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Empirical Article

The Big-Five personality factors, cognitive ability, health, and social-demographic indicators as independent predictors of self-efficacy: A longitudinal study

ADRIAN FURNHAM[1] and HELEN CHENG[2,3]

[1]*BI: Norwegian Business School, Oslo, Norway*
[2]*Department of Psychology, University College London, London, UK*
[3]*ESRC Centre for Learning and Life Chances in Knowledge Economies and Societies, Institute of Education, University College London, London, UK*

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This study set out to examine to what extent a set of psychological, health and socio-demographic factors are associated with self-efficacy (SE) in a large sample of over 12,000 participants over a two-year period. We were interested in the correlates of self-efficacy (criterion variable) with gender, age, education and occupation, the Big-Five personality factors and cognitive ability, as well as mental and physical health (predictor variables). Regression analyses showed that four of the Big-Five personality factors (extraversion, neuroticism, conscientiousness, and openness), cognitive ability, mental and physical health, gender, education and occupation were all significant and independent predictors of self-efficacy, accounting for 23% of the variance of the outcome variable. Personality variables, particularly Neuroticism and Conscientiousness, were the most powerful predictors of SE two years later. The implications for encouraging SE in individuals are discussed.

Key words: Self-confidence, big-five personality factors, cognitive ability, mental and physical health, education and occupation, cross-sectional and longitudinal.

Adrian Furnham, BI: Norwegian Business School, Nydalsveien 37, 0484 Oslo, Norway. E-mail: adrian@adrianfurnham.com

INTRODUCTION

Self-efficacy (SE) is defined simply as a person's belief in their ability to succeed in a particular situation (Lippke, 2020). It has been considered a stable, trait-like, variable as well as a self-assessed concept that varies as a function of contextual variables. For nearly fifty years psychologists have examined the causes and consequences of self-efficacy (Bandura, 1986, 2019) recognized as a major factor in mental and physical health (Azizli, Atkinson, Baughman & Giammarco, 2015; Barańczuk, 2021; Dammeyer, Marschark & Zettler, 2018; Djourova, Rodriguez, Tordera & Gebeyehu, 2019; Gangwani, Cain, Collins & Cassidy, 2022; Hamerman, Aggarwal & Poupis, 2021; Luszczynska, Scholz & Schwarzer, 2005; Meyer, Niemand, Davila & Kraus, 2022; Rippon, Shepherd, Wakefield, Lee & Pollet, 2022; Schunk, 1995; Shoji, Cieslak, Smoktunowicz, Rogala, Benight & Luszczynska, 2016; van Zyl, Klibert, Shankland, See-To & Rothmann, 2022; Volz, Voelkle & Werheid, 2019) as well as educational (Doménech-Betoret, Abellán-Roselló & Gómez-Artiga, 2017; Livinţi, Gunnesch-Luca & Iliescu, 2021), and work outcomes (Iroegbu, 2015).

The concept has attracted so much attention that there are now meta-analyses dedicated to specific features of SE like sex differences (Huang, 2013), sedentary behavior (Szczuka, Banik, Abraham, Kulis & Luszczynska, 2021) and older adults receiving care (Whitehall, Rush, Górska & Forsyth, 2021). Further, in a meta-analysis relevant to this study Barańczuk (2021) collected data from 53 studies (including 60 independent samples and 188 effect sizes), and in total 28,704 participants. Lower neuroticism and higher extraversion, openness to experience, agreeableness, and conscientiousness were associated with greater generalized self-efficacy. The strongest two correlates of SE were Neuroticism (negatively) and Conscientiousness (positively).

In this study we use the General Self-Efficacy Scale which measures a general belief in successful agency in a variety of life situations and challenges. A central question has always been what psychological factors and processes SE is related to, and how does it develop. This study is concerned with demographic, personality trait, cognitive ability and health correlates of SE. Researchers have examined individual difference correlates, but they have been restricted in both the number and range of variables examined and the size and representativeness of their populations (Barańczuk, 2021; Berg, Sanderson, Cox, Mahnke, Greiner & Ellerbeck, 2008; Herts, Khaled & Stanton, 2016). The essential novelty of this study lies in three features: the size and representativeness of the sample; the number of variables we examine at the same time (demography, personality, intelligence, health); and the fact the study has longitudinal data. Most researchers favor, where possible, longitudinal over cross-sectional data, as it is possibly to more accurately infer causation.

In this study, a set of psychological, socio-demographic, and health factors were examined to ascertain to what extent SE was related to these factors. We were interested in exploring, through regressions, the *comparative* power of demographic (sex, age, education, social class) personality, cognitive ability and mental and physical health variables in predicting generalized SE. We were able to mine an established data set which we know well, though inevitably we were restricted to the data available. As noted above, it was also a *longitudinal* study as most of the

variables were measured two years (2011) before the measure of SE (2013).

