The Three Pathways to Happiness: How Orientations to Pleasure, Engagement, and

Meaning Relate to Grit and Well-Being in a Longitudinal, International Sample

By

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Abstract

Orientations to happiness (OTH)--to what extent people endorse pleasure, engagement, and meaning--and Grit--perseverance and passion for long term goals-- have not been studied together longitudinally before. Further, grit and OTH have not been investigated together along with a measure of psychological well-being before. Therefore, the aim of the present study was to investigate the links between and among OTH, grit, and well-being through a number of longitudinal mediation analyses. Data from the International Well-Being Study was used, in which 755 participants completed surveys at five time points over one year. The results illustrated that all of the variables were positively related to each other over time, except for a negative relationship found between grit and pleasure OTH. Pleasure, meaning and engagement were all found to be significant predictors and outcomes of the longitudinal mediations of grit to well-being and of well-being to grit. Additionally, engagement was found to be the only OTH pathway that was a marginally significant mediator of the relationship between grit and well-being. Future research should further investigate the relationships between OTH, grit and well-being. This research also has implications for devising and implementing interventions that increase grit and OTH, which also in turn are likely to improve well-being, decrease mental illness, and improve levels of success.

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Chapter One: Introduction

"Lasting happiness may come, in part, from activities such as working for one's

goals, participating in close social relationships, experiencing renewable physical

pleasures, experiencing mental pleasures, and being involved in 'flow' activities."

Diener (2000, p. 41)

A common goal and pursuit that unites people across the world is to be happy.

Happiness is thought to be fundamental to a good life, and the pursuit of happiness is

an endeavour of many (Tkach & Lyubomirsky, 2006). In one study, people in 47

nations rated their happiness and life satisfaction on a seven-point scale. Participants

in this study rated both happiness (6.39) and life satisfaction (6.21) as very important

to them (Diener, Sapyta, & Suh, 1998). Happiness is defined as a subjective state of

high levels of life satisfaction and positive affect combined with low levels of, or

infrequent episodes of negative affect (Lyubomirsky, Sheldon, & Schkade, 2005). Not

only is happiness important to people, research also illustrates that being happy has

many benefits. For example, happy people have been found to be healthier, more

successful, more socially engaged, to have better relationships, and to live longer

(Lyubomirsky, King, & Diener, 2005). Humans strive to survive, thrive, flourish, live

'the good life' and experience success, true contentment and happiness. Therefore,

understanding happiness and how people become successful is an important

endeavour in Psychology.

Although research on happiness and well-being has increased over the past 10

years, there are still gaps in our knowledge pertaining to how people can become

happier and live more productive and positive lives. Orientations to Happiness (OTH)

is a theory of three different ways to happiness, which was developed by Peterson, Park, and Seligman (2005). Although much has been learnt about OTH and how each theme leads to improved well-being and life satisfaction, OTH has not been examined in a longitudinal study before and there are some mixed findings in this area. Therefore, there is a need for more research examining OTH, preferably of a longitudinal design. Another area that will be investigated in the current study is Grit, a trait that leads to success through perseverance and passion for long-term goals (Duckworth, Peterson, Matthews, & Kelly, 2007). Again, grit has not been investigated longitudinally and currently there are only a small number of studies that have examined OTH and grit together. The current research will bring these two constructs together to further understand what makes people happy and successful. It will also attempt to improve the current knowledge of these areas by using a large, longitudinal, and international sample to examine what variable is driving the relationships among grit, well-being, and the OTH themes.

The Evolution of Positive Psychology

The pursuit of happiness has been pondered since ancient times. The modern psychological view of happiness can be traced back to the ancient Greek philosophers who proposed two distinct types of happiness: hedonic and eudaimonic. Hedonic happiness refers to the pursuit of pleasure for its own sake, maximising pleasure through the satisfaction of one's desires and minimising one's pain (Steger, Kashdan, & Oishi, 2008). Hedonic theory states that quality of life is the quantity of good moments minus the quantity of bad moments (Seligman, 2002). This view is typically ascribed to Aristupus who believed in immediate sensory gratification and this point of view was later elaborated by Epicurus who suggested that humans fundamental moral obligation is to maximize their experience of pleasure (Peterson et al., 2005).

Engaging in hedonic behaviour has been found to increase positive affect and life satisfaction in the short-term (Diener, Sandvik, & Pavot, 2009), but these effects may not last in the long-term (Huta & Ryan, 2010; Seligman, 2002; Steger et al., 2008; Tončić & Anić, 2014).

In comparison, eudaimonic happiness refers to psychological growth, flourishing, and meaning in life (Ryan & Deci, 2001). Aristotle asked "what is the good life?" He is credited with being the first philosopher to have developed the eudaimonic perspective, and he advocated for the pursuit of virtue or excellence instead of sensory pleasure in isolation. According to this view, true happiness follows from identifying one's virtues, strengths, and inherent potentials, and pursuing complex and meaningful goals (Aristotle & Chrisp, 2000). The concept of eudaimonia has also been refined and developed by other theorists in modern Psychology. Three important developments are worthy of note: 1) Carl Rogers' (1951) ideal of the fully-functioning person, client centered therapy, and finding one's authentic self; 2) Maslow's (1970) concept of self-actualization, a state in which people have full access to their talents and strengths; and 3) Deci and Ryan's (2000) self-determination theory where competence, autonomy, and relatedness influence motivation, psychological growth, and well-being. A commonality among all of these psychological theories is that people should develop skills within themselves and then use these skills in the service of something greater (Peterson et al., 2005). It is important to note that hedonia may be related to eudaimonia. For example, research suggests that eudaimonic behaviours make people happier than purely hedonic behaviours. For instance, in a daily diary study, Steger et al. (2008) found that eudaimonic behaviours were related to greater life satisfaction, positive affect, and levels of daily subjective well-being compared to hedonic behaviours. Furthermore,

eudaimonic activity but not hedonic activity had a positive relation with participants'
well-being the next day, especially in regard to meaning in life.

Today these components of happiness are conceptualized, examined and
researched in the new field of Positive Psychology (PP). "Positive Psychology is the
study of conditions and processes that contribute to the flourishing or optimal
functioning of people, groups, and institutions" (Gable & Haidt, 2005, p. 103). The
PP movement was overtly formed in 1998 by Martin Seligman during his presidency
of the American Psychological Association (Seligman & Csikszentmihalyi, 2000).
With this movement, Seligman aimed to redress the imbalance in Psychology with its
focus on abnormal behaviour. Before WWII, the field of Psychology attempted to
improve people's lives by identifying ways to help people be more productive and
lead more fulfilling lives, studying individuals marked by genius and talent, while at
the same time also alleviating mental distress and disorder (Seligman, Parks, & Steen,
2004). However, after WWII, with the large number of soldiers needing mental health
services and the availability of research funding in this area, the focus turned toward
psychopathology and the assessment, understanding, and treatment of mental illness
(Seligman & Csikszentmihalyi, 2000). Since then, Psychology has tended to focus on
abnormality, psychopathology, and psychological deficits from the point of view of a
disease model of human functioning (Seligman & Csikszentmihalyi, 2000).
Psychology became a profession effective at "learning how to bring people from
negative eight to zero, but not as good at understanding how people rise from zero to
positive eight" (Gable & Haidt, 2005, p. 103).

The PP position questions this emphasis on abnormal behaviour, and argues
that in addition to studying psychopathology, other areas of human functioning such
as strengths, resilience, happiness, joy, and success should also be researched in order

to address the full spectrum of human experience (Gable & Haidt, 2005). The focus of PP is the idea that happiness is not the same as the absence of unhappiness (Seligman, Parks, & Steen, 2004). Ultimately, PP aims to understand what makes people happy, how they can enhance their lives, what makes life worth living, and how to live the "good life".

For over a decade, PP literature has extended the field of Psychology and demonstrated that people can become happier, that happiness is important for health and well-being, that people have strengths and talents which play an important role in well-being, and that they can be resilient in the face of adversity (Cohn, Fredrickson, Brown, Mikels, & Conway, 2009; Lyubomirsky et al., 2005; Tugade & Fredrickson, 2004). From these findings PP interventions have been developed which aim to foster these important attributes, enable people to be happier, and also alleviate mental illness. Not only can PP help people stuck in an average mood to experience enhanced happiness, it has also been shown to improve various mental illnesses while also making clients happier. Meta-analyses have illustrated that PP interventions such as writing gratitude letters, practicing optimistic thinking, replaying positive experiences, and mindfulness increase well-being and decrease depression (Boiler et al., 2013; Sin & Lyubomirsky, 2009). Furthermore, PP interventions not only help people who are suffering from mental illness, but they can also help people possessing middle-of-the-road mood states to become happier, to understand themselves better, to identify triggers and strengths to become more successful, and to improve their well-being and quality of life (Seligman, Rashid, & Parks, 2006).

Improving well-being is an important goal of PP interventions. However, to properly understand how these interventions work and to improve and develop them, it is important to properly understand the nature of happiness. One way to do this is to

break down happiness into its components in order to understand what the targets of PP interventions should be. One notable attempt to do this is Peterson, Park, and Seligman's (2005) theory of Orientations to Happiness (OTH), which further develops the components of happiness.

Orientations to Happiness

The OTH approach proposed by Peterson et al. (2005) adds one more element, namely flow (or engagement), to the hedonic and eudaimonic bases of happiness. OTH is made up of three pathways to happiness: pleasure, or the "pleasant life", meaning, or the "meaningful life", and engagement, or the "engaged life".

First, the "pleasant life" refers to hedonia, where pleasure and happiness follow immediate rewards or pleasures, such as buying new clothes, going to the movies, or eating chocolate. Experiencing frequent pleasure has been found to increase positive affect and life satisfaction (Diener, Sandvik, & Pavot, 2009), and experiencing frequent positive emotion appears to be important. In a large cross-national study, positive emotions were more strongly correlated to life satisfaction than the absence of negative emotions (Kuppens, Realo, & Diener, 2008). However, it has been suggested that experiencing immediate pleasure does not tend to be long lasting and that once the pleasurable stimulus fades or one habituates to it, the pleasure can dissipate (Seligman, 2002; Steger et al., 2008). For example, physical pleasure has been found to be associated with short-term satisfaction with life (within a day), but not in the longer term (over several weeks) (Oishi, Schimmack, & Diener, 2001). Similarly, other studies have found that hedonia tends to improve well-being, life satisfaction, and positive affect in the short term, but eudaimonia leads to more longer lasting improvements and is more beneficial in the long term (Huta & Ryan, 2010; Tončić & Anić, 2014).

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Second, the "meaningful life" is based on eudaimonia, where pursuing activities that contribute to and connect to something larger than oneself provides a sense of purpose and meaning. One can find meaning, for example, through volunteering, spirituality, or helping others (Peterson et al., 2005). People who experience a meaningful life report that they feel their actions are significant, make a difference, and have purpose. These feelings lead to goals that guide and promote well-being and also to social connections with others (Baumeister & Vohs, 2002). People who feel purpose report greater life satisfaction, more positive affect, higher levels of optimism, and better self-esteem and physical health (Compton, Smith, Cornish, & Qualls, 1996). Furthermore, the presence of meaning in one's life is significantly associated with happiness, life satisfaction, and positive affect, and negatively associated with depression, psychopathology, and negative affect across the lifespan (Grouden, 2014; Mascaro, & Rosen, 2006; Park, Park, & Peterson, 2010; Steger, Oishi, & Kashdan, 2009).

