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Social and Personal Predictors of Test Anxiety
Among Norwegian Secondary and Postsecondary Students

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Abstract

This study examined predictors of test anxiety in a sample of 2,528 Norwegian upper-secondary and postsecondary students by means of structural equation modeling. Results showed that personal goals related to career and grades positively predicted test anxiety, whereas self-efficacy beliefs were a negative predictor of test anxiety. In turn, participants' personal goals and self-efficacy beliefs were predicted by perceived family expectation and gender and, thus, mediated the effects of those variables on test anxiety. Specifically, academic expectations from students' families had an indirect positive effect on test anxiety mediated by career goal and an indirect negative effect on test anxiety mediated by self-efficacy beliefs, and gender indirectly affected test anxiety through self-efficacy beliefs (with females displaying lower self-efficacy beliefs than males). Finally, both family expectation and gender also had direct effects on test anxiety. The unique contribution of this large scale study is highlighted and theoretical and educational implications are discussed.

Keywords: Test anxiety; family expectation, gender, personal goals, self-efficacy beliefs.

Social and Personal Predictors of Test Anxiety

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1. Introduction

The 21st century knowledge society is characterized by a huge emphasis on the importance of education in combination with a great admiration for individual merit and success (Michaels, Handfield-Jones, and Axelrod, 2001; OECD, 2013; World Bank, 2011). Because there is also an increased use of high-stakes testing within education (Nichols and Berliner, 2007; UK Parliament, 2008), more students than ever may be at risk of experiencing stress and anxiety in evaluative contexts at school, with underperformance and even dropout being potentially negative consequences of such experiences. For example, recent research from the United Kingdom has suggested that as many as 15% of secondary school students experience high levels of test anxiety, and many more suffer from mild to moderate levels of test anxiety (Putwain and Daly, 2014). Not all students are equally vulnerable to experiencing anxiety in evaluative contexts, however, with social as well personal factors considered to play important roles (Zeidner, 1998, 2014). Also, the determinants of test anxiety can be assumed to vary across cultures due to variations in cultural values, social structures, and the importance placed on individual academic success (Zeidner, 1998). In the current study, we investigated both social and personal predictors of test anxiety in the Norwegian educational and cultural context, which traditionally is known for prioritizing egalitarian values and placing relatively little emphasis on competition and individual distinction (Undheim, Nordvik, Gustafsson, and Undheim, 1995; Warner-Søderholm, 2012). Still, we assumed that personal beliefs and goals among students in upper-secondary and postsecondary education would mediate the effects of family expectation and gender on students' test anxiety. Crucial to our assumption is the idea that in evaluative educational contexts, students' beliefs and

goals will be proximal contributors to test anxiety through which more profound influences (i.e., family expectation and gender) work. Before we further describe the model we created to test this assumption about mediation, we briefly discuss conceptualizations relevant for understanding the determinants of test anxiety and prior research focusing on the variables that we included in our model.

1.1 Theoretical and empirical background

Test anxiety has received systematic attention from researchers in education and psychology for many decades (McKeachie, 1951, Sarason and Mandler, 1952, Zeidner, 1998). It refers to an individual's disposition to react with extensive worry, intrusive thoughts, mental disorganization, tension, and physiological arousal when exposed to evaluative contexts or situations (Spielberger, Anton, and Bedell, 1976; Zeidner 2014). Moreover, test anxiety has been found to impede individuals' task-relevant processing, cause lower levels of achievement, and lead to the underestimation of competence (Cassady, 2004; Hembree, 1988; Zeidner, 2007).

Regarding the determinants of test anxiety, social as well as personal factors have been highlighted in the literature (Cassady, 2004; Zeidner, 2014). Among the social factors included in Zeidner's (2014) influential model of test anxiety are aspects of the family context, such as family climate, interaction pattern, and exposure to stressors. Other social determinants discussed by Zeidner (2014) concern not only parental pressure but also parents' direct engagement in their children's studies in the form of expectation, encouragement, and support. Accordingly, building on models of family interaction, such as the Circumplex Model (Olson, Russell, and Sprenkle, 1983) and the Family Environment Model (Moos and Moos, 1986), Peleg-Popko and colleagues (e.g., Peleg, Deutch, and Dan, 2016; Peleg, Klingman, and Abu-Hana, 2003; Peleg-Popko, 2002; Peleg-Popko and Klingman, 2002) have highlighted the importance of family interaction patterns and parental expectations for the

development and maintenance of children's anxiety, including test anxiety. For example, Peleg-Popko (2002) found that lack of open communication and encouragement of personal growth as perceived by the children were associated with higher levels of test anxiety. Moreover, Peleg-Popko and Klingman (2002) found that middle school students perceiving their family rules as ambiguous may feel uneasy, less supported or protected, and become more anxious. Conversely, students who perceive their family rules as clear and open may become more autonomous and self-disciplined, which, in turn, seems to prevent anxiety reactions in evaluative contexts. Other research has found a relationship between parent perfectionism and their children's level of test anxiety in secondary school (Besharat, 2003). Of particular relevance to the current investigation are previous studies demonstrating that perceived parental academic expectations may positively predict test anxiety among adolescent and adult students (Agliata and Renk, 2009; Peleg et al., 2013, 2016; Ringeisen and Raufelder, 2015).