SELF-EFFICACY

It has been suggested that general, as well as specific (e.g. academic, creativity, health, occupational), SE is a consistent, powerful and stable predictor of a number of important life outcomes such as health, wealth and well-being (Artino, 2012; Caprara, Vecchione, Alessandri, Gerbino & Barbaranelli, 2011; Choi, 2005; Dinther, Dochy & Segers, 2011; Gore, 2006; Grøtan, Sund & Bjerkeset, 2019; Gwaltney, Metrik, Kahler & Shiffman, 2009; Haase, Hoff, Hanel & Innes-Ker, 2018; Jenkins & Gortner, 1998; Liao, Stead & Liao, 2021; Luszczynska *et al*., 2005; Pajares, 1996; Rabani Bavojdan, Towhidi & Rahmati, 2011; Selzler, Habash, Robson, Lenton, Goldstein & Brooks, 2020; Truxillo, Seitz & Bauer, 2008; Zakiei, Vafapoor, Alikhani, Farnia & Radmehr, 2020). Whilst we accept that SE is a general belief in successful agency, the literature suggests there may be relatively minor task- and situation-specific variations in those beliefs (Lippke, 2020).

Researchers in this area have been concerned with a number of specific questions such as: How is SE different from self-confidence and self-esteem? How does it develop over time? Is it relatively stable and trait-like or malleable and trainable? What life outcomes is it particularly related to? What is the process or mechanism that explains it? How best to assess or measure SE?

It has been demonstrated that SE is linked to academic achievement, career success, mental health, and interpersonal communications (Cheng & Furnham, 2002; Furnham, 2008; Lippke, 2020; Shoji *et al*., 2016). SE is correlated with setting goals, initiating actions, and maintaining motivation (Schwarzer & Born, 1997). It is closely related to high self-esteem (Rosenberg, 1986), which has been reported to be one of the strongest predictors of psychological well-being (Cheng & Furnham, 2002; Diener, 1984). SE is also, as noted closely related to locus of control (Rotter, 1966), which is a predictor of various optimal outcomes (Furnham, 2008). Most of all, many studies have also shown that SE is closely related to a wide range of health behaviors (Selzler *et al*., 2020).

One central question for personality psychologists is the relationship between the personality traits and SE, and whether SE is trait-like in its stability and mechanisms. Caprara *et al*. (2011) found as hypothesized that both Conscientiousness and Openness with positively correlated with academic SE. Rivers (2021) argued that while personality traits reflect stable individual characteristics deriving from genetic endowment, SE beliefs are malleable and subject to educational intervention. In other words, it can and does change over time, hence the importance of doing longitudinal research. As a consequence, various studies have used both established traits and SE as predictors of a wide variety of behavioral outcomes (Guntern, Korpershoek & van der Werf, 2017).

Various studies have examined demographic correlates of SE which tend to show that males more than females, older rather than young, better rather than less educated and higher rather than people with lower socio-economic status tend to have higher SE scores (Hoeltje, Silbum, Garton & Zubrick, 1996; Saleem, Beaudry & Croteau, 2011). We are able to investigate each of these relationships in this paper.

SE is also clearly related to personality traits, particularly Neuroticism/Emotional Stability, although studies have used both SE and Big Five traits to predict outcomes such as academic success (Caprara *et al*., 2011). Our data set also allows us to see if we can replicate these findings.

There has been less work on two other possible correlates of SE which we examine in this study. SE has been found to relate positively with mental effort, writing performance, use of learning strategies, mathematics achievement, and memory functioning and academic achievement, including grades and aptitude tests yet the relationship between SE, achievement, and intelligence has had mixed results (Jurecska, Lee, Chang & Sequeira, 2011). We shall investigate the relationship between cognitive ability and SE in this study.

We also investigate the relationship between subjectively assessed mental and physical health and SE. O'Leary (1985) noted that SE play a significant role in such diverse forms of health behavior as smoking-cessation relapse, pain experience and management, control of eating and weight, success of recovery from myocardial infarction and adherence to preventive health programs.

THIS STUDY

This study investigated the correlates of SE drawing data on a large longitudinal dataset in Britain, the UK Household Longitudinal Study (UKHLS). Based on the previous literature reviewed above, we tested various hypotheses:

Hypothesis 1: Males would have higher SE scores compared to females. This was based on the data that suggest males are socialized to be more agentic than females. Most studies in the area have found sex differences.

Hypothesis 2: Age would be positively correlated with SE. This is based on the concept that as people age, they gain more skill, insights and experience that benefits the sense of SE.

Hypothesis 3: Education and occupation level (both highly correlated) would be positively correlated with SE. This is based on the observation that education and occupation are associated with more income and job options and hence a greater sense of control and SE.

Hypothesis 4: Personality traits Conscientiousness, and Openness would be significantly and positively associated with SE, while trait Neuroticism would be significantly and negatively associated with SE. This was based on the extensive data that these three traits are related to better health and occupational outcomes which foster an increased sense of SE (Furnham, 2018).