The third and last orientation is the "good life", or the life of engagement, which describes how engaged a person is in their activities. One experiences "flow" if one loses oneself in an activity, loses awareness of one's surroundings and sense of time, and becomes completely engrossed in an activity (Csikszentmihalyi, 1975). Flow is said to occur when there is an optimal balance of challenge and skill wherein one successfully navigates a task in the face of challenge (Moneta & Csikszentmihalyi, 1996). For example, one might experience flow when he or she is writing, painting, at work, or playing with his/her children (Seligman, 2002). Flow has been argued to significantly overlap with both hedonia (pleasure) and eudaimonia (meaning) as it can occur in states that lead to personal growth (Waterman, 1993) but it is also experienced in less meaningful and virtuous activities like playing video

games (Hsu & Lu, 2004). Because flow is associated with both hedonia and eudaimonia but is also distinct from them, it has been identified as the third component of OTH (Peterson et al., 2005).

Findings suggest that people who spend more time in flow experience higher levels of well-being (Csikszentmihalyi, 1997a, 1997b). However, it is important to note that the flow state does not necessarily result in a subjective experience of happiness or meaning in the moment, but that the experience of engagement is predictive of greater well-being at a later point in time (Huta & Ryan, 2010). For example, participants have reported that being in a state of flow was more enjoyable after retrospective reflection than in the moment (Carli, Delle Fave, & Massimini, 1988). Research suggests that flow states may also promote adaptive resources and lead to psychological growth, such as developing and improving talents, interest, and skills that may increase long-term well-being and lead people to be more productive and successful (Schueller & Seligman, 2010). In support of this idea, Csikszentmihalyi (1990) found that people who frequently experience flow tend to persist longer on tasks and therefore achieve better outcomes. Furthermore, the frequent experience of flow has been associated with achievement, work satisfaction, and creativity, and because it leads to greater skills, people are then more likely to experience flow again (Csikszentmihalyi, 1997a; 1997b; Nakamura & Csikszentmihalyi, 2009).

Measurement of Orientations to Happiness

Peterson et al. (2005) have developed the Orientations to Happiness (OTH) scale, a self-report measure of whether participants typically approach life in terms of meaning, pleasure, and/or engagement. In using the OTH scale with 845 participants, Peterson et al. (2005) found that all three orientations (pleasure, meaning, and

engagement) positively predicted life satisfaction. However, Peterson and colleagues found that meaning and engagement were more robust predictors of life satisfaction compared to pleasure. Additionally, people who pursued all three of the orientations, thus experiencing "the full life", were found to have the highest degree of life satisfaction, suggesting a complementary or cumulative effect. These findings have since been replicated all over the world (Avsec, Kavčič & Jarden, 2015; Chan, 2009; Chen, 2010; Chen, Tsai, & Chen, 2010; Kavčič & Avsec, 2014; Ruch, Harzer, Proyer, Park, & Peterson, 2010). For example, across all of the 27 nations included in one study (n = 424,836), each of the three OTH themes were found to predict life satisfaction, and engagement and meaning were more robustly associated with life satisfaction than pleasure (Park, Peterson, & Ruch, 2009).

Other research on OTH has investigated different outcome measures. Schueller and Seligman (2010) undertook an international online study of 13,565 participants from 112 countries, the majority from the United States. Participants completed a measure of their OTH, subjective (SWB), and objective well-being (OWB). The results indicated that pleasure, engagement, and meaning were all correlated with higher levels of SWB, with engagement and meaning being stronger predictors of SWB than pleasure. In regard to OWB (educational and occupational attainment), engagement and meaning were positively correlated with OWB, whereas pleasure was negatively related. This set of results suggests that pursuing and engaging in meaningful activities may lead to higher well-being than pleasure, and that pursuing pleasure may have negative consequences for education and occupation. Although this is an interesting and helpful finding, the representativeness of the sample could be improved as the majority of participants were highly educated (89% attending college, 31% had completed postgraduate education), predominantly female

(66.5%), and aged between 35 and 44 years. Further, because this study is cross-sectional, there is need for a longitudinal study on OTH and well-being to investigate the direction of predictive relationships, and it would be helpful to understand if there is a third variable affecting this relationship.

In an experience sampling study by Grimm (2013), it was illustrated that participants experienced their daily activities as a blend of both hedonic and eudaimonic activities, and importantly, their dominant OTH did not predict engagement in different activities. Further, Grimm (2013) found that participants who scored high on all three OTH also rated their daily experiences high on pleasure, meaning, engagement, and happiness, thus supporting the full life hypothesis in everyday activities in a real-time format. Interestingly, all three of the OTH were equally correlated with life satisfaction, whereas pleasure was more strongly correlated with positive affect than meaning and engagement. This finding could be explained by the real-time format used in this study as engaging in pleasurable activities are likely to give more pleasure in the moment but are not as long lasting as the effects of meaningful and engaging activities.

An additional study by Vella-Brodrick, Park, and Peterson (2009) compared the OTH of 12,622 American and 332 Australian respondents and found that all three OTH themes positively predicted life satisfaction, with stronger relationships again found for engagement and meaning over pleasure. Australian respondents also completed a Big Five personality inventory, and these associations were obtained after covarying out the contributions of basic personality traits. American participants scored slightly higher on an orientation to meaning than did Australian participants. This difference might reflect a difference in religiousness, with Americans typically being more religious that Australians (Vella-Brodrick et al., 2009).

Although the literature discussed above suggests that engagement and meaning are superior to pleasure in enhancing life satisfaction and that being high on all three orientations leads to the best outcomes, other research is more inconsistent. Kose (2014) investigated the OTH scale in Turkish and Russian university students and found that all three orientations related to life satisfaction in the Turkish sample, with meaning being the highest predictor. However, in the Russian sample only meaning significantly predicted life satisfaction whereas pleasure and engagement did not. Similarly, Kenkyu (2011) created a Japanese version of the OTH scale and found that although engagement and meaning were correlated with life satisfaction, an orientation to pleasure was not. Kenkyu suggested that the difference in findings in Japan versus the US is that in America happiness is considered to come from positive emotions whereas in Japan positive feelings, as well as living a hopeful life under negative circumstances is considered to be the basis of happiness.

Henderson, Knight, and Richardson (2013) set out to test these inconsistencies in the OTH literature. Australian participants completed the OTH scale and Satisfaction with Life Scale before completing a daily online report of their actual instances of hedonic and eudaimonic behaviour. Consistent with previous research, all three orientations were related to life satisfaction, with engagement and meaning being stronger predictors compared to pleasure. Engagement and meaning were both predictors of eudaimonic behaviour, with meaning being the strongest predictor. Furthermore, the pleasure orientation was found to be unrelated to actual hedonic behaviour. However, the pleasure orientation does not measure typical hedonic behaviour but the extent to which people seek out and endorse hedonic pleasure. Additionally, hedonia was found to be a stronger predictor of life satisfaction than eudaimonia, which contrasts with the literature that suggests that meaning and

engagement are stronger predictors of life satisfaction than pleasure. Henderson and colleagues suggest that these findings reflect a problem with the OTH scale's validity. However, another explanation for their findings could be that they were obtained with a daily diary method. As previously explained, pleasure has been found to have a greater impact on life satisfaction and well-being in the short-term, whereas eudaimonia is more beneficial in the long-term (Huta & Ryan, 2010; Seligman, 2002; Steger et al., 2008; Tončić & Anić, 2014). It is not surprising then, that hedonia was a stronger predictor of life satisfaction in the short-term compared to eudaimonia as there was no long-term follow-up, which is where the benefits of eudaimonia are likely to become clearer.

The research on how OTH predicts hedonia and eudaimonia has yielded mixed results, but in general the three components of OTH have been found to be independent and unique predictors of subjective well-being and life satisfaction. Support has been accrued for engagement and meaning being stronger predictors of well-being than pleasure, and the combined presence of all three OTH (i.e., the full life) has been suggested to lead to the highest levels of well-being and life satisfaction (Peterson et al., 2005; Peterson, Ruch, Beerman, Park, & Seligman, 2007). Although these findings have been backed up by research, not all studies find the same results and there is a need for more research on OTH to clear up these inconsistencies in the literature. As the above literature suggests, there are currently no longitudinal investigations into OTH and its outcomes, and this constitutes a significant gap in the literature. Further, as flow has been suggested to build resources and lead people to be more successful in their pursuits, looking at a trait which builds success, such as grit could also be fruitful and take the current OTH and happiness literature in a new direction.

Grit

A universal need of humanity is to experience happiness and well-being, but another important goal in life is to be successful and achieve one's long-held goals and dreams (Deci & Ryan, 2000). In turn, achieving one's goals is thought to lead to improved well-being and life satisfaction (Wiese, 2007). A good example of this drive for success is the American dream, embedded in the Declaration of Independence, which states that all men are created equal with the right to life, liberty and the pursuit of happiness. The American dream encompasses the idea that anyone can be successful no matter where they have come from, and no matter their ethnicity, class, or religion as long as they work hard (Adams, 1931). Seeing as being successful is important to people, and that working hard and achieving one's goals can also improve well-being, this may be an important area to research in relation to OTH.

Historically, as a way to understand why some people are more successful than others, Galton collected information from people in many different occupations and concluded that ability alone did not bring about success in any field. Rather, he believed that high achievers had "ability combined with zeal and with capacity for hard labour" (Galton, 1892, p. 33). That is, people who were most successful across a number of different fields had some talent, but over and above their talent they were willing to put in a lot of effort and had great enthusiasm for their chosen pursuit. Similarly, Bloom (1985) undertook a qualitative study of world-class pianists, neurologists, swimmers, chess players, mathematicians, and sculptors, Bloom (1985) found that those who were the most accomplished had a strong interest and desire to reach a high level in their field and worked hard day after day for 10-15 years before they reached the top.

More recently, a mathematics teacher by the name of Angela Duckworth, noticed that it was not necessarily talent or intelligence that made her students successful but hard work, determination, and perseverance. Duckworth, Peterson, Matthew, and Kelly (2007) investigated the quality that distinguished star performers across a number of different fields and found that the high achievers were not necessarily those who were the most talented but were the people who showed sustained commitment and ambition. This observation led Duckworth to coin the psychological construct called Grit, which is defined as "perseverance and passion for long-term goals" (Duckworth et al., 2007, p. 1087). Grit involves working strenuously toward one's very long-term goals, maintaining effort and interest over years, and persisting despite challenges, failure, and plateaus in progress (Duckworth et al., 2007).

In Duckworth et al. (2007)'s original work in developing and validating the Grit Scale, six studies were completed. In the first and second study it was found that "grittier" individuals had attained higher levels of education than less gritty individuals of the same age. Further, grit tended to be higher in older individuals than younger individuals, suggesting that grit may increase over the life span. It was also found that participants who scored higher on grit made fewer career changes than less gritty peers of the same age. In the third study, Duckworth and colleagues illustrated that undergraduate university students who were higher in grit earned higher Grade Point Average's (GPAs) even though they had lower SAT scores than their peers. In the fourth and fifth studies with cadets at West Point Military Academy, grit was found to be a better predictor of first summer retention in a very challenging training programme than either self-control or a summary measure of cadet quality used by West Point. However, among the cadets who persisted in the training, self-control was

found to be a better predictor of academic performance than grit. In the final study, grittier competitors in a National Spelling Bee outranked less gritty competitors of the same age. This increase in performance was found to be at least in part due to grittier people doing more accumulated practice. The results of these studies support the psychometric properties of the Grit Scale and suggest that achieving goals is not only determined by one's talent but also by one's amount of grit.

