Candidate number: 10038

Passion in Norwegian Students Across Academic Degrees and Fields

Bachelor's thesis in Psychology
Supervisor: Wei Wang and Adrian Dybfest Eriksen
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Foreword

I would like to give my sincere gratitude towards the help in writing this thesis as a conclusion to my bachelor program of psychology. I am extremely thankful for the help of my supervisors, Wei Wang leading the project and Adrian Dybfest Eriksen, for his endless feedback and guidance towards the end of the project. My gratefulness goes out to my research assistant, Vegard Renolen Litlabø, as his helpfulness, patience, and work with the survey was of great help. Data was collected as a student group. All statistical analyses were conducted by me, and the research question chosen individually free within the project description.

I would also like to acknowledge constant help from my classmates in the concurrent project, as group work and help provided both uplifting and practical aid. Lastly, I would like to thank my parents and my sister for continuous help and support during fatiguing periods, along with endless belief in my work and ability.

Passion in Norwegian Students Across Academic Degrees and Fields

Abstract

Passion is widely viewed as an important motivator, as we tend to invest great time, energy, and emotion in areas we find passionate. Nevertheless, passion as a psychological construct has not generated interests until the last century. Passion is now viewed as an important facilitator in establishing knowledge and expertise, acting as a motivator in perseverance of effort. In what manner and the effect of our respective passionate behavior is attracting interest in relation to its differences across individuals through personality and eventual life outcomes. This present study aims to investigate how passion may vary across life-outcome related choices such as academic fields, and how establishment of expertise through higher academic levels have affected passionate levels. Surveying 189 Norwegian students, correlation was applied to investigate the relation between passion and higher academic degrees, and a one-way ANOVA to analyze variance across academic faculties. No statistical differences were found in passion across academic degrees or faculties. Passion was found, however weakly, to decrease as students got older, with a correlational value of -.15, p = .044. Although the study showed methodological limitations, theoretical implications may still arise from its results. Further research should explore nuances of passion, including its types, effect, and its development in relation to aging. A more holistic understanding of passion may contribute to knowledge surrounding the continuing hypothesis of individual differences, and underlying aspects of our nature affecting life outcomes.

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Passion in Norwegian Students Across Academic Degrees and Fields

A core principle in psychology is understanding the factors and influences that affect our life choices and outcomes. The predictive effect of constructs such as passion, has become the basis of numerous studies on the relationship between intrapersonal outcomes and types of passion (Vallerand, 2008, 2012; Curran et al., 2015). As passion may influence our enthusiasm, perseverance and strong feelings of importance, the construct is considered an important aspect in numerous theoretical perspectives (Curran et al., 2015; Sala et al., 2017; Sigmundsson et al., 2017). Still, the role of passion is undermined in a field where perseverance, grit, investment of time, energy and enthusiasm bear significant weight, namely education. Passion has been established as an important motivating factor in academic success, yet only been utilized to predict factors such as engagement, functioning, and burnout (Stoeber et al., 2010; Bélanger & Ratelle; Zhao et al., 2021b). Few studies have examined the direct relationship between passion and academic choices, such as academic field. Similarly, studies surrounding persistence and achievement in education focus on personality traits, not directly addressing passion as a potential important moderator (Pozzebon et al., 2013; Vedel et al., 2015; Verbree et al., 2021). Illustratively, the beforementioned studies have found that passion-related personality traits, such as conscientiousness and openness, moderate differences in academic field and achievement (Vedel, 2014; Verbree et al., 2021). As such, the findings have indicated that passion may play an important role in academic choices and success. This study aims to further the insight on passion for success in choice of academic field and academic achievement and may deepen our understanding of underlying aspects of our nature in accordance with life outcomes.

Theory

Defining Passion

As a broad construct, defining passion and its accompanying aspects is of importance. Even though passion may be considered a domain-specific term, with varying facets relating to different fields, an accepted general definition is a feeling of strong importance or motivation towards a self-defined activity (Vallerand, 2008). Passion is accompanied by strong feelings of enthusiasm and value towards the activity, including investment of time and energy (Jachimowicz et al., 2018). We are inclined to engage in that particular activity, often establishing relation to our well-being, affection, or importance to our identity or life (Vallerand, 2010; Curran et al., 2015). This enthusiasm leads us to immerse ourselves in the activity, and passion may thusly be expressed as an intense affective state (Vallerand, 2008; Sigmundsson et al., 2020). Passion can according to this definition be described as a form of "drive" we experience accompanying a domain-specific, meaningful activity. Jachimowicz and colleagues further define passion in relation to success, stating that individuals of a strong persevering nature, only achieve success when the goals they are pursuing are of a passionate nature (2018, p. 9981).

In the field of expertise, passion is increasingly being regarded as a critical aspect, in combination with grit and perseverance (Balon & Rimé, 2013; Curran et al., 2015; Jachimowicz, 2018). Consensus in the field of expertise and development of cognitive skills, is to digress from the concept of far-transfer of skill and knowledge (Sala & Gobet, 2017; Sigmundsson et al., 2020). Sala and Gobet argue that development of skill and knowledge should rather focus on the domain-specific learning and training (2017). Major theoretical perspective and theories value specificity, training, and perseverance in specific fields to attain (Deci & Ryan, 2008; Duckworth, 2016, Sigmundsson et al., 2017). These theoretical

perspectives emphasize the effect of commitment and effort on becoming an expert. As higher level of accomplishment in academia accompanies higher levels of knowledge and skill, this current study will be using academic students and their respective level and field as a measure for passion in relation to expertise and achievement.

