

**The General Factor of Personality: Predicting Psychological Distress and  
Individual-Level Protective Factors in a Male Cohort**

**Jia Min, Zhou**

**School of Psychology**

**University of Adelaide**

**September 2020**

*This thesis is submitted in partial fulfilment of the Honours degree of Psychological Science  
(Honours)*

**Wordcount: 9190**

## Table of Contents

<b>Table of Contents</b> .....	<b>i</b>
<b>List of Tables and Figures</b> .....	<b>iv</b>
<b>Abstract</b> .....	<b>v</b>
<b>Declaration</b> .....	<b>vi</b>
<b>Contribution Statement</b> .....	<b>vii</b>
<b>Acknowledgements</b> .....	<b>viii</b>
<b>CHAPTER 1. INTRODUCTION</b> .....	<b>1</b>
1.1. Justification .....	1
1.2. Background .....	1
1.2.1. Nature of the GFP .....	3
1.2.2. Generality of the GFP .....	4
1.2.3. Criticisms: Non-Substantive Interpretations .....	5
1.3. Utility of a GFP: Theoretical and Predictive Value.....	6
1.3.1. Measures of Occupational Outcomes.....	7
1.3.2. Measures of Social and Behavioural Outcomes.....	8
1.3.3. Measures of Psychological Outcomes.....	10
1.3.4. Summary of the Predictive Power of a GFP .....	11
1.4. Trait Emotional Stability and Psychological Distress .....	12
1.4.1. Individual-Level Protective Factors for Psychological Distress .....	12
1.5. Present Study.....	14

<b>CHAPTER 2. METHOD .....</b>	<b>15</b>
2.1. Participants .....	15
2.2. Materials .....	16
2.2.1. Hardiness .....	16
2.2.2. Personality .....	16
2.2.3. Function and Well-Being .....	17
2.2.4. Psychological Distress .....	18
2.2.5. Self-Esteem & Locus of Control .....	19
2.2.6. Perceived Stress .....	19
<b>CHAPTER 3. RESULTS .....</b>	<b>21</b>
3.1. Factor Analyses .....	25
3.2. Predictive Power of the GFP .....	28
3.3. Explanatory Power of the GFP .....	29
3.4. Mediation Analyses .....	31
<b>CHAPTER 4. DISCUSSION .....</b>	<b>35</b>
4.1. Main Findings .....	35
4.2. Limitations .....	40
4.3. Implications and Future Research .....	42
4.4. Conclusion .....	43
<b>Reference .....</b>	<b>44</b>

**APPENDIX A: Self-Esteem & Lack of Control Questionnaire .....52**

**APPENDIX B: Mediation Models (Unstandardized) .....53**

## List of Tables and Figures

### Tables

<b>Table 1.</b> Descriptive statistics (means, standard deviations, minimums and maximums) for all measured variables (N = 271 – 287). .....	23
<b>Table 2.</b> Correlation matrix for all measured variables (N = 257 – 287).....	24
<b>Table 3.</b> Pearson Correlations (95% confidence intervals) for personality factors (GFP and the Big Five) with the protective factors and perceived stress (N = 257 – 281).....	30

### Figures

<b>Figure 1.</b> Plot of eigen values from principal components (PC) and factor analysis for five personality variables (i.e. the Big Five, unbroken lines) and from random data (broken lines). .....	27
<b>Figure 2.</b> Standardized regression coefficients (95% confidence intervals) for the relationship between the GFP and mental health (MCS) as mediated by psychological distress (PsychDist). .....	33
<b>Figure 3.</b> Standardized regression coefficients (95% confidence intervals) for the relationship between the GFP and physical health (PCS) as mediated by psychological distress (PsychDist). .....	34

## Abstract

The general factor of personality (GFP) is theorized to occupy the apex of the hierarchical model of personality. With its existence supported by a large body of theoretical and empirical research, the substantive nature of this construct remains to be confirmed. Interpreted as a social effectiveness factor that reflects social knowledge and skills, substantial empirical studies have found the GFP to predict a wide range of occupational, social and behavioral outcomes at the interpersonal level. However, there remains limited empirical evidence regarding the predictive power of GFP in the psychological domain. For this reason, the primary aim of this study was to explore the predictive power of GFP on the following outcome criteria of psychological distress, perceived stress and individual-level protective factors (i.e., hardiness, locus of control, and self-esteem) in a male cohort ( $N = 300$ ; aged 35-83). Additionally, the explanatory power of GFP was compared to the well-established Big-Five traits. This study also aimed to find the potential mechanisms underlying the relationship between GFP and mental health and well-being. The primary finding was that the GFP seems to reflect an adaptive trait, which significantly and positively associated with individual-level protective factors that act to buffer against stress. Moreover, a mediating relationship was found between the GFP and mental health through psychological distress. Based on these results, GFP may possibly serve as a valuable construct for future personality research in relation to individual differences in stress management and adaptive coping strategies.

## **Declaration**

This thesis contains no material which has been accepted for the award of any other degree of diploma in any University, and, to the best of my knowledge, this thesis contains no material previously published except where due reference is made. I give permission for the digital version of this thesis to be made available on the web, via the University of Adelaide's digital thesis repository, the Library Search and through web search engines, unless permission has been granted by the School to restrict access for a period of time.

**September 2020**

## **Contribution Statement**

In writing this thesis, my supervisor provided the existing data from the FAMAS sub-study, and we collaborated to generate research questions of interest. My supervisor also guided the development of R code for all analyses in R scripts. I conducted the literature research and wrote up all aspects of the thesis.



## **Acknowledgements**

On the very outset of this thesis, I would like to express my deepest gratitude to my supervisor

Nicholas Burns for his continuous guidance and support in this rather unusual year.

I am also extremely thankful to my sister and friends, for their time and constant encouragement

throughout my completion of the thesis.

# CHAPTER 1

## Introduction

### 1.1. Justification

The General Factor of Personality (GFP) is theorised to be the highest-order personality factor that causes the consistent intercorrelations observed across the lower-order personality traits (e.g., Musek, 2007). With the existence of GFP supported by a large body of theoretical and empirical research, the nature of this construct remains to be confirmed. While numerous empirical studies have found the GFP to predict a wide range of major life outcome measures, a considerable number of these studies are devoted to the occupational, social and behavioural domains. There remains limited to no empirical evidence regarding the predictive power of GFP in the psychological domain. For this reason, the purpose of this thesis is to add to the limited empirical evidence on the predictive value of the GFP on psychological outcomes. Specifically, in relation to the individual-level protective factors (i.e., self-esteem, lack of control and hardiness), and how one responds (i.e., psychological distress) and appraises stressful experiences (i.e., perceived stress). Additionally, the influence of GFP on mental health and its potential mechanisms are also examined.

### 1.2. Background

The General Factor of Personality (GFP) refers to the highest-order factor that has been suggested to occupy the apex of the hierarchical structure of personality (e.g., Musek, 2007). Contrary to the conceptualization of the Big Five personality factors as orthogonal (e.g., Costa &

McCrae, 1995), the emergence of the GFP is based on the robust findings that showed the lower-order personality traits to intercorrelate consistently (e.g., Musek, 2007; van der Linden, te Nijenhuis, & Bakker, 2010). The construct is typically conceptualized to exert a broad influence on one's behaviour in a socially desirable direction (van der Linden, Dunkel, & Petrides, 2016). Accordingly, high-GFP individuals are assumed to be, on average, open-minded, industrious, sociable, emotionally stable, and having high levels of self-esteem and well-being (Musek, 2007). In terms of the well-established Big Five dimensions, they can be expected to score relatively high on Openness to experience, Conscientiousness, Extraversion, Agreeableness, and Emotional Stability (the inverse of Neuroticism), but more highly with some (e.g., Extraversion and Emotional Stability) than others (Loehlin, 2012). Still, the GFP is proposed to account for the substantial amounts of the variance shared by the Big Five (Musek, 2007). Indeed, the most recent large meta-analysis (van der Linden, te Nijenhuis, et al., 2010) that included virtually all available Big Five intercorrelation matrices from studies between 2000 to 2008 ( $K = 212$ ;  $N = 144,117$ ) showed that the GFP typically explains between 20 to 60% of the variance in the Big Five dimensions.

With evidence in favour of a GFP accumulating in the personality literature, the interpretation of this construct, however, still remains widely debated. The substantive view of the GFP prevails in the majority of the empirical research, that is, that it reflects social and personal adjustment and effectiveness (Musek, 2017). However, some researchers have argued that the GFP is a mere reflection of non-substantive response bias (Bäckström, Björklund, & Larsson, 2009), or statistical artefacts (Hopwood, Wright, & Brent Donnellan, 2011; Revelle & Wilt, 2013) and that it has no further relevance for personality research. The following sections will discuss in detail the nature and generality of the GFP as a substantive construct with

supporting research included, and briefly address the main criticisms that have argued against the substantiveness of the GFP.

### **1.2.1. Nature of the GFP**

Theoretically, the GFP is widely considered to be a substantive construct encompassing socially approved behaviour and attitudes that pervade all most important personality dimensions including the Big Five personality factors (Musek, 2017). Thus, the current leading substantive interpretation of the GFP is that it reflects one's general social effectiveness (see the review by van der Linden et al., 2016). According to this interpretation, when dealing with social and environmental demands, high-GFP individuals can be assumed to have the knowledge, skills, and motivation to act in ways that others consider socially desirable (van der Linden et al., 2016). Consequently, individuals high on GFP may have an increasing chance of achieving important life goals including job and academic performance, personal health and well-being, and social relations (Musek, 2017; van der Linden et al., 2016). Laboratory and field studies have provided empirical support for this interpretation, with high GFP associated with greater social advantages that facilitate one's efficacy and desirability across different situations and different settings, more of which later.

Furthermore, in a literature review, van der Linden et al. (2016) suggested that if the GFP is a social effectiveness factor, it would be expected to show strong associations with the putatively established emotional intelligence (EI) construct. Broadly defined, EI concerns individuals' ability to experience, express, and utilize affect-laden information for themselves, and those of the people around them (van der Linden et al., 2016). Indeed, in a meta-analysis, van

der Linden et al. (2017) found high-GFP individuals to perform better on ability tests of social knowledge and skills than low-GFP individuals. Importantly, a large overlap ( $r_{\text{corrected}} = .86$ ) was found between trait EI (self-perception of affect-related variables) and the GFP. Based on these findings, it was suggested that high or low scoring on the GFP may also reflect the extent to which an individual uses emotional knowledge and skills in order to obtain important life goals (van der Linden et al., 2017). In general, this conceptual overlap between trait EI and the GFP adds to the notion that the latter personality construct exert influence on one's general behaviour and attitudes in effectively dealing with daily social and environmental demands.

### **1.2.2. Generality of the GFP**

Strong evidence shows that the GFP is a fairly generalizable and quite readily measurable construct that can be derived from a variety of different personality inventories not explicitly based on the Big Five dimensions (Rushton & Irwing, 2009a, 2009b, 2009c, 2009d). Furthermore, Burns et al. (2017) confirmed that a GFP can be extracted from Big Five inventories of various length (from 10 to 100 items), with increased length associated with greater strength of relationship between the GFP scores and outcomes. A few studies have also made direct comparison of the GFPs derived from pairs of inventories completed by the same sample and found appreciable correlations (e.g.,  $r = .54$  to  $.70$  in Loehlin & Martin, 2011).