For example, in a study using latent variable structural equation modeling with Israeli college students, Peleg et al. (2016) found that there was a direct positive effect of students' perceptions of their parents' academic expectations on their test anxiety. According to these authors, when students try to fulfil higher levels of parental academic expectations, they may feel a pressure that increases their test anxiety because they do not want to disappoint their parents (see also, Naumann, Guillaume, and Funder, 2012). Interestingly, Ringeisen and Raufelder (2015), in a study of German adolescents, found that both perceived parental academic pressure and perceived parental academic support may be positively associated with aspects of test anxiety. This suggests that parental pressure and support may represent "two sides of the same coin" because they both indicate an interest in improving children's academic performance (Ringeisen and Raufelder, 2015, p. 75). Thus, also when trying to meet the expectancies of parents perceived to be highly supportive, students may feel a pressure in

evaluative situations that increases their test anxiety because they fear they might disappoint their parents,

Zeidner (2014) also suggested that social, environmental factors might work in concert with biological factors in contributing to test anxiety. With respect to biological factors, much previous research has shown that female students reportedly experience test anxiety more frequently and also experience higher levels of test anxiety than do male students (e.g., Bråten and Olaussen, 1998, 2000; Hagtvet, Man, and Sharma, 2001; Peleg et al., 2003; Putwain, 2008; Putwain and Daly, 2014; Ringeisen and Raufelder, 2015). Possible reasons for this difference include that female students may be more self-conscious with respect to emotional experiences, including negative affect (Else-Quest, Higgins, Allison, and Morton, 2012, and that they may experience greater threat in evaluative situations due to gender stereotypes (Osbourne, 2006). Of note is that gender can be regarded as socially constructed rather than biologically determined, with gender as a social construct resulting from sociocultural influences in early life and throughout an individual's development (Schneider, Gruman, and Coutts, 2005).

In the present study, we uniquely contributed to research on social determinants of test anxiety by investigating the extent to which family expectation and support, as perceived by students, might underlie test anxiety even among students in upper-secondary and postsecondary education, that is, during a period of life when many students have left their childhood homes. Additionally, we investigated not only direct but also indirect effects of family expectation mediated through personal beliefs and goals. Likewise, we investigated not only direct effects of gender on test anxiety but also the extent to which the effect of this factor might be mediated through students' personal beliefs and goals.

Regarding personal determinants of test anxiety, Pekrun's (2006) control-value theory of achievement emotions is highly relevant. This theory, which focuses on academic emotions

more generally, explains students' emotions in achievement situations as determined by control appraisals and value appraisals, respectively. Control appraisals include perceptions or beliefs concerning one's own competence and value appraisals include appraisals of the subjective importance of achievement activities and their outcomes, as well as the desire to attain particular goals.

Of note is that such aspects of control and value appraisals within control-value theory of achievement emotions are consistent with central constructs within a broader social-cognitive approach to human behavior. Thus, the construct of self-efficacy, which refers to "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (Bandura, 1997, p. 3), essentially concerns appraisals of one's own competence. As described within social-cognitive theory (Eccles, 2007; Wigfield and Eccles, 2000), social-contextual forces influence students' beliefs about their own competence, with parents playing a particularly important role (Grolnick, Friendly, and Bellas, 2009). Accordingly, Pomerantz, Grolnick, and Price (2005) discussed how parents' perceptions of children's competence and their expectancies for children's performance positively affect children's own perceptions of their competence. During the last decades, a large number of studies have demonstrated that self-efficacy beliefs positively predict adaptive behavior in a variety of contexts (Bandura, 1997, Luszczynska, Benight, and Cieslak, 2009; Zimmerman, 2000), with recent empirical work (Roick and Ringeisen, 2017) also suggesting that self-efficacy may protect against the development of test anxiety among students. Moreover, the importance of personal goals has been underscored within a social-cognitive perspective. For example, Boekaerts (2009, p 105) stated that "from the moment individuals have set a personal goal, their actions have become meaningful and purposive because that goal is used both as a desired end-state ... and as standard for selecting the chain of actions that will lead to that desired end-state." Also, according to Bandura (1997), features such as goal

specificity, goal challenge, and goal proximity are important for how strongly individuals commit themselves to goal attainment, with goals that are more specific, attainable, and near in time generally having a stronger motivational impact. However, goals that are specific, yet ambitious and difficult, may sometimes exceed individuals' resources and lead to experiences of threat and anxiety in achievement situations (Drach-Zahavy and Erez, 2002). Similar to self-efficacy beliefs, children's personal goals are likely to be influenced by parental expectations (Grolnick et al., 2009; Peleg et al., 2016). More specifically, Peleg et al. (2016) noted that parental academic expectations are likely to influence children's expectations for how far they will go in school and their academic and career choices. For example, Jodl, Michael, Malanchuk, Eccles, and Sameroff (2001) found that higher parental academic expectations were associated with higher educational aspirations in children and predicted their professional career aspirations (see also, Jacobs, Chhin, and Bleeker, 2006).