Hypothesis 5: Cognitive ability would be significantly and positively associated with SE. This hypothesis was formulated because of the extensive literature linking IQ to health and wealth outcomes (Deary, Hill & Gale, 2021). That is, more intelligent people tend to make better life decisions which result in happier outcomes and which foster a higher sense of SE.

Hypothesis 6: Both mental and physical health would be significantly associated with SE. This was based on the

experimental and correlational data that suggests that those with higher SE sustain higher levels of all forms of health (Hamerman *et al*., 2021).

Hypothesis 7: All psychological, sociodemographic, and health factors listed in H1) to H6) would be independent predictors of SE variable, each of them would explain unique variance of the outcome variable.

One central question to be answered by this study is which of the various categories of variables assessed (demographic, health, personality and cognitive ability) is most closely linked to SE and the extent to which individual difference variables provide incremental validity over the other variables.

METHOD

The UK Household Longitudinal Study (UKHLS) follows the lives of 40,000 of British people in various waves. Data Wave 1 (2009), Wave 3 (2011) and Wave 5 (2013) were used in the study. This is a data set used by many researchers who are registered (e.g., Furnham & Cheng, 2018). There is no requirement to obtain any ethics approval.

Participants

The study was based on a sample of 12,362 participants (52% females) with age range from 17 through 98 years (<20 = 5.3%, 20–29 = 16.4%, 30–39 = 25.5%, 40–49 = 29.0%, 50–59 = 19.2%, > 60 = 4.6%) (M = 47.2, SD = 17.6) where we had information on the complete data for all variables examined in the study in Wave 1 (in 2009). This sample was representative of the British population at the time, though the lowest socio-economic class was under-represented.

Measures

Cognitive ability tests. A set of four sets of cognitive ability tests were used in the study: *Immediate Word Recall* (number of correct items); *Subtract* (number of correct answers); *Verbal fluency* (count of correct answers) and *Numeric Ability* (count of items answered correctly). The standardized tests scores were combined and the Alpha for the measure was 0.81. The data for this came from Wave 3 (2011).

Personality factors. Personality traits are classified according to the 'Big Five' taxonomy (BFT): Agreeableness (A), Conscientiousness (C), Extraversion (E), Neuroticism (N), and Openness (O). The Big Five personality traits were assessed in Wave 3 (in 2011) using a 15-item version of the BFT (John, Naumann & Soto, 2008). Three items were used to assess each of the five dimensions. The Cronbach's alpha was 0.57 for A, 0.55 for C, 0.60 for E, 0.71 for N, and 0.66 for O.

General Health Questionnaire (GHQ). Mental health was measured by GHQ in Wave 3 (in 2011). It is a 12-item self-completion instrument, measuring depression, anxiety and psychosomatic illness (Goldberg & Williams, 1988). The alpha for the total score was 0.83.

Perceived health. In Wave 3 (2011) participants were asked to think back over the last 12 months about how their health had been, compared to people of their own age, and answer a question "Would you say that your health has on the whole been: Excellent, Good, Fair, Poor, or Very poor?". In this study it is reverse coded so that 1 = Very poor and 5 = Excellent.

Education. Educational qualifications were ranged from 0 = No Qualification to 5 = University Degree in Wave 1 (in 2009).

Occupation/Social Class. Current occupation in Wave 5 (in 2013) was measured by the Registrar General's measure of social class (RGSC). (Marsh, 1986). It was coded on a 6-point scale: I unskilled (3.1%), II partly skilled (13.6%), IIIM skilled manual (18.1%), IIIN skilled non-manual (20.6%), V managerial /technical (37.7%), VI professional (6.9%) (Leete & Fox, 1977).

Self-efficacy: SE was only measured in Wave 5 (2013). In this study we used the Schwarzer and Jerusalem (1995) Generalized Self-Efficacy scale which has been used in a number of studies and translated into 32 languages (Parschau, Fleig, Koring, *et al*., 2013; Schüz, Wurm, Warner & Ziegelmann, 2012). It is a 10-item psychometric scale that is designed to assess optimistic self-beliefs to cope with a variety of difficult demands in life. In contrast to other scales that were designed to assess optimism, this one explicitly refers to personal agency, that is, the belief that one's actions are responsible for successful outcomes. Alpha for the total scale was 0.91.

RESULTS

Data analysis

We first examined the data with a correlational analysis of all the data of concern. Thereafter we did a series of hierarchical regressions to test out hypotheses.

Correlational analysis

Correlation analysis was conducted to examine the associations between SE and a set of psychological, health, and sociodemographic variables in the study.