Studies investigating multiple-inventory (Big Five and non-Big Five) comparisons of the GFPs using the same sample also reported high levels of convergence. For example, in a US community sample ( $N = 573$  to  $741$ ), Loehlin (2012) found eight different personality inventories to contain a substantial common GFP with loadings ranging from  $.53$  to  $.87$ . Moreover, they

found that the GFPs derived from these different personality inventories correlated significantly with the majority of the averaged peer ratings on a given inventory and majority of the measured behavioural outcomes. Correlations obtained were typically in the .10 to .30 range; although not high, these are interpreted as evidence that the GFP is not just mere artefact. Importantly, most of these correlations are comparable to the .23 reported for the associations between the GFPs and supervisor-rated performance (van der Linden, te Nijenhuis, et al., 2010; Study 2).

It is noteworthy that the data used by Loehlin (2012) was originally from the study by Hopwood et al. (2011), which also addressed the generality of a GFP across same different personality inventories. However, using different and stricter extraction methods to Loehlin (2012), Hopwood et al. (2011) came to a markedly different conclusion, with overall results failing to support a common GFP. Hopwood et al. (2011) employed a series of hierarchical factor analyses on each inventory to extract a culminating GFP, whereas Loehlin (2012) extracted the GFP as the unrotated first principal factor from the intercorrelations of the scales of the inventory. Nevertheless, as aforementioned, GFPs extracted using this simpler method not only showed considerable generality across sets of different inventories (Big-Five and non-Big Five; self- and other's reports), but also a modest degree of correlation with the behavioural outcomes. Therefore, the present study will be using the simpler methods to extract the common GFP.

### **1.2.3. Criticisms: Non-Substantive Interpretations**

Researchers have associated the GFP with social desirability biases in self-report (e.g., Bäckström et al., 2009) or halo biases in ratings by others, as opposed to self-ratings (Anusic, Schimmack, Pinkus, & Lockwood, 2009). On the other hand, researchers (e.g., Musek, 2017)

have shown the GFP variance to remain practically the same even after controlling for social desirability effects, indicating that social desirability does not influence the factor structure of personality. Revelle and Wilt (2013) emphasized that it is mathematically possible to have a large unrotated general factor even when it does not at all explain a substantial portion of the variance in a set of measures. van der Linden et al. (2016) agreed with this possibility but they also argued that this possibility is at odds with the wide range of empirical data confirming that lower-order personality traits do, in fact, load on the GFP and in the usual pattern of +Openness/Intellect, +Conscientiousness, +Extraversion, +Agreeableness and +Emotional Stability/-Neuroticism (Musek, 2017).

### **1.3. Utility of a GFP: Theoretical and Predictive Value**

Clearly, there is now a substantial amount of literatures supporting the existence of a GFP as the most general dimension of personality (e.g., Loehlin, 2012; van der Linden et al., 2016). Yet, the nature of this construct is still under debate. With the leading interpretation of a GFP as a social effectiveness factor that allows individuals to be socially advantageous in different contexts, Musek (2017) proposed the GFP to be a hypothetical predictor relevant to a broad range of major life outcomes. That is, if a GFP indeed reflects a tendency towards increased social effectiveness and better emotional adjustments, it can be expected to predicts major life outcomes including career success, interpersonal relations, and health and well-being. Ultimately, this indicates that the GFP can therefore be applicable in practical areas such as counselling, personnel selection, organizational settings, stress management and similar (Musek, 2017). The following sections will highlight the existing literatures supporting the validity of GFP as a

substantive construct on different outcomes, specifically occupational, social and behavioural, and psychological.

### **1.3.1. Measures of Occupational Outcomes**

The GFP has been found to be a relatively strong and consistent predictor for other-rated or objective indicators of job performance, with high-GFP individuals having higher performance ratings. For example, van der Linden, te Nijenhuis, et al. (2010; Study 2) with a sample of 144 employees from professional backgrounds in organizations, education and hospitality, found that the GFP was correlated  $r = .23$  with supervisor-rated general performance. Moreover, the unique variance of the Big Five dimensions were not found to significantly contribute to predicting performance beyond the effect of the GFP (van der Linden, te Nijenhuis, et al., 2010).

A similar study (Sitser, van der Linden, & Born, 2013) that looked at the supervisor-rated and objective sales performance of sales employees ( $N = 433$ ) also found an averaged correlation of  $r = .20$  for both outcomes. Additionally, the GFP was found to associate with one's performance in personnel selection. In a Dutch military setting (van der Linden, te Nijenhuis, Cremers, van de Ven, & van der Heijden-Lek, 2014), high-GFP individuals were found to receive higher performance ratings by interviewers ( $r = .23$ ), and were perceived to behave as more emotionally stable and confident with higher display of motivation and social skills.

Finally, Pelt, van der Linden, Dunkel, and Born (2017) reanalyzed the relevant meta-analytical data from the existing literatures that had tested the correlations between the Big Five and various job performance and related-outcome measures. The authors found that the GFP was



associated positively with the broader performance measures including general, supervisor-rated and objective performance ( $r_{\text{corrected}} = .31, .33, \text{ and } .28$ , respectively). This is fully in line with the aforementioned empirical evidence, and thereby strengthens the possibility that a strong relationship exists between the GFP and occupational outcomes. In general, these studies add support to the presumption that high GFP scores may reflect a social advantage (van der Linden, Scholte, Cillessen, te Nijenhuis, & Segers, 2010), which is the knowledge and skills that facilitate one's efficacy and desirability in interpersonal situations, promoting cooperation and social ties between peers and co-workers.

### **1.3.2. Measures of Social and Behavioural Outcomes**

Several empirical studies have shown the GFP to correlate significantly with social and behavioural outcomes including peer-rated popularity ( $r = .27$ ) and likeability ( $r = .33$ ; van der Linden, Scholte, et al., 2010), and one's actual display of social behaviours ( $r = .17$ ) and other-rated leadership qualities ( $r = .22$ ; van der Linden, Oostrom, Born, van der Molen, & Serlie, 2014). Smaller associations ( $r_s < .17$ ) were also found for outcomes such as one's values and ethics (Kawamoto, van der Linden, & Dunkel, 2017) and fewer problematic life-events (Watters, Walton, & Parker, 2020).

According to Musek (2007, 2017), high-GFP individuals are proposed to be more adaptive to their social surroundings and have higher levels of self-esteem, leading to better emotional and personal adjustments. Similarly, the GFP has been claimed to largely overlap with trait EI (van der Linden et al., 2017), an adaptive trait allowing individuals to effectively modulate their emotion and behaviour to match the social context.

In line with this proposition, Hengartner, van der Linden, Bohleber, and von Wyl (2017) examined the influence of personality in relation to individual stress reactions and coping strategies following an adverse event. The study ( $N = 306$ ) was conducted following a false emergency alarm at a university campus and reported the GFP to significantly moderate stress response following this supposedly stressful life event. For instance, a strong positive relationship was found between the GFP and social activity ( $r = .36$ ), while a negative association was found with medication use ( $r = -.28$ ). Based on these findings, the authors suggested the GFP to reflect an adaptive trait that may serve as a buffer against the aftermath of adverse events. That is, high-GFP individuals may be more effective at obtaining social support to deal with their stress, while low-GFP individuals may engage less in socially adaptive coping strategies but more in maladaptive substance use. Interestingly, the GFP did not significantly relate to acute stress reactions such as fear and worry. Rather, Neuroticism was found to be the better and more specific indicator of this criterion.

In a recent comprehensive diary study that investigated the relation between the GFP and social interactions ( $N = 1223$ ; Pelt, van der Linden, Dunkel, & Born, 2020), high-GFP was found to associate positively with daily relationship quality ( $r = .33$ ) and levels of self-esteem ( $r = .52$ ), but negatively with inter-personal conflicts. These results fit with the previous findings that showed the GFP to reflect social aptness that relates positively with social and occupational outcomes such as popularity (van der Linden, Scholte, et al., 2010) and objective sales performance (Sitser et al., 2013), respectively. Moreover, in line with the GFP as an adaptive trait that may act to buffer the impact of adversities through social supports (Hengartner et al., 2017),

the effect of GFP on daily averaged self-esteem and mood was found to be mediated by their daily relationship quality and impressions on others.

### **1.3.3. Measures of Psychological Outcomes**

It has been proposed that low GFP is indicative of a personality profile reflecting possible difficulties in terms of interpersonal behaviour (Rushton & Irwing, 2011). In this view, compared to high-GFP individuals, low-GFP individuals are expected to exhibit poorer mental health and well-being that may impede social effectiveness and subsequent social participation. Moreover, aforementioned findings on the social and behavioural outcomes suggested the GFP to be an adaptive trait which facilitates better stress management. This indicates that low-GFP individuals may have lowered ability to deal with demanding and stressful life situations (van der Linden et al., 2017), which may partially explain the substantial link reported between the GFP and psychopathology. For example, in a community sample of 1,630 older adults (Oltmanns, Smith, Oltmanns, & Widiger, 2018), a relatively strong correlation of .72 was reported between the general psychopathological factor (p factor) and GFP. However, weaker associations were also reported for this GFP-p factor link in Etkin, Mezquita, López-Fernández, Ortet, and Ibáñez (2020); the GFP was found to regress on the p factor with beta indices ranging from .42 to .47.

In addition to the previously mentioned study by Hengartner et al. (2017), there is another empirical study supporting a positive association between the GFP and mental health in a young cohort. By examining the role of the GFP in the domain of anxiety symptoms, van der Linden, Vreeke, and Muris (2013) found that the GFP was associated with anxiety proneness and anxiety problems in children aged from 9-to-12 years old. Using both self-reports and parent ratings, they

found that among non-clinical children ( $N = 226$ ), low-GFP individuals had lower social participation (behavioural inhibition;  $r = -.49$ ) and higher display of anxiety symptoms ( $r = .30$ ). Importantly, by comparing children diagnosed with anxiety disorders ( $N = 45$ ) to their healthy counterparts ( $N = 81$ ), the latter healthy controls were found to score higher on GFP.

#### **1.3.4. Summary of the Predictive Power of a GFP**

Unsurprisingly, there are currently considerable amounts of empirical evidence supporting the criterion-related validity and theoretical relevance of the GFP as a social effectiveness factor, particularly in relation to one's occupational, social and behavioural outcomes. However, empirical research on the psychological outcomes remains limited, making the predictive value of the GFP on such outcomes uncertain. There is one empirical study (van der Linden et al., 2013) supporting the GFP to be a relevant construct in the domain of anxiety symptoms. This finding was extended in Hengartner et al. (2017) using traumatic-stress. Additionally, in the same study, the GFP was found to positively associate with implementation of behavioral coping strategies (i.e. seeking social supports) when confronted with stressful life events. Altogether, these empirical findings suggest GFP to be a prominent construct in predicting similar psychological or related outcomes. For this reason, the present study will focus on exploring the practical value of the GFP on stress management, specifically on its predictive power on psychological distress. Furthermore, the cognitive coping abilities, namely the individual-level protective factors for psychological distress will also be examined in relation to the GFP.

## **1.4. Trait Emotional Stability and Psychological Distress**

There is a reason to examine the predictive value of the GFP on psychological distress. Psychological distress is one of the predisposing factors in the development of mental health problems, a major public health concern (Markou & Cryan, 2012). Considerable research has found personality traits (Big Five) and more specifically, the trait Emotional Stability to play an important role in the development of mental health disorders and problems (see e.g., Kotov, Gamez, Schmidt, & Watson, 2010). Widely defined as the tendency to experience negative affect, especially in times of stressful life events, low-ES individuals have been found to be associated with poorer mental health outcomes including depression and increased suicidal ideations (Newton-Howes et al., 2014), and more intense responses to the experience of stress (Depue & Fu, 2011). Indeed, individual's perceived stress has been found to be a significant mediator in the relationship between trait Emotional Stability and psychological distress (Pereira-Morales, Adan, & Forero, 2019). This seems to be in line with the assumption that high-GFP individuals who are socially advantaged can be expected to be, on average, emotionally stable and have the essential skills, knowledge and motivation to successfully deal with the daily social and environmental demands (Musek, 2017; van der Linden et al., 2017). Therefore, it will be anticipated that high-GFP individual would be less sensitive to the effects of stress, and thereby experience lower levels of psychological distress, promoting better outcomes in mental health and well-being.