Passion in research

Views on passion and its role in the human condition has differed across time. Within philosophy, passion was divided in different perspectives on its role as a trait or temperament. Positive perspectives on passion were spearheaded by philosophers such as Descartes, believing it to be controllable through reason. (Vallerand et al, 2003; Sigmundsson et al, 2020). In contrast, philosophers such as Spinoza, regarded passion as the absence of control and reason, and such feelings may accompany forms of suffering (Vallerand et al., 2003, Vallerand, 2016). Across philosophy until the twentieth century, passion was thusly understood as a form of temperament, or internal disposition or an emotional state (Balon et al., 2013; Sigmundsson et al., 2020). The introduction of personality inventories included aspects of "passionate" behavior, but was never furtherly addressed as an independent construct in psychological literature until recently (Belon et al. 2013; Vallerand, 2016).

In modern empirical literature, passion has emerged as a popular and important aspect of research in motivation, work, personality, and other fields within psychology. In the past decades, most studies surrounding passion have embraced the theoretic model introduced by Vallerand in 2003, called the Dualistic Model of Passion (2003). This model is based on the Self-Determination Theory, dividing passion in two distinct types, Harmonious and Obsessive passion, distinguishable in their respective path of development as well as consequences that may arise in the different approaches (Vallerand et al., 2003; Vallerand, 2008, 2010). Vallerand and colleagues argue that as passion relates to activities important to our identity

and values, it may also influence well-being and control (2003; Vallerand, 2008, 2012). These strong affections related to our immersion in meaningful activates through the types of passion, have been explored in different fields of expertise and achievement (Bonneville-Rousy et al., 2011, Vallerand, 2016; Breu & Yasseri, 2022).

The dualistic model of passion has presented a theory based on a dynamic perspective of passion. According to Vallerand and colleagues, passion is developed through the interface between the respective valued activity and the individual at hand (Vallerand et al., 2006, Vallerand, 2008). This suggests that passion is not reliant on specific personality facets or compositions of traits (Balon et al., 2013, Breu & Yasseri, 2022). Still, Vallerand acknowledges personality and interpersonal traits as a possible important determinator in the internalization that is present in the different passion types (Vallerand et al., 2006). As a result of the debate around personality's role in passion, studies have been conducted to specifically review the strength between these constructs (Balon et al., 2013; Dalpé et al., 2019). These studies investigated the link between the Dualistic Model of Passion and the the Big Five Model (Costa & MacCrae, 1992). This personality inventory is widely accepted, and consists of five bipolar dimensions; introversion/extraversion, conscientiousness/impulsiveness, neuroticism/emotional stability, agreeableness/antagonism, and openness/closedness that defines personality (Costa & MacCrae, 1992; Balon et al., 2013).

Due to the popularity of passion and its emergence in the psychological research, the role of the personality traits in facilitating motivation, perseverance and immersion has been investigated. Particularly linked to passion is conscientiousness, defined as goal-directed behavior and form of impulse control centered around tasks and adhering to norms and rules through organization (Costa & MacCrae, 1992; John et al., 2008; Vergauwe et al., 2022). Costa and MacCrae, alongside John and colleagues, further define the dimensions as follows: Extraversion is an energetic approach to sociability, activity, and positive emotionality to

others. Agreeableness is referred to as pro-social orientation, often accompanying altruism, compliance, and modesty. Neuroticism encompasses emotional instability, accompanying negative emotional states, stress and feelings of anxiety, self-consciousness, and depression. Lastly, openness, or openness to experience, is often referred to as originality, depth, insightfulness, or creativeness (1992, 2008).

Balon and colleagues found patterns of relation between the dualistic model of passion and the big five model (2013). Assessment of scores in the big five dimensions along with measures of harmonious or obsessive passion, indicated that different types of passion are associated differently based on traits. For example, the study found that low scores on agreeableness were associated with obsessive passion (Balon et al., 2013) Concurrently, harmonious passion associated with certain degrees of higher conscientiousness, agreeableness, extraversion, and openness (Balon et al., 2013). Replication of these findings were attempted in 2019, including the various underlying facets of the beforementioned Big Five dimensions (Dalpé et al., 2019). Similar positive relationships were found between harmonious passion and positive affect, and obsessive passion and negative affect (Dalpé et al., 2019). These results are in line with a decade of research on intrapersonal outcomes in relation to the dualistic model (Curran et al., 2015). As such, in fields of expertise and achievement where personality traits may play a critical role, passion may be of value to further investigate as an important factor.

Present research

Research across the last decade grounded in the dualistic model of passion and its role in achievement, has furthered our insight into passionate behavior. A study conducted by Bonneville-Roussy and colleagues, investigated how obsessive and harmonious passion acted as a mediating factor in musicians' approach to practice, performance goals and well-being

(2010). The study found that elite performance as well as motivation was facilitated by the passion the musicians inhabited (Bonneville-Roussy et al., 2010). The researchers also found however, that different types of passion led to different approaches to practice and the resulting outcomes. Harmonious passion predicted a more "healthier" use of goals orientation and motivation purpose and included a positive prediction of subjective well-being (Bonneville-Roussy et al., 2010). Obsessive passion, although an indicator or elite performance, influenced a directly negative impact on performance attainment and predicted more unhealthy approaches such as social comparison (Bonneville-Roussy, 2010). As such, passion furthered insight on elite performance and attainment, but also indicated differences in approach and moderating effects on participants' individual well-being and health.

Similarly, passion has also been established as a possible major moderating factor in performance-centered activities such as sports. Multiple studies have been conducted using Sigmundsson and colleagues' Passion Scale for Success, investigating difference in passion-score and level of achievement in their respective sport (Sigmundsson et al. 2020, 2022a; Shamshirian et al., 2021). When Sigmundsson and colleagues investigated motivational factors across elite and junior football teams, they found that 30% of the highest scoring players scored significantly higher on the passion scale in contrast to the 30% lowest scoring players (Sigmundsson et al., 2022). Similar connections were found in studying passion and grit in Iranian wrestlers (Shamshirian et al., 2021). These studies compliment the general acceptance of training, specificity, and experience in establishing expertise av development of skill (Duckworth, 2016; Sigmundsson et al., 2017). Based on studies surrounding the relationship of sports and passion, Sigmundsson has presented further supporting for the neural basis and effect of passion (2022b). This perspective presents passion as a facilitator for interconnection in relation, motion and well-being, and the continuous training as a result strengthens and maintains our neural development through age (Sigmundsson et al., 2022c).