Table 1 shows that SE was significantly and positively associated with age, education and occupation, health, cognitive ability, and personality traits extraversion, agreeableness, conscientiousness, and openness, and negatively associated with gender (females showed lowed lower SE), neuroticism, and mental health ($p < 0.05$ to $p < 0.005$). The highest significant correlations indicated that Neuroticism and poor Mental Health were strongly negatively associated with SE, while ratings of perceived physical health, Conscientiousness and Openness were positively associated with SE. Thus, all hypotheses H1 to H6 were supported.

Regression analysis

Following this, a hierarchical regression analysis was carried out using SE as the criterion variable. Table 2 shows the results. Table 2 shows that in model 1, gender and age, education and occupation were significant predictors of SE, accounting for 3.4% of variance. In model 2, health factors were entered into the equation. This showed that both mental and physical health were significant predictors of SE, which in addition accounted for 7.6% of variance. In model 3, individual differences factors were entered into the equation. It revealed that among the Big-Five personality factors, extraversion, conscientiousness, and openness were significant and positive predictors and neuroticism was the negative predictor of SE. Cognitive ability was also a significant and positive predictor of SE. Individual differences factors explained incrementally 11.7% of variance. The final regression explained 23% of the variable of the outcome variable. Thus, the final hypothesis (H7) was supported.

DISCUSSION

This study examined the correlates of SE based on a large longitudinal dataset in Britain. Results show that four personality traits (Extraversion, Neuroticism, Conscientiousness, and

Table 1. *Pearson correlations matrix between self-efficacy, sociodemographic indicators, personality factors, cognitive abilities and health*

	Variables	Mean SD	Correlation												
			1	2	3	4	5	6	7	8	9	10	11	12	13
1.	Self-efficacy	31.05 (4.62)	–												
2.	Gender		**−0.11****	–											
3.	Age	47.24 (17.68)	**0.03***	0.01	–										
4.	Educational qualifications	2.76 (1.68)	**0.15****	0.03**	−0.26**	–									
5.	Occupational levels	3.91 (1.29)	**0.13****	−0.05**	0.05**	0.45**	–								
6.	Extraversion	4.58 (1.31)	**0.19****	0.08**	−0.03*	−0.01	−0.01	–							
7.	Neuroticism	3.56 (1.44)	**−0.37****	0.21**	−0.16**	−0.01	−0.03*	−0.18**	–						
8.	Agreeableness	5.61 (1.05)	**0.09****	0.18**	0.10**	−0.05**	−0.01	0.16**	−0.06**	–					
9.	Conscientiousness	5.46 (1.10)	**0.26****	0.09**	0.12**	0.01	−0.01	0.20**	−0.17**	0.31**	–				
10.	Openness	4.56 (1.32)	**0.25****	−0.09**	−0.10**	0.24**	0.12**	0.25**	−0.11**	0.18**	0.20**	–			
11.	Cognitive abilities	0.51 (2.52)	**0.16****	−0.10**	−0.20**	0.43**	0.27**	0.03*	−0.04**	−0.06**	0.03*	0.21**	–		
12.	Mental health	23.01 (5.40)	**−0.35****	0.11**	−0.05**	−0.03*	0.01	−0.15**	0.47**	−0.07**	−0.17**	−0.10**	−0.08**	–	
13.	Perceived health	3.47 (1.10)	**0.27****	−0.01	−0.21**	0.25**	0.11**	0.08**	−0.19**	0.04*	0.14**	0.12**	0.22**	−0.36**	–

Notes: Standard deviations (SD) are given in parentheses. Variables were scored such that a higher score indicated being female, a higher score on self-confidence, highest educational qualification and a more professional occupation, higher scores on personality factors and cognitive ability, higher scores on mental health problems, and higher scores on perceived health for participants. Correlations between the outcome variable and other variables measured are in bold. Correlation analysis was weighted with UK sampling weight.

*$p < 0.05$.

**$p < 0.01$.

Table 2. *Predicting adult self-efficacy from gender and age, education and occupation, health, personality factors and cognitive ability*

	Model 1		Model 2		Model 3		
Measures	Beta	*t*	Beta	*t*	Beta	*t*	*p* #
Gender	−0.92***	12.32	−0.70***	9.59	−0.51***	7.11	<0.001
Age	0.02*	3.06	0.02*	3.07	0.01	0.43	0.661
Educational qualifications	0.18***	6.35	0.16***	6.02	0.11***	4.02	<0.001
Occupational levels	0.33***	10.07	0.28***	8.96	0.24***	8.10	<0.001
Mental health			−0.19***	24.54	−0.08***	10.56	<0.001
Perceived health			0.45***	11.28	0.30***	8.16	<0.001
Extraversion					0.26***	9.07	<0.001
Neuroticism					−0.66***	22.63	<0.001
Agreeableness					−0.01	0.35	0.726
Conscientiousness					0.59***	16.42	<0.001
Openness					0.49***	16.53	0.002
Cognitive ability test scores					0.05**	3.13	<0.002
Variance explained	R^2 *adjusted = 0.034* *F (4,12,354) = 103.18****		R^2 *adjusted = 0.109* *F (6,12,352) = 238.32****		R^2 *adjusted = 0.226* *F (12,12,346) = 283.61****		

Notes: Significance in the final model. The Ns were un-weighted. Regression analyses were weighted with UK sampling weight.
*$p < 0.05$.
**$p < 0.01$.
***$p < 0.001$.