### **1.4.1. Individual-Level Protective Factors for Psychological Distress**

Studies have found individuals to implement different methods of coping strategies at individual-level, namely protective factors to minimize the potential harmful effects attributable

to stress. For this reason, the present study will aim to explore the potential influence of the GFP on individual-level protective factors. For instance, the personality construct hardiness (i.e., commitment, control and challenge) which encourages one to re-appraises stressful occurrences to be meaningful and solvable rather than harmful (Kobasa, 1979), was found to predict psychological distress in different cohorts including students (Knowlden, Sharma, Kanekar, & Atri, 2012) and police officers (Andrew et al., 2013). Interestingly, in the police cohort, hardiness was generally found to be a stronger protective factor in female compared to their male counterparts. In a similar study with a student cohort, hardiness was further reinforced to be a protective and predictive factor against perceived stress and consequent suicidal ideations (Abdollahi, Abu Talib, Yaacob, & Ismail, 2015).

Locus of control is another possible protective factor against psychological distress, and refers to the self-evaluation of one's ability in controlling their life (Pearlin & Schooler, 1978). According to Llamas, Morgan Consoli, Hendricks, and Nguyen (2018), increased mastery of control, the belief that one's life is controlled through one's abilities, was found to relate to better emotional adjustments and greater resistance to psychological dysfunction. Finally, one's subjective evaluation of self-worth (Rosenberg, 1965), namely self-esteem also plays an important protective role in mental health. For example, in a recent network analysis that included four major UK cohorts (Stochl et al., 2019), positive self-perception was consistently found to be one of the central items in improving mental health and well-being. Based on these past findings, it is clear that the presence of these individual-level protective factors has a prominent positive influence on how one responds to (i.e., psychological distress) and cognitively appraises stressful experiences (i.e. perceived stress). In line with this idea, the present study will

be expecting high-GFP individuals to have greater associations with these positive protective factors.

### **1.5. Present Study**

The present study aims to address a gap in the literature, that is the limited empirical evidence on the predictive value of the GFP in the psychological domain. Specifically, in relation to the individual-level protective factors (i.e., self-esteem, locus of control and hardiness) that are assumed to cushion the negative impact of psychological distress and perceived stress. Following on from this, the influence of GFP on individuals' mental health and well-being will also be examined. Based on previous literature, three research questions are explored for a male cohort:

1. Does the GFP predicts individual measures of i) protective factors, ii) psychological distress and iii) perceived stress?
2. Compared to the Big Five traits, does the GFP explains similar or more variance in individual measures of i) protective factors and ii) perceived stress?
3. Is the relationship between the GFP and individual function and well-being mediated by psychological distress?

## CHAPTER 2

### Method

#### 2.1. Participants

Data were from a sub-study of the Florey Adelaide Male Aging Study (FAMAS). FAMAS was a multi-disciplinary population cohort study examining the health and health-related behaviors of 1195 randomly selected men (aged 35-80) living in the North West regions of Adelaide (Martin et al., 2007). Baseline data collection of this longitudinal study commenced in August 2002. Participants were periodically re-examined or sent updating questionnaires following the first clinic visit. Between December 2005 and February 2007, invitations were sent to all participants to participate in a sub-study. A total of 300 men (aged 37-83) volunteered to complete an extensive battery of psychological tests. Based on the 2001 Australian Census, the FAMAS cohort is comparable with men in the same age group from both the local and national populations (Martin et al., 2007). Participants in this sub-cohort did not differ for age, country of origin, marital status, employment status, or annual income (Kelly, Burns, Bradman, Wittert, & Daniel, 2012) from the total cohort. Compared to the entire FAMAS cohort that does have a greater proportion of men with post-secondary qualifications, this sub-cohort displayed a slightly greater proportion with post-high school, non-university qualifications such as trade qualifications (Kelly et al., 2012).

This study was approved by the Human Research Ethics Committee of the Royal Adelaide Hospital. All subjects gave written informed consent.



## **2.2. Materials**

A total of six self-report tests were selected to measure personality, and physical and mental health. This test-battery assessing the following measures was administered during a single session.

### **2.2.1. Hardiness**

The Hardiness Scale (HS; Bartone, Ursano, Wright, & Ingraham, 1989) was used to measure dispositional resilience to stress, the hardiness of personality. This scale is a modified version of Kobasa's (1979) measure of personality hardiness, and comprises 45 items designed to measure how respondents approach and interpret experiences using three subscales: Commitment, Control and Challenge. Participants indicated on a 5-point Likert scale the extent to which they agreed with each of the statements regarding life that people often feel differently about. Scores of items from each subscale were summed to create a total resilience score, higher scores indicate more hardiness (i.e., greater resilience to stress). The three subscales showed good internal consistency (Bartone et al., 1989) with Cronbach's alpha ranging from .62 (Challenge) to .82 (Commitment, and for the summated scale, a Cronbach's alpha of .85. Scores are found to be predictive of mental and physical health (Bartone et al., 1989).

### **2.2.2. Personality**

Personality traits were measured using the 100-item version of the Big-Five factor markers (Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Intellect or Openness; Goldberg, 1992) from the International Personality Item Pool (IPIP; Goldberg, 1999).

Each factor is measured by a 20-item scale. Participants indicated on a 5-point Likert scale the extent to which each statement accurately described their current behaviours, in relation to people of same sex and equivalent age. Scores are separately summed for each factor, with higher scores indicating more identification with that factor. According to the IPIP website (<https://ipip.ori.org/newBigFive5broadTable.htm>), the internal consistency of the measure is high with Cronbach's alpha for the five factors being .88 (Agreeableness and Conscientiousness), .90 (Intellect), and .91 (Extraversion and Emotional Stability).

### **2.2.3. Function and Well-Being**

Function and well-being were measured using the 36-item Short Form Survey (SF-36; Ware, Snow, Kosinski, & Gandek, 1993). The SF-36 comprises eight scales designed to tap eight dimensions of health: physical and social functioning, bodily pain, role limitation due to physical and personal/emotional problems, vitality (energy and fatigue), general mental (psychological distress and well-being) and general health perceptions. For all items, participants were asked to select from the two to six options, the one that best described their health status. The standard SF-36 scoring algorithms (Ware et al., 1993) were followed to derive the two component summary scores for physical (PCS) and mental health (MCS). In brief, scores of the relevant (re-coded) items from each scale were first summed and then transformed to a 0 to 100 scale. These transformed scale scores were standardized to the general adult population, and then aggregated using respective factor weights to derive the PCS and MCS, which were finally standardized with the mean set to 50 and the standard deviation to 10. Detailed scoring steps can be found in the SF-36 user's manual (Ware, Kosinski, & Keller, 1994). For this dataset, the latest available

Australian population norm from 1995 (Australian Bureau of Statistics, 1997) was used in the standardization and in the aggregation of the scale scores.

Higher PCS and MCS indicate better health-related quality-of-life and lower level of disability. All scores above and below 50 are above and below the average, respectively, in the general Australian population. High internal consistency of the PCS and MCS scales have been estimated using data from general population surveys in four countries (Germany, Sweden, the U.K., and the U.S.; Ware et al., 1994). The Cronbach's alpha ranged from .92 (the U.K. and Sweden) to .94 (Germany) for the PCS scale and .87 (Germany) to .89 (the U.K.) for the MCS scale.

#### **2.2.4. Psychological Distress**

Psychological distress was measured using the 42-item Depression Anxiety Stress Scale (DASS-42; Lovibond & Lovibond, 1995). The DASS comprises three scales (14 items each) designed to assess the respondent's present negative emotional states of depression, anxiety, and stress. Participants indicated on a 4-point Likert scale the extent to which each statement described how they have been feeling over the past seven days. Scores for each scale (ranging from 14 to 56) were derived by summing the scores for the relevant items. Higher scores indicate greater severity of the corresponding negative emotional states. High internal consistency has been reported for the measure in both clinical (Cronbach's alpha = .96, .89 and .93 for Depression, Anxiety, and Stress, respectively; Brown, Chorpita, Korotitsch, & Barlow, 1997) and non-clinical samples (Cronbach's alpha = .91, .84 and .90 for Depression, Anxiety, and Stress, respectively; Lovibond & Lovibond, 1995). Test-retest reliability of the three scales over a 2-week period is

adequate (Brown et al., 1997) with correlation coefficients ranging from .71 (Depression) to .81 (Stress).

### **2.2.5. Self-Esteem & Locus of Control**

Self-esteem and locus of control were measured by a 13-item questionnaire adapted from two global measures of the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965) and the Personal Mastery Scale (PMS; Pearlin & Schooler, 1978). The questionnaire (Appendix A) comprises five positively worded items and an additional negatively worded item from the RSES measuring self-esteem, and all seven items from the PMS assessing one's belief of their controllability over future important life events and circumstances. All items are rated on a 5-point Likert scale. Participants were asked to indicate how strongly they agreed or disagreed with each statement. Scores for items 1 to 6 were summed to create an overall score for self-esteem with higher scores indicating higher self-esteem. Scores for items 7 to 13 were summed to create an overall score for locus of control with higher scores indicating greater lack of control. The RSES has high internal consistency with a mean Cronbach's alpha of .81 reported in people from 53 nations (Schmitt & Allik, 2005). Test-retest reliability of the scale over a 2-week period reveals good stability with correlations ranging from .82 to .85 (Rosenberg, 1965). Internal consistency for the PMS is adequate with Cronbach's alpha being .72 (Pearlin & Schooler, 1978).

### **2.2.6. Perceived Stress**

The 10-item Perceived Stress Scale (PSS-10; Cohen & Williamson, 1988) was used to assess participant's perceptions of stress, the extent to which situations in their life are appraised

as stressful. The PSS is designed to observe how unpredictable, uncontrollable, and overloaded respondents find their lives, and for use in community samples with at least a junior high school education. Participants indicated on a 5-point Likert scale the frequency they felt or thought a certain way during the last month. Scores of all items were summed to obtain the total perceived stress score, higher scores indicate higher levels of psychological stress. Previous studies (see e.g., Ruisoto, López-Guerra, Paladines, Vaca, & Cacho, 2020) with different community samples have shown the PSS-10 to have good internal consistency (ranging from .65 to .91) and adequate psychometric properties.

## CHAPTER 3

### Results

Prior to exploration of the research questions, the nature of a GFP is addressed first using exploratory (EFA) and confirmatory (CFA) factor analysis to determine the most viable factor and model solutions, respectively. Best-fit models for protective factors and psychological distress is also addressed using CFA. Afterwards, research questions are individually considered using different statistical model analyses. All statistical analyses are tested using maximum likelihood (ML) estimators. ML estimations are applied here to reduce the unwanted effects of scores (i.e. influential observations) that are markedly low or high. Only participants who had complete data were included in the corresponding analyses, sample size varied from 257 – 287 across different analytical tests.

Table 1 shows descriptive statistics for all the measured variables. Participants reported relatively normal and low levels of psychological distress, the average scores for Anxiety (17.0), Depression (18.0) and Stress (21.0) were comparable. Additionally, individual-level protective factors (lack of control, self-esteem and hardiness) were, on average, in the moderate-to-high ranges. The average scores for each of the Big Five personality factors were comparable. Finally, participants' function and well-being ( $PCS_{\text{mean}} = 48.5$ ;  $MCS_{\text{mean}} = 50.9$ ) were in the mean range for the general Australian population.

