

Linking Optimistic Attributional Style to Academic Performance:

Attributions Following Positive Events Matter Most

DOI: 10.1007/s10212-019-00414-y

Tamara O. Gordeeva

*Lomonosov Moscow State University Faculty of Psychology, Department of Educational Psychology & International Laboratory of Positive Psychology of Personality and Motivation, National Research University Higher School of Economics  
Verkhoyanskaya str., 6 -1, 370, 129344 Moscow, Russia*

Kennon M. Sheldon

*University of Missouri, Missouri, Columbia, USA  
International Laboratory of Positive Psychology of Personality and Motivation, National Research University Higher School of Economics  
Dpt. of Psychological Sciences, 112 McAlester Hall University of Missouri-Columbia, Columbia, MO 65211*

Oleg A. Sychev

*Shukshin Altai State Humanities Pedagogical University, Biysk, Russia  
Korolenko str., 43-213, 659333 Biysk, Russia*

Running Head: Linking Optimistic Attributional Style to Academic Performance

Contact: Tamara Gordeeva, tamgordeeva@gmail.com

### Abstract

Optimistic attributional style was shown to be reliably associated with low depression and high well-being. Via both a meta-analysis and two new studies, we examine the relationship between optimistic attributional style and academic performance. In the meta-analysis, dispositions to make stable and global attributions for positive events were more strongly related to achievement ( $d = 0.21$ ,  $k = 30$ ,  $N = 6351$ ) than dispositions to make unstable and local attributions regarding negative events ( $k = 66$ ,  $d = 0.11$ ,  $N = 11023$ ). Academic level (secondary school vs. university) and type of test (general vs. achievement-specific) were shown to moderate the associations. Two new studies were designed to address remaining questions. In both studies optimistic attributional style for positive events most reliably predicted student academic achievement, including boosted achievement over time. Possible explanations for the moderator effects are discussed, and recommendations for future research as well as practical recommendations are provided.

*Keywords:* academic performance, optimistic attributional style, meta-analysis, positive and negative events, achievement events, academic level.

### **Theoretical Background**

Research on attributional styles (dispositions for explaining one's own life-outcomes) has focused primarily on the relations of style with mental health. Less research has focused on the relationship between attributional style and achievement, despite the fact that this was the original focus of attribution research (see below). Also, the extant achievement research has concentrated on optimism following negative events rather than optimism following positive events, and has yielded a rather mixed picture. In this article we attempt to clarify the picture, via a meta-analysis and via two new studies.

### **Historical background**

Weiner's (1974) attributional theory of achievement motivation addressed the question of how peoples' explanations for achievement-related outcomes affect their emotional and behavioral reactions to those outcomes. Early research showed that people with high achievement motivation tend to differ in their attributions for success and failure, compared to those low in achievement motivation: high achievers attribute their successes to ability and effort, not luck, and attribute their failures to lack of effort, not lack of ability (Weiner 1979). Drawing from Weiner's (1974) work, Abramson, Seligman, and Teasdale (1978) introduced the construct of *attributional style*, which refers to how people habitually explain the causes of different events in their lives.

According to Seligman and his colleagues, people with an optimistic attributional style (OAS) habitually view good events as caused by factors that are internal (to them), stable (i.e. permanent rather than changeable) and global (i.e., affecting all parts of life rather than just one part), and they view bad events as caused by factors that are external, unstable and specific (Peterson et al. 1982). Conversely, those with a pessimistic style explain good events as caused by factors that are external, unstable and specific and bad events as caused by factors that are internal, stable and global. The original Attributional Style Questionnaire (ASQ) was developed in the late 1970s and remains the most popular and widely used questionnaire (Peterson et al. 1982; Seligman et al. 1979). It asks participants to imagine various hypothetical situations they might encounter, then to write about the causes of the outcomes of that situation, then to rate those causes on three different dimensions of

attributions (discussed below). The ASQ includes six positive and six negative situations, among them six achievement and six interpersonal situations.

Initially it was hypothesized that people with a pessimistic attributional style (the opposite of optimism; e.g. the tendency to make stable, global, and internal attributions regarding negative events and unstable, specific, and external attributions regarding positive events) are more prone to depression. Indeed, studies by M. Seligman, C. Peterson and their colleagues and then meta-analyses (Hu et al. 2015; Peterson et al. 1985; Sweeney et al. 1986) confirmed that pessimism is a reliable predictor of depression. Other studies generalized the effects of pessimistic attributional style to other negative outcomes including physical illness (Peterson 1995; Peterson and Seligman 1984), and anxiety (Lynd-Stevenson and Rigano 1996; Ralph and Mineka 1998). Furthermore, pessimistic style predicts lower scores on positively valenced outcomes such as positive affect, life-satisfaction, and self-esteem (Cheng and Furnham 2001, 2003; Rigby and Huebner 2005).

### **Attributional Style and Academic Performance**

Seligman, Peterson and colleagues later suggested that having an optimistic attributional style boosts achievement at school, university and work (Peterson and Barrett 1987; Seligman and Schulman 1986; Seligman 1995). Their reasoning was that optimistic thinking enhances positive expectancies and stimulates persistence after failure (Seligman and Schulman 1986). Conversely, people with a pessimistic explanatory style tend to have vague goals and to behave in a passive and fatalistic manner, rather than using active coping strategies to resolve problems.