Openness), cognitive ability, mental and physical health, education and occupation, as well as gender were *all significant and independent* predictors of SE two years later. Each of them explained unique variance of the outcome variable, accounting for 23% of variance. This study therefore confirmed and extended previous findings in the area, particularly identifying the most powerful predictors of SE two years later.

The study was different from most using this SE measure, because SE was the dependent/criterion, rather than the independent/predictor variable. That is, many studies look at the effect on an outcome variable like health or educational/occupational success rather than the other way around (Caprara *et al*., 2011; Choi, 2005; Luszczynska, Schwarzer, Lippke & Mazurkiewicz, 2011).

This was a longitudinal study in the sense that a number of variables (e.g., intelligence and personality) were measured two years prior to the measure of SE (Wave 3: 2011; Wave 5: 2013). In this sense we may think about predictability rather than correlations alone, though we accept the possibility, indeed probability, of reciprocal causation. This helps with trying to understand the process and mechanisms that underlie SE. However, if SE is thought to a stable trait, it may be expected that these relationship would be stable over most of an adult's life.

The results indicated that all of the Big Five factors were related to SE, though this was marginal for Agreeableness. It confirmed the relatively few studies in the area (Barańczuk, 2021; Caprara *et al*., 2011; Rivers, 2021). It is clear that Neuroticism/Emotional Stability is by far the strongest correlate. Emotionally stable people are less anxious and depressed, more optimistic and agentic and better able to regulate their emotions. They tend to have better coping strategies and greater resilience which makes them more socially effective (Furnham, 2008). This leads to a generalized sense of SE to both cope and thrive in a variety of situations. Similarly, Conscientious people tend to be more organized, planful and reliable which makes them more successful in educational and occupational setting, and which, over time, should contribute to their SE. it is no surprise that these two traits have been consistently shown to be the strongest predictors of a whole range of work outcomes (Furnham, 2018).

The results for Openness were less expected, but explicable. Openness is related to intelligence which is related to a range of life outcomes. Open people are more behaviorally experimental, creative and able to learn from experience which increases SE. They tend be curious and interested in finding solutions to a wide range of problems. The fact that Extraversion is related to SE may be explained by the fact that extraverts tend to be optimistic and have a wider circle of friends and associates who may be able to

provide help and support to achieve various life objectives (Cheng & Furnham, 2017). Extraverts are seen as more likeable, interesting and popular; introverts more honest, stable and reliable (Furnham, 2008).

The three "cognitive" variables namely IQ, education and occupations were clearly inter-related and very similarly related to SE. More intelligent people, with higher educational qualification and better payed jobs, would expectedly feel more agentic. Interestingly, while the correlation between occupational level (i.e., social class) and SE was lowest of the three, the regression indicated that it was occupation that was most predictive of SE. Occupational level affords a range of outcomes and benefits which include income, social status and professional contacts all of which feed into SE. It seems apparent from the regression that IQ alone is not a predictor over time for SE but operates through occupation. There is a vast literature which demonstrates that good work affords a large number of social and material benefits which in turn increases SE (Furnham, 2008).

The two health variables, both measured two years before SE were logically related to SE: those with lower mental health (GHQ) and self-rated lower physical health had lower SE scores. However, whilst the correlations indicated the GHQ score was more strongly related to SE than the perceived physical health score, the regressions showed the reverse. That is, those who simply rated themselves higher on general physical health had significantly higher SE scores two years later. It has often been observed that physical health is a very basic requirement for all forms of well-being, which in turn, influence SE (Cheng & Furnham, 2002, 2017). Indeed, the SE literature is dominated by examining its relationship to health (Chirico, Lucidi, Merluzzi, *et al*., 2017; Hamerman et al., 2021).

The regression indicated that emotionally stable people, males more than females and those who were both Conscientious and Open-to-Experience had the highest SE scores. The size of the sample meant that many results were significant, though the effect sizes are variable and indicate that many of these variables measured do have a clear impact on SE. The question is how stable SE is over time if it is related to so many stable factors, and whether it is subject to much change. This is clearly very important for those trying to help individuals increase their personal SE which in turn influences their behavior. Equally the question posed by others is what unique variance it adds over other factors like personality and ability, in relating to educational, health and work outcomes.

In her meta-analysis of personality correlates of SE, Barańczuk (2021) was at pains to point out how her findings have important implications for those trying to help people with SE problems as they can be better identified through their personality profile. This study suggests that gender, too is a very important factor in SE which means programs devised to help improve SE may benefit from targeting women.