Table 2 presents the correlation matrix containing all the measured variables. Similar to previous studies, statistically significant and sizeable correlations were found for all three dimensions of psychological distress with the protective factors and perceived stress (e.g., Abdollahi et al., 2015; Hengartner et al., 2017; Llamas et al., 2018). As expected inverse associations (adjusted  $p < 0.001$ ) were found for self-esteem and hardiness with psychological distress, lack of control and perceived stress. In line with the meta-analytical findings by Kotov et al. (2010), statistically significant correlations were only found for psychological distress and MCS scores with personality traits Extraversion, Conscientiousness and Emotional Stability. Importantly, trait Emotional Stability had the highest correlations with both outcome variables ( $r_{\text{psychological distress}}$  range  $-.50$  to  $-.59$ ;  $r_{\text{MCS}} = .53$ ). PCS scores were not found to correlate with the majority of the variables, including the Big Five factors (adjusted  $p = .12 - 1.0$ ), self-esteem (adjusted  $p = .13$ ) and MCS scores (adjusted  $p = 1.0$ ). Finally, consistent with past literatures (e.g., Musek, 2017; van der Linden, te Nijenhuis, et al., 2010) that had tested the existence of a GFP, similar intercorrelations ranging from  $.19$ -to- $.53$  were found between the Big Five factors in this sample.

**Table 1.** Descriptive statistics (means, standard deviations, minimums and maximums) for all measured variables (N = 271 – 287).

	<i>M</i>	SD	Min	Max
Psychological Distress				
Anxiety	17.0	4.33	14.0	48.0
Depression	18.0	6.13	14.0	51.0
Stress	21.0	6.36	14.0	53.0
Perceived Stress	21.7	6.07	10.0	43.0
Lack of Control	14.7	4.88	7.00	35.0
Self-Esteem	25.5	3.37	8.00	30.0
Hardiness	151.6	13.5	106.0	193.0
Big Five Factors				
Extraversion	62.5	13.0	24.0	100.0
Agreeableness	74.4	10.1	46.0	100.0
Conscientiousness	71.8	10.9	37.0	98.0
Emotional Stability	66.7	10.5	36.0	92.0
Intellect	67.5	11.0	46.0	100.0
Function and Well-Being				
PCS	48.5	8.67	17.9	64.4
MCS	50.9	10.0	7.79	66.6

*Note.* PCS = Physical Component Summary, MCS = Mental Component Summary



**Table 2.** Correlation matrix for all measured variables (N = 257 – 287).

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Anxiety	-												
2. Depression	.68	-											
3. Stress	.73	.74	-										
4. Perceived Stress	.47	.66	.62	-									
5. Lack of Control	.39	.56	.42	.62	-								
6. Self-Esteem	-.40	-.51	-.40	-.60	-.62	-							
7. Hardiness	-.41	-.49	-.38	-.54	-.67	.56	-						
8. Big Five _E	-.29	-.38	-.29	-.38	-.48	.42	.52	-					
9. Big Five _A	<b>-.17</b>	<b>-.18</b>	<b>-.16</b>	-.21*	-.26	.26	.35	.53	-				
10. Big Five _C	-.26	-.27	-.23	-.29	-.30	.35	.23	.19*	.25	-			
11. Big Five _ES	-.50	-.55	-.59	-.64	-.54	.56	.52	.41	.24	.33	-		
12. Big Five _I	<b>-.13</b>	<b>-.07</b>	<b>-.06</b>	-.19*	-.27	.34	.39	.43*	.45	.19	.28	-	
13. PCS	-.33	-.20*	-.19*	-.18*	-.18*	<b>.15</b>	.24	<b>.08</b>	<b>.01</b>	<b>.09</b>	<b>.14</b>	<b>.16</b>	-
14. MCS	-.44	-.55	-.49	-.53	-.41	.39	.27	.28	<b>.13</b>	.20*	.53	<b>.00</b>	<b>-.02</b>

*Note.* A = Agreeableness, C = Conscientiousness, ES = Emotional Stability, I = Intellect, PCS =

Physical Component Summary, MCS = Mental Component Summary

All correlations are statistically significant (\*adjusted  $p < .05$ ; without\* adjusted  $p < 0.001$ ) except for those in bold.

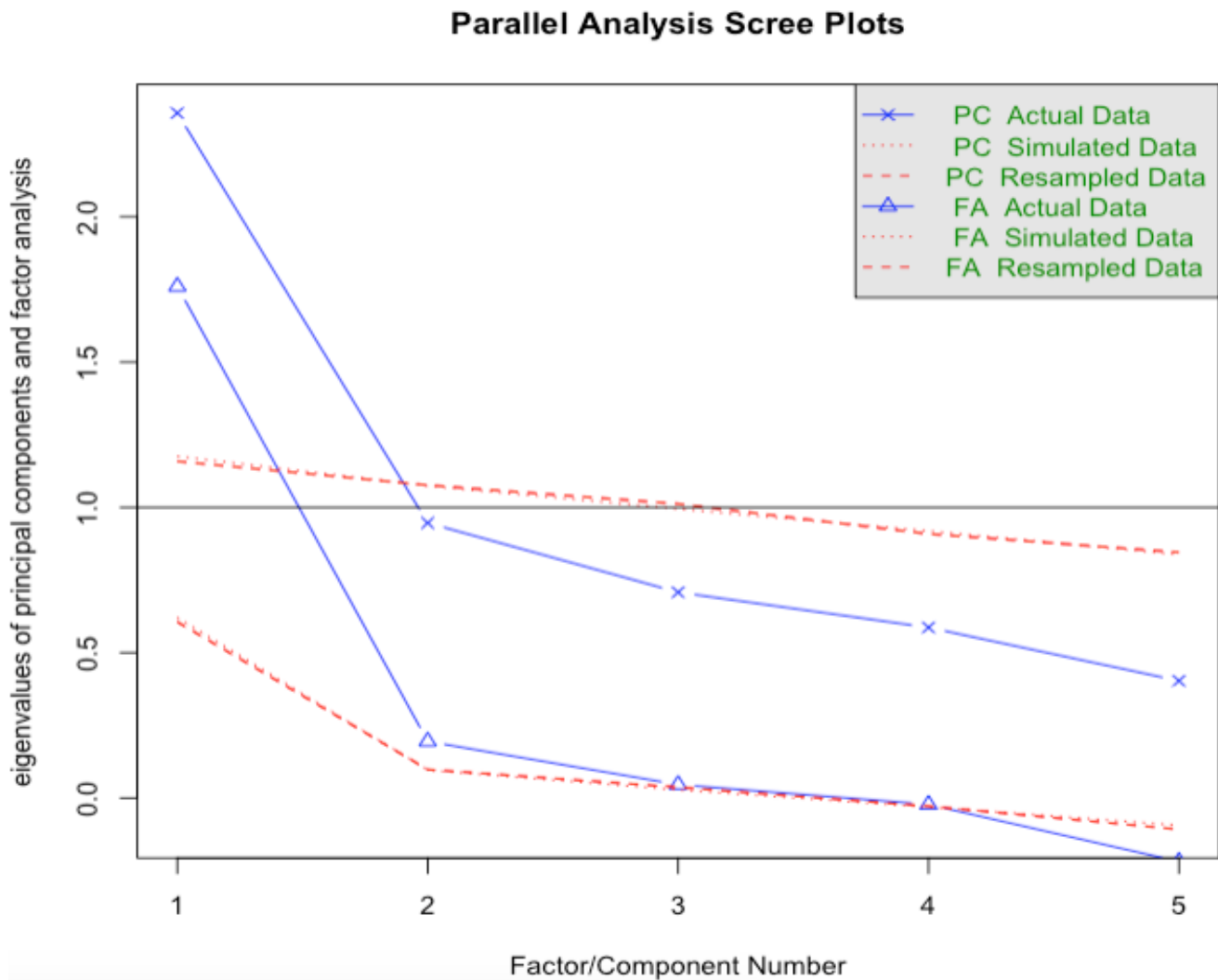
### 3.1. Factor Analyses

EFA with the criterion of eigen value greater than one and oblique rotation methods was used first to extract the viable number of factors from the Big Five dimensions. This preliminary analysis led to a two-factor solution. The first factor had an eigen value of 1.44 and explained 29% of the Big Five variance. Personality traits Agreeableness, Extraversion and Intellect loaded highly on the first factor (.87, .64, .58, respectively). The second factor had an eigen value of 1.18 and explained 24% of the variance. Traits Emotional Stability and Conscientiousness loaded substantially on this factor (1.09 and .26, respectively). Interestingly, the pattern of these factor loadings was inconsistent with the previous findings that reported the two-factor solution to largely reflect two meta-factors in which traits Conscientiousness, Agreeableness and Emotional Stability (or Neuroticism) loaded on Stability, while traits Intellect (or Openness) and Extraversion loaded on Plasticity (e.g., van der Linden, te Nijenhuis, et al., 2010).

As Figure 1 illustrates, there is only one eigen value greater than one. Additionally, both the scree plot and parallel analysis showed that the only clear drop occurred after the first factor. Importantly, a considerable correlation ( $r = .58$ ) was found between the two factors, which indicated that they do not exist independently. As argued by van der Linden, te Nijenhuis, et al. (2010), these results suggest a possibility of a more favourable one-factor solution, namely a GFP.

Following the EFA that provided preliminary evidence for a GFP, CFA was subsequently employed to test the model in which each of the Big Five factors directly loaded on a GFP. The

fit of this model ( $\chi^2 = 26.2$ ,  $df = 5$ ) was moderate with CFI = 0.92, while other fit indices such as RMSEA (90% CI) = .12 (.08 – .17) indicated a modest but acceptable fit. Noteworthy, a similar model has been analysed in previous studies, and reported fit indices that were poorer (RMSEA = .16, CFI = .88; van der Linden, te Nijenhuis, et al., 2010) or near identical (RMSEA = .12, CFI = .94; Hengartner et al., 2017) with the current findings. Different approaches were implemented in both studies to reach the best fitting CFA models. This will be further commented on in discussion. For confirmation, similar CFA methods were applied to test the goodness-of-fit of another two models for psychological distress (Anxiety, Depression and Stress) and protective factors (Hardiness, Lack of control, Self-esteem), respectively, in which the relevant indicators were loaded on a single latent variable. For both models ( $\chi^2 = 0$ ,  $df = 0$ ) the fit indices such as the CFI = 1 and the RMSEA = 0 indicated an excellent close-fit because these were just identified models.



*Figure 1.* Plot of eigen values from principal components (PC) and factor analysis for five personality variables (i.e. the Big Five, unbroken lines) and from random data (broken lines). There is one eigen value  $> 1$  and the scree plot and parallel analysis both suggest one factor.

### 3.2. Predictive Power of the GFP

The first research question aimed to explore whether the GFP predicts individual measures of: i) protective factors, ii) perceived stress, and iii) psychological distress. Table 2 showed that the Big Five correlated substantially (adjusted  $p < .001$ ) with all those outcome measures, except for Intellect and Agreeableness with psychological distress. The previous section on factor analysis (EFA and CFAs) demonstrated that the Big Five factors, protective factors and psychological distress measures loaded on different single latent variables. Therefore, structural modelling equation (SEM) is applied here to determine the fit of three different models in which the latent GFP factor with five indicators (Big Five) led a direct path to each of the identified latent (protective factors and psychological distress) and observed (perceived stress) variables. That is, the latent variables of interest were regressed on the latent GFP.

