King and Hicks (2021).

### **Limitations**

There are some limitations concerning the methodological choices made in the thesis. A correlational analysis does not allow for any directional inferences, implying that the analysis merely reveals relationships between variables, not how the variables affect each

other (Schober et al., 2018). In the principal component analysis (PCA), the two components task immersion and flow motivation had a Cronbach's alpha of .62, which is below the recommended .7 threshold. This finding questions the two components underlying structure (i.e., internal item consistency) and how reliable the components' relation to grit is. In addition, the first component (task perception) in the PCA had a good reliability score, but consists of five reversed items. There is a possibility that the items only loaded on the same component because they are reverse worded. For instance, Zhang et al. (2016) found that an abbreviated need for cognition scale with both reversed- and normal worded items did not have a good 1-factor structure fit. However, when the scale was modified to contain only reversed worded items or only normal items, support for a one-factor structure was found.

Further, it should also be noted that the 3-item presence of meaning in life scale has never been used in a published study before. Thus, no studies have supported the validity of the 3-item presence of meaning scale, even though the items in the scale showed good internal consistency in the current study (.86). In addition, several studies have argued that the subscale "search for meaning" is an important part of the meaning in life construct (Cohen & Cairns, 2012; DeZutter et al., 2013; Steger et al., 2006).

Further, it could also have been beneficial to include different control variables in the regression analysis. Since grit has been coined as a personality trait (Duckworth et al., 2007) and the general flow proneness scale emphasizes flow frequency across all situations (i.e., general prediction of behavior), they are both related to other personality traits. Thus, an inclusion of a well validated personality scale would have been favorable, both for grit which have been criticized for its close resemblance to conscientiousness (Credé et al., 2017; Lam & Zhou, 2019; Muenks et al., 2017; Ponnock et al., 2020), and to gain a better understanding of how the novel general flow scale is related to different traits. A viable option in this case may have been the 10-item personality inventory (TIPI), which was developed as a cost- and time efficient way to measure the big five personality traits (Gosling et al., 2003). The TIPI is not as reliable as the more comprehensive five-factor scales, but has been argued to be sufficient in studies where the five-factor model is a control variable (Muck et al., 2007). Along these lines, a short social desirability scale (Reynolds, 1982) could also have served as a feasible control variable since the majority of the measured scale items are of a desirable nature in western societies. Finally, it should also be noted that the directional relationship chosen in the regression analysis does not allow for a clear, one-way inference. For instance, McKnight and Kashdan (2009) have argued that purpose should be treated as an underlying,

motivational component for all behavior, and Hill et al. (2016) found that purpose was a significant predictor of grit.

### **Implications**

Despite the limitations, the current study still presents findings of theoretical importance. Given the shortcomings of the Pearson correlation, it is challenging to draw direct conclusions from this specific part of the thesis. However, the strong correlation between grit and flow proneness both encourages and highlights the need for further research that can uncover the directionality between the constructs. To be able to draw causal inferences, relevant covariates should also be controlled for in future studies.

The regression analysis further supported that perseverance of effort has better predictive abilities than consistency of interest. Thus, future research aiming at exploring the relationship between grit and presence of meaning in life should also consider to measure grit's facets separately. In this regard, it should be noted that the aim of using a scale is to measure a complex feeling, action or behavior that cannot be captured without a composition of several items (Boateng et al., 2018). Since scholars have argued that grit without passion (i.e., consistency of interest) is merely a grind (Jachimowicz et al., 2018), the current findings arguably highlight the need for a modified grit scale that captures both perseverance and passion.

Additionally, the PCA conducted on the general flow proneness scale highlights the need for further developing the grit scale, also recalling that the two components (task immersion and flow motivation) did not display convincing reliability. It would also be beneficial to investigate if the same factor-structure found in this study would remain if the reversed-worded items in the scale were modified to regular worded items.

### **Conclusion**

The aim of this study was to (1) investigate the relationship between grit and a novel general flow proneness scale and (2) to check if grit's facets and the novel flow proneness scale could predict the presence of meaning in life. To obtain a better understanding of the general flow proneness scale, a principal component analysis was conducted (PCA). The final PCA model suggested a three-component structure: (1) Task perception, (2) task immersion and (3) flow motivation. The components were also used in the correlation analysis. A Pearson correlation analysis showed a strong correlation between grit and flow

proneness ( $r = .54$ ). Both perseverance of effort and consistency of interest displayed a similarly strong relation to the general flow proneness scale. In the discussion section, a bidirectional relationship between grit and general flow proneness was proposed, but further research is needed to uncover the directionality between the two constructs. Grit's relation to the three components also varied substantially, with a strong correlation to task perception ( $r = .62$ ), a moderate correlation with flow motivation ( $r = .40$ ) and a weak correlation with task immersion ( $r = .16$ ). However, the PCA and the discussed relations between grit and the three components should be seen in light of inadequate Cronbach's alfa values for the two components task immersion and flow motivation, and the fact that the last component task perception may be a result of all items being reverse-worded.