LIMITATIONS

Like all studies this had limitations. The sample was very large with mainly complete data, although we had a slight under-representation of lower/manual occupational classes, which may provide a small bias in these results (i.e., the findings were more conservative). This means that is was unlikely that we had some range restrictions. Second, one of the measures was single items (e.g., physical health) which could be unreliable. Third, apart from cognitive ability all measures were based on self-reports which involves problems of item-overlap and common method variance. Next, the alpha coefficients for the Big Five tests did not attain the usual 0.7 cut off criterion, but they probably underestimate the actual reliability of these scales due to their brevity (Donnellan & Lucas, 2008; Lucas & Donnellan, 2011). Finally, it would have been desirable to have a measure of SE at both time periods (Wave 3 and 5) so that we could examine both its stability over time but also whether the correlates changed.

This is obtainable from The UK Household Longitudinal Study (UKHLS). This is a publicly available website. This was sought and obtained (UCL: Research Department of Clinical Educational and Health Psychology's Ethics Committee: CEHP/514/2017). Participants gave written consent for their anonymized data to be analyzed and published. Adrian Furnham is responsible for visualization, writing and reviewing; and Helen Cheng for data curation and analysis.

REFERENCES

Artino, A.R. (2012). Academic self-efficacy: From educational theory to instructional practice. *Perspectives on Medical Education*, *1*, 76–85.

Azizli, N., Atkinson, B.E., Baughman, H.M. & Giammarco, E.A. (2015). Relationships between general self-efficacy, planning for the future, and life satisfaction. *Personality and Individual Differences*, *82*, 58–60.

Bandura, A. (1986). The explanatory and predictive scope of self-efficacy theory. *Journal of Social and Clinical Psychology*, *4*, 359–373.

Bandura, A. (2019). Applying theory for human betterment. *Perspectives on Psychological Science*, *14*, 12–15.

Barańczuk, U. (2021). The five-factor model of personality and generalized self efficacy: A meta-analysis. *Journal of Individual Differences*, *42*, 183–193.

Berg, C.J., Sanderson, S., Cox, L., Mahnke, J.D., Greiner, K.A. & Ellerbeck, E.F. (2008). Correlates of self-efficacy among rural smokers. *Journal of Health Psychology.*, *13*, 416–421.

Caprara, G.V., Vecchione, M., Alessandri, G., Gerbino, M. & Barbaranelli, C. (2011). The contribution of personality traits and self-efficacy beliefs to academic achievement: A longitudinal study. *British Journal of Educational Psychology*, *81*, 78–96.

Cheng, H. & Furnham, A. (2002). Personality, peer relations, and self-confidence as predictors of happiness and loneliness. *Journal of Adolescence*, *25*, 327–339.

Cheng, H. & Furnham, A. (2017). Early indicators of self-esteem in teenagers: Findings from a nationally representative sample. *Personality and Individual Differences*, *116*, 139–143.

Chirico, A., Lucidi, F., Merluzzi, T., Alivernini, F., Laurentiis, M., Botti, G. *et al*. (2017). A meta-analytic review of the relationship of cancer coping self-efficacy with distress and quality of life. *Oncotarget*, *8*, 36800–36811.

Choi, N. (2005). Self-efficacy and self-concept as predictors of college students' academic performance. *Psychology in the. Schools*, *42*, 197–205.

Dammeyer, J., Marschark, M. & Zettler, I. (2018). Personality traits, self-efficacy, and Cochlear implant use among deaf young adults. *Journal of Deaf Studies and Deaf Education*, *23*, 351–359.

Deary, I.J., Hill, W.D. & Gale, C.R. (2021). Intelligence, health and death. *Nature Human Behaviour*, *5*, 416–430.

Diener, E. (1984). Subjective well-being. *Psychological Bulletin*, *95*, 542–575.

Dinther, M.V., Dochy, F. & Segers, M. (2011). Factors affecting students' self-efficacy in higher education. *Educational Research. Review*, *6*, 95–108.

Djourova, N.P., Rodriguez, I., Tordera, N. & Gebeyehu, A. (2019). Self-efficacy and resilience: Mediating mechanisms in the relationship between the transformational leadership dimensions and well-being. *Journal of Leadership & Organizational Studies.*, *27*, 256–270.

Doménech-Betoret, F., Abellán-Roselló, L. & Gómez-Artiga, A. (2017). Self-efficacy, satisfaction, and academic achievement: The mediator role of Students' expectancy-value beliefs. *Frontiers in Psychology*, *8*, 1193.

Donnellan, M.B. & Lucas, R.E. (2008). Age differences in the big five across the life span: Evidence from two national samples. *Psychology and Aging*, *23*, 558–566.

Furnham, A. (2008). *Personality and intelligence at work*. London: Routledge.