The Dualistic Model of Passion has also been applied to performance and relation to the personality in job environment. A study by Breu and Yasseri in 2022, investigated organizational success and passion, including its interaction with specific personality traits. The study explored how specific personality traits may be scored in relation to obsessive of harmonious passion, and how these may differ in approaching and impact the perception of the job environment. A relationship was found where specific traits influence relation between what environment one may flourish in, the different passion types and the trait conscientiousness (Breu & Yasseri, 2022). Such relationships indicate how both our underlying compositions in the form of personality traits, and our active surroundings may influence passion in their interaction. Such studies suggest that environment should also be considered, where not only underlying compositions such as personality traits may affect development our respective passion.

Passion in academia

The role of passion, grit and perseverance have not until recently been investigated in achievement, subjective well-being, and personality in students. Use of the Dualistic Model of Passion is aimed to investigate students' passion in relation to functioning, such as burnout, well-being, satisfaction, and overall engagement. (Stoeber et al., 2011; Zhao et al., 2021b). Studies centered on overall academic thriving have been conducted, one recently finding how both types facilitate academic thriving, with harmonious passion especially predict thriving strongly (Zhao, 2021a). Still, this beforementioned study implies how obsessive passion may still be strongly beneficial in high-threat stress appraisal and workload educational practice (Zhao, 2021a). A study conducted in 2020 found that obsessive passion was negatively related to perseverance and consistency of interest as facets of grit (Verner-Filion et al.,

2020). Still, Zhao and colleagues found that obsessive passion negative correlated with two central aspects of burnout, illustrating the diverse nature of the passion-construct (2021b).

The role of personality traits in academic achievement and engagement has been the basis of numerous studies across the last decade. In academia, achievement and expertise is valued as measurable through results, including GPA and level of degree. Association between GPA and the Big Five has been studied numerous times, and was the basis of a meta-study conducted by Anna Vedel in 2014 regarding 20. Vedel found that conscientiousness was a robust predictor of GPA, the very same personality trait regarded as central to passion in different ways (2014, Balon et al., 2013; Curran et al., 2015; Dalpé et al., 2019). In a later study, Vedel and colleagues found that the robust predictive ability of conscientiousness in relation to GPA varied across different academic majors (2015). As such, differences in personality traits and their respective facets may affect academic achievement and success. Such traits and their composition may affect our development and passion, central to our pursuit in long-term personal goals (Verner-Filion et al., 2020).

In college students, passion has therefore come to be viewed as a central aspect in long-term goals, engagement, well-being, and establishment of expertise. Further studies have investigated the role of personality traits central to academic success, indicating the central position of facets also important to the development of passion. Still, variation in passion and its development and effect, is underemphasized across academic field. The beforementioned study by Vedel and colleagues, found that the predicting ability of the traits Openness and Conscientiousness varied across different majors (2015). A study in 2021, found that higher score in Openness and less Conscientiousness, meant more likely for students to enroll humanities and arts field (Verbree et al., 2021). Passion may therefore vary across academic field. Zhao and colleagues found that teacher development moderated the relationship between academic engagement and passion, signifying an important role (2021b). Aspects

such as teacher feedback may vary in shape and consistency across academic fields. As such, these studies call for a broadening inclusion of academic field and majors, where levels of passion may vary as differences may accompany differences in personality traits, engagement, perseverance, and burnout.

This present study

This study will examine the relationship between passion of success between Norwegian students of different levels of higher education and academic field. As in the field of personality and passion in students rarely has addressed academic field and distinct levels of their degrees, these will be examined more thoroughly. Earlier research has established a connection between personality traits, passion, and achievement-related concepts such as GPA, but never differences in majors or what academic field of faculty they belong to (Vedel, 2014; Verner-Fillion et al., 2020; Verbree et al., 2021). The continuous hypothesis of the critical role of passion in students functioning is however supported, including the accompanying effect passion may have in establishing expertise (Sigmundsson et al., 2017 (Jachimowicz et al., 2018; Bélanger & Ratelle; 2020). The general outline of this hypothesis encompasses the effect passion may have through more engagement, stress-handling, and immersion in their respective field, leading to more resilience and perseverance in establishing knowledge and skill. As such, higher scores of passions may theoretically signify higher levels of achievement in academia.

The questionnaire used will measure passion of success through the passion scale, an 8-item scale for assessing passion in a selected area or interest (Sigmundsson et al., 2020). The scale has shown valid and reliable psychometric properties across various cultures and samples (Taylan et al., 2020; Hoseininezhad & Rasouli, 2022). Level of degree is measured through a 6-item scale, consisting of the degrees of higher education in Norway, ranging from

1-year unit to a Ph.D.-degree, requiring general higher levels of expertise passion may help facilitate. To measure academic field, the scale consists of the official 8 faculties at the Norwegian University of Science and Technology (NTNU). By using these scales, this study may examine the pattern of passion for success between Norwegian students in different degrees and their respective academic fields. Two hypotheses will be tested, and if not supported, may indicate that level of degree or field chosen to study, have no effect on their individual passion for success.

Hypothesis 1: There is a relationship between higher levels of degree being studied and passion for success.

Hypothesis 2: There is a difference in passion for success amongst academic fields being studied.