While self-efficacy beliefs can be linked to the control component, personal goals can be linked to the value component of control-value theory of achievement emotions (Pekrun, 2006). Moreover, both constructs may be involved in the prediction of test anxiety, consistent with the explanatory mechanisms suggested by this theory. This means that if a goal, such as qualifying for a particular future occupation (i.e., a career goal) or attaining a particular grade (i.e., a grade goal), is considered less desirable, there is not much to lose and, consequentially, less anxiety will be experienced in evaluative achievement contexts independently of self-efficacy beliefs. Contrary, if value appraisal informs that such goals are highly desirable and evaluative achievement contexts are essential in attaining those goals, one condition for experiencing anxiety in those contexts is fulfilled. However, whether individuals actually will experience test anxiety under this condition is dependent on their control appraisal. If they believe they are self-efficacious and therefore judge the evaluative contexts to be controllable, test anxiety is not likely to occur. However, if individuals doubt

their capabilities to handle the evaluative contexts (i.e., when their self efficacy beliefs are low), the second condition for experiencing anxiety in those contexts is also fulfilled, and test anxiety is likely to occur.

1.2 The present study

Given this background analysis, we developed the hypothesized model displayed in Figure 1 and tested the fit of the model to data obtained from a large sample of Norwegian upper-secondary and postsecondary students. As can be seen in Figure 1, personal factors concerning beliefs (i.e., self-efficacy) and goals (i.e., career goal and grade ambition) were hypothesized to have direct effects on test anxiety, with those factors, in turn, being directly affected by family expectation and gender and, thus, mediating the effects of family expectation and gender on test anxiety. Specifically, we expected that personal goals concerning career and grades, respectively, would positively predict test anxiety because more would be at stake in evaluative achievement contexts for students with stronger goals, whereas self-efficacy would negatively predict test anxiety because it would help students cope with the challenges of such contexts (Bandura, 1997; Pekrun, 2006; see also, Schunk, Meece, and Pintrich, 2014). Presumably, high commitment to and valuing of a particular future occupational career and striving for a higher grade might imply more pressure in evaluative contexts deemed important to attain those goals, which increase the risk of experiencing anxiety in those contexts (Drach-Zahavy and Erez, 2002). With respect to self-efficacy, prior research has consistently shown a negative relationship between academic self-efficacy and test anxiety (e.g., Bråten and Olaussen 1998; Erzen and Odaci, 2016; Pintrich, Smith, Garcia, and McKeachie, 1993; Roick and Ringeisen, 2017; Zimmerman, 2000).

[Figure 1 about here]

We hypothesized, in addition, that family expectation had direct positive effects on students' self-efficacy beliefs and career goals, and thus affected their test anxiety indirectly

through those variables, with an indirect negative effect arising through self-efficacy and an indirect positive effect arising through career goals. This assumption is consistent with a social-cognitive approach to achievement motivation (Wigfield and Eccles, 2000, 2002) as well as career development (Lent, Brown, and Hackett, 1994), and supported by prior research (Grolnick et al., 2009; Jacobs et al., 2006; Jodl et al., 2001; Pomerantz et al., 2005). With respect to gender, we expected that this variable would indirectly affect test anxiety through its direct effect on self-efficacy, which is consistent with prior research investigating gender differences in academic self-efficacy, showing that male students generally judge themselves to be more self-efficacious than do female students (Schunk et al., 2014; Wigfield and Eccles, 2002). The reason we did not have a specific hypothesis regarding the relationship between family expectation and grade ambition was that we operationalized the latter as a wish to improve one's grades (see *Method* below) and entertained the possibility that higher family expectation would not necessarily lead to higher grade ambition because many students perceiving family expectation to be high would already perform relatively well (Froiland and Davison, 2014; Grolnick et al., 2009; Naumann et al., 2012). In the context of the Norwegian cultural and educational context, where efforts and progress towards gender equality, in general, have been remarkable (Statistics Norway, 2014), we also found it difficult to formulate specific hypotheses regarding the relationship between gender and students' career goals and grade ambitions, respectively. However, based on prior work, we hypothesized that both family expectation (Peleg et al., 2003, 2016; Ringeisen and Raufelder, 2015) and gender (Hagtvet et al., 2001; Peleg et al., 2003; Putwain and Daly, 2014) would have direct effects on test anxiety in addition to their indirect effects, with higher family expectations being associated with higher test anxiety and female students reportedly experiencing more test anxiety than male students. With respect to correlations, we expected self-efficacy beliefs and grade ambition to be negatively correlated because higher self-

efficacy beliefs among students would likely imply that they already performed relatively well (Bandura, 1997; Zimmerman, 2000) and therefore experienced less difference between what they attained and what they wished for. On the other hand, we expected self-efficacy beliefs and career goal to be positively correlated because students who are confident that they will master academic tasks may also be more confident that they will be able to qualify for a particular future career.

At least to our knowledge, this is the first time a model that specifies direct and indirect relationships between these social and personal factors and test anxiety has been tested in a large sample of upper-secondary and postsecondary students to investigate such complex relationships collectively. As such, this investigation represents a unique extension of prior work on the antecedents of test anxiety. Of course, we expected all the effects that we included in the hypothesized model to hold while controlling for the entire set of variables.