Duckworth and Quinn (2009) refined the Grit scale and developed the Grit Short Version scale (Grit-S) which consists of eight items and contains both self-report and informant-report versions. Grit-S was found to have improved psychometric properties compared to the original Grit Scale and the correlations between peer, self-report, and family member Grit-S scores were medium to large, illustrating that the informant Grit Scale is also successful in measuring grit. Duckworth and Quinn (2009) undertook another six studies in order to test the reliability and validity of their scale. These studies illustrated that adults who scored higher in grit had higher educational achievement and made fewer career changes, and adolescents who were grittier achieved higher GPAs and watched less television one year later. They also found that again West Point cadets were less likely to drop out during their first summer of training if they were grittier and grittier National Spelling Bee finalists were more likely to advance to further rounds than were their less gritty competitors. Additionally, as three of the studies were prospective longitudinal designs, this set of results suggests that grit drove the relationships with achievement and not the other way around (Duckworth & Quinn, 2009).

Since creating the grit scales, Duckworth has continued to investigate grit and its impact on achievement in different populations. For example, another study by Duckworth, Kirby, Tsukayama, Berstein, and Ericsson (2010) was undertaken to

understand why successful competitors in the spelling bee are more successful, and if grit plays a role in this. It was found that those children who engaged in deliberate practice (studying and memorizing words while alone with a particular learning goal) performed better in the spelling bee than those children who used other less effortful techniques. Furthermore, grittier spellers were found to engage in deliberate practice more than less gritty spellers, and hours of deliberate practice mediated the association between grit and spelling performance. This result suggests that possessing the attributes of perseverance and passion for long-term goals allows spellers to persist with practice that is less enjoyable and more effortful, and that this practice is more rewarding in the long run (Duckworth et al., 2010).

Similarly, grit has continued to be researched in cadets at West Point Military Academy. For instance, Maddi, Matthews, Kelly, Villarreal, and White (2012) examined grit, hardiness (continued health and performance in a variety of stressful circumstances), overall attrition, and cadet performance after cadets' first year at West Point. Hardiness and grit were both found to predict unique variance in first year retention, but only hardiness predicted first year performance at the school. Kelly, Matthews, and Bartone (2014) extended this research but separated grit into its two main components, perseverance of effort and consistency of interests over time. After four years of the full West Point programme, consistency of interest and hardiness commitment predicted attrition from the programme, and only perseverance of effort predicted persistence across the remaining four years.

In another investigation of grit in the achievement of different domains, Eskreis-Winkler, Shulman, Beal, and Duckworth (2014) found that soldiers who report having more grit were more likely to complete a special operations selection course, that grittier sales employees were more likely to keep their jobs three months

later, that high school students who scored higher on grit were more likely to graduate from high school on time one year later, and that men (but not women) who were higher on grit were more likely to stay married. These findings remained statistically significant even when predictors of retention were controlled for (e.g., intelligence, physical aptitude, Big Five personality traits, job tenure, and demographic variables).

Research has also shown that grit leads to positive outcomes for teachers and their students. Grittier teachers are more likely to stay in teaching and their students perform better than the students of teachers who are low in grit (Robertson-Kraft & Duckworth, 2014; Duckworth, Quinn, & Seligman, 2009). Being gritty also has benefits for persisting and being successful in completing higher academic education. For example, grit has been positively related to the college grades of black male college students at predominantly white institutions (Strayhorn, 2013). Furthermore, online doctorate students who are grittier earn higher GPAs and spend more time per week working on their study compared with less gritty individuals (Cross, 2014). This trend was especially true for women and older students who exhibited higher grit scores than younger students. The relationship between grit and achievement has even been found at the physiological level as grit predicts nervous system responses in the form of increased autonomic co-activation and parasympathetic activity when participants are given achievement tasks (Silvia, Eddington, Beaty, Nusbaum, & Kwapil, 2013). Increased autonomic co-activation (stronger pre-ejection period) and parasympathetic activity (respiratory sinus arrhythmia) was much stronger for the perseverance of effort component of grit and less so for the consistency of interest component. This suggests that those who are high in perseverance viewed the task as more important and dedicated greater effort to it.

In another related study, Bowman, Hill, Denson, and Bronkema (2015)

investigated the two components of grit, perseverance of effort and consistency of interest, separately in relation to a number of student outcomes. Across three samples from two universities Bowman and colleagues found that perseverance of effort was a better predictor of grades than consistency of interest. Perseverance of effort predicted greater academic adjustment, college grade point average, college satisfaction, sense of belonging, engagement in curricular activities, faculty-student interactions, and intent to persist, and led students to be less likely to change majors. In contrast, consistency of interest was only associated with less intent to change majors and careers.

In contrast to most of the research illustrating the benefits of being gritty for achievement, Ivcevic and Brackett, (2014) illustrated that grit did not predict school outcomes (rule violating behaviour, academic recognitions, honours, and GPA) in private high school students, whereas conscientiousness and emotion regulation ability did. Ivcevic and Brackett (2014) suggest that grit may be more successful if the outcome is based on a narrow, self-selected goal as opposed to a broad measure like GPA, which reflects success in a range of subjects and areas.

In summary, the above literature has shown that grit leads to increases in achievement across a number of different domains. The intent of the present study was to ask whether grit would also be related to other constructs that are important for people. The small literature on the associations between grit and subjective well-being will now be summarised.

Grit and Well-Being

A small number of studies have investigated grit's role in well-being and life satisfaction, and the results suggest that being gritty leads people to be happy and to live a high quality of life. For example, Singh and Jha (2008) found that grit was

positively correlated with life satisfaction (r = .32), positive affect (r = .44), and happiness (r = .26), and negatively correlated with negative affect (r = -.14). In a study of general surgery residents, scoring high in grit was related to greater psychological well-being six months later (Salles, Cohen, & Muller, 2014). In the same vein, Tittanen (2014) found that grit was highly positively related to psychological well-being, life satisfaction, and harmony in life for Swedish participants. Additionally, Tittanen found that having a sense of coherence and authenticity mediated the relationship between grit and well-being. This set of findings suggests that being gritty about one's goal pursuits promotes a sense that the world is coherent and enhances an authentic connection with the self and that these, in turn, benefit psychological well-being. In another study, grit in combination with gratitude (noticing benefits and gifts received by others) has been associated with reducing the risk of suicidal ideation four weeks later by enhancing meaning in life (Kleinman, Adams, Kashdan, & Riskind, 2013). Grit has also been found to moderate the relationship between hopelessness and suicidal ideation and plans, which highlights grit as a potential protective factor against suicide even in individuals with elevated levels of hopelessness (Pennings, Law, Green, & Anestis, 2015). The results of these studies suggest that grit has important benefits for increasing well-being and happiness, but how this relationship unfolds over time is unknown. The following section will consider whether and how grit might be related to Orientations to Happiness (OTH).

Grit and Orientations to Happiness

As the research on OTH illustrated above, there are three distinct routes to happiness and well-being, and it is intriguing to consider whether the involvement of grit adds anything to this previously established relationship. Furthermore, as

experiencing flow has been suggested to promote resources, improve talents, and lead to greater success, it is likely that a link between grit and the flow component of OTH (engagement) would be found. Currently a small number of studies have investigated grit and OTH or hedonia/eudaimonia together. Von Cullin, Tsukayama, and Duckworth (2014) investigated grit and its two component facets, perseverance of effort and consistency of interests over time, and OTH in two cross-sectional Internet survey studies. In both studies it was demonstrated that gritty people were most likely to endorse higher engagement, and pursuing engagement was more strongly associated with perseverance of effort than consistency of interests over time. Gritty people also endorsed meaning but to a lesser extent than engagement, and meaning contributed to both sustained effort and interest over time. Further, participants who endorsed seeking happiness through pleasure were found to be less gritty, and an inverse relationship was found between pleasure and grit. This inverse relationship suggests that gritty people do not find pleasure as important as engagement and meaning. Additionally, pleasure was more strongly inversely related to consistency of interests over time compared to perseverance of effort. In summary, this study illustrated that engagement may promote grit by encouraging sustained effort over time, and pleasure may impede grit by discouraging sustained interest over time (Von Cullin et al., 2014).

In contrast to Von Cullin et al. (2014)'s study, Suzuki, Tamesue, Asahi and Ishikawa (2015) investigated grit and OTH in Japanese workers and found that an orientation toward meaning was more strongly correlated with grit as opposed to engagement. Suzuki et al. (2015) suggest that meaning leads to higher grit in Japanese society because Japanese people value the contribution to the organization of society more than individual engagement, whereas the opposite is true in US samples. Similar

to Von Cullin et al. (2014)'s study they found that engagement and meaning were positively correlated with grit, whereas pleasure was negatively correlated with grit. Suzuki and colleagues also found that grit was a strong predictor of work and academic performance and demonstrated that participants with an orientation toward engagement and meaning felt more engaged in their work compared to those with an orientation toward pleasure.

Datu, Valdez, and King (2016) found that grit was beneficial for educational outcomes, meaning in life, flourishing, and engagement in class in Filipino high school students. The perseverance of effort component of grit was found to positively predict behavioural engagement, emotional engagement, and flourishing, and both consistency of interest and perseverance of effort were found to negatively predict behavioural and emotional disengagement. Additionally, Xiafei, Fang, and Shijiang (2015) found that Chinese adolescents' grit in learning, performance approach, and learning strategy were positively predicted by eudaimonic orientations and negatively predicted by hedonic orientations. Xiafei et al. (2015) also found that performance avoidance was negatively predicted by eudaimonic orientations and positively predicted by hedonic orientations.

In another study, the character trait of perseverance in the face of adversity (which is similar to the construct of grit) was strongly associated with an orientation toward engagement, moderately associated with an orientation toward meaning, and only weakly associated with an orientation toward pleasure (Peterson et al., 2007). As perseverance is a part of grit, this result may suggest that there is a relationship between grit and OTH, especially in regard to engagement and less so for pleasure. And last, Schueller and Seligman (2010) found that more educated, professional, and successful adults are more likely to endorse engagement and meaning, and less likely

to endorse pleasure, as their preferred paths to happiness. Although grit was not included in this study, it is possible that it may have mediated the relationship between education or professional attainment and OTH.

Goals of the Present Study

Grit is a relatively new and understudied area of Positive Psychology, and there is still much to learn about the components of OTH and how they relate to happiness and well-being. Further, there is a distinct gap in the literature that examines the associations between grit and OTH. Von Cullin et al. (2014) found that the three OTH themes related differently to grit in two cross-sectional studies. The aim of the current study was to further investigate the relationships between OTH and grit, but to improve the current knowledge by using a large, longitudinal, and international sample. The use of this type of sample will provide a better understanding of what variable is driving the relationships among grit, well-being, and the OTH themes. Furthermore, as both OTH and grit have been found to lead to increased well-being, looking at all three of these variables together may help us to understand how to best improve well-being, and also how to help people to become more successful either through grit or by becoming more engaged in the tasks they do, experiencing more pleasure in their lives, or living a more meaningful life.