Based on previous recommendations from researchers (Disabato et al., 2019; Kwon, 2021), grit's facets were measured separately in the regression analysis. Furthermore, grit was not measured as a one-factor construct in the regression analysis as this would have caused problems with multicollinearity. The hierarchical regression analysis showed that perseverance of effort significantly predicted presence of meaning in life ( $\beta = .20$ ), whilst consistency of interest did not ( $p = .88$ ). In the discussion it was suggested that perseverance of effort enhances meaning in life through (1) high achievement, (2) affective benefits from short-term goal attainment, (3) having a more straight forward everyday approach (i.e., not being paralyzed by the abundance of choices in a complex society) and (4) living a more habitual driven lifestyle. Consistency of interest did not predict presence of meaning in life, possibly due to the subscale's lack of affective mechanisms that are present in other passion scales (Sigmundsson et al., 2020; Vallerand et al., 2003). In addition, consistency of interest has been linked to a rigorous life approach, which has been suggested to impede well-being (Disabato et al., 2019) and therefore possibly also impede presence of meaning in life.

Further, general flow proneness also predicted presence of meaning in life significantly ( $\beta = .22$ ). It is possible that high levels of general flow proneness lead to presence of meaning by (1) causing frequent self-rewarding flow experiences (i.e., autotelic reward), (2) possessing personality traits that produce more wholesome feelings and/or (3) causing flow experiences to be perceived as meaningful on their own.

The results from the regression analysis suggest that future studies investigating grit's relation to presence of meaning in life should also consider measuring grit's facets separately. Finally, further scale development is a necessity if the general flow proneness scale is intended to be used on a broader basis.

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## Appendix

### Information sheet and consent agreement

Hei!

Velkommen til en spørreundersøkelse som handler om personlighet og konsentrasjon.

Undersøkelsen er frivillig og anonym, og tar ca. 10 minutter å gjennomføre. Det er ingen rette eller gale svar.

Du kan avbryte undersøkelsen når som helst uten at besvarelsen blir lagret.

Du samtykker til å delta ved å trykke "send" på siste side.

For spørsmål, ta kontakt med

Håvard: [hvard@psykologi.uio.no](mailto:hvard@psykologi.uio.no) eller Magdalena:

## Demographic variables

Alder:

Kjønn:

- Mann
- Kvinne
- Annet/Ønsker ikke å oppgi

Er du student?

- Ja
- Nei
- Ønsker ikke å oppgi

Høyeste utdanning fullført:

- Grunnskole
- Videregående skole/yrkesfag
- Bachelorgrad
- Mastergrad
- Doktorgrad
- Annet/Ønsker ikke å oppgi

## flow proneness scale

Hvor enig eller uenig er du med følgende?

Kryss av for ett svaralternativ som beskriver deg best.

	Helt uenig	Delvis uenig	Hverken eller	Delvis enig	Helt enig
Jeg liker utfordrende oppgaver/aktiviteter som krever mye fokus.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Når jeg fokuserer på noe, glemmer jeg fort det som skjer og/eller er rundt meg (f.eks. andre personer, tid og sted).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg opplever som regel en god flyt i det jeg holder på med (ting er verken for lette eller for vanskelige for meg).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg har flere ulike interesseområder.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Det er vanskelig for meg å gå ifra eller avslutte et prosjekt jeg holder på med.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg blir stresset i møte med vanskelige/utfordrende oppgaver.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Det er vanskelig for meg å opprettholde konsentrasjon over tid.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg blir fort lei av ting jeg holder på med.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg blir som regel fornøyd med resultatet av innsatsen min på tvers av oppgaver (opplever mestringsfølelse).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Når jeg fokuserer på noe, glemmer jeg ofte å ta pause.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg kjeder meg fort.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mine daglige gjøremål er utmattende fremfor stimulerende.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg utvikler interesse for det meste jeg holder på med i livet.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Grit-S

## Hvor typisk er dette for deg?

	Ikke meg i det hele tatt	Ikke typisk meg	Litt typisk meg	Ganske ty- pisk meg	Veldig typisk meg
Noen ganger distraherer nye ideer og prosjekter meg fra tidligere prosjekter.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg mister ikke motet ved tilbakegang/motgang.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg har vært besatt av en bestemt ide eller prosjekt i en kort periode, men har seinere mistet interessen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg er arbeidsom.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg setter meg ofte et mål, men bestemmer meg så for et annet isteden.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg har vansker med å beholde fokus på prosjekter som tar mer enn et par måneder å fullføre.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg fullfører alt jeg påbegynner.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg er flittig.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