2. Method

2.1 Participants

Participants were 2,528 upper-secondary ($n = 1566$) and postsecondary ($n = 962$) Norwegian students with an overall mean age of 19.63 years ($SD = 5.01$) and a gender distribution of 63% females and 37% males. While male students were somewhat underrepresented in our sample in relation to the population of Norwegian upper-secondary and postsecondary students, it should be noted that the main purpose of the current study was to test hypothesized relationships between social and personal factors and test anxiety rather than provide representative measurements of these factors based on random sampling. As such, the number of male participants ($n = 939$) yielded sufficient statistical power to reject null hypotheses related to gender.

Participants were at different levels and enrolled in different study programs. Among the upper secondary school students, 45% were in the first year, 27% were in the second year,

and 28% were in the third year. Moreover, the majority (68%) of the upper-secondary school students completed college preparatory courses and the rest completed vocational courses. Among the postsecondary students, the majority (87%) were undergraduates and the rest were graduate students. The postsecondary students completed courses in economy and administration (53%), science, technology, engineering, and mathematics (STEM) (19%), and humanities and social sciences (20%). The rest (8%) did not specify their study program. Participants attended upper-secondary schools and postsecondary institutions in different parts of Norway.

Data were collected by means of a web-based digital survey created to help students self-assess their study motivations and strategies, with 68% of the participants responding to the survey in class on the initiative of their teachers and the rest responding on their own initiative by accessing the survey through a web portal for Norwegian students or by means of a free smartphone application created by the third author. No bias resulted from the particular way our participants accessed and responded to the survey. That is, comparable results were obtained for all measured variables for those who responded in class on the initiative of their teachers and those who responded on their own initiative. Collection and handling of all data in the current study met the requirements of the Personal Registers Act and were based on the guidelines of the Norwegian Social Science Data Services. Also, the authors of this article had no conflict of interest.

2.2 Measures

Due to the web-based format of the survey, and to prevent students from leaving the site without completing the entire survey, all measures were kept short and contained no more than three items (Gogol et al., 2014). Items for each measure were based on theoretical considerations and existing measures of the constructs in question. We also conducted a pilot study with a larger number of items for each measure. The three items used to represent each

construct in the main study thus took psychometric information from the piloting into account. Specifically, items for each of the measures described below were piloted in a sample of 1100 students, with construct validity examined by means of confirmatory factor analyses (Brown, 2015) and reliability analyses performed to ensure adequate reliabilities for all measures (Gugiu and Gugiu, in press). Also, in the process of selecting the items for the main study, we considered content validity to ensure that the core components of the theoretical constructs were captured by the measures (Kerlinger and Lee, 2000). For example, to measure the construct of test anxiety, we used five items in the pilot study. After having carefully considered the psychometric properties of participants' scores, we chose the three items that taken together represented the construct of test anxiety in an appropriate way (Zeidner, 1998). Of note is that Gogol et al. (2014) similarly showed that short (one- and three-item) scales measuring the constructs of academic anxiety and academic self-concept may represent psychometrically sound (i.e., valid and reliable) alternatives to longer scales when assessing such constructs for educational research purposes. Also, Brady, Martin Hard, and Gross (in press) recently showed that test anxiety may be effectively and validly measured by means of only three items concerning both the emotionality and worry components of test anxiety.

2.2.1 Test anxiety

In accordance with Hagtvet (1983) and Zeidner (1998), test anxiety was measured with three items addressing different aspects of anxiety that students may experience in evaluative achievement contexts. Thus, the first item targeted their experience of worry in such situations (*Before important tests, I worry a lot about how I will do*). The second item targeted bodily symptoms associated with test anxiety (*When taking important tests, I feel physically unwell*). Finally, the third item was created to address the construct of test anxiety

more broadly and might represent different aspects of test anxiety, such as worry, tension, and bodily symptoms (Sarason, 1984) (*I am apprehensive about taking important tests*).

Each item was rated on a seven point Likert-type scale (1 = *not at all true for me*, 7 = *very true for me*). The internal consistency reliability (Cronbach's α) for participants' scores on this measure was .85.

2.2.2 Career goal

Our measure of participants' career goals was based on the conceptualization of Lent et al. (1994), focusing on the certainty, clarity, and justification of their occupational goals. Thus, the first item concerned how certain they were about their occupational goal (*I know for certain what type of job I will have after my education*). The second item focused on the clarity of their goal (*I have a clear goal of getting a particular type of job*), and the final item addressed how well justified they considered their choice of a future occupational career (*I have reflected very carefully on the job I want to have in the future*). Each item was rated on a seven-point Likert-type scale (1 = *not at all true for me*, 7 = *very true for me*). The internal consistency reliability (Cronbach's α) for participants' scores on the career goal measure was .90.

2.2.3 Grade ambition

To assess participants' goals to improve their grades, they were asked to report their current grade point average (*What is your current average grade?*) as well as the grade point average they wanted or strived for (*What average grade do you want or work toward?*). In Norway, upper secondary and postsecondary education have different grading systems, with upper secondary school using grades ranging from 6 to 1 and postsecondary education using grades ranging from A to F. For the purpose of this study, all self-reported grades, current as well as targeted, were transformed into the upper-secondary six-point grading system ranging from 6 (*excellent*) to 1 (*fail*). The variable of grade ambition was computed by subtracting

each participant's self-reported current average grade from his or her self-reported targeted average grade. Participants' scores on this variable ranged from -1 to 3.