Aim and Hypotheses

The aim of the present study was to add to the OTH, Positive Psychology, and grit literature by investigating how the three OTH themes relate to well-being and grit in an international longitudinal sample. It was hypothesized, consistent with current literature, that grit and the three OTHs would predict increased well-being over time (H1), and that greater well-being, in turn, would lead to higher grit and OTH over time (H2). Among the OTH themes, it was expected that engagement and meaning

would be positively correlated with grit, but that pleasure would be negatively correlated with grit (H3). Furthermore, a systematic set of mediations were investigated between grit, OTH and well-being in order to identify the complex interplay among these three components. It is hypothesized, based on associations identified in previous studies, that engagement would mediate the relationship between grit and well-being, but that meaning and pleasure would not (H4). It is also hypothesized that engagement would be more strongly linked with grit compared to pleasure and meaning (H5) consistent with Von Cullin et al. (2014)'s study.

Chapter Two: Method

The present study used the dataset from the International Wellbeing Study (IWS), a large-scale Internet study that was created in 2006 by Aaron Jarden, Kennedy McLachlan, Paul Jose, Alex Mackenzie, Ormond Simpson, and Todd Kashdan (www.wellbeingstudy.com). The IWS is a longitudinal data set consisting of five time points separated by three months each, with a large number of adult community participants drawn from around the world.

Participants and Procedure

Participants were 755 community adults (121 males, 634 females) aged 15 to 82 (average age = 39.0, SD = 14.40 years), who had access to the Internet and could read and write English or one of the 15 additional languages included in the study. Participants were recruited and completed the study from a wide variety of different countries. The data from the participants who completed all five time points was used in the present study. Participants came from 40 different countries, with the greatest number coming from New Zealand ($N = 263$), the U.S. ($N = 121$), Hungary ($N = 70$), and Australia ($N = 68$). Participants from other countries were from Europe, North and South America, and Asia, all of which had fewer than 40 participants from each country. The majority of participants were married ($N = 292$) or in a long-term relationship ($N = 163$), and 177 were single, 42 were divorced, 20 were separated, 17 were widowed, and 44 identified as "other." A wide range of ethnicities were represented in the sample, but the majority of participants identified as White/Caucasian.

Participants were recruited by a variety of methods in different countries, for example, through posters, newsletters, email-lists, and website postings. Participants

signed up on the study website (www.wellbeingstudy.com) and were then contacted

by email to participate in the study. Participants then completed a 25-30 minute

survey on the study website every three months over a 12-month period (yielding five

time points). Participants were recruited between March 2009 and March 2012.

Participants were informed that upon completion of the study, they would be entered

into a drawing for 10 $100 amazon.com vouchers and would also receive an email

report describing the study in more detail and their scores in relation to other

participants.

Materials

Participants needed access to the Internet to participate in this study, which

involved completing a survey of 22 measures. Three of these measures were used in

the present study and are described below.

The Orientations to Happiness Scale. The Orientations to Happiness Scale is

an 18-item scale designed by Peterson, Park, and Seligman (2005) and it consists of

three subscales (See Appendix A). The first subscale is obtaining happiness through

pleasure, a hedonic route that focuses on maximizing pleasure and minimizing pain.

The second subscale is obtaining happiness through engagement, an activity-based

route involving flow. The third subscale is obtaining happiness through meaning, a

eudaimonic route in which people feel their life is meaningful and use their strengths

and virtues. The OTH Scale measures the endorsement of these three different ways

to be happy and asks participants to rate their agreement with descriptions of each

OTH domain on a five-point scale (1 = *not at all like me* to 5 = *very much like me*).

Example items are "Life is too short to postpone the pleasures it can provide,"

(pleasure) "I am always very absorbed in what I do," (engagement), and "My life

serves a higher purpose" (meaning). The three subscales have previously

demonstrated good psychometric properties (Park et al., 2009) and have been shown to each independently predict life satisfaction (Peterson et al., 2007).

Grit Scale. The Grit Scale is a 17-item scale created by Angela Duckworth (Duckworth et al., 2007). It measures Grit (perseverance and passion for long term goals) and also includes a five-item ambition scale (See Appendix B). Within the Grit scale there are two subscales, consistency of interest over time and perseverance of effort. Sample items (reversed items) of the consistency of interest subscale include "My interests change from year to year" and " I have been obsessed with a certain idea or project for a short time but later lost interest". Sample items of the perseverance of effort subscale include "I finish whatever I begin", "I have achieved a goal that took years of work", and "Achieving something of lasting importance is the highest goal in life". These items are rated on a five-point scale from 1= *not at all like me* to 5 = *very much like me*. The Grit Scale has been demonstrated to be a reliable and valid measure over a number of studies with different samples (Duckworth et al., 2007).

Psychological Well-Being Scales (Short version). The Psychological Well-Being Scales consist of 18-items that was created by Carol Ryff (Ryff & Keyes, 1995), which assesses six areas of life in a particular moment in time (See Appendix C). The scale assesses: autonomy (e.g., "I have confidence in my own opinions, even if they are different from the way most other people think"), environmental mastery (e.g., "In general I feel I am in charge of the situation in which I live"), personal growth (e.g., I think it is important to have new experiences that challenge how I think about myself and the world"), positive relations with others (e.g., "People would describe me as a giving person, willing to share my time with others"), purpose in life (e.g., "Some people wander aimlessly through life, but I am not one of them"), and

self-acceptance (e.g., "I like most parts of my personality"). Participants answer the 18 questions on a scale from 1= *strongly disagree* to 7 = *strongly agree*.

Analyses

Descriptive statistics were used to determine the relationships between the variables at each time point and longitudinally. Then a series of longitudinal mediations were preformed to determine the complex interplay on the variables effects on each other over time and to examine whether one variable changes the relationship between the other two variables (Jose, 2013; MacKinnon, 2008). All combinations of the longitudinal mediations were analysed in order to understand how all of the variables relate to each other in all of the different combinations and not to limit the investigation of OTH, grit, and well-being.

Chapter Three: Results

Descriptive Statistics

      First, descriptive statistics were used to examine the means and standard deviations of pleasure, engagement, meaning, grit, and well-being at all time points to examine how the variables changed over time. As shown in Table 1, the means at each time point for all variables were very similar over time. On average across the five time points, participants scored 3.63 in grit (out of a possible 5), 16.79 in pleasure, 17.55 in engagement, 20.10 in meaning (out of a possible 30 points), and 100.28 in well-being (out of 126 points). Similar to previous literature on the OTH scale, participants in the current study across the five time points on average scored highest in meaning, second highest in engagement, and lowest on pleasure.

Table 1. *Means (and Standard Deviations) of Pleasure, Engagement, Meaning, Grit and Well-Being at all Five Time Points*

	T1	T2	T3	T4	T5	Mean
Pleasure	16.78 (5.06)	16.78 (5.04)	16.77 (5.13)	16.77 (5.21)	16.83 (5.31)	16.79
Engagement	17.45 (4.27)	17.43 (4.38)	17.54 (4.33)	17.57 (4.38)	17.77 (4.53)	17.55
Meaning	20.13 (5.68)	19.96 (5.60)	20.21 (5.65)	20.08 (5.72)	20.12 (5.85)	20.10
Grit	3.61 (.62)	3.60 (.62)	3.62 (.63)	3.67 (.64)	3.67 (.64)	3.63
Well-being	100.33 (13.24)	100.04 (13.33)	100.14 (13.03)	100.50 (13.05)	100.40 (13.16)	100.28

Next, Pearson correlations of the relationships among grit, well-being and pleasure, meaning and engagement was undertaken at all five time points. As shown in Table 2, the large majority of the correlations were significant at either the $p < .01$ or .05 level. Only four of the correlations were non-significant (highlighted in blue). An examination of the correlations showed, in agreement with previous research, that meaning and engagement were more strongly associated with well-being than pleasure, and that all three of the OTHs were correlated with each other. Table 2 also suggests that participants experienced higher well-being if they scored high on pleasure, meaning, engagement and grit, which is consistent with hypothesis one. In turn, higher well-being was associated with higher endorsement of all three OTHs and higher grittiness, which is consistent with hypothesis two. Furthermore, the pattern of results supports hypothesis three because engagement and meaning were positively associated with grit at all time points, whereas pleasure was *negatively* correlated with grit at all time points. This difference suggests that pleasure was not highly endorsed by gritty people but engagement and meaning were.

Table 2. *Correlations of Pleasure, Engagement, Meaning, Grit, and Well-Being At and Across All Five Time Points.*

	P 1	E	M	G	W	P 2	E	M	G	W	P 3	E	M	G	W	P 4	E	M	Grit	W	P 5	E	M	G	W
P 1		.319	.207	-.121	.187	.816	.290	.252	-.096	.187	.756	.270	.115	-.083	.158	.765	.271	.196	-.088	.172	.749	.283	.162	-.092	.165
E	.319		.408	.301	.366	.291	.764	.351	.327	.320	.255	.717	.317	.319	.328	.263	.711	.323	.318	.357	.187	.676	.307	.315	.328
M	.207	.408		.228	.387	.126	.336	.835	.244	.323	.089	.353	.797	.213	.325	.113	.352	.796	.228	.327	.086	.344	.781	.226	.304
G	-.121	.301	.228		.473	-.115	.295	.208	.853	.431	-.124	.289	.194	.818	.436	-.111	.282	.182	.822	.431	-.135	.271	.182	.821	.444
W	.187	.366	.387	.473		.167	.365	.342	.453	.797	.151	.356	.326	.428	.757	.169	.372	.332	.457	.790	.158	.355	.347	.424	.787
P 2	.816	.291	.126	-.115	.167		.408	.181	-.086	.209	.812	.331	.111	-.068	.173	.791	.334	.161	-.084	.169	.779	.341	.151	-.056	.168
E	.290	.764	.336	.295	.365	.408		.405	.356	.389	.310	.752	.317	.332	.346	.283	.747	.317	.315	.364	.254	.725	.315	.333	.367
M	.151	.351	.835	.208	.342	.181	.405		.258	.346	.128	.388	.849	.224	.322	.124	.377	.836	.222	.302	.094	.341	.812	.234	.306
G	-.096	.327	.244	.853	.453	-.086	.356	.258		.465	-.106	.341	.234	.863	.434	-.107	.326	.236	.848	.405	-.116	.324	.221	.841	.451
W	.187	.320	.323	.431	.797	.209	.389	.346	.465		.192	.409	.352	.447	.818	.185	.398	.337	.459	.805	.186	.376	.347	.434	.799
P 3	.756	.255	.089	-.124	.151	.812	.310	.128	-.106	.192		.384	.174	-.076	.210	.806	.323	.163	-.104	.178	.803	.337	.147	-.076	.183
E	.270	.717	.353	.289	.356	.331	.752	.388	.341	.409	.384		.428	.340	.428	.298	.779	.356	.325	.410	.243	.727	.350	.329	.410
M	.115	.317	.797	.194	.326	.111	.317	.849	.234	.352	.174	.428		.243	.396	.115	.367	.855	.227	.330	.088	.336	.833	.234	.326
G	-.083	.319	.213	.818	.428	-.068	.332	.224	.863	.447	-.076	.340	.243		.482	-.076	.318	.230	.874	.468	-.099	.311	.210	.864	.460
W	.158	.328	.325	.436	.757	.173	.346	.322	.434	.818	.210	.428	.396	.482		.173	.394	.357	.476	.821	.167	.358	.359	.450	.815
P 4	.765	.263	.113	-.111	.169	.791	.283	.124	-.107	.185	.806	.298	.115	-.076	.173		.387	.222	-.083	.209	.837	.345	.170	-.074	.191
E	.271	.711	.352	.282	.372	.334	.747	.377	.326	.398	.323	.779	.367	.318	.394	.387		.412	.326	.447	.298	.779	.372	.318	.419
M	.196	.323	.796	.182	.332	.161	.317	.836	.236	.337	.163	.356	.855	.230	.357	.222	.412		.239	.373	.156	.360	.886	.226	.332
G	-.088	.318	.228	.822	.457	-.084	.315	.222	.848	.459	-.104	.325	.227	.874	.476	-.083	.326	.239		.514	-.115	.307	.218	.871	.490
W	.172	.357	.327	.431	.790	.169	.364	.302	.450	.805	.178	.410	.330	.468	.821	.209	.447	.373	.514		.190	.490	.349	.453	.847
P 5	.749	.187	.086	-.135	.158	.779	.254	.094	-.116	.186	.803	.243	.088	-.099	.167	.837	.298	.156	-.115	.190		.387	.193	-.102	.209
E	.283	.676	.344	.271	.355	.341	.725	.341	.324	.376	.337	.727	.336	.311	.358	.345	.779	.360	.307	.409	.387		.424	.328	.441
M	.162	.307	.781	.182	.347	.151	.315	.812	.221	.347	.147	.350	.833	.210	.359	.170	.372	.886	.218	.349	.193	.424		.233	.369
G	-.092	.315	.226	.821	.424	-.056	.333	.234	.814	.434	-.076	.329	.234	.864	.450	-.074	.318	.226	.871	.453	-.102	.328	.233		.480
W	.165	.328	.304	.444	.787	.168	.367	.306	.451	.799	.183	.410	.326	.460	.815	.191	.419	.332	.490	.847	.209	.441	.369	.480	