All three models showed relatively poor fit to the data. The fit indices for the psychological distress model ( $\chi^2 = 140.1$ ,  $df = 19$ ) were CFI = .86 and the RMSEA = .15 (.13 – .17). For the protective factors model, the fit indices were better, but still not optimal ( $\chi^2 = 97.4$ ,  $df = 19$ , RMSEA (90% CI) = .12 (.10 - .14), CFI = .90). The perceived stress model ( $\chi^2 = 102.9$ ,  $df = 9$ ) had the worst fit indices with the CFI = .76 and the RMSEA (90% CI) = .19 (.16 - .23). These results showed that these proposed models were not optimal in predicting the outcomes for protective factors, psychological distress, and in particularly, perceived stress. Given that the previous fit for the GFP-model has been moderate only, these findings are only preliminary. Nonetheless, the structural part of each model, the regression, is still informative on the relationships of interest. The regression coefficients for the relationships between the GFP and

psychological distress, protective factors, and perceived stress were -.23, 1.03 and -.44, respectively. That is, negative relationships were found for the GFP with psychological distress and perceived stress, whereas a positive relationship was found with the individual-level protective factors.

### 3.3. Explanatory Power of the GFP

The second research question aimed to explore whether compared to the Big Five factors, the GFP explains similar or more variance in individual measures of i) protective factors and ii) perceived stress. Table 3 presents the correlations reported for the GFP and Big Five with the three indicators (Lack of Control, Self-Esteem and Hardiness) of protective factors and scores for perceived stress. All correlations were statistically significant ( $p < 0.001$ ). For protective factors, the GFP and personality trait Emotional Stability had the highest correlations for all three indicators. Except for Hardiness ( $r_{\text{GFP}} = .58$ ,  $r_{\text{Emotional Stability}} = .52$ ), Emotional Stability was the one that correlated slightly higher to Self-Esteem ( $r_{\text{GFP}} = .52$ ,  $r_{\text{Emotional Stability}} = .56$ ) and Lack of Control ( $r_{\text{GFP}} = -.52$ ,  $r_{\text{Emotional Stability}} = -.54$ ) than the GFP. For perceived stress, Emotional Stability had the strongest correlation with  $r = -.64$ , while the GFP only showed a correlation with  $r = -.46$ . Overall, these results indicate that a GFP only failed to explain more variance in the outcome measures when compared to the personality trait Emotional Stability. Importantly, the comparable correlations between the GFP and Emotional Stability for the protective factors shows that a GFP does explain similar variance.

**Table 3.** Pearson Correlations (95% confidence intervals) for personality factors (GFP and the Big Five) with the protective factors and perceived stress (N = 257 – 281).

	<u>Protective Factors</u>			<u>Perceived Stress</u>
	Lack of Control	Self-Esteem	Hardiness	PSS
GFP	-.52 (-.60, -.43)	.52 (.43, .60)	.58 (.49, .65)	-.46 (-.55, -.36)
Emotional Stability	-.54 (-.62, -.45)	.56 (.47, .63)	.52 (.43, .61)	-.64 (-.71, -.56)
Extraversion	-.48 (-.57, -.39)	.42 (.32, .51)	.52 (.42, .60)	-.38 (-.48, -.27)
Agreeableness	-.26 (-.37, -.15)	.26 (.15, .37)	.35 (.24, .45)	-.21 (-.32, -.09)
Conscientiousness	-.30 (-.40, -.19)	.35 (.25, .45)	.23 (.11, .34)	-.29 (-.40, -.18)
Intellect	-.27 (-.38, -.16)	.34 (.23, .45)	.39 (.29, .49)	-.19 (-.31, -.07)

*Notes.* PSS = Perceived Stress Score

### 3.4. Mediation Analyses

The third and final research question aimed to determine whether the relationship between the GFP and individual function and well-being is mediated by psychological distress. In this sample, the outcome variable function and well-being were measured by two distinct summary scores for individual's health and well-being in the physical and mental domains. Sizeable correlations (adjusted  $p < 0.001$ ) were found for the majority of the Big Five dimensions with all indicators of psychological distress (see Anxiety, Depression and Stress in Table 2). Associations for the Big Five dimensions with function and well-being, however, were only found to be statistically significant for mental health (see MCS in Table 2). As the Big Five dimensions related to the mediator psychological distress and outcome variable MCS, mediation analysis was permissible. While statistically significant correlations were not found for the Big Five dimensions with physical health, mediation analysis was applied for validation. However, it was expected that no mediating relationship will be found for this model.

Generally, the causal step strategy that focuses on the individual paths in mediation model is employed to test mediational relationships (Preacher & Hayes, 2008). Here, however, the *ab* critical path approach is used to interpret the indirect effect from the mediation analyses. This approach is based on the logic that the product of *ab* is identical to the difference between the total and direct effect. In this case, path *a* refers to the effect of GFP on the proposed mediator psychological distress, whereas path *b* is the effect of psychological distress on the outcome variables (PCS and MCS) partialling out the effect of GFP. Standardized regression coefficients are used to illustrate the path diagram for mediating relationships, however, the statistical



significance of the indirect effect is tested using unstandardized regression coefficients as recommended by Preacher and Hayes (2008).

Unsurprisingly, the relationship between the GFP and mental health was mediated by psychological distress. In Figure 2, the standardized regression coefficients for path  $a$  ( $\beta = -.72$ ) and  $b$  ( $\beta = -.40$ ) were both statistically significant. The standardized indirect effect  $ab$  was .29. Significance of this indirect effect was computed via a 95% confidence interval derived from 1000 bootstrapped samples using unstandardized regression coefficients (see B1 in Appendix B). The bootstrapped unstandardized indirect effect was .37 ( $p < 0.05$ ), and the 95% confidence interval ranged from .12 to .65. Thus, the indirect effect was statistically significant.

As expected, no mediating relationship was found for the GFP with physical health through psychological distress (Figure 3). The standardized regression coefficients for path  $a$  ( $\beta = -.60, p = .05$ ) and  $b$  ( $\beta = -.28$ ) were both statistically significant. However, significance level for the bootstrapped unstandardized indirect effect was .15 (see B2 in Appendix B), and thus not significant. These results clearly suggest there is only mediating relationship between the GFP and mental health through psychological distress.

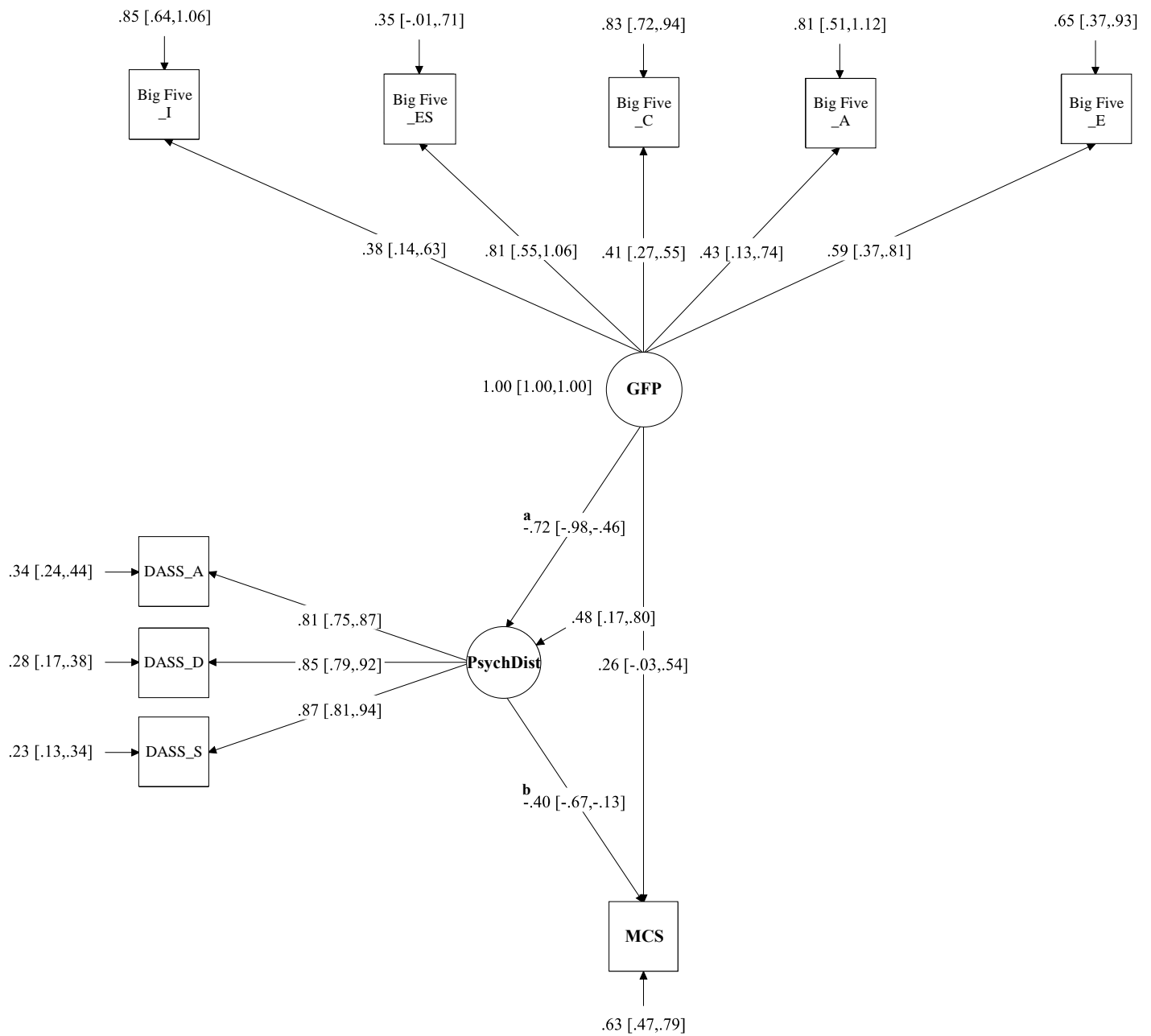


Figure 2. Standardized regression coefficients (95% confidence intervals) for the relationship between the GFP and mental health (MCS) as mediated by psychological distress (PsychDist).

Note. DASS\_A, D, S = measures for anxiety, depression and stress, respectively.