2.2.4 Self-efficacy beliefs

To assess participants' beliefs about academic self-efficacy, we adapted three items from the self-efficacy subscale of the Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich et al., 1993). The first item focused on students' judgments about their capabilities to master the learning materials presented in their study program (*I am confident that I can learn and understand the learning materials presented in the study*), while the two other items also addressed their confidence in their abilities to perform well on assignments and exams in the study program (*I am confident that I can obtain very good results in the study; I am confident that I can do a good job on the assignments and obtain good grades on tests and exams in the study*). Each item was rated on a seven-point Likert-type scale (1 = *not at all true for me*, 7 = *very true for me*). The internal consistency reliability (Cronbach's α) for participants' scores on the self-efficacy measure was .82.

2.2.5 Family expectation

Based on prior research on family involvement and engagement in students' education (Bowers et al. 2011; Diaconu-Gherasim and Măirean, 2016; Juang and Silbereisen, 2002), we adapted a three-item measure that focused on students' perceptions of their family's expectations that they put effort into their study (*My family has clear expectations that I will do my best in the study*), students' perceptions of their family's support regarding school achievement (*My family supports me with respect to doing well in the study*), and students' perceptions of their family's concern about academic success (*My family is very concerned that I will succeed in the study*). Each item was rated on a seven-point Likert-type scale (1 = *not at all true for me*, 7 = *very true for me*). The internal consistency reliability (Cronbach's α) of participants' scores on this measure was .78.

2.2.6 Gender

In addition to the measures described above, we included the dichotomous variable of gender in our model (female = 0, male = 1).

2.3 Procedure

The participants who accessed and responded to the web-based survey in class were introduced to the survey by their teachers in this way: “This survey contains questions concerning your study and takes about 5 minutes to complete. When you have finished the survey, you will receive feedback on the various parts of the survey that compares you with other students. Participation is voluntary.” For students who individually accessed and responded to the survey, they either used a link to “to test their own study habits” available on the student portal studenttorget.no, which is an open discussion forum for Norwegian students, or a free smartphone application containing information about efficient studying that was developed by the third author.

When accessing the survey, participants were first informed about the format of the survey and how the various questions should be answered (e.g., “You should rate each statement on a scale from (1) *not at all true for me* to (7) *very true for me*”). In addition, they were informed that their answers would remain anonymous and that by completing the survey, they approved that their data could be used for research purposes. The first questions of the survey asked for background information concerning, gender, age, location, study program, level of studying, and previously completed classes/programs. Then, they rated themselves on the items included in the test anxiety, career goal, self-efficacy, and family expectation measures, with these 12 items presented in random order. Of note is that participants answered the question about their targeted grade point average at the beginning of the survey while the question about their current grade point average was placed at the end. After completing all questions, participants received feedback that compared their score on

each measure with a norm (e.g., low, medium, or high on the self-efficacy measure in relation to other students responding to the survey). To ensure that participants had not responded to the web-based survey more than once, we carefully checked the log data for the participants who had responded to the survey in class and combinations of background variables (e.g., gender, age, study program, institution, and location) for the participants who had individually responded to the survey by means of the student portal or the smartphone application.

2.4 Analytic approach

We used structural equation modeling with Mplus 7 (Muthén and Muthén, 2012) to test our hypothesized model. Initially, we examined the dimensionality of scores on the three-item measures (i.e., test anxiety, career goal, self-efficacy, and family expectation) by means of confirmatory factor analysis (CFA), which formed the basis for a well-fitted measurement model. In the final model testing, these variables were included as latent variables, while grade ambition and gender were included as observed variables. To evaluate the overall fit of the model, we applied the chi-square statistics and other fit-indices provided by the Mplus 7 software (Muthén and Muthén, 2012), specifically the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). After reviewing the literature concerning cut-off criteria for goodness of fit (Bentler, 1990; Bentler and Bonett, 1980; Hu and Bentler, 1998, 1999; Marsh, Hau, and Wen, 2004; Schermelleh-Engel, Moosbrugger, and Müller, 2003), and taking the current analytic situation (e.g., model complexity) into consideration, we adopted the following criteria for model evaluation: $CFI \geq .90$, $RMSEA \leq .08$, and $SRMR \leq .09$ indicate an acceptable fit of the model, while $CFI \geq .95$, $RMSEA \leq .05$, and $SRMR \leq .06$ indicate a good model fit.

3. Results

3.1 Preliminary analyses

The scores on all items were normally distributed except for one item included in the family expectation measure, which was slightly skewed (coefficient of skewness = -1.30). A four-factor CFA model including the 12 items of the test anxiety, career goal, self-efficacy, and family expectation measures was evaluated by means of robust maximum likelihood estimation. The measurement model, which included all 12 items, fit the data well, $\chi^2 [48] = 235, p < .001$; CFI = .98; RMSEA = .039, 90% CI (.034 – .044); SRMR = .031. All items had proper loadings in their respective factor. More specifically, except for one family expectation item, which loaded .57, the factor loadings ranged from .72 to .89. Descriptive statistics and reliabilities for all variables involved in the final model testing are displayed in Table 1, together with zero-order correlations between those variables.