Method

Sampling

In the questionnaire encompassing the study, a total of 421 participants answered. As the focus of this study considers passion in students, the statistics of respondents currently studying were examined. Among the 189 students responding to the questionnaire, 72 were men (38%) and 117 were women (62%). The mean was age of the students was 23.6 ($SD = 4.02$, range = 19-55). Among the students, 9 were studying at the one-year level (5%), 1 was studying at the two-year college candidate level (1%), 86 were studying at the bachelor level (45%), 2 answered both bachelors and master's degree (1%), 69 were studying at the master's level (37%), 19 were studying at the professional study level (10%), and lastly, 3 were

studying at the Ph.D. level (2%). Sampling included all NTNU's academic faculties, as earlier studies have favored more academic field in more general categories (Verbree et al., 2021; Wen et al., 2021). Across the different academic faculties, 5 of the students were a part of the Faculty of Architecture and Design (AD) (3%), 17 a part of the Faculty of Humanity (HF) (9%), 13 a part of the Faculty of Information Technology and Electric Engineering (IE) (7%), 14 a part of the Faculty of Engineering (IV) (7%), 19 a part of the Faculty of Medicine and Health Science (MH) (10%), 12 a part of the Faculty of Natural Sciences (NV) (6%), 49 a part of the Faculty of Social and Educational Sciences (SU) (26%), and lastly, 12 were part of the Faculty of Economics and Management (OK) (6%). 48 participants answered "other" (25%).

Procedure

The study recruited respondents through convenience sampling. Recruiting included asking acquaintances through digital messaging such as Messenger and Facebook, online via social media posts such as Instagram, and through pre-existing groups such as student organizations. Through the sampling, the study was presented as a regarding personality, humor styles and interests, and the questionnaire was answered through an electronic link to an online webpage at nettskjema.no. The front page consisted of more thorough information about the project, including contact information regarding questions, anonymity, and use. The questionnaire could be stopped at any time, and their answered were not saved in case of interruption. The study, including the use of instruments and questionnaires, was submitted, and later approved through from by the Norwegian Centre of Research Data (NSD) in December 2022 (Reference nr. 830341).

Instruments

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The questionnaire consisted of the Passion Scale, the Zuckerman-Kuhlman-Aluja Personality Questionnaire in shortened form, and the Humor Styles Questionnaire (Martin et al., 2003; Aluja et al., 2018; Sigmundsson et al., 2020). The questionnaire was presented through "Nettskjema", a Norwegian survey website. In this present study, only passion is statistically analyzed. Passion was measured through The Passion Scale, an 8-item scale developed to assess self-reported passion for achievement (Sigmundsson et al., 2020). Sigmundsson and colleagues constructed the scale to be able to measure passion in a distinct area of important value or preference, as well to be able to administer it across larger groups in an effective and reliable manner (2020). As such, the scale integrates multiple theories and perspectives on skill learning and expertise, and the scale directs the focus towards achievement (Sigmundsson et al., 2020). By using eight questions assessed on a 5-point Likert scale, respondents assess their position to the respective items, ranging from 1 = not at all like me, to 5 = very much like me (Sigmundsson et al., 2020). Questions include goal orientation, such as "I work hard enough to fulfill my goals", expertise; "I think I could be an expert in one are/theme/skill", and time; "I use a lot of time on the projects I like" (Sigmundsson et al., 2020). The scale has been administered across different cultures and languages, and its psychometric properties have found to be both reliable and applicable over a wide range of respondents, including high internal consistency (Taylan et al., 2020; Hoseininezhad, N., & Rasouli, R, 2022). As the possible alternatives ranged from 1 to 5, mean score were calculated and turned into averages for each participant. A Cronbach's Alpha value of $\alpha = .857$ indicated high levels of internal consistency for the scale.

Statistical Analysis

The descriptive statistics for the student participants was calculated through mean, standard deviation as well as frequency, including across genders, level of degrees and

different faculties. The data was analyzed in IBM SPSS Statistics, version 27. To explore the relationship between level of academic degree and passion for success and how they may covariate, a bivariate correlational analysis was applied using Spearman Rho. The analysis further included age and gender. Spearman's rank correlation coefficient was applied due to level of education being studied was operationalized as an ordinal variable. As such, in the correlational analysis, passion for success was regarded as the dependent variable, and level of academic degree as the independent variable. Preliminary assumptions for correlational analysis were all met, as the variable gender was treated as dichotomous, and academic level of degree, gender and passion for success were continuous variables.

Examining the difference across academic fields, a one-way ANOVA was applied to analyze the variance of score in passion for success across the students of different faculties at NTNU. In the analysis of variance, passion for success was regarded as the dependent variable, and faculty as the independent variable. Multiple assumptions are needed to be met for a one-way ANOVA to be conducted (Field, 2017) . The dependent variable, passion for success, was continuous and of interval level, thus valid for use. Homogeneity of variance was established through a non-significant Levene's test, valuing at .411. An outlier was identified, but a comparison of the overall mean (3.9112) with 5% trimmed mean (3.9371) indicated no significant effect and the outlier was included.

The assumption of normal distribution as tested through several measures. A Q-Q plot of passion for success showed an approximation of normal distribution. Similarly, the Kurtosis and Skewness values showed an acceptable level within the standards of normal distribution, scoring at -.042, and -.454, respectively. A significant score on the Kolmogorov-Smirnoff test indicates a non-normal distribution, however. Further testing without the beforementioned outlier, lowered the Kolmogorov-Smirnoff test, while lowering the overall skewness. The Kolmogorov-Smirnov test is showing differing results, and as such the Q-Q

plot and original skewness/kurtosis measured will be used, and the assumption of normal distribution will be treated as met.