<sup>a</sup> The effect of independent variable on mediator variable

<sup>b</sup> The effect of mediator variable on outcome variable

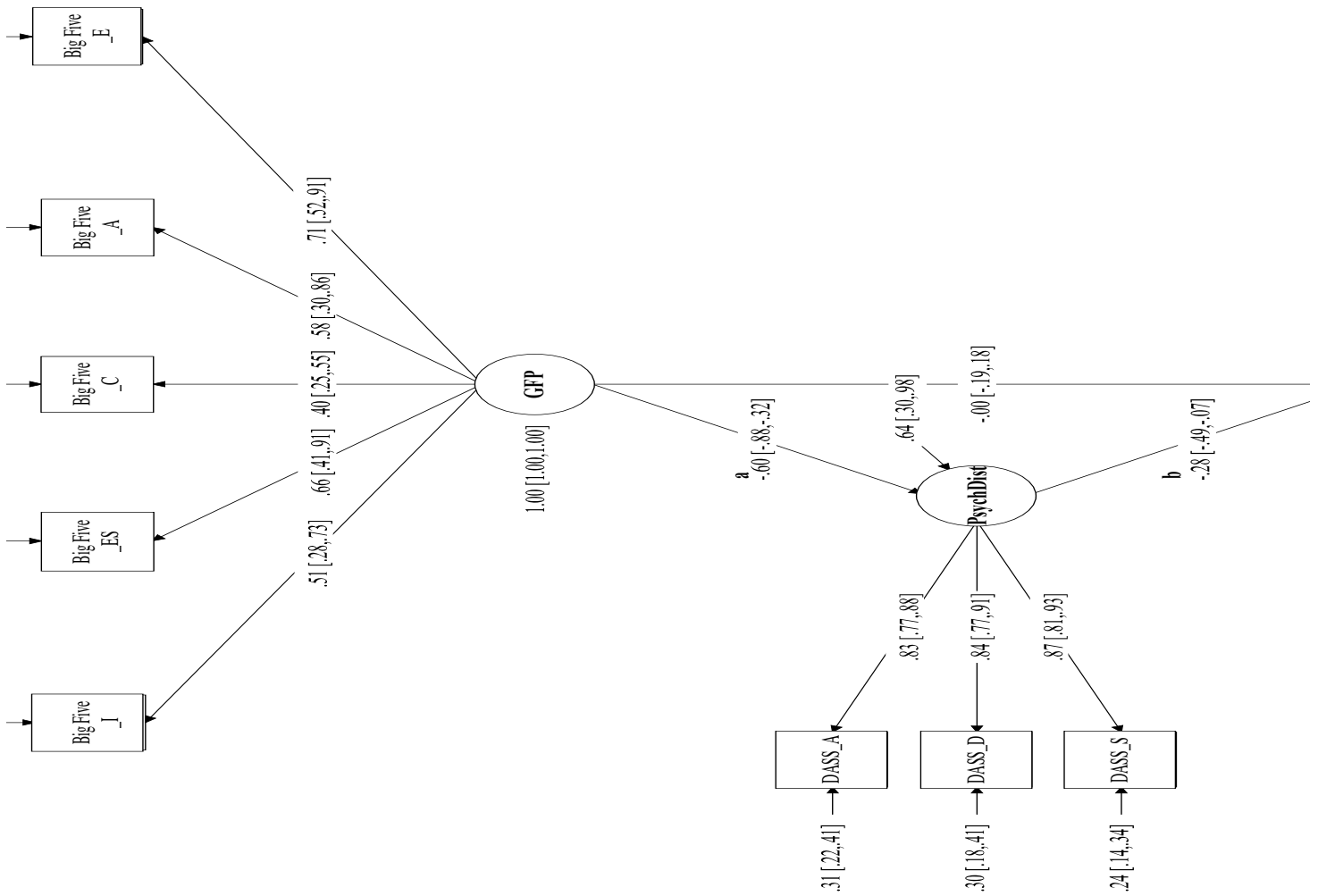


Figure 3. Standardized regression coefficients (95% confidence intervals) for the relationship between the GFP and physical health (PCS) as mediated by psychological distress (PsychDist).

Note. DASS\_A, D, S = measures for anxiety, depression and stress, respectively.

<sup>a</sup> The effect of independent variable on mediator variable

<sup>b</sup> The effect of mediator variable on outcome variable

## CHAPTER 4

### Discussion

The present study had an overall aim of adding empirical evidence to the current limited research on the predictive value of the GFP on psychological outcomes. Specifically, in relation to the individual-level protective factors that act as buffers against the negative impact of psychological distress and perceived stress. In this study, the individual-level protective factors included self-esteem, locus of control (measured as lack of control) and hardiness. Previous research had found these individual-level protective factors to improve one's mental health and well-being (see e.g., Abdollahi et al., 2015; Llamas et al., 2018; Stochl et al., 2019). Therefore, this study had an additional aim of examining the influence of GFP on mental health and well-being through psychological distress. Overall, the single factor GFP extracted from the Big Five dimensions in the current sample was only found to be informative on the relationships of interest, namely psychological distress, individual-level protective factors and perceived stress. Additionally, as anticipated, the GFP was found to influence mental health through psychological distress. The following section will discuss in detail the main findings of the present study and with respect to the three research questions. Following on from this, the limitations, implications and future directions for this study will be considered.

#### 4.1. Main Findings

The present study confirms that there is a single latent factor which the Big Five factors substantially loaded on, namely the GFP. Similar to the meta-analytical study by van der Linden,

te Nijenhuis, et al. (2010), two meta-factors that correlated substantially with  $r = .58$  were initially extracted in the preliminary analysis for a GFP, which suggested a more favourable single-factor solution. For the present data, the fit of the CFA model in which the Big Five factors were directly loaded on a single GFP was found to be only moderate but still acceptable. Previous studies have also tested similar models and obtained near identical or poorer CFA results. The fit of these models were ultimately improved by the addition of two meta-factors (Stability and Plasticity) which loaded directly on the GFP beyond the Big Five factors (see e.g., van der Linden, te Nijenhuis, et al., 2010), or correlated residuals as recommended by modification indices (see e.g., Hengartner et al., 2017). Intuitively, it could be assumed that the satisfactory CFA results for the GFP-model in this study reflect a possible loss of information. Yet, to err on the side of caution, the present study did not undertake further steps to obtain a best fitting model.

An unexpected finding was the pattern of factor loadings of the Big Five on the two meta-factors, that being, trait Agreeableness was found to load on the first meta-factor along with traits Extraversion and Intellect. This clearly differed from the past findings that showed the first meta-factor (Stability) to encompass traits Agreeableness, Conscientiousness and Emotional Stability (see e.g., van der Linden, te Nijenhuis, et al., 2010). It is unclear as to why this difference has emerged, additional studies would thus be worthwhile in determining a more comprehensive structural hierarchy of personality. Specifically, the relevance of these two meta-factors in this hierarchical structure. In general, the results of factor analyses in this study are in line with the findings of past research supporting for the existence of a GFP.

The first research question aimed to explore the predictive value of the GFP for individual outcomes in psychological distress, protective factors and perceived stress. The results from the

SEM analyses in which the latent GFP factor led a direct path to the different outcomes all suggested a poor fit to the data, in particular for perceived stress and followed by psychological distress. It seems that the extracted GFP may have an inadequate predictive value for these criteria. This is however not definitive and could be further clarified with a more comprehensive GFP-model, given that the current finding is only tentative as the fitting of the GFP-model in this study was only moderate. Still, the structural part of each model was informative on the relationships between the GFP and corresponding outcome criteria. Negative relationships were found for the GFP with psychological distress and perceived stress, whereas a positive relationship was found with the individual-level protective factors. As anticipated, these findings suggest high-GFP individuals to have better stress management and, at the same time, display a higher magnitude of individual-level protective factors (Musek, 2007, 2017).

The inverse associations found for the GFP with psychological distress and perceived stress are in line with previous research that reported the GFP to negatively associate with anxiety symptoms in children (van der Linden et al., 2013). Importantly, Hengartner et al. (2017) also empirically supported this relationship showing high-GFP individuals with markedly lower peri-traumatic distress to engage in more adaptive coping strategies (i.e., seeking social supports), which acted as buffers against the negative impact of stressful life events. This finding is extended in the present study by examining coping strategies occurring at the individual level (i.e., individual-level protective factors).

Although further investigation is needed for clarification, the findings presented above for the first research question seemed to suggest high-GFP individuals to be more well-equipped with adaptive coping strategies at both the social and individual levels (Hengartner et al., 2017).

Therefore, when confronted with stressful life events, high-GFP individuals would be intuitively better at managing their stress. This provides strong support to the assumptions that high-GFP individuals can be expected to be, on average, emotionally stable and self-efficacious in dealing with demanding and stressful life situations (Musek, 2017; van der Linden et al., 2017).

The second research question aimed to examine whether the GFP has the same or stronger explanatory power than the Big Five dimensions. This was tested by comparing the amount of variance explained by these two levels of personality factors for each of the individual-level protective factors (i.e., self-esteem, locus of control and hardiness) and individuals' scores on perceived stress. The results showed the GFP and trait Emotional Stability to be the only two personality indicators that correlated strongly and consistently with all the protective factors and perceived stress. As expected, comparable strength with an averaged correlation coefficient of .54 (negative for locus of control; measured as lack of control) was found in the relationship with the protective factors between the GFP and trait Emotional Stability. These findings suggest, like the lower-order personality trait Emotional Stability, the higher-order personality factor GFP also explains similar variance in these individual-level protective factors. This converged with the past research (van der Linden, te Nijenhuis, et al., 2010; Study 2) that found the unique variance of the Big Five dimensions to not contribute in predicting job performance beyond the effect of the GFP.

However, there was a difference in the strength of the relationship with perceived stress between the GFP ( $r = -.46$ ) and trait Emotional Stability ( $r = -.64$ ). A stronger correlation was clearly observed for the latter personality trait, suggesting this indicator to be more optimal and specific in explaining individual differences in perceived stress. This finding replicates the

consistent and prominent role of trait Emotional Stability with respect to mental disorders and psychological dysfunctions reported in the psychopathological literatures (Kotov et al., 2010; Newton-Howes et al., 2014). It is noteworthy that in Hengartner et al. (2017), trait Emotional Stability was the only specific indicator for individuals' reactivity to stress such as worry and fear, whereas the GFP was only reported to significantly correlate with individuals' coping strategies and levels of traumatic stress. Taken together, the different magnitude for the correlations may be attributable to perceived stress involving individuals' sensitivity to the effect of stress. That is, it encompasses individuals' commonly pervasive reactivity to stressful condition as defined by trait Emotional Stability (Lazarus & Folkman, 1984). The GFP, however, was suggested to be an adaptive trait (Musek, 2017; van der Linden et al., 2017), which could be interpreted to reflect individuals' abilities in the cognitive reappraisal of stress through effective emotional and personal adjustments.

Overall, the results for the second research question supported the GFP to have similar explanatory power to the trait Emotional Stability for individuals' outcomes on protective factors. However, trait Emotional Stability clearly outperformed the GFP in measuring individuals' perceived stress. This indicates that the GFP may have a limited validity for psychopathological research (Hengartner et al., 2017), adding support to the notion that the substantial relation reported between the GFP and p factor (Etkin et al., 2020; Oltmanns et al., 2018) may be attributable to the influence of the GFP on individuals' effective management of stress (van der Linden et al., 2017).

Moreover, based on the findings for the first two research questions, the GFP may not suffice in reflecting individuals' full personality, which subsumes their sensitivity to the effect of



stress. Rather, it seemed to be more informative in measuring individuals' broader personal and social effectiveness that encompasses their general behaviours and attitudes toward stressful situations (Musek, 2017). Additional replication studies with inclusion of additional measures on psychopathological factors such as psychological distress is required for further clarification.

The final research question aimed to examine whether there is a possible mediating relationship between the GFP and mental health through psychological distress. A significant indirect effect was found for the proposed mediation model, indicating psychological distress to be a mediator for the relationship observed between the GFP and mental health. This is expected, since psychological distress has been found to be one of the significant risk factors in the development of mental health problems (Markou & Cryan, 2012), whereas aforementioned findings from this study showed the high-GFP individuals to have stronger associations with adaptive coping strategies (i.e., individual-level protective factors) to stressful events. Taken together, it would be intuitive to assume that any protective factors associated with the GFP would act to cushion the negative impact of psychological distress, in turn, promoting higher levels of well-being.

## **4.2. Limitations**

There are several limitations in this study. First, self-report was used to obtain the measures for all variables. Although these self-reports questionnaires are all psychometrically adequate, this exclusive reliance on self-report indicates that the present study may be biased by social desirability or reduced self-awareness, leading to possible unintentional under- or

overestimate of variables. Use of multi-informant reports from additional family members or friends should be considered in future research to ensure construct validity.