Furnham, A. (2018). Personality and occupational success. In V. Zeigler-Hill & T.K. Shackelford (Eds.), *The SAGE handbook of personality and individual difference* (pp. 537–551). New York: Sage.

Furnham, A. & Cheng, H. (2018). Social-demographic indicators, cognitive ability, personality traits, and region as independent predictors of income: Findings from the UK household longitudinal study (UKHLS). *Journal of Intelligence*, *6*, 19.

Gangwani, R., Cain, A., Collins, A. & Cassidy, J.M. (2022). Leveraging factors of self-efficacy and motivation to optimize stroke recovery. *Frontiers in Neurology*, *13*, 823202.

Goldberg, D.P. & Williams, P. (1988). *A user's guide to the general health questionnaire*. Windsor: NFER-Nelson.

Gore, P.A. (2006). Academic self-efficacy as a predictor of college outcomes: Two incremental validity studies. *Journal of Career Assessment*, *14*, 92–115.

Grøtan, K., Sund, E.R. & Bjerkeset, O. (2019). Mental health, academic self-efficacy and study progress among college students. *Frontiers in Psychology*, *10*, 45.

Guntern, S., Korpershoek, H. & van der Werf, G. (2017). Benefits of personality characteristics and self-efficacy in the perceived academic achievement of medical students. *Educational Psychology*, *37*, 733–744.

Gwaltney, C.J., Metrik, J., Kahler, C.W. & Shiffman, S. (2009). Self-efficacy and smoking cessation: A meta-analysis. *Psychology of Addictive Behaviors*, *23*, 56–66.

Haase, J., Hoff, E.V., Hanel, P.H. & Innes-Ker, Å. (2018). A meta-analysis of the relation between creative self-efficacy and different creativity measurements. *Creativity Research Journal*, *30*, 1–16.

Hamerman, E.J., Aggarwal, A. & Poupis, L.M. (2021). Generalized self-efficacy and compliance with health behaviours related to COVID-19 in the US. *Psychology & Health*, 1–18.

Herts, K.L., Khaled, M.M. & Stanton, A.L. (2016). Correlates of self-efficacy for disease management in adolescent/young adult cancer survivors: A systematic review. *Health Psychology*, *36*, 192–205.

Hoeltje, C.O., Silbum, S.R., Garton, A.F. & Zubrick, S.R. (1996). Generalized self-efficacy: Family and adjustment correlates. *Journal of Clinical and Child Psychology*, *25*, 446–453.

Huang, C. (2013). Gender differences in academic self-efficacy: A meta-analysis. *European Journal of Psychology of Education*, *28*, 1–35. http://www.jstor.org/stable/23421703.

Iroegbu, M. (2015). Self-efficacy and work performance: A theoretical framework of Albert Bandura's model, review of findings, implications and directions for future research. *Psychology and Behavioral Sciences.*, *4*, 170–173.

Jenkins, L.S. & Gortner, S.R. (1998). Correlates of self-efficacy expectation and prediction of walking behavior in cardiac surgery elders. *Annual of Behavioural Medicine*, *20*, 99–103.

John , O. P. , Naumann , L. P. & Soto , C. J. (2008). Paradigm shift to the integrative big five trait taxonomy: History, measurement, and conceptual issues . In O. P. John , R. W. Robins & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (pp. 114 – 158). New York: The Guilford Press .

Jurecska, D.E., Lee, C.E., Chang, K.B. & Sequeira, E. (2011). I am smart, therefore I can: Examining the relationship between IQ and self-efficacy across cultures. *International Journal of Adolescent Medicine and Health*, *23*, 209–216.

Leete, R. & Fox, J. (1977). Registrar General's social classes: Origins and users. *Population Trends*, *8*, 1–7.

Liao, K.Y.H., Stead, G.B. & Liao, C.Y. (2021). A meta-analysis of the relation between self-compassion and self-efficacy. *Mindfulness*, *12*, 1878–1891.

Lippke, S. (2020). Self-efficacy theory. In V. Zeigler-Hill & T.K. Shackelford (Eds.), *Encyclopedia of personality and individual differences* (). Cham: Springer.

Livinţi, R., Gunnesch-Luca, G. & Iliescu, D. (2021). Research self-efficacy: A meta-analysis. *Educational Psychologist*, *56*, 215242.

Lucas, R.E. & Donnellan, M.B. (2011). Personality development across the life span: Longitudinal analyses with a national sample from Germany. *Journal of Personality and Social Psychology*, *101*, 847–861.

Luszczynska, A., Scholz, U. & Schwarzer, R. (2005). The general self-efficacy scale: Multicultural validation studies. *Journal of Psychology*, *139*, 439–457.

Luszczynska, A., Schwarzer, R., Lippke, S. & Mazurkiewicz, M. (2011). Self-efficacy as a moderator of the planning-behaviour relationship in interventions designed to promote physical activity. *Psychology & Health*, *26*, 151–166.