Results

The results of the correlational analysis and descriptive statistics is depicted in Table 1. The table includes correlations, mean scores and standard deviations among gender, level of education, age, and mean score in passion for success. Among the 189 students sampled, the scores for passion of success ranged from 1.88 to 5, with the average score of $M = 3.91$, $SD = .66$. The educational level studies ranged from 1 to 6, from a one-year unit to ph.d, with a mean of 3.52, $SD = .92$. No significant correlation was found between educational level being studied and passion for success, $r. = .03$, $p = .724$. Similarly, the correlation between passion for success and gender was not significant, $r. = -.03$, $p = .712$.

One significant correlation involving passion for success was however found. The analysis between passion for success and age yielded a negative correlation, however weak, of $r. = -.15$, $p = .044$. The relationship between age and education level also yielded a significant correlation, $r = .17$, $p = .020$.

Table 1

Descriptive statistics and correlations (N = 189)

	M	*SD*	Correlations		
			1	2	3
1. Gender[a]	1.62	0.49			
2. Education level	3.52	0.92	-.04		
3. Age	23.60	4.02	-.07	.17*	
4. Passion for Success	3.91	0.66	-.03	.03	-.15*

Note.

[a] 1 = Male, 2 = Female

p<.05 (Two-tailed)

The results of one-way ANOVA found no significant difference in mean score for passion for success across the different faculties, $F(8, 188) = 1.35$, $p = .220$.

Discussion

The aim of this present study was to find how passion for success may vary across different academic fields and level of degrees, in which gender and age was investigated as well. The correlational analysis applied to investigate the relationship between academic degree and passion for success, yielded no significant result. Still, a weak, but significant negative correlation was found between passion for success and age across the students. The result may indicate a decline in passion as students get older, however the weak value significantly lowers the ability to affirm this relationship. The one-way ANOVA conducted to investigate mean score differences across faculties yielded no significant results. As such, this

present study found no significant difference in passion for success across different academic fields. Both hypotheses presented were thusly not supported.

Passion and academic level

Numerous studies investigating intrapersonal factors on academic functioning, have utilized larger samples than this present study ($N = 460$, Bélanger & Ratelle, 2020; $N = 425$, Verner-Filion et al., 2020; $N = 1029$, Zhao et al., 2021b). These studies have in contrast to this present study, concluded on associations between passion and academic functioning, pursuit of long-term goals, and academic engagement, respectively. The statistical analyses applied by these studies have however utilized the Dualistic Model of Passion, implementing an element of relevance to well-being. The studies also recruited students as a whole, not differentiating majors. The results imply, however, that amongst students in two Canadian and one Chinese university, that passion may play an important part in educational settings to promote engagement and perseverance (Bélanger & Ratelle, 2020; Verner-Filion et al., 2020; Zhao et al., 2021b). Particularly the study conducted by Verner-Filion and colleagues indicate perseverance of effort, an important facet of passion and grit, was associated with progress in personal goals through structural equation modeling ($\beta = 0.283$, $p < .001$), indicating a relevancy in long-term goals across their academic career (2020). Comparing these studies are however troublesome, due to differing study designs and statistical tests being conducted.

The results from these prior studies still contrast with the results from the primary hypothesis of this study. Previous results support the increasingly regarding of passion as an important aspect of establishing specific knowledge relevant to expertise. (Balon & Rimé, 2013; Curran et al., 2015; Jachimowicz et al., 2018). The primary hypothesis was based on the required long-term goals and perseverance necessary throughout higher and more prowess-centered education, therefore relevant to establishing expertise. The Spearman's

correlational value of $r. = .03$, $p = .724$ between educational level and passion for success didn't signify a change in passion across the Norwegian academic levels. The findings don't support the hypothesis; however, a key difference may be identified in the form of the passion-scale. The purpose of the passion-scale is assessment of passion in a specific area or skill, whereas questions such as "I use a lot of time on the projects I like", are of a more general nature and may be interpreted differently (Sigmundsson et al., 2020). As such, the area the participants assess their passion towards, may differ.

A relatively high mean score of 3.91 for the entire sample suggests general high levels of passion for success (Sigmundsson et al., 2020). Considering the general interpretive nature of the scale, most participants may, due to the questioning, contemplate which areas of their life they find passionate. Participants' respective area they find passionate could include sports or hobbies, and may therefore bear no relevance to the field of education. Thus, this present study may have investigated students' passion for success in a self-chosen area, and as such may not correspond to academic passion relevant to higher academic success and expertise. Statistical research at Statistics Norway, reported that 20% of students in 2012 changed their university degree (Andersen & Lervåg, 2022). Students earlier in their academic career, such as one-year unit and bachelor's degrees, may not have found what academic field they are passionate about and as such may change academic fields throughout. Therefore, a passion-scale centered on self-chosen areas of passion, may not be suited to measure the relationship of passion amongst students of different levels as hypotheized. As a result, further studies are suggested to present alternative measurements, or the passion-scale specifically centered towards the area the studies are investigating.

Although weak, the significant negative correlation between age and passion for success at $r = -.15$, $p = .044$ signifies a relationship of interest. The relationship may signify that amongst older students, levels of passion for success may deteriorate. Most younger

students at a one-year unit and a bachelor's level receive large amount of developmental feedback as they're in adapting to academic practices, suggested by Zhao and colleagues (2021b). The beforementioned study found a moderate correlation between teacher developmental feedback and academic passion, $r = .025$, $p < .01$, as well as developmental feedback and academic self-efficacy, $r = .033$, $p < .01$(Zhao et al., 2021b). Older students may later in their academic career experience less feedback, especially if specific higher degrees relies on experienced students being increasingly self-reliant. The challenging effects of COVID-19 might similarly have affected teachers' ability, decreasing academic support students of higher levels might require. (Madigan & Kim, 2020; Pressley, 2021). The negative correlational result between age and passion, may therefore indicate self-reported passion deteriorating due to deficient teacher feedback and support.