P = pleasure, E = engagement, M = meaning, G = grit, W = well-being. Correlations over .095 are significant at the .01 level (not highlighted). Correlations from .074 to .094 are significant at the .05 level (yellow highlight). Correlations under .073 are non-significant (blue highlight). 1 = time 1, 2 = time 2, 3 = time 3, 4 = time 4, 5 = time 5.

Longitudinal Mediations

Next, the rest of the hypotheses were investigated: that out of the three OTH themes only engagement would mediate the relationship between grit and well-being (H4), and that engagement would be more strongly linked with grit compared to pleasure and meaning (H5). To answer these questions, the associations among the three themes of OTH, grit and well-being were analysed through longitudinal mediations. It is also possible that other orders of longitudinal mediations might yield significant results. Therefore, to more fully investigate the complex relationships among all of the variables, a systematic investigation of all possible orders of the longitudinal mediations was completed at all five time points, using three time point increments in all cases. Refer to Figure 1 for an example of one of the longitudinal mediations undertaken in this analysis. In this example, grit was posed as the independent variable at time one, the three residualised OTHs scores at time three acted as the three mediators, and the outcome was residualised well-being at time five. The OTHs and well-being scores were residualised by removing the stability from these variables, i.e., by regressing time three scores on time one scores. Therefore, mediators and outcome variables at their respective time points represented *changes* in these scores over time (as suggested by Jose, 2013; MacKinnon, 2008).
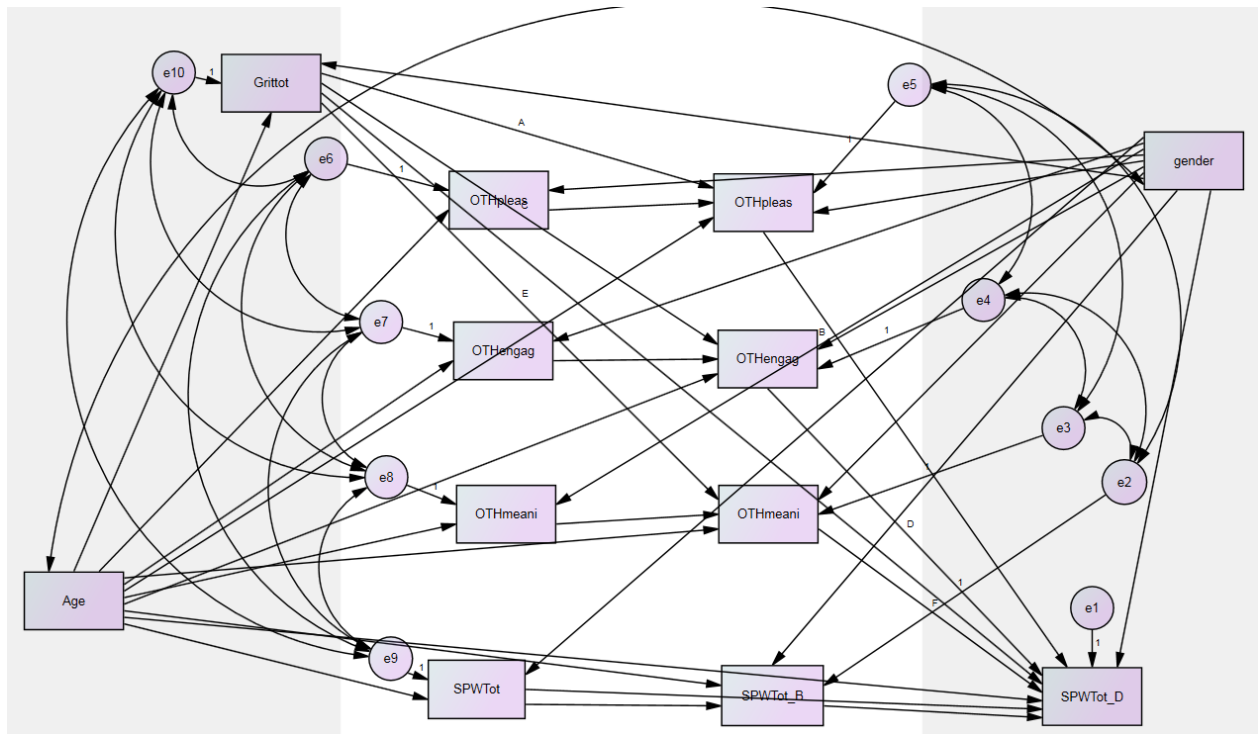
Figure 1. Example of a longitudinal mediation with grit as the independent variable at time one, the three OTHs as the mediator variables at time three (residualised), and well-being as the outcome variable at time five (residualised).

In AMOS, multiple mediation effects can be estimated through 'estimands' otherwise known as AMOS macros. In the present case, an estimand macro was written to accompany the model, and it permitted an estimate of the strength of each of the three indirect effects simultaneously (Amos Development Corporation, 2015). This approach allowed the assessment of the three indirect effects at the same time (specified by letters A to F attached to particular paths in the example) in order to investigate individually the strength of the three OTHs that mediated the relationship between grit and well-being. Furthermore, as shown in Figure 1, age and gender were introduced into the model as covariates. That is, the influences exerted on all variables by age and gender were controlled for in the longitudinal mediations.

Next the results of all of the longitudinal mediations that were undertaken are displayed in Table 3. Table 3 displays all of the variations of variables at all of the combinations of time points with age and gender as covariates. A Sidak adjustment (Šidák, 1967) was used in Table 3 to control for the multiple comparisons that were made using the same data and to reduce the familywise error rate (identifying false positives and making type one errors when performing multiple hypothesis tests). The Sidak adjustment assumes that the individual tests are independent and uses an equation, $\alpha_{SID} = 1 - (1 - \alpha)^{\frac{1}{m}}$, to obtain a more conservative significance threshold. The result of the Sidak adjustment for the current analysis was calculated to be .022, therefore the p-values in Table 3 which are less than or equal to .022 are considered to be statistically significant (numbers with yellow highlight), and the p-values that are .023 to .05 are marginally significant (numbers with blue highlight). All estimations of indirect effects were performed with 400 bootstrapped iterations and a 95% bias-corrected confidence interval with Monte Carlo calculation.

Table 3. *Longitudinal Mediations Involving Grit, Orientations to Happiness and*

Well-being (WB) with Age and Gender as Covariates and with a Sidak Adjustment.

Mediation	P value T1,2,3	P value T2,3,4	P value T3,4,5	P value T1,3,5
Grit-OTH-WB	Pleasure= .562 Engagement= .965 Meaning= .458	Pleasure= .934 Engagement= .064 Meaning= .399	Pleasure= .388 Engagement= .106 Meaning= .599	Pleasure= .585 Engagement= .027 Meaning= .513
Grit-WB-OTH	Pleasure= .057 Engagement= .006 Meaning= .005	Pleasure= .327 Engagement= .030 Meaning= .164	Pleasure= .020 Engagement= .179 Meaning= .158	Pleasure= .278 Engagement= .289 Meaning= .129
OTH-Grit-WB	Pleasure= .221 Engagement= .169 Meaning= .172	Pleasure= .647 Engagement= .087 Meaning= .438	Pleasure= .022 Engagement= .033 Meaning= .664	Pleasure= .312 Engagement= .002 Meaning= .966
OTH-WB-Grit	Pleasure= .129 Engagement= .529 Meaning= .837	Pleasure= .657 Engagement= .368 Meaning= .049	Pleasure= .618 Engagement= .179 Meaning= .392	Pleasure= .993 Engagement= .172 Meaning= .299
WB-OTH-Grit	Pleasure= .393 Engagement= .131 Meaning= .438	Pleasure= .185 Engagement= .295 Meaning= .829	Pleasure= .692 Engagement= .084 Meaning= .700	Pleasure= .588 Engagement= .084 Meaning= .360
WB-Grit-OTH	Pleasure= .142 Engagement= .059 Meaning= .354	Pleasure= .273 Engagement= .760 Meaning= .280	Pleasure= .070 Engagement= .133 Meaning= .697	Pleasure= .101 Engagement= .261 Meaning= .487

Sidak adjustment = .022. *p*-values under .022 are statistically significant. *p*-values from .023 to .050 are marginally significant (blue highlight). Numbers over .050 are non significant (no highlight). 1= time 1, 2= time 2, 3= time 3, 4= time 4, 5= time 5. WB = well-being

In order to investigate hypothesis four, that engagement would mediate the relationship between grit and well-being but pleasure and meaning would not, the longitudinal mediation Grit-OTH-WB at all four combinations of the five time points was completed (See Table 3). A significant indirect effect was found for engagement, standardized indirect effect = .003, standard error = .003, 95% CI = [-.001, .010], *p* = .027 at Times 1, 3, and 5. Neither pleasure nor meaning yielded significant mediation so engagement was found to be the only OTH theme to mediate the relationship

between grit and well-being. However, the mediation was evaluated as 'marginally significant' once the Sidak adjustment was taken into account, and this anticipated pattern was only found at one of the four combinations of time points, so this set of results partially supports hypothesis four.