Second, the present data were assessed with a cross-sectional retrospective design. This restricts the ability to make causal inferences on the direction of the association between the GFP and outcomes variables including psychological distress, individual-level protective factors and perceived stress. A longitudinal design would be more favourable in obtaining a more comprehensive research on the prospective and functional associations between the GFP and these criteria. Furthermore, the information on psychological distress and individual's health and well-being was solely based on participant's recollection at a specific time-point, responses may be subjected to inaccuracy and biases.

Finally, the present study only included male participants aged between 35 and 80 years old. While the data was highly representative of the general male populations in Australia, this also reflects a possible limitation on the generalizability of the present study to younger, female or clinical populations. For instance, hardiness has been found to be a stronger individual-level protective factors in female police officers compared to their male counterparts (Andrew et al., 2013). Additional studies with inclusion of different populations would thereby be useful in the better understanding and further clarification of the GFP influences on individual's psychological outcomes.

### 4.3. Implications and Future Research

The results of current study provided some useful insight into the practical and theoretical relevance of a GFP in relation to individuals' psychological outcomes, specifically for the general male populations. First and foremost, the current study adds to the existing substantial evidence supporting the GFP to be the highest-order personality factor. Furthermore, current study demonstrated the possible practical relevance of GFP in the psychological domain as an adaptive trait. That is, it seemed to modulate individuals' behaviours and attitudes in a positive direction, and thereby resulting in better stress management. This is underscored by the strong association observed between the GFP and outcome criteria such as individual-level protective factors, and somewhat weaker for perceived stress. Additionally, the GFP was found to have a significant indirect effect on individual's mental health through its influence on psychological distress. Altogether, the GFP may possibly serve as a valuable construct for future personality research in relation to individual differences in stress management and adaptive coping strategies.

Importantly, limited predictive value was found for the GFP on psychological distress, individual-level protective factors and perceived stress. It is noteworthy, the poorest fitting to the data was found for perceived stress, followed by psychological distress. Additionally, trait Emotional Stability was found to outperform the GFP with respect to its explanatory power specifically for perceived stress. Still, these results are only preliminary, and additional empirical studies using different populations and measures is required for further clarification.

Overall, when interpreting these results as a whole with respect to the relevant past literatures, particularly to the interpretation of GFP as an adaptive trait (see e.g., Hengartner et al.,

2017), it may seem that this construct reflects the existence of the general mechanisms that push individual's lower-level personality traits toward the favourable and desirable end of a continuum (van der Linden et al., 2016). Therefore, the use of such a construct would be most pragmatic in terms of providing critical insights into the complex structure of personality.

#### **4.4. Conclusion**

The current study aimed to examine the predictive validity of the GFP in relation to psychological outcomes. The findings presented above indicate limited predictive validity for the GFP on the proposed psychological outcomes; however, strong preliminary evidence is provided for its significant association with individual-level protective factors that act to buffer against stress. Importantly, the GFP also exerts its effect on mental health indirectly through psychological distress. In general, as proposed by Musek (2017), the present study shows the GFP to reflect social skills and knowledge as a social effectiveness factor, and also individuals' own adaptive abilities at both the social and individual level.

## Reference

- Abdollahi, A., Abu Talib, M., Yaacob, S. N., & Ismail, Z. (2015). The Role of Hardiness in Decreasing Stress and Suicidal Ideation in a Sample of Undergraduate Students. *Journal of Humanistic Psychology, 55*(2), 202-222. doi:10.1177/0022167814543952
- Andrew, M. E., Mnatsakanova, A., Howsare, J. L., Hartley, T. A., Charles, L. E., Burchfiel, C. M., . . . Violanti, J. M. (2013). Associations between protective factors and psychological distress vary by gender: the Buffalo Cardio-Metabolic Occupational Police Stress Study. *International journal of emergency mental health, 15*(4), 277-288. Retrieved from <https://www.scopus.com/inward/record.uri?eid=2-s2.0-84899155271&partnerID=40&md5=1aaabfefb8d30ffa8dce4915c257b7c0>
- Anusic, I., Schimmack, U., Pinkus, R. T., & Lockwood, P. (2009). The Nature and Structure of Correlations Among Big Five Ratings: The Halo-Alpha-Beta Model. *Journal of Personality and Social Psychology, 97*(6), 1142-1156. doi:10.1037/a0017159
- Australian Bureau of Statistics. (1997). *1995 National Health Survey - SF-36 Population Norms (Catalogue No. 4399.0)*. Australia, ABS Retrieved from <https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/4399.01995?OpenDocument>
- Bäckström, M., Björklund, F., & Larsson, M. R. (2009). Five-factor inventories have a major general factor related to social desirability which can be reduced by framing items neutrally. *Journal of Research in Personality, 43*(3), 335-344. doi:<https://doi.org/10.1016/j.jrp.2008.12.013>

- Bartone, P. T., Ursano, R. J., Wright, K. M., & Ingraham, L. H. (1989). The impact of a military air disaster on the health of assistance workers: A prospective study. *Journal of Nervous and Mental Disease*, *177*(6), 317-328. doi:10.1097/00005053-198906000-00001
- Brown, T. A., Chorpita, B. F., Korotitsch, W., & Barlow, D. H. (1997). Psychometric properties of the Depression Anxiety Stress Scales (DASS) in clinical samples. *Behaviour Research and Therapy*, *35*(1), 79-89. doi:10.1016/S0005-7967(96)00068-X
- Burns, G. N., Morris, M. B., Periard, D. A., LaHuis, D., Flannery, N. M., Carretta, T. R., & Roebke, M. (2017). Criterion-related validity of a Big Five general factor of personality from the TIPI to the IPIP. *International Journal of Selection and Assessment*, *25*(3), 213-222. doi:10.1111/ijsa.12174
- Cohen, S., & Williamson, G. (1988). Perceived Stress in a Probability Sample of the United States. In S. Spacapan & S. Oskamp (Eds.), *The Social Psychology of Health: Claremont Symposium on Applied Social Psychology*. Newbury Park, CA: Sage.
- Costa, P. T., Jr., & McCrae, R. R. (1995). Solid grounds in the wetlands of personality: A reply to Block. *Psychological Bulletin*, *117*, 216–220.
- Depue, R. A., & Fu, Y. (2011). Neurogenetic and experiential processes underlying major personality traits: Implications for modelling personality disorders. *International Review of Psychiatry*, *23*(3), 258–281.
- Etkin, P., Mezquita, L., López-Fernández, F. J., Ortet, G., & Ibáñez, M. I. (2020). Five Factor model of personality and structure of psychopathological symptoms in adolescents. *Personality and Individual Differences*, *163*. doi:10.1016/j.paid.2020.110063
- Goldberg, L. R. (1992). The Development of Markers for the Big-Five Factor Structure. *Psychological Assessment*, *4*(1), 26-42. doi:10.1037/1040-3590.4.1.26

- Goldberg, L. R. (1999). A broad-bandwidth, public domain, personality inventory measuring the lower-level facets of several five-factor models. In I. Mervielde, I. Deary, F. De Fruyt, & F. Ostendorf (Eds.), *Personality Psychology in Europe* (Vol. 7, pp. 7-28). Tilburg, The Netherlands: Tilburg University Press.
- Hengartner, M. P., van der Linden, D., Bohleber, L., & von Wyl, A. (2017). Big Five Personality Traits and the General Factor of Personality as Moderators of Stress and Coping Reactions Following an Emergency Alarm on a Swiss University Campus. *Stress and Health, 33*(1), 35-44. doi:10.1002/smi.2671
- Hopwood, C. J., Wright, A. G. C., & Brent Donnellan, M. (2011). Evaluating the evidence for the general factor of personality across multiple inventories. *Journal of Research in Personality, 45*(5), 468-478. doi:10.1016/j.jrp.2011.06.002
- Kawamoto, T., van der Linden, D., & Dunkel, C. S. (2017). The General Factor of Personality (GFP) and moral foundations. *Personality and Individual Differences, 119*, 78-82. doi:10.1016/j.paid.2017.06.043
- Kelly, S., Burns, N., Bradman, G., Wittert, G., & Daniel, M. (2012). Does IQ Vary Systematically with All Measures of Socioeconomic Status in a Cohort of Middle-Aged, and Older, Men? *Sociology Mind, 2*, 394-400. doi:10.4236/sm.2012.24052
- Knowlden, A. P., Sharma, M., Kanekar, A., & Atri, A. (2012). Sense of coherence and hardiness as predictors of the mental health of college students. *International quarterly of community health education, 33*(1), 55-68. doi:10.2190/IQ.33.1.e
- Kobasa, S. C. (1979). Stressful life events, personality, and health: An inquiry into hardiness. *Journal of Personality and Social Psychology, 37*(1), 1-11. doi:10.1037/0022-3514.37.1.1

- Kotov, R., Gamez, W., Schmidt, F., & Watson, D. (2010). Linking "Big" personality traits to anxiety, depressive, and substance use disorders: A meta-analysis. *Psychological Bulletin*, *136*(5), 768-821. doi:10.1037/a0020327
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York, NY: Springer.
- Llamas, J. D., Morgan Consoli, M. L., Hendricks, K., & Nguyen, K. (2018). Latino/a freshman struggles: Effects of locus of control and social support on intragroup marginalization and distress. *Journal of Latina/o Psychology*, *6*(2), 131-148. doi:10.1037/lat0000089
- Loehlin, J. C. (2012). How general across inventories is a general factor of personality? *Journal of Research in Personality*, *46*(3), 258-263. doi:10.1016/j.jrp.2012.02.003
- Loehlin, J. C., & Martin, N. G. (2011). The general factor of personality: Questions and elaborations. *Journal of Research in Personality*, *45*(1), 44-49.  
doi:10.1016/j.jrp.2010.11.008
- Lovibond, S. H., & Lovibond, P. F. (1995). *Manual of the Depression Anxiety Stress Scales* (2nd ed.). Sydney: Psychology Foundation.
- Markou, A., & Cryan, J. F. (2012). Stress, anxiety and depression: Toward new treatment strategies. *Neuropharmacology*, *62*(1), 1-2.  
doi:<https://doi.org/10.1016/j.neuropharm.2011.09.023>
- Martin, S., Haren, M., Taylor, A., Middleton, S., Wittert, G., & FA-MAS. (2007). Cohort Profile: The Florey Adelaide Male Ageing Study (FAMAS). *International Journal of Epidemiology*, *36*(2), 302-306. doi:10.1093/ije/dy1279
- Musek, J. (2007). A General Factor of Personality: Evidence for the Big One in the Five-Factor Model. *Journal of Research in Personality*, *41*, 1213-1233.



- Musek, J. (2017). The general factor of personality: Ten years after. *Psihologijske Teme*, 26(1), 61-87. Retrieved from <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85019102335&partnerID=40&md5=460e009fe994284de2cd93f07ed27c9e>
- Newton-Howes, G., Tyrer, P., Johnson, T., Mulder, R., Kool, S., Dekker, J., & Schoevers, R. (2014). Influence of personality on the outcome of treatment in depression: Systematic review and meta-analysis. *Journal of Personality Disorders*, 28(4), 577-593. doi:10.1521/pedi\_2013\_27\_070
- Oltmanns, J. R., Smith, G. T., Oltmanns, T. F., & Widiger, T. A. (2018). General factors of psychopathology, personality, and personality disorder: Across domain comparisons. *Clinical Psychological Science*, 6, 581-589.
- Pearlin, L. I., & Schooler, C. (1978). The structure of coping. *Journal of health and social behavior*, 19(1), 2-21. doi:10.2307/2136319
- Pelt, D. H. M., van der Linden, D., Dunkel, C. S., & Born, M. P. (2017). The general factor of personality and job performance: Revisiting previous meta-analyses. *International Journal of Selection and Assessment*, 25(4), 333-346. doi:10.1111/ijsa.12188
- Pelt, D. H. M., van der Linden, D., Dunkel, C. S., & Born, M. P. (2020). The General Factor of Personality and daily social experiences: Evidence for the social effectiveness hypothesis. *Personality and Individual Differences*, 155. doi:10.1016/j.paid.2019.109738
- Pereira-Morales, A. J., Adan, A., & Forero, D. A. (2019). Perceived Stress as a Mediator of the Relationship between Neuroticism and Depression and Anxiety Symptoms. *Current Psychology*, 38(1), 66-74. doi:10.1007/s12144-017-9587-7
- Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40(3), 879-891. doi:10.3758/BRM.40.3.879

Revelle, W., & Wilt, J. (2013). The general factor of personality: A general critique. *Journal of Research in Personality, 47*(5), 493-504. doi:<https://doi.org/10.1016/j.jrp.2013.04.012>

Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.