[Table 1 about here]

3.2 Hypothesized model testing

The hypothesized model fit the data well, with $\chi^2 [65] = 290, p < .001$; CFI = .98; RMSEA = .037, 90% CI (.033 – .041); SRMR = .030. As can be seen in Figure 2, there were direct effects of students' personal goals and beliefs on test anxiety. As expected, there were direct positive effects of career goal ($\beta = .09, p < .001$) and grade ambition ($\beta = .06, p < .01$) on test anxiety, whereas the direct effect of self-efficacy beliefs on test anxiety was negative ($\beta = -.26, p < .001$). In turn, the variables of family expectation and gender had direct effects on students' goals and self-efficacy beliefs. Thus, as expected, family expectation had direct positive effects on self-efficacy beliefs ($\beta = .31, p < .001$) and career goals ($\beta = .17, p < .001$), and gender had a direct positive effect on self-efficacy ($\beta = .10, p < .001$), with males reportedly being more self-efficacious than females. In addition, there was a small but statistically significant, unexpected negative effect of gender on grade ambition ($\beta = -.04, p < .05$), with males tending to have lower grade ambitions than females. In addition to their direct effects on students' goals and self-efficacy beliefs, family expectation and gender had

direct effects on test anxiety. As we hypothesized, family expectation had a positive effect on test anxiety ($\beta = .20, p < .001$), whereas gender had a negative effect on test anxiety ($\beta = -.36, p < .001$), with females reportedly experiencing more test anxiety than male students.

[Figure 2 about here]

Finally, both family expectation and gender had statistically significant mediated effects on test anxiety, with these mediated effects also consistent with our hypotheses. Thus, there was an indirect negative effect of family expectation on test anxiety mediated by self-efficacy ($\beta = -.08, p < .001$) and an indirect positive effect of family expectation on test anxiety mediated by career goal ($\beta = .02, p < .001$). The indirect negative effect of gender on test anxiety was mediated by self-efficacy ($\beta = -.03, p < .001$), which means that females were also more likely to experience test anxiety due to their lower self-efficacy beliefs. Given these direct and indirect effects, the model explained 24% of the variance in test anxiety.

It should also be noted that we tested the hypothesized model for upper-secondary and postsecondary students separately. This model testing confirmed the overall factor structure in both subsamples, and the same paths turned out to be statistically significant. However, invariance testing revealed that the metric was not invariant across the subsamples (Brown, 2015), which means that the corresponding factor loadings were not equal at the two educational levels. For that reason, we did not proceed with multi-group analyses comparing path coefficients across the subsamples. Please see the Appendix for descriptive information about the measured variables for upper-secondary and postsecondary students separately.

4. Discussion

This study uniquely contributes to research on the role of social and personal factors in test anxiety by using structural equation modeling to investigate complex, direct and indirect relationships between such variables in a large sample of Norwegian upper-secondary and postsecondary students. It was found that the hypothesized model that we developed on the

basis of theoretical assumptions and prior empirical work fit the data well, and that the direct and indirect relationships that we expected to find between variables essentially were confirmed. By testing these relationships collectively, this study extends prior work on the determinants of test anxiety that has investigated such relationships without controlling for the entire set of variables.

First, consistent with our expectations, personal goals related to career and grades were found to positively predict test anxiety, whereas self-efficacy beliefs were found to be a negative predictor of test anxiety. Within social-cognitive theory (Bandura, 1997; Boekaerts, 2009), personal goals are applauded because they provide energy and direction to behavior and may lead to better outcomes. At the same time, however, stronger commitment to a particular future career or higher grades may seem to create vulnerability in evaluative contexts, presumably because they increase the cost of failure and the risk of falling from great height, as it were. That appraisal of such goals as highly valuable may form a basis for test anxiety is also consistent with Pekrun's (2006) control-value theory of achievement emotions (see also Folkman and Lazarus, 1985). On the other hand, self-efficacy beliefs seemed to represent a buffer against test anxiety, with this finding also consistent with theory as well as prior research (e.g., Bandura, 1997; Roick and Ringeisen, 2017). In accordance with the control-value theory (Pekrun, 2006), this indicates that students with higher self-efficacy beliefs perceived themselves to be in control of the content and tasks presented in their study program and therefore capable of handling the requirements of evaluative contexts with less stress and worry.

Second, as expected, participants' personal goals and self-efficacy beliefs were predicted by perceived family expectation and gender and, thus, mediated the effects of those variables on test anxiety. Specifically, academic expectations from students' families had an indirect positive effect on test anxiety mediated by career goal and an indirect negative effect