Marsh, C. (1986). Social class and occupation. In R. Burgess (Ed.), *Key variables in social investigation* (pp. 123–152). London: Routledge.

Meyer, N., Niemand, T., Davila, A. & Kraus, S. (2022). Biting the bullet: When self-efficacy mediates the stressful effects of COVID-19 beliefs. *PLoS One*, *17*, e0263022.

O'Leary, A. (1985). Self-efficacy and health. *Behaviour Research and Therapy*, *23*, 437–451.

Pajares, F. (1996). Self-efficacy beliefs in academic settings. *Review of Educational Research*, *66*, 543–578.

Parschau, L., Fleig, L., Koring, M., Lange, D., Knoll, N., Schwarzer, R. *et al.* (2013). Positive experience, self-efficacy, and action control predict physical activity changes: A moderated mediation analysis. *British Journal of Health Psychology*, *18*, 395–406.

Rabani Bavojdan, M., Towhidi, A. & Rahmati, A. (2011). The relationship between mental health and general self-efficacy beliefs, coping strategies and locus of control in male drug abusers. *Addiction and Health*, *3*, 111–118.

Rippon, D., Shepherd, J., Wakefield, S., Lee, A. & Pollet, T.V. (2022). The role of self-efficacy and self-esteem in mediating positive associations between functional social support and psychological wellbeing in people with a mental health diagnosis. *Journal of Mental Health*, *5*, 1–10.

Rivers, D.J. (2021). The role of personality traits and online academic self-efficacy in acceptance, actual use and achievement in Moodle. *Education and Information Technologies*, *26*, 4353–4378.

Rosenberg, M. (1986). Self-concept from middle childhood through adolescence. In J. Suls & A.G. Greenwald (Eds.), *Psychological perspectives on the self* (Vol. *3*, pp. 107–135). Hillsdale, NJ: Lawrence Erlbaum.

Rotter, J.B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs*, *80*, 1–28.

Saleem, H., Beaudry, A. & Croteau, A.-M. (2011). Antecedents of computer self-efficacy: A study of the role of personality traits and gender. *Computers in Human Behaviour*, *27*, 1922–1936.

Schunk, D. (1995). Self-efficacy, motivation, and performance. *Journal of Applied Sport Psychology*, *7*, 112–137.

Schüz, B., Wurm, S., Warner, L.M. & Ziegelmann, J.P. (2012). Self-efficacy and multiple illness representations in older adults: A multilevel approach. *Psychology & Health*, *21*, 13–29.

Schwarzer, R. & Born, A. (1997). Optimistic self-beliefs: Assessment of general perceived self-efficacy in thirteen cultures. *World Psychology*, *3*, 177–190.

Schwarzer, R. & Jerusalem, M. (1995). Generalized self-efficacy scale. In I.J. Weinman, S. Wright & M. Johnston (Eds.), *Measures in health psychology: A user's portfolio. Causal and control beliefs* (pp. 35–37). Windsor: NFER-NELSON.

Selzler, A.M., Habash, R., Robson, L., Lenton, E., Goldstein, R. & Brooks, D. (2020). Self-efficacy and health-related quality of life in

chronic obstructive pulmonary disease: A meta-analysis. *Patient Education and Counselling*, *103*, 682–692.

Shoji, K., Cieslak, R., Smoktunowicz, E., Rogala, A., Benight, C.C. & Luszczynska, A. (2016). Associations between job burnout and self-efficacy: A meta-analysis. *Anxiety, Stress, and Coping*, *29*, 367–386.

Szczuka, Z., Banik, A., Abraham, C., Kulis, E. & Luszczynska, A. (2021). Associations between self-efficacy and sedentary behaviour: A meta-analysis. *Psychology & Health*, *36*, 271–289.

Truxillo, D.M., Seitz, R. & Bauer, T.N. (2008). The role of cognitive ability in self-efficacy and self-assessed test performance. *Journal of Applied Social Psychology*, *38*, 903–918.

van Zyl, L.E., Klibert, J., Shankland, R., See-To, E.W.K. & Rothmann, S. (2022). The general academic self-efficacy scale: Psychometric properties, longitudinal invariance, and criterion validity. *Journal of Psychoeducational Assessment*, *40*, 777–789.

Volz, M., Voelkle, M.C. & Werheid, K. (2019). General self-efficacy as a driving factor of post-stroke depression: A longitudinal study. *Neuropsychological Rehabilitation*, *29*, 1426–1438.

Whitehall, L., Rush, R., Górska, S. & Forsyth, K. (2021). The general self-efficacy of older adults receiving care: A systematic review and meta-analysis. *The Gerontologist*, *61*, e302–e317.

Zakiei, A., Vafapoor, H., Alikhani, M., Farnia, V. & Radmehr, F. (2020). The relationship between family function and personality traits with general self-efficacy (parallel samples studies). *BMC Psychology*, *8*, 1–11.

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