In order to investigate hypothesis five, that out of the three OTH themes engagement would be most strongly related to grit, the rest of the combinations of longitudinal mediations were investigated systematically and all indirect effects were examined over all combinations of the five time points (See Table 3). This analysis yielded a number of significant relationships, which are described below.

Grit-WB-OTH. The first longitudinal mediation to discuss is grit to OTHs mediated by well-being. Significant indirect effects were obtained for pleasure over Times 3, 4, and 5, standardized indirect effect = .003 standard error =.002, 95% CI = [-.0005, .010], p = .020; and for meaning at Times 1, 2, and 3, standardized indirect effect = .004, standard error = .002, 95% CI = [.001, .010], p = .005. Significant indirect effects were also found for engagement at Times 1, 2, 3, standardized indirect effect =.002, standard error = .002, 95% CI = [.00003, .008], p = .006; and engagement at Times 2, 3, 4, standardized indirect effect = .005, standard error = .003, 95% CI = [.001, .012], p =.030. This set of results indicates that engagement, pleasure and meaning are all significant outcomes in the relationship from grit to well-being to OTH. These results suggest that being more gritty increases one's well-being, and this increased well-bring, in turn, then leads to an increase in one's engagement and meaning. In contrast, and as expected, pleasure was found to be a significant negative outcome of grit over time. This finding suggests that having more grit leads to more well-being, but then well-being leads to less pleasure because grit is negatively correlated with the pleasure OTH.

OTH-Grit-WB. The next longitudinal mediation to discuss is OTHs to well-being mediated by grit. At Times 3, 4, and 5 significant indirect effects were obtained for pleasure, standardized indirect effect = -.003, standard error = .002, 95% CI = [-.007, -.0004], p = .022; and for engagement, standardized indirect effect = .002, standard error = .002, 95% CI = [.0002, .007], p = .033. Additionally at Times 1, 3, and 5 another significant indirect effect was obtained for engagement, standardized indirect effect = .005, standard error = .002, 95% CI = [.001, .012], p = .002. This result indicates that high engagement predicted high grit, which then predicted an increase in well-being. This finding suggests that increasing one's engagement may have a positive effect on both grit and well-being. In contrast, and as expected, pleasure was found to be a negative predictor of grit.

OTH-WB-Grit. The last longitudinal mediation to discuss is the longitudinal mediation in which the associations between OTH to grit were mediated by well-being. A significant indirect effect was obtained for meaning, standardized indirect effect = .003, standard error = .002, 95% CI = [.00003, .008], p = .049. Meaning was the only (marginal) significant predictor of the OTH-WB-Grit mediation. This pattern illustrates that having higher levels of meaning orientation predicted increases in one's well-being, and this increased well-being in turn predicted an increase in one's grit. This result suggests that the meaning orientation may lead to increases in grit through an elevated sense of well-being.

These findings showed that the engagement OTH was involved in more (five in total) significant or marginally significant mediation results than the meaning (two) or pleasure (two) OTHs. This set of results indicates that engagement was more strongly related to grit and well-being than the meaning OTH, which manifested one significant and one marginally significant result, and the pleasure OTH which

manifested two significant results. The strong link between grit and engagement found here is consistent with the predictions of the current research, and supports hypothesis five. Additionally, this set of results demonstrates an interesting pattern between grit and pleasure being negatively correlated with one another. The important lesson from this last result is that not all OTHs were found to be positively related to well-being and grit: pleasure demonstrated a consistent negative association with grit.

Age and Gender as Moderators

In addition, age and gender were also investigated as possible moderators of each longitudinal mediation (see Appendix D) because grit has been found to vary in regards to age and gender in previous literature. Gender was dichotomized into females and males, and age was dichotomised by the median age of the sample at time one, which was 37 years (young < 37 years, old > 37 years). As shown in Appendix D, some differences were found in regards to age and gender, such as the larger number of significant mediations for females as opposed to males, and the higher number of significant results for old participants than young participants. However, in order to empirically evaluate whether these differences were statistically significant, an equality constraint was used in the structural equation models, which showed that none of these findings were significantly different from each other. In other words, these longitudinal mediations were not significantly moderated by age or gender.

Overall, these results demonstrate that pleasure, engagement, and meaning are all related in some degree and in some fashion to well-being and grit over time, with engagement and meaning being positively related to grit and well-being, and pleasure being negatively related with grit and positively related to well-being. Engagement was found to be the only significant OTH mediator for the relationship between grit to

well-being, and, as expected, it was most strongly related to grit and well-being over time. And finally, age and gender were not found to significantly moderate the relationships between grit, well-being and OTH.

Chapter Four: Discussion

The present research aimed to add to the current Orientations to Happiness (OTH) and grit literature by using a large, longitudinal, and international sample and by investigating whether the involvement of grit explains anything significant in the previously established relationship between OTH and well-being. Overall, four of the hypotheses of the current study were supported, and one hypothesis was partially supported. Specifically, OTH, grit and well-being were all found to be significantly related to each other over time, illustrating a novel finding that has not been investigated before.

Hypotheses 1 and 2: Associations among grit, OTH, and well-being

Consistent with the predictions of hypotheses one and two, all three OTH themes were related to grit and well-being over time, and increased well-being was related to increased grit and OTH over time. These findings are consistent with previous research, which finds that all three OTH themes and grit increases one's well-being (Salles et al., 2014; Schueller & Seligman, 2010; Singh & Jha, 2008; Tittanen, 2014). In the present study, meaning was found to have the strongest positive association with well-being, engagement the second strongest and pleasure the weakest association. Again, this finding is consistent with previous literature, which has found that meaning and engagement are stronger predictors of well-being compared to pleasure. For example, Schueller and Seligman (2010) found that pleasure, engagement, and meaning were all correlated with higher levels of subjective well-being, with engagement and meaning being stronger predictors of subjective well-being than pleasure. They also found that engagement and meaning were positively correlated with objective well-being, whereas pleasure was negatively

related. Schueller and Seligman suggest that pursuing pleasure might have negative consequences for education and occupation, but that all three OTH themes have a positive effect on well-being. Research on hedonia and eudaimonia has also found similar results. Steger et al. (2008) found that eudaimonic behaviours were related to greater levels of daily subjective well-being, life satisfaction, and positive affect compared to hedonic behaviours. Similarly, other studies have found that hedonia improves well-being, life satisfaction, and positive affect in the short term, but eudaimonia leads to more longer lasting improvements and is more beneficial in the long term (Huta & Ryan, 2010; Oishi et al., 2001; Tončić & Anić, 2014).

Although Life Satisfaction was not measured in the present study, these same findings have been demonstrated in regard to satisfaction with life. For example, Peterson et al. (2005) found that meaning and engagement were more robust predictors of life satisfaction compared to pleasure. Additionally, people who pursued all three of the orientations, thus experiencing the so-called "full life", were found to have the highest degree of life satisfaction, suggesting a complementary or cumulative effect. These findings have since been replicated all over the world in a number of studies in regard to life satisfaction (Avsec et al., 2015; Chan, 2009; Chen, 2010; Chen et al., 2010; Park et al., 2009; Park et al., 2010; Ruch et al., 2010; Vella-Brodrick et al., 2009).

In contrast to the findings of the present study, other research on OTH has been more inconsistent. Kose (2014) found that all three orientations related to life satisfaction in a sample of Turkish participants, with meaning being the highest predictor. However, only meaning significantly predicted life satisfaction, whereas pleasure and engagement did not in their Russian sample. Similarly, Kenkyu (2011) found that although engagement and meaning were correlated with life satisfaction,

an orientation to pleasure was not in their Japanese sample. These differences are interesting considering the findings from the present study. Much of the past research on OTH has been performed across cultures and the majority of the studies have found the same results as the present study. The small variations noted in Kose and Kenkyu's studies might have occurred because of their larger samples, their particular cultures, or other unknown factors.

Hypothesis 3: Relationships between OTH and grit

As predicted in hypothesis three in the present study, engagement and meaning were found to be positively correlated with grit while pleasure was negatively correlated with grit at all time points. Again, this finding is consistent with previous literature. Von Cullin et al. (2014) demonstrated that grit was positively correlated with engagement and meaning, that gritty people were most likely to endorse higher engagement, and that pursuing engagement was more strongly associated with perseverance of effort than consistency of interests over time. Gritty people also endorsed meaning but to a lesser extent than engagement, and meaning contributed to both sustained effort and interest over time. Von Cullin and colleagues also found that participants who endorsed pleasure were less gritty, and that pleasure was negatively correlated with grit. In a Japanese study it was also found that engagement and meaning were positively correlated and pleasure was negatively correlated with grit (Suzuki et al., 2015). However, unlike Von Cullin and colleagues, Suzuki and colleagues found that an orientation toward meaning was more strongly correlated with grit as opposed to engagement. Additionally, they found that grit was a strong predictor of work and academic performance and that participants with an orientation to pleasure were less likely to be engaged at work compared to participants with an orientation to engagement and meaning.

Other research has also demonstrated the interesting relationship found between grit and OTH. Datu et al. (2016) found that Filipino high school students who scored highly in grit had positive educational outcomes, flourished, were more engaged in class, and were more likely to say that there was meaning in their life. The perseverance of effort component of grit was found to positively predict behavioural engagement, emotional engagement, and flourishing, and both consistency of interest and perseverance of effort were found to negatively predict behavioural and emotional disengagement. Moreover, Xiafei et al. (2015) found that in Chinese adolescents, grit in the learning context was positively predicted by eudaimonic orientations and negatively predicted by hedonic orientations.

This set of results demonstrates an interesting negative relationship between grit and pleasure. This inverse relationship could perhaps be explained through participants' motivations. For example, people who score high in grit seem to be less attracted to endorsing pleasure as a pastime as opposed to more meaningful, engaging, and flow-inducing pursuits. This choice may reflect gritty people's belief that focusing largely on pleasure prevents them from reaching their goals like meaning and engagement do. They may believe that pleasurable activities take time away from working productively on their goals. Von Cullin et al. (2014) suggested that gritty people do not find pleasure as important as engagement and meaning, and they explain that the inverse relationship is due to the short-term satisfaction of pleasurable experiences that stand in contrast with the long-term endeavours of the gritty individual. This perceived negative correlation between grit and pleasure might also indicate that gritty people have less fun than less gritty people because they endorse pleasure less. However, even though gritty people endorse less pleasurable pursuits than non-gritty people, the current research suggests that gritty people still

report good levels of well-being. Therefore, it can be concluded that gritty people are likely to more often gain their well-being through meaningful and engaging pursuits than from pleasurable pursuits.

Hypotheses 4 and 5: Longitudinal mediations between OTH, grit and well-being

In the current research, hypothesis four was partially supported with engagement being the only OTH theme to partially mediate the relationship between grit and well-being. Here it was found that being gritty increased one's orientation to engagement, and, in turn, that increased engagement then predicted an increase in well-being. It should be noted, however, that this mediation was only found to be marginally significant. This finding of a trend suggests that there may be some degree of mediation by the engagement OTH between grit to well-being. This result may also reflect a unique and similar relationship between engagement and grit because engagement in the present study was also found to be the OTH theme that was most strongly linked with grit, supporting hypothesis five. This finding is not surprising, as engagement and grit appear to be theoretically compatible constructs with one other, both increase resources and skills, and both lead to improved success, goal attainment, and well-being (Csikszentmihalyi, 1997a; 1997b; Duckworth & Quinn, 2009; Eisenberger et al., 2005; Nakamura & Csikszentmihalyi, 2009; Schueller & Seligman, 2010; Salanova, Bakker & Llorens, 2006; Singh & Jha, 2008; Tittanen, 2014). Flow appears to be a plausible way in which to reach the goals the gritty individual desires and research has demonstrated that people who frequently experience flow are more likely to persist longer on tasks and therefore achieve better outcomes (Csikszentmihalyi, 1990).