Ruisoto, P., López-Guerra, V. M., Paladines, M. B., Vaca, S. L., & Cacho, R. (2020).

Psychometric properties of the three versions of the Perceived Stress Scale in Ecuador.

*Physiology and Behavior, 224*. doi:10.1016/j.physbeh.2020.113045

Rushton, J. P., & Irwing, P. (2009a). A General Factor of Personality in the Millon Clinical Multiaxial Inventory-III, the Dimensional Assessment of Personality Pathology, and the Personality Assessment Inventory. *Journal of Research in Personality, 43*(6), 1091-1095. doi:10.1016/j.jrp.2009.06.002

Rushton, J. P., & Irwing, P. (2009b). A General Factor of Personality (GFP) from the Multidimensional Personality Questionnaire. *Personality and Individual Differences, 47*(6), 571-576. doi:10.1016/j.paid.2009.05.011

Rushton, J. P., & Irwing, P. (2009c). A General Factor of Personality in 16 sets of the Big Five, the Guilford-Zimmerman Temperament Survey, the California Psychological Inventory, and the Temperament and Character Inventory. *Personality and Individual Differences, 47*(6), 558-564. doi:10.1016/j.paid.2009.05.009

Rushton, J. P., & Irwing, P. (2009d). A general factor of personality in the Comrey Personality Scales, the Minnesota Multiphasic Personality Inventory-2, and the Multicultural Personality Questionnaire. *Personality and Individual Differences, 46*(4), 437-442. doi:10.1016/j.paid.2008.11.015

Rushton, J. P., & Irwing, P. (2011). The General Factor of Personality: Normal and Abnormal. In *The Wiley-Blackwell Handbook of Individual Differences* (pp. 132-161).

- Schmitt, D. P., & Allik, J. (2005). Simultaneous administration of the Rosenberg self-esteem scale in 53 nations: Exploring the universal and culture-specific features of global self-esteem. *Journal of Personality and Social Psychology, 89*(4), 623-642. doi:10.1037/0022-3514.89.4.623
- Sitser, T., van der Linden, D., & Born, M. P. (2013). Predicting Sales Performance Criteria With Personality Measures: The Use of the General Factor of Personality, the Big Five and Narrow Traits. *Human Performance, 26*(2), 126-149. doi:10.1080/08959285.2013.765877
- Stochl, J., Sonesson, E., Wagner, A. P., Khandaker, G. M., Goodyer, I., & Jones, P. B. (2019). Identifying key targets for interventions to improve psychological wellbeing: replicable results from four UK cohorts. *Psychological Medicine, 49*(14), 2389-2396. doi:10.1017/S0033291718003288
- van der Linden, D., Dunkel, C. S., & Petrides, K. V. (2016). The General Factor of Personality (GFP) as social effectiveness: Review of the literature. *Personality and Individual Differences, 101*, 98-105. doi:10.1016/j.paid.2016.05.020
- van der Linden, D., Oostrom, J. K., Born, M. P., van der Molen, H. T., & Serlie, A. W. (2014). Knowing what to do in social situations: The general factor of personality and performance on situational judgment tests. *Journal of Personnel Psychology, 13*(2), 107-115. doi:10.1027/1866-5888/a000113
- van der Linden, D., Pekaar, K. A., Bakker, A. B., Schermer, J. A., Vernon, P. A., Dunkel, C. S., & Petrides, K. V. (2017). Overlap between the general factor of personality and emotional intelligence: A meta-analysis. *Psychological Bulletin, 143*(1), 36-52. doi:10.1037/bul0000078
- van der Linden, D., Scholte, R. H. J., Cillessen, A. H. N., te Nijenhuis, J., & Segers, E. (2010). Classroom ratings of likeability and popularity are related to the Big Five and the general

- factor of personality. *Journal of Research in Personality*, 44(5), 669-672.  
doi:10.1016/j.jrp.2010.08.007
- van der Linden, D., te Nijenhuis, J., & Bakker, A. B. (2010). The General Factor of Personality: A meta-analysis of Big Five intercorrelations and a criterion-related validity study. *Journal of Research in Personality*, 44(3), 315-327. doi:10.1016/j.jrp.2010.03.003
- van der Linden, D., te Nijenhuis, J., Cremers, M., van de Ven, C., & van der Heijden-Lek, K. (2014). The General Factor of Personality (GFP) Relates to Other Ratings of Character and Integrity: Two validity studies in personnel selection and training of the Dutch armed forces. *International Journal of Selection and Assessment*, 22(3), 261-271.  
doi:10.1111/ijsa.12075
- van der Linden, D., Vreeke, L., & Muris, P. (2013). Don't be afraid of the General Factor of Personality (GFP): Its relationship with behavioral inhibition and anxiety symptoms in children. *Personality and Individual Differences*, 54(3), 367-371.  
doi:10.1016/j.paid.2012.10.002
- Ware, J. E., Kosinski, M., & Keller, S. D. (1994). *SF-36 Physical and Mental Health Summary Scales: A User's Manual*. Boston, MA: Health Assessment Lab.
- Ware, J. E., Snow, K. K., Kosinski, M., & Gandek, B. (1993). *SF-36 Health Survey Manual and Interpretation Guide*. Boston, MA: The Health Institute, New England Medical Center.
- Watters, C. A., Walton, B., & Parker, J. D. A. (2020). The general factor of personality (GFP) and criminal behavior across the lifespan: Expanding predictive validity. *Personality and Individual Differences*, 166. doi:10.1016/j.paid.2020.110208

## APPENDIX A: Self-Esteem & Lack of Control Questionnaire

The Self-Esteem and Lack of Control Questionnaire Adapted from the Rosenberg's Self-Esteem Scale (Q1 - Q6; Rosenberg, 1965) and the Pearlin's Mastery Scale (Q7 - Q13; Pearlin & Schooler, 1978).

**2. Below is a list of statements about how you see yourself.**

**Using the scale provided, please indicate how strongly you disagree or agree with each statement. Please give only one answer per item.**

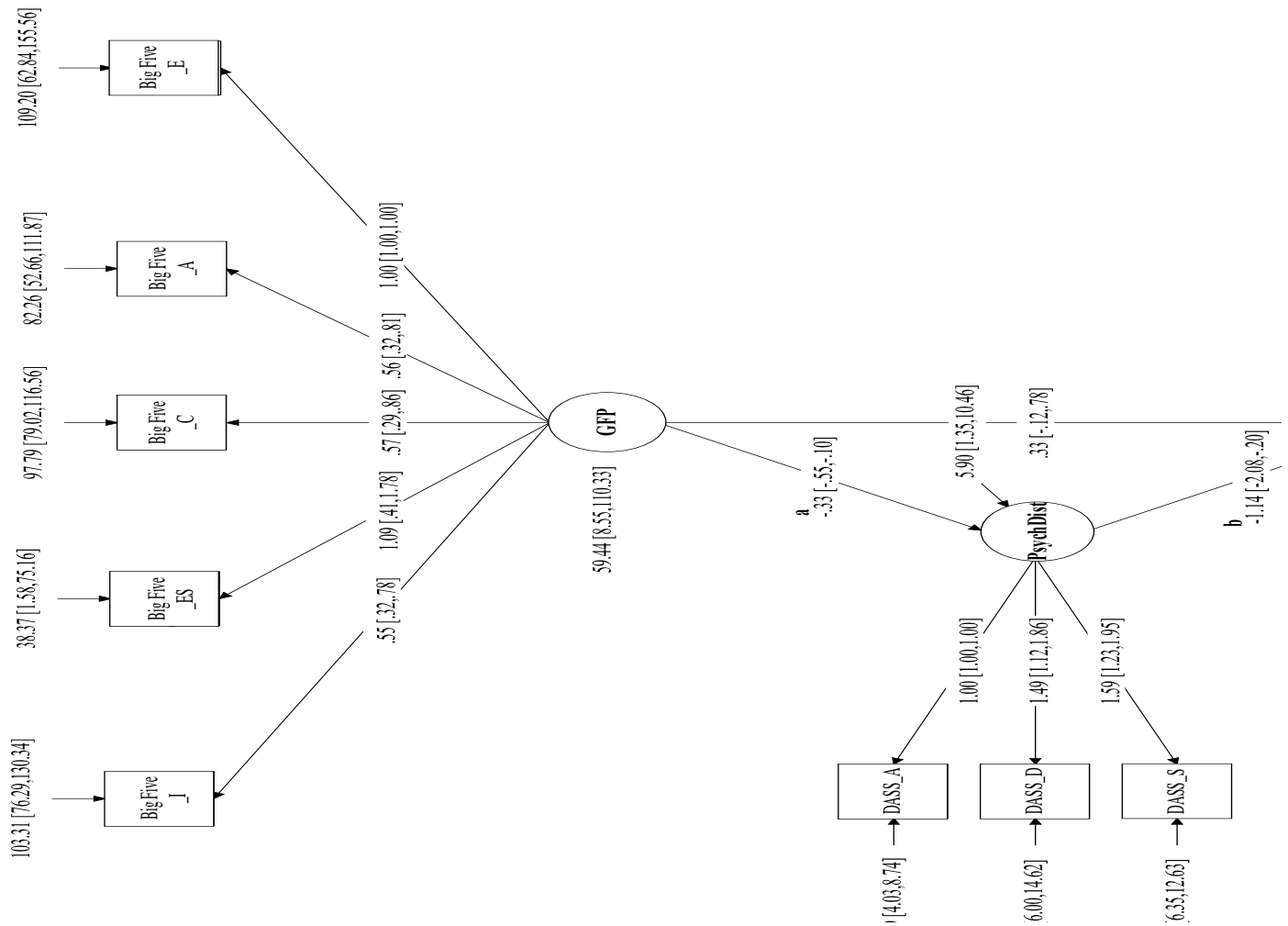
(a)	(b)	(c)	(d)	(e)
Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

***How strongly do you agree or disagree that:***

1. I feel that I have a number of good qualities
2. I feel that I'm a person of worth, at least on an equal plane with others
3. I am able to do things as well as most other people
4. I take a positive attitude toward myself
5. On the whole, I am satisfied with myself
6. All in all, I am inclined to feel that I'm a failure
7. I have little control over the things that happen to me
8. There is really no way I can solve some of the problems I have
9. There is little I can do to change many of the important things in my life
10. I often feel helpless in dealing with the problems of life
11. Sometimes I feel that I'm being pushed around in life
12. What happens to me in the future mostly depends on me
13. I can do just about anything I really set my mind to do

## APPENDIX B: Mediation Models (Unstandardized)

B1. Unstandardized regression coefficients (95% confidence intervals) of the mediation model for mental health (MCS).



B2. Unstandardized regression coefficients (95% confidence intervals) of the mediation model for physical health (PCS).