mediated by self-efficacy beliefs. That family expectations, as perceived by students, may contribute to their career goals is consistent with theory and research on career development (Lent et al., 1994), as well as with prior empirical work linking parental academic expectations to students' career choices and aspirations (Jacobs et al., 2006; Jodl et al., 2001). On the other hand, the contribution of family expectations to self-efficacy is consistent with the idea that students' motivational beliefs are influenced by their social environment, such as their interactions with parents, which figures prominently within expectancy-value theory of achievement motivation (Grolnick et al., 2009; Wigfield and Eccles, 2002), and it is supported by prior empirical work linking parental expectations to children's own perceptions of their competence (Grolnick et al., 2009; Pomerantz et al., 2005). Although others also have suggested that perceived family expectations, including support, may have negative consequences for children because that create a concern with pleasing the parents, along with positive consequences due to the building of motivational resources (Pomerantz et al., 2005; Ringeisen and Raufelder, 2015), our study provides new insight into how family expectations may represent a double-edged sword with respect to test anxiety. Taken together, the indirect effects of family expectations that we discovered indicate that although the intentions of family expectations may certainly be good and their effect on self-efficacy helpful, their contribution to firm career goal setting may actually make students more vulnerable to test anxiety. With regard to the indirect effect of gender on test anxiety via self-efficacy, this finding confirms prior research indicating lower self-efficacy among female students (Schunk et al., 2014; Wigfield and Eccles, 2002). Moreover, it indicates that female students may be doubly vulnerable in relation to test anxiety because, in addition to the direct effect of gender on test anxiety (see below), females may be more likely to experience test anxiety due to their lower self-efficacy beliefs.

Third, as expected, not only gender but also family expectation had a direct effect on test anxiety in addition to its indirect effect. We consider the direct positive effect of family expectation on test anxiety a particularly interesting finding in this sample because many participants likely had already left their childhood homes and lived on their own. Still, their perceptions of high academic expectations from their family seemed to do more harm than good in terms of test anxiety, presumably adding pressure and creating fear of not living up to their family's standards in evaluative contexts (see also, Peleg et al., 2003, 2016; Ringeisen and Raufelder, 2015). Finally, although the finding that gender directly affected test anxiety, with female students reportedly experiencing more test anxiety than males, is consistent with prior research (e.g., Peleg et al., 2003; Putwain and Daly, 2014), the substantial influence of gender on test anxiety is somewhat remarkable given the strong emphasis on gender equality in the Norwegian cultural and educational context (Statistics Norway, 2014). It is possible that female students are more likely to be aware of and open about negative affect than are male students (Else-Quest et al., 2012). However, it is also possible that Norwegian female students still feel more threatened in evaluative situations due to gender role socialization and gender stereotypes (Eccles, 2007). Further research should investigate other potentially mediating variables to better understand how family expectation and gender are indirectly as well as directly related to test anxiety.

Among the limitations of the current study is that the constructs were measured with a small number of items, which did not allow us to investigate different facets of each construct (e.g., subcomponents of test anxiety; Zeidner, 2007). It should be noted, however, that indicators were carefully selected based on a pilot study to ensure that the core constructs were captured by our measures in a psychometrically sound way (see *Measures* above). Still, future research should further investigate subcomponents of the factors that we included, for example attempting to reveal whether some aspects of family expectation or career goal

setting are more likely to induce test anxiety in students than are other aspects. A related limitation is that the test anxiety items primarily targeted how participants would typically feel before taking important tests. Although students' experiences of anxiety before, during, and after test taking usually are related (Cassady, 2004), our findings therefore seem more relevant to the preparation phase than to the performance and reflection phases of test taking. Moreover, because our study was based on cross-sectional, correlational data, questions about causality cannot be adequately answered regardless of statistical technique. Thus, although structural equation modeling comes with causal terminology (e.g., direct and indirect effects), longitudinal or, preferably, experimental work is needed to draw firmer causal conclusions about the relationships that we tested. Finally, our findings should be taken with some caution because several of the effects that we revealed were quite small. That said, research in education and psychology has more often than not been plagued with underpowered studies that may lead to inconsistent results and disregard of relationships that deserve further attention from both researchers and practitioners (Maxwell, 2004).

Despite the limitations, we believe that the current findings may have some practical implications in addition to their theoretical significance. While a range of interventions for test anxiety have been developed and evaluated during the last decades (for reviews, see von der Embse, Barterian, and Segool, 2013; Zeidner, 2004), our findings highlight that not only personal but also social factors need to be targeted in test anxiety interventions, especially the academic expectations of students' families and how those are interpreted by the students. For example, parallel to how students have been successfully induced to reappraise test anxiety as neutral or even beneficial (Brady et al., in press), students might be helped to reappraise family academic expectations in positive terms. Moreover, our study may alert practitioners to the potentially detrimental effects of career goal fixation with little openness for alternative occupational trajectories. On the positive side, the buffering effect of self-efficacy beliefs

suggested by our findings may be utilized during treatment as well as for prevention, with provision of sufficient academic mastery experiences presumably serving to protect against test anxiety, which may be particularly important for female students. Finally, because family expectations may influence both career goals and self-efficacy directly, families may be well advised to engage less in students' career goal setting and instead direct their expectations and support towards students' mastery of academic tasks without, directly or indirectly, communicating a pressure to perform well.

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Table 1
Descriptive information, reliabilities, and zero-order correlations for all variables

	1	2	3	4	5	6
1 Gender	-					
2 Family expectation	-.01	-				
3 Career goal	-.02	.17***	-			
4 Grade ambition	-.04*	.02	.02	-		
5 Self-efficacy	.09***	.31***	.22***	-.22***	-	
6 Test anxiety	-.39***	.13***	.07**	.14***	-.23***	-
Cronbach's α	-	.78	.90	-	.82	.85
<i>M</i>	-	5.58	4.28	0.73	5.06	4.57
<i>SD</i>	-	1.28	1.84	0.68	1.20	1.65

Note. * $p < .05$. ** $p < .01$. *** $p < .001$.