Across a number of studies and populations the current grit literature has also illustrated that people who score highly in grit become more successful, stick to their

goals and challenges longer, make fewer career changes, attain higher levels of education and higher GPAs, and are more likely to stay married (if male) (Duckworth et al., 2007; Duckworth & Quinn, 2009; Eskreis-Winkler et al., 2013). In the present study, the fact that engagement and grit were most strongly related to each other and that engagement was the only OTH to partially mediate the relationship between grit and well-being suggests that grit and engagement may increase one's success in life, i.e. by leading individuals to stay determined, work hard and reach their goals. It is necessary for future research to investigate the influence of OTH and grit on success outcomes in order to replicate whether OTH explains something significant in the mechanism by which people become successful and/or increase their well-being.

Effects of Gender and Age

Additionally, exploratory analyses in the present study illustrated that age and gender did not significantly moderate the relationships between grit, well-being and OTH. The non-significant moderation of age and gender differs from other studies, which have found that levels of grit are higher in females and older people (Cross, 2014; Duckworth et al., 2007). Therefore, investigating the influence of age and gender on grit and OTH warrants further investigation in future research.

The current research brought grit and OTH together in an attempt to understand what makes people happy and successful, as well as to add to the current literature by examining which variable is driving the relationships apparent among grit, well-being, and the OTH themes. This study adds novel findings to the literature by being the first study to examine OTH and grit longitudinally and to combine the associations among OTH, grit and well-being together. Overall the results of this study have shown that OTH, grit and well-being exhibit significant relationships with each other, with all components being found to manifest a positive relationship with

each other over time, with the exception of grit and pleasure. This study has obtained results similar to those of past research but in a large, longitudinal sample, which supports confidence in these findings.

Future Directions

Future research should attempt to replicate this study with another sample and investigate whether OTH, particularly engagement, mediates the relationship between grit and well-being over time. In doing so, a stronger relationship between grit and engagement may be found and this would increase confidence in the identified relationship between engagement and grit. Future research needs to understand the relationships between grit, OTH, and well-being better as well as investigating other outcome measures such as life satisfaction and success. It may also be beneficial for research to examine the relationship between grit, OTH and measures of mental illness, such as depression and anxiety. In doing so, important implications for possible interventions, which could improve mental health as well as improve well-being and success, could be developed and investigated. Research into Positive Psychology interventions that attempt to enhance grit and OTH could have important benefits for well-being and mental health as well as encouraging people to become more successful in life, experience more engagement and flow in their activities, live a more meaningful and pleasurable life, and flourish. Because of some of the mixed findings in this literature (e.g. Henderson et al., 2013), it would also be helpful if future research continues to compare OTH and actual pleasurable, meaningful, and engaging behaviours to understand if they are measuring the same construct or are different.

Implications

There are currently a number of Positive Psychology interventions that target OTH, which have been shown to foster more happiness and reduce depression (Seligman, Steen, Park, & Peterson, 2005). For example, Giannopoulos and Vella-Brodrick (2011) found that targeting any one of the three lives (pleasure, meaning, or engagement) in positive interventions increased participants' well-being two weeks later. In another study it was found that taking part in an optimism intervention increased the pursuit of OTH engagement-related happiness, but not OTH meaning or OTH pleasure in the short-term. They also found that depressive symptoms and dysfunctional thinking decreased in the long-term (Sergeant & Mongrain, 2014). Grimm (2013) suggests that it may not be changing people's activities that make them happier but paying more attention to different aspects of the activities that are already being carried out. Hence, interventions that increase attention in daily life could bring more awareness to the positive aspects of daily life and improve well-being (Grimm, 2013). One way to increase one's attention to daily life is through using mindfulness interventions, which have been shown in a number of meta-analyses to have positive effects on well-being, anxiety, and depression (Eberth & Sedlmeier, 2012; Hofmann, Sawyer, Witt, & Oh, 2010; Jain et al., 2007; Khoury et al., 2013).

Another way that people could increase their well-being and success in life is using interventions to increase grit. For example, Alan, Boneva, and Ertac (2015) undertook a grit intervention with elementary school students in Istanbul. The programme involved using videos, case studies, and classroom activities, which taught the children about the plasticity of the human brain, the role of effort in enhancing skills and achieving goals, how to make sense of failures, and the importance of goal setting. Alan et al. (2015) found that the intervention increased

participant's levels of grit, made them more likely to take up a challenge, succeed and earn higher school grades, and less likely to give up after failure. It appears that this intervention had a positive impact on elementary school children's levels of success. However, it would also be beneficial if future research replicated this study with older children and adults, and also included well-being as an outcome measure.

Additionally, DiMenichi and Richmond (2015) found that encouraging participants to reflect on their failures as opposed to their successes led to a significant reduction in error rates on a cognitive task that required perseverance and led to higher grit scores. In another study, university students with learning approach goal orientations (namely those who are curious about learning new skills, give preference to effortful tasks, and keep going after failures) were found to also hold high levels of grit (Akin & Arslan, 2014). In contrast, students with learning avoidance (namely those who avoid misunderstanding and are not willing to learn or master some tasks), and performance approach/avoidance goal orientations (students who use social comparisons, wish to receive desirable judgments, and do not challenge themselves so they will not fail) were less likely to report grit (Akin & Arslan, 2014). These findings could have important implications for interventions that could help to improve grit, especially considering that there are a limited number of interventions that currently target grit. Hence, future research may benefit from investigating if having people focus on their failures and acquiring learning approach goals could improve individuals' levels of grit, and in turn their success and well-being.

Other interventions have aimed to increase grit through targeting individuals' growth mindset. People who have a growth mindset value effort and hold the view that intelligence is malleable and not fixed (Dweck, 2010). Research has shown that

students' mindsets have a direct influence on their academic performance and that teaching students to develop a growth mindset improves their achievement test scores and grades (Blackwell, Trzesniewski, & Dweck, 2007; Good, Aronson, & Inzlicht, 2003). Other studies have also found that students who acquired a growth mindset evidenced raised achievement test scores, as well as students' investment in, engagement, and enjoyment of school (Aronson, Fried, & Good, 2002; Good et al., 2003). Further, Yeager and Dweck (2012) found that an intervention to increase students' growth mindset and teach them that intellectual abilities and social attributes can be developed over time, showed enhanced school achievement and greater course completion. The intervention also lowered adolescents' aggression and stress in response to peer victimisation or exclusion. The growth mindset has also been found to be successfully taught to children through an educational computer game, resulting in increases in overall time played, strategy use, perseverance after challenge, and persistence in the educational game (O'Rourke et al., 2014).

Other Positive Psychology (PP) interventions that do not specifically target grit or OTH may also improve mental health as well as increase success and well-being. For example, meta-analyses have illustrated that PP interventions such as writing gratitude letters, practicing optimistic thinking, replaying positive experiences, and engaging in mindfulness practices and acceptance increase well-being and decrease depression (Boiler et al., 2013; Sin & Lyubomirsky, 2009). For instance, Mongrain, Komeylian, and Barnhart (2015) undertook an intervention study with 741 American participants. Participants were randomly assigned to one of three intervention conditions (positivity, mindfulness, or control condition) for three weeks. All intervention types showed significant decreases in depressive symptoms from baseline to two months. However, the positivity intervention, which involved

participants practicing one of 10 positive emotions every other day, was the only intervention to predict significant increases in meaning, pleasure, engagement, and satisfaction in life across follow-ups. They also found that dependent individuals responded favourably to the positivity intervention in the short run but worsened in the long run for the pleasure orientation of happiness. This study suggests that focusing on positive emotions can help individuals flourish in terms of engagement, meaning, pleasure, and life satisfaction. The Mindfulness condition led to significant and lasting decreases in depression as well as increases in life satisfaction, but not greater happiness. Furthermore, the control condition, which involved writing in a daily diary, also decreased depressive symptoms but to a lesser extent than the other two conditions.

In another study, Gander, Proyer, Ruch, and Wess (2013) investigated nine strengths-based positive online interventions which included a gratitude visit, three good things for one or two weeks, signature strengths intervention, gratitude visit plus three good things, three funny things, counting kindness, gift of time, one door closes and another door opens, and a control group (early memories exercise). Gander and colleagues illustrated that all interventions increased happiness (except for the three good things in two weeks intervention) and all interventions decreased depression at post-test, 1-, 3-, and 6-months follow-up. The control group also increased happiness, but to a lesser extent than the other interventions. Similar results were found in a study of participants aged 50-79 years which illustrated that the gratitude visit, three good things, and using signature strengths in new ways increased happiness, while three funny things and using signature strengths in new ways also decreased depressive symptoms (Proyer, Gander, Wellenzohn, & Ruch, 2014).

Another PP intervention, called Well-Being Therapy, which is a short term, non-directive therapy that promotes health and well-being, has been found to be more effective in reducing depression and increasing well-being than Cognitive Behavioural Therapy (Moeenizadeh & Salagame, 2010). PP interventions have also been found to be effective in children and adolescents (Manicavasagar et al., 2014). For example, Shoshani and Steinmetz (2014) undertook a school-based PP intervention with 537 Israeli adolescents. This intervention targeted six key components of PP: gratitude, positive emotions, goal fulfillment, optimism, character strengths, and positive relationships, and was taught to teachers to implement in their classrooms. The intervention was found to lead to significant decreases in distress, anxiety, and depressive symptoms, and significant increases in well-being, self-esteem, self-efficacy, and optimism in students compared to the waitlist control group. However, no significant changes in life satisfaction were found.

The results of these intervention studies suggest that PP interventions, which target grit, OTH, and other PP components, can have very beneficial effects in decreasing mental illness and improving both well-being and success in children and adults. Because the current study demonstrated the important relationships between OTH and grit, it would be beneficial if future research examined the influence of combining these two components into an intervention to investigate if a joint grit and OTH intervention improved well-being, levels of success, and potentially decreased mental illness.

Limitations

Several important limitations of the current study deserve mention. First, although the sample was cross-cultural, the large majority of participants were Caucasian and lived in Western countries. Therefore, it would be beneficial if future

research were able to recruit similar numbers of participants from different ethnicities and countries for a more systematic comparison. Second, the present sample contained an overrepresentation of female participants compared with male participants, which could have influenced the obtained non-significant moderation effect of gender on the mediations. A more equal gender balance would have been preferred and would be important to attempt in future samples. Third, it is also important to acknowledge that the participants in this sample chose to participate in this study over the Internet. This method suggests that the sample may be more affluent than average, and had the motivation and time to complete online surveys at five time points. Fourth, the data was gathered via an Internet site, which has certain weaknesses such as higher rates of drop out, repeated participation, or non-serious responders (Gosling, Vazire, Srivastava, & John, 2004). However, Internet studies can also be a useful way to collect data from large and diverse samples with relatively low costs, and evidence has been garnered to argue that data obtained over the Internet are just as good quality as paper-and-pencil methods (Birnbaum, 2004; Gosling et al., 2004). However, an advantage of the Internet method in the present research is that it provided a diverse sample drawn from 40 different countries that was not chiefly composed of university students. Fifth, as most research on OTH has included measures of life satisfaction, it would have been beneficial to investigate grit and OTH in relation to life satisfaction in the present research. Investigating life satisfaction may have resulted in some different findings, and it may have also alerted us to a different direction in OTH and grit research.