The negative correlation may also signify a relationship indicating the presence of a concept steadily increasing in interest amongst psychological research, namely academic burnout. As a concept, burnout refers to stressors of an emotional and interpersonal nature, (Maslach et al., 2001). Passion through perseverance of effort along with grit, may help facilitate resilience against stress (Jachimowicz et al., 2018). Research on burnout has gained popularity in the field of academia, including how forms of passion may be impaired in relation to stress, well-being, and performance (Lin & Huang, 2014; March-Amengual et al., 2022) The study conducted by Lin & Huang indicated higher values of factors of life stresses amongst upper year students at junior and senior level, compared to lower year students at freshmen and sophomore levels (2014). As such, older students may experience burnout and stressors as a result of lowered passion, finding their motivation and enthusiasm lack due to overbearing work as higher academic levels may be more demanding.

Still, this contradicts the results in line with the primary hypothesis, as passion for success didn not yield a significant correlation with academic level. Critique may however be

directed to the study formatting, as older students may start anew in differing academic degrees despite studying for years, signifying that the two categories must be regarded as distinct. The negative correlation between age and passion for success, despite its weak value, still indicate a relationship that may be worth exploring further. It is however worth mentioning that such a connection is purely speculative as burnout is not measured in this present study. Connecting a such third variable is purely speculative, and thus, no casual connection can be made. Still, investigating burnout and relevant factors may help provide a basis for protecting students' motivation and subsequent well-being during their academic careers. Researchers are thereby recommended to utilize the dualistic model of passion, as the scale encompasses aspects of whether the passion exhibited is adaptive, and how they may affect mental and physical health, cognitive functioning, and performance variables (Vallerand, 2010; 2016).

Further, the results might contribute to the field of psychological effects of aging. The passion scale has previously been applied to measure level of passion for success amongst different age groups (Sigmundsson et al., 2022b). Sigmundsson and colleagues found that amongst 1548 participants aged 13 to 79, finding that the highest scores of passion was age group 13-19, and decreased in each age group towards the ages of 50-59 (2022b). Such results may arise from age groups 20-29, usually encompassing students, experience significantly more life stressors in relation to their teenage years. Factors such as independent living situations, transitions towards higher education, employment and establishing families, has led to this period being regarded as one of the more unstable and stressing (Arnett et al., 2014; Matud et al., 2020). The negative correlation between passion for success and higher academic levels, may thusly indicate how these stressors affect students in this time period. Young adulthood is widely viewed as an important psychosocial developmental stage, prone

to disruptive factors, and thus scholars are recommended to further research the effects of stressor in this age (Bleidorn, 2015; Bühler et al., 2022).

Passion in academic fields

A one-way ANOVA was applied to investigate hypothesis 2; If there was a difference amongst academic fields in passion for success. The statistical analyses yielded no significant results, and as such did not support the hypothesis. Neither the Passion Scale developed by Sigmundsson, nor the Dualistic Model of Passion has been applied to examine differences in academic field in passion. Academic fields has newly become of interest within personality psychology, where differences in personality traits and their respective effectiveness in academic functioning and preference is being explored (Verbree et al., 2021). In turn, research have indicated that specific personality traits may affect the development of types of passion, and thus should considered a function for its development (Balon & Rimé, 2013; Dalpé et al., 2019). The study by Verbree and colleagues called for academic fields being included in personality research, as personality traits such as conscientiousness and openness was found to differ amongst students and their likelihood in applying to different academic fields (2021). As such, due to the specific traits conscientiousness and openness being regarded as related to both harmonious and obsessive passion in different manners, it was hypothesized that differences in passion may occur across academic faculties (Dalpé et al., 2019).

As no significant differences was found in passion across the academic faculties, the second hypothesis was not supported by the results. Highly uneven sample sizes across the academic faculties are a natural obstructing factor in establishing significant results (Field, 2018). Similar to critique regarding the primary hypothesis, the use of the passion scale framed in a self-chosen area may also bear little relevancy to the hypothesis regarding

differences in passion across academic fields. The result in no difference across the faculties, may therefore be due to the passion scale measuring a self-chosen area not relevant to their respective academic choice of study. The biggest difference, between the Faculty of Natural Sciences and Engineering at $\Delta M = .63$, $p = .28$, if significant, would indicate levels of passion of success vary sufficiently across the students of these fields. Such a result could be due to a number of factors, including formatting of the courses. For example, the form of engineering-courses may be more practical and utilize frequent interactions with the teacher, whereas natural sciences may apply more theoretical practices, in the form of self-study and assignments over longer periods.

The non-correspondence between passion for success and faculty may result from omitted variables or factors. Individual differences across the academic fields may differ in accordance with other factors that may affect the students' respective chosen field of study. A study conducted using 989 undergraduate and 896 prospective students at a UK university, found that those who chose an engineering degree exhibited association with career interest, such as prospective jobs and higher pay, and lower association with actual interest in the degree in both samples using logistic regression (Skatova & Ferguson, 2014). The authors found, however, that respondents in the arts and humanities field associated more highly with interest, and low concern regarding careers. The arts and humanities students consequently scored high on loafing, and were thusly concerned on how easy they would be able to complete their degrees (Skatova & Ferguson, 2014). Such a relationship may bear relevancy to the findings of this study in relation to the relevant personality traits and differences previously investigated amongst students of different fields (Verbree et al., 2021)

Differences in academic fields accompany different motivations for choosing their respective degree, and as such may affect their general enthusiasm and thus passion if the studies coincide with their motivations. Still, the results from the study conducted by Skatova

& Ferguson reflect the personality differences found by Verbree and colleagues (2014; 2021). Verbree and colleagues found that arts/humanities students scored higher on the Big Five traits openness to experience and lower on conscientiousness, which has shown good predictive validity (2014; Vedel et al., 2015). These trait compositions may act as underlying facets in facilitating arts/humanities students' higher scoring in interests and loafing, and subsequently low scoring in career concern as found by Skatova and Ferguson (2014). Passion may be accompanied by the students' intrinsic motivation, described as positively related to namely conscientiousness and openness (Furnham et al., 2002). Thus, motivation and passion may arise from other, intrinsic factors relevant to the students' degree choice, of which its relationship to personality traits is recommended to study further. This relationship may act as an underlying factor in the findings indicating no differences in passion across academic fields amongst the Norwegian students sampled.