Figure captions

Figure 1. The hypothesized model. Gender is coded 0 for females, 1 for males. + = positive prediction, - = negative prediction, +/- = valence not prespecified.

Figure 2. The resulting model for social and personal predictors of test anxiety. Gender is coded 0 for females, 1 for males. * $p < .05$, ** $p < .01$, *** $p < .001$.

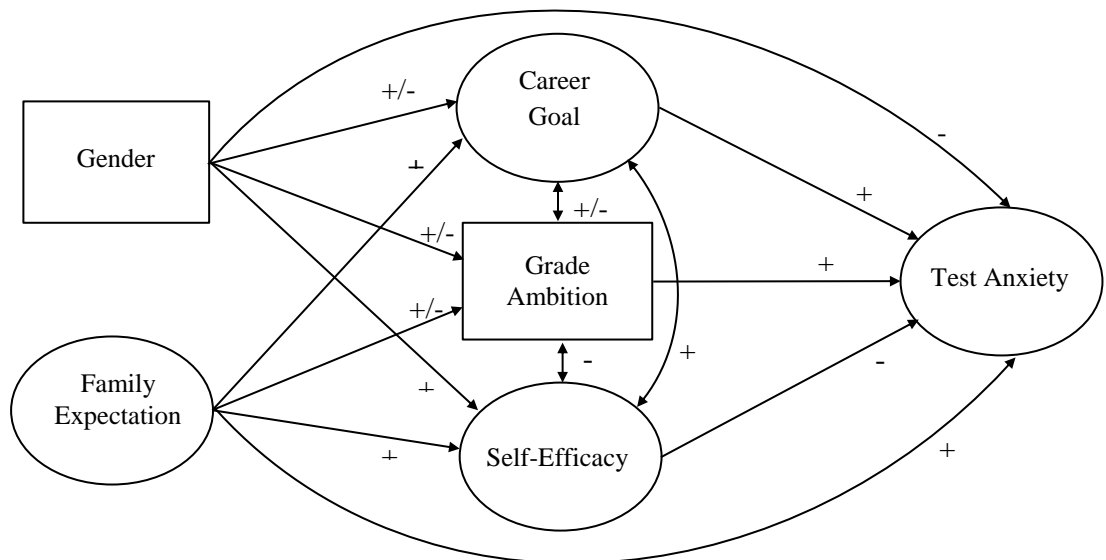


Figure 1.

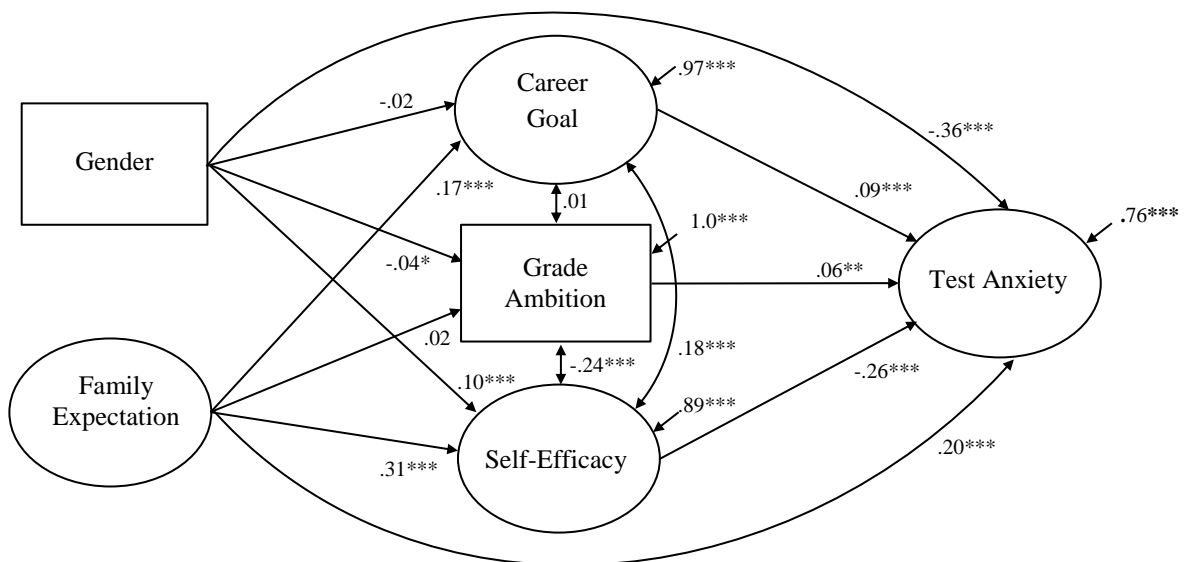


Figure 2.

Appendix

Descriptive information about the measured variables for upper-secondary and postsecondary students separately

	Upper-secondary students ($n = 1566$, 59% female)		Higher education students ($n = 962$, 68% female)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Family expectation	5.77	1.20	5.28	1.33
Career goal	4.36	1.85	4.16	1.79
Grade ambition	0.65	0.58	0.81	0.80
Self-efficacy	5.13	1.19	4.94	1.20
Test anxiety	4.51	1.65	4.64	1.65