Conclusions

In conclusion, the findings from the present high quality, large scale, diverse, and longitudinal study have contributed to the current Positive Psychology, OTH,

well-being, and grit literatures. The current study has illustrated that OTH, grit and well-being are all significantly and positively related to each other longitudinally, with the exception of grit and the pleasure OTH, which exhibited a negative relationship. This study is the first of its kind to combine these three variables together, and these tentative findings should be replicated and extended with different samples in future research. This study has identified results congruent with past research, but has done so with a large, longitudinal sample, which adds confidence in these findings. Overall, it does appear that having the drive and goals to be successful, and seeking happiness through OTH, especially through engagement and meaning, are important ways that people can improve their well-being. Therefore, interventions based on OTH and grit processes may be beneficial in encouraging people to succeed, live meaningful, pleasurable, and engaging lives, while also reaching their goals, becoming successful, and flourishing.

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Appendices

Appendix A: Scales of Psychological Well-being

Please indicate how strongly you agree or disagree with each of the following statements (1 = Strongly disagree, 2 = Somewhat disagree, 3 = A little disagree, 4 = Don't know, 5 = A little agree, 6 = Somewhat agree, 7 = Strongly agree).

1. I like most parts of my personality.
2. When I look at the story of my life, I am pleased with how things have turned out so far.
3. Some people wander aimlessly through life, but I am not one of them.
4. The demands of everyday life often get me down.
5. In many ways I feel disappointed about my achievements in life.
6. Maintaining close relationships has been difficult and frustrating for me.
7. I live life one day at a time and don't really think about the future.
8. In general, I feel I am in charge of the situation in which I live.
9. I am good at managing the responsibilities of daily life.
10. I sometimes feel as if I've done all there is to do in life.
11. For me, life has been a continuous process of learning, changing, and growth.
12. I think it is important to have new experiences that challenge how I think about myself and the world.
13. People would describe me as a giving person, willing to share my time with others.
14. I gave up trying to make big improvements or changes in my life a long time ago.
15. I tend to be influenced by people with strong opinions.
16. I have not experienced many warm and trusting relationships with others.
17. I have confidence in my own opinions, even if they are different from the way most other people think.
18. I judge myself by what I think is important, not by the values of what others think is important.

Appendix B: Orientations to Happiness Scale

Below are the statements that many people would find desirable, but we want you to answer only in terms of whether the statement describes how you actually live your life (1 = Not at all like me, 2 = A little like me, 3 = Somewhat like me, 4 = Mostly like me, 5 = Very much like me).

1. Regardless of what I am doing, time passes very quickly.
2. My life serves a higher purpose.
3. Life is too short to postpone the pleasures it can provide.
4. I seek out situations that challenge my skills and abilities.
5. In choosing what to do, I always take into account whether it will benefit other people.
6. Whether at work or play, I am usually "in a zone" and not conscious of myself.
7. I am always very absorbed in what I do.
8. I go out of my way to feel euphoric.
9. In choosing what to do, I always take into account whether I can lose myself in it.
10. I am rarely distracted by what is going on around me.
11. I have a responsibility to make the world a better place.
12. My life has a lasting meaning.
13. In choosing what to do, I always take into account whether it will be pleasurable.
14. What I do matters to society.
15. I agree with this statement: "Life is short-eat dessert first."
16. I love to do things that excite my senses.
17. I have spent a lot of time thinking about what life means and how I fit into its big picture.
18. For me, the good life is the pleasurable life.

Appendix C: Grit Scale

Read each statement and then indicate how much the statement is like you (1 = Not at all like me, 2 = A little like me, 3 = Somewhat like me, 4 = Mostly like me, 5 = Very much like me).

1. I aim to be the best in the world at what I do.
2. I have overcome setbacks to conquer an important challenge.
3. New ideas and new projects sometimes distract me from previous ones.
4. I am ambitious.
5. My interests change from year to year.
6. Setbacks don't discourage me.
7. I have been obsessed with a certain idea or project for a short time but later lost interest.
8. I am a hard worker.
9. I often set a goal but later choose to pursue a different one.
10. I have difficulty maintaining my focus on projects that take more than a few months to complete.
11. I finish whatever I begin.
12. Achieving something of lasting important is the highest goal in life.
13. I think achievement is overrated.
14. I have achieved a goal that took years of work.
15. I am driven to succeed.
16. I become interested in new pursuits every few months.
17. I am diligent.

Appendix D: Longitudinal Mediations Involving Grit, Orientations to Happiness and Well-being (WB) Moderated by Age and Gender

Mediation	Moderation	P value T1,2,3	P value T2,3,4	P value T3,4,5	P value T1,3,5
Grit-OTH-WB	Female	Pleasure= .559 Engage= .430 Meaning= .546	Pleasure= .548 Engage= .145 Meaning= .440	Pleasure= .498 Engage= .088 Meaning= .294	Pleasure= .431 Engage= .146 Meaning= .306
	Male	Pleasure= .569 Engage= .399 Meaning= .723	Pleasure= .380 Engage= .297 Meaning= .408	Pleasure= .459 Engage= .424 Meaning= .464	Pleasure= .398 Engage= .265 Meaning= .291
	Young	Pleasure= .450 Engage= .310 Meaning= .961	Pleasure= .969 Engage= .078 Meaning= .240	Pleasure= .436 Engage= .589 Meaning= .458	Pleasure= .969 Engage= .106 Meaning= .858
	Old	Pleasure= .419 Engage= .315 Meaning= .168	Pleasure= .503 Engage= .604 Meaning= .660	Pleasure= .344 Engage= .192 Meaning= .592	Pleasure= .767 Engage= .160 Meaning= .707
Grit-WB-OTH	Female	Pleasure= .086 Engage= .013 Meaning= .013	Pleasure= .349 Engage= .009 Meaning= .051	Pleasure= .104 Engage= .157 Meaning= .232	Pleasure= .301 Engage= .128 Meaning= .021
	Male	Pleasure= .458 Engage= .264 Meaning= .484	Pleasure= .192 Engage= .213 Meaning= .687	Pleasure= .612 Engage= .764 Meaning= .580	Pleasure= .464 Engage= .341 Meaning= .448
	Young	Pleasure= .079 Engage= .070 Meaning= .104	Pleasure= .423 Engage= .144 Meaning= .954	Pleasure= .052 Engage= .414 Meaning= .425	Pleasure= .259 Engage= .682 Meaning= .693
	Old	Pleasure= .507 Engage= .025 Meaning= .042	Pleasure= .040 Engage= .014 Meaning= .032	Pleasure= .326 Engage= .182 Meaning= .339	Pleasure= .719 Engage= .018 Meaning= .071
OTH-Grit-WB	Female	Pleasure= .408 Engage= .583 Meaning= .502	Pleasure= .349 Engage= .109 Meaning= .030	Pleasure= .101 Engage= .060 Meaning= .300	Pleasure= .161 Engage= .028 Meaning= .365
	Male	Pleasure= .120 Engage= .383 Meaning= .066	Pleasure= .568 Engage= .589 Meaning= .502	Pleasure= .198 Engage= .433 Meaning= .679	Pleasure= .171 Engage= .503 Meaning= .248

	Young	Pleasure= .390 Engage= .105 Meaning= .310	Pleasure= .684 Engage= .339 Meaning= .397	Pleasure= .168 Engage= .206 Meaning= .342	Pleasure= .746 Engage= .064 Meaning= .247
	Old	Pleasure= .203 Engage= .175 Meaning= .220	Pleasure= .763 Engage= .704 Meaning= .720	Pleasure= .099 Engage= .136 Meaning= .662	Pleasure= .365 Engage= .199 Meaning= .385
OTH-WB-Grit	Female	Pleasure= .064 Engage= .602 Meaning= .785	Pleasure= .503 Engage= .117 Meaning= .038	Pleasure= .490 Engage= .438 Meaning= .758	Pleasure= .398 Engage= .292 Meaning= .325
	Male	Pleasure= .619 Engage= .602 Meaning= .701	Pleasure= .208 Engage= .605 Meaning= .918	Pleasure= .567 Engage= .283 Meaning= .334	Pleasure= .792 Engage= .748 Meaning= .993
	Young	Pleasure= .815 Engage= .202 Meaning= .387	Pleasure= .110 Engage= .081 Meaning= .575	Pleasure= .801 Engage= .561 Meaning= .496	Pleasure= .193 Engage= .478 Meaning= .618
	Old	Pleasure= .071 Engage= .089 Meaning= .460	Pleasure= .701 Engage= .739 Meaning= .016	Pleasure= .518 Engage= .304 Meaning= .802	Pleasure= .742 Engage= .776 Meaning= .787
WB-OTH-Grit	Female	Pleasure= .931 Engage= .068 Meaning= .369	Pleasure= .096 Engage= .069 Meaning= .822	Pleasure= .354 Engage= .173 Meaning= .669	Pleasure= .712 Engage= .099 Meaning= .558
	Male	Pleasure= .196 Engage= .654 Meaning= .540	Pleasure= .530 Engage= .244 Meaning= .304	Pleasure= .314 Engage= .464 Meaning= .??	Pleasure= .276 Engage= .425 Meaning= .255
	Young	Pleasure= .278 Engage= .253 Meaning= .739	Pleasure= .361 Engage= .277 Meaning= .956	Pleasure= .227 Engage= .222 Meaning= .570	Pleasure= .606 Engage= .043 Meaning= .493
	Old	Pleasure= .580 Engage= .207 Meaning= .484	Pleasure= .190 Engage= .712 Meaning= .749	Pleasure= .357 Engage= .645 Meaning= .186	Pleasure= .649 Engage= .353 Meaning= .312
WB-Grit-OTH	Female	Pleasure= .153 Engage= .552 Meaning= .592	Pleasure= .835 Engage= .478 Meaning= .151	Pleasure= .044 Engage= .290 Meaning= .419	Pleasure= .089 Engage= .334 Meaning= .430
	Male	Pleasure= .263 Engage= .200 Meaning= .268	Pleasure= .308 Engage= .252 Meaning= .246	Pleasure= .950 Engage= .109 Meaning= .923	Pleasure= .257 Engage= .381 Meaning= .338
	Young	Pleasure= .017 Engage= .267 Meaning= .027	Pleasure= .718 Engage= .279 Meaning= .344	Pleasure= .055 Engage= .049 Meaning= .542	Pleasure= .233 Engage= .229 Meaning= .810

Old	Pleasure= .758	Pleasure= .236	Pleasure= .252	Pleasure= .164
	Engage= .262	Engage= .127	Engage= .655	Engage= .420
	Meaning= .499	Meaning= .856	Meaning= .671	Meaning= .166

Numbers with yellow highlighter = significant $p < .05$. Numbers with blue highlighter = marginally significant p value of .05 to .99. 1= time 1, 2= time 2, 3= time 3, 4= time 4, 5= time 5.