As studies consistently have showed indications of relations between distinct personality traits and forms of passion, recent research still calls for inclusion of environmental effects on passionate behavior (Balon et al., 2013; Breu & Yasseri, 2022). In academia, teacher development and interaction may help moderate the relationship between passion and academic engagement for students (Zhao, H. et al., 2021b). Natural science students, if perceiving continuous demanding practical attendance and teacher interaction as a form of high-threat appraisal and workload, obsessive passion may be beneficial (Zhao, 2021a). In turn, students in the arts/humanities field, if more susceptible to showing patterns of harmonious passion through openness to experience, may benefit from perceive more theoretical academic practices as lesser levels of threat-appraisal and workload (Verbree et al., 2021; Zhao, 2021a). As such, contextual factors such as academic practices in their respective fields, might be beneficial in accordance with student's types of passion and possibly personality compositions. Scholars are thus recommended to consider types of passion in

relation to personality differences, when investigating differences in passion amongst academic fields.

Few or no differences in passion may stem from a slow recovery towards standard academic operation as a result from the COVID-pandemic. During COVID-19, the standardized use of online courses and learning has been reportedly associated with decreases in satisfaction amongst students (Maqableh & Alia, 2021). The pandemic accompanied challenges inhibiting routinely academic work, which in turn increased workload (Lund Dean & Forray, 2020; Jung et al., 2021). A study conducted in Spain amongst two samples of 190 and 226, investigated engagement and prevalence of burnout before and after COVID-19 (Aguayo-Estremera et al., 2022). Aguayo-Estremera and colleagues found that the students' reported personal accomplishment, vigor, absorption, and dedication were lowered compared to pre-pandemic, whilst emotional exhaustion and depersonalization was reported by those who experienced psychological consequences (2022). The COVID-pandemic may thusly have affected students' overall enthusiasm and passion. The study year 2022-2023 is generally regarded as the first returning to normal academic operation since COVID-19, and thus students may still recuperate from possible academic passionate turmoil. The general academic passion may therefore have leveled out in recuperation, and thus may bear relevance to the results indicating no differences in passion across academic fields was found.

Therefore, the results from this present study may have resulted from a number of factors and contextual aspects. The hypotheses presented were not supported, despite being in line with previous research. However, no earlier studies have centered on differences in passion across academic degrees and fields. Still, these studies still imply passion plays a significant role in facilitating engagement and resilience. (Bélanger & Ratelle, 2020; Verner-Filion et al., 2020; Zhao et al., 2021b). Although not found to differentiate between degrees and academic fields, passion was still found to inversely be associated with aging. In similar

fashion, the results indicated more contextual factors in relation to passion and its effects are worth exploring further, included the long-term effects of COVID-19, academic practices, its relation to burnout, including psychosocial aspects of young adulthood. Although explorative, this study recommends more research be centered around the multi-faceted nature of passion, and its effect on students across their academic life and careers. Thus, this present study may have shown indications relevant to the continuous hypothesis regarding passion types, effects, and relevancy in establishing knowledge and expertise.

Limitations and strength of study

The sample consisted of 189 students of degrees offered in higher education in Norway. This study utilizes different academic fields in the form of all academic faculties at NTNU. No studies as far as we know utilizes both academic degree and field, whilst most studies center on either one. Similarly, passion across field or higher levels have not been investigated within a Norwegian population. The passion scale ahve previously shown both strong internal consistency and reliability across samples (Sigmundsson et al., 2020; Taylan et al., 2020; Hoseininezhad & Rasouli, 2022). As such, this present study further contributes to the establishment of a relatively new scale as showing promising psychometric aspects and potential use.

The sample does however include several limitations. The sample size of 189 in comparison to the larger population of Norwegian students, constitute low representability therefore generalizability (Shen et al., 2011; Etikan et al., 2016). One prominent weakness is the imbalance of genders, as the 117 women outweigh the 72 men. A severe skewness can also be identified amongst the academic degrees. The majority of the sample consisted of bachelor and master's students, at 86 and 69, respectively. In comparison, only two participants were studying at a two-year collegiate level, whilst three were studying at a PhD

level. Although ANOVA doesn't necessarily require equal groups sizes if equal variances are assumed, larger indifferences in the samples may still be problematic (Field, 2018). Such vast differences in group severely lowers the statistical power of the ANOVA, as utilizing groups of 2 participants compared to groups of 86 and 69 prove to unbalanced to reach a statistically significant result (Field, 2018).

Critique may also be brought up in relation to the formatting of academic faculties as fields. Despite NTNU being the largest university in terms of students and a wide range of academic faculties, 48 participants, or 25% of the sample, answered "other" faculties than those offered at NTNU. Participants from multiple universities may be viewed as a strength, but in this case influence the results from the ANOVA without furthering insight. Students from different universities encompasses the larger population and thusly strengthening the study. Differences in faculties across universities, however, may lead to the result of 48 answering "other" and thusly further unbalance group sizes in the ANOVA as little insight is provided in this option. Still, dividing academic fields in more divisive categories should be considered a strength, as it is corresponding to previous research calling for its inclusion (Verbree et al., 2021). Shortcomings may arise due to utilizing convenience sampling as a method. Selection bias may occur due to participants who are particularly passionate about their studies find an inclination to answer. As such, higher levels of reported passion may arise, and the sample may be regarded as non-representative. Still, previous scholars have utilized voluntary surveys in similar studies and thus more passionate students may have been more inclined to answer. Caution should be applied in generalizing the findings and the points presented in the discussion. This study is explorative, and correlation must not be mistaken for causality.

The questionnaire was self-reported, and as such, participants may want to present themselves in a socially desirable manner (Shen et al., 2011; Etikan et al., 2016;). Such effects

might be enhanced through relatives and friends of students conducting the study participating in the questionnaire, despite assurance of anonymity (Shen et al., 2011; Etikan et al., 2016). The questionnaire was estimated to last 20 minutes, and participants may therefore find grow impatient or hastily answer questions towards the end. In reporting their own passion, Credé colleagues argue through a meta-study that knowledge surrounding individual academic performance may influence the estimate of students' respective grit, perseverance of passion, and possibly passion (2017). Students may thus be unsure about their own levels of grit and passion, and lead to inflated estimates of their own self-reported scores (Kruger & Dunning, 1999; Credé et al., 2017).

The operationalization of the variables may similarly be considered a shortcoming. The passion scale measures passion in a self-chosen area or activity (Sigmundsson et al., 2020). Due to passionate areas not being specified, the measurement through the passion scale may bear little or no relevancy to academic passion. Centralizing the scale towards a common passion amongst the students, analyzing individual variation would be clearer and more central to the hypotheses as the topic of interests are differences. The passion scale is relatively new, and has only been utilized in published studies across the last couple of years, and thus its psychometric abilities may be open to criticism (Sigmundsson et al., 2022). Still, the passion scale has proven both reliable and valid in different regions, including Turkish and Iranian samples (Taylan et al., 2020; Hoseininezhad & Rasouli, 2022).

Further research and implications

This present study, despite its noteworthy shortcomings, still suggests a range of practical and theoretical suggestions. Firstly, further studies would benefit from broader sampling techniques. Students who participate voluntarily might exhibit higher passion for their respective academic degree, in which broader range of students through more inclusive

sampling strategies would provide more insight. In similar fashion, inclusion of academic fields, faculties or departments not offered or differing from NTNU would benefit from inclusion, and such a category which generalizes field of study and not departments might be more beneficial. Passion should be regarded as the multi-faceted construct, and thus scholars are advised to utilize its respective psychometric scales accordingly. The passion scale, although effectively applied in measuring difference in performance, psychometrically regards a participants' self-chosen area (Sigmundsson et al., 2020). The Dualistic Model of Passion may be suited for specialized studies related to passion, for example well-being and mental health as it previously scholars have (Curran et al., 2015). As such, researchers are recommended to deploy passion-related scales accordingly to their research's respective field of interest.

Further studies should further aim to investigate the relationship between age and passion. Previous explorative research using the passion scale has found passion to decrease towards the ages of 50-59 (Sigmundsson et al., 2022b). This present study's statistical results coincide with this previous investigation, signifying changes in passion as a theoretical function of aging. A meta-study has shown that burnout is inversely associated with age (Brewer & Shapard, 2004). The factoring effect of types of passion may influence this relationship (Vallerand et al., 2010; Curran et al., 2015). Scholars are thus recommended to investigate this relationship further, to build confidence regarding passion as a strong factor in facilitating or inhibiting burnout across age groups. Differences in academic levels, in combination with age, may perhaps be operationalized through differentiating undergraduates and postgraduates, in which academic level and age may be more effectively coherent.

It was theorized based on the predictive validity of Big Five traits in previous studies, that a connection may be based between differences in passion and chosen academic field (Balon et al., 2013; Vedel et al., 2015; Dalpé et al., 2019; Verbree et al., 2021). Although the

disconfirmation of this hypothesis could appear from skewed sampled groups, it may still contain theoretical implications. This present study consequently contributes one classical perspective considering personality traits and compositions as linked towards later life outcomes (Shiner et al., 2004; Roberts et al., 2007; Hill et al., 2019). The results from this present study failed to connect choice of academic field with levels of passion, despite both having been specifically linked with conscientiousness and openness to experience (Balon et al., 2013; Vedel et al., 2015; Dalpé et al., 2019; Verbree et al., 2021). As such, further studies are suggested to continue investigating the consolidation of personality traits and life choices, whereas passion may be regarded as a common factor the relationship can be researched through.

Conclusion

This study set out to investigate levels of passion amongst Norwegian students of different academic level in the form of degrees, and explore if passion would differ across academic fields. The results indicated no significant difference across these levels, despite previous research establishing passion as an important factor in facilitating perseverance of effort, motivation, and establishing expertise. The findings from this present study does not support previously documented research as higher education is presented as an expertise-establishing field. Still, shortcomings in methodological aspect, such as factors of the passion scale, most likely attributed to a generalized high passion amongst all students. A relationship, although weak, was found between age and passion in the form of a negative correlation. This result coincides with recent studies, having shown decreasing passion associated with aging, although this field in psychology remain quite recent. This relationship might indicate factors relating to constructs such as burnout, and as such might help facilitate a more holistic

understanding of different types of passion, its relation to affection and well-being, and the psychological effects of aging. Finally, the findings indicated no significant difference in passion amongst different academic fields. Although based on similarities regarding specific personality traits as a predictive commonality between academic field chosen and development of passion, no support was generated through this sample. Still, methodological shortcomings, specifically skewed sampling, affected the results. Caution should be applied to interpretation of this present study, due to its explorative nature and methodological limitations. Thus, further studies are recommended to broaden sampling sizes and utilize methods of measuring passion corresponding with specific areas. Due to passion as a broad and multi-faceted construct, nuances of different types, effects, and longitudinal passion should be studied further. Hence, the expanding field of research on passion may facilitate a more holistic understanding of motivation within the human nature.

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