The original focus of most research linking OAS and academic performance was optimism following *negative* events (OAS\_N), as justified by the helplessness theory of depression and its extension, hopelessness theory (Abramson et al. 1989), as well as by the clinical focus of these two theories. Following this tradition some researchers have indeed limited the definition of OAS to positive construals of negative events (e.g., Dykema et al. 1996; Jackson et al. 2002; Peterson and Barrett 1987). A similar picture was observed in the studies of relationship between causal attributions and academic performance, mostly attributions contributing to poor performance were studied (Perry et al. 2008). However the empirical link between OAS\_N and academic achievement has been inconsistent and sometimes contradictory. For example, Peterson and Barrett (1987) found that low

OAS\_N was a reliable predictor of poor academic performance in college students, a pattern that was later confirmed with schoolchildren (Yates and Yates 1995). However, subsequent studies showed no relationship between OAS\_N and the academic achievement of university students and high school students (e.g., Bridges 2001; Houston 2016; Yee et al. 2003), while others reported that pessimistic students can actually perform better than their more optimistic counterparts (e.g., Houston 1994; LaForge and Cantrell 2003).

Somewhat later, researchers began to specifically consider the importance of peoples' styles for explaining *positive* events (OAS\_P), as attention turned to understanding the processes by which people can *recover* from depression (Needles and Abramson 1990). Again, OAS\_P involves explaining good outcomes (such as doing well on a test, at a competition, or on a date) as being due to factors that are internal, global and stable (Peterson et al. 1982). However OAS\_P has received much less research attention overall, including in the achievement domain. Although there is less information to draw from, it appears that OAS\_P may indeed be important for predicting academic and achievement outcomes. Yates and Yates (1995) found that in elementary Australian schoolchildren, OAS\_P was more strongly associated with mathematics achievement over two years than OAS\_N. In a recent large-scale study of British high-schoolers, Houston (2016) found that OAS\_P predicts concurrent academic performance (see also Boyer 2006; Henry et al. 1993).

Unfortunately, little research has *directly* compared OAS\_P and OAS\_N as predictors of outcomes. Reasons include the fact that some researchers followed Peterson's (1991) recommendations and measured only attributional style for negative events (Dykema et al. 1996; Hilsman and Garber 1995; Kent and Martinko 1995; Travers et al. 2015), and the fact that sometimes when OAS\_P is assessed, it is simply subsumed into a single OAS composite (e.g., Ciarrochi et al. 2007; Leeson et al. 2008; Thompson et al. 1998), rather than being examined separately. This is a procedure which is open to question from an empirical standpoint, given the relative independence of the two constructs (Peterson 1991; Xenikou et al. 1997; Zautra et al. 1985).

Nevertheless, some research has directly compared OAS\_N and OAS\_P. This research has established that OAS\_P is just as important as OAS\_N in predicting (lower) negative emotional outcomes such as depression or negative affect (Needles and Abramson 1990), as well in predicting

positive emotional outcomes such as positive affect, life satisfaction (Rigby and Huebner 2005), happiness (Cheng and Furnham 2001), and self-esteem (Cheng and Furnham 2003). Happy people, it appears, explain good events as being due to stable, global and internal causes, just as much as they explain bad events as being due to unstable, local, and external causes. Again, less research has directly compared OAS\_P and OAS\_N in studies of academic achievement. Still, a small literature has developed around this question. Our first research goal was simply to meta-analyze this emerging literature.

Our main research hypothesis was that feeling *optimism regarding the continuation and pervasiveness of good events* is more important for supporting or boosting academic achievement, than is *optimism regarding the temporariness and specificity of bad events*. This hypothesis is consistent with recent Houston's study (2016) which found that in schoolchildren OAS\_P predicts academic performance, whereas OAS\_N does not. We based this hypothesis also on Weiner's attributional model of achievement motivation (1985) as well as on the "broaden and build" theory of positive emotions (Fredrickson 2008), which says that positive emotions help people to develop their "thought-action repertoires," that is, they facilitate the processes of learning and growth. We suggest that the positive emotions provided by optimistic assessments of positive events ("they will continue and will proliferate throughout my life!") help activate and maintain the broaden-and-build process, more directly than optimistic assessments of negative events, which primarily involve feelings of relief ("thank god, that probably won't happen, or will soon end!"). Optimistic attributions regarding positive events promote more actual academic growth, leading to correspondingly greater achievement.

### **Potential Moderators of Academic Performance–OAS Correlations**

One of the major advantages of meta-analysis is that it allows consideration of systematic variations between studies (Hunter and Schmidt 2004; Steel and Kammeyer-Mueller 2002). Two potential moderators of the relationship between OAS and academic performance were examined in this research. Previous researchers have found that as the participant's academic level rises (from primary to tertiary education), the associations of personality and individual difference variables with performance weaken. For example, within older students, performance is less strongly predicted by

intelligence (Jensen 1980) or by personality traits (all Big Five traits except Conscientiousness, Poropat 2009). The increasing diversity of educational and assessment practices at higher levels of education (Tatar 1998) could help to explain such heterogeneity. Alternatively, the moderating effect of academic level may be due to the presence of methodological artifacts, such as restriction of range at higher levels of education (Chamorro-Premuzic and Furnham 2006; Jensen 1980). Regardless of the explanation, in our analyses we tested whether academic level (secondary or tertiary) moderates the size of the associations between academic performance and OAS, for both positive and negative situations.

The second moderator we examined was type of test – general, or domain-specific. In addition to the domain-general ASQ, several specific types of ASQ have been proposed to examine the relationships between OAS and academic performance. The first and most widely used is Peterson and Barrett (1987) Academic ASQ (AASQ) which is patterned similarly to the ASQ, but which refers only to negative academic outcomes (e.g., “You fail a final examination,” “You cannot get started writing a paper”). Peterson and Barrett (1987) argued that their achievement-specific measure should better predict student grades. Although they showed the expected relation between the AASQ and grades, they did not compare the ASQ and AASQ measures. Via similar reasoning, Bandura argued that domain-specific self-efficacy is a better predictor of outcomes than general self-efficacy (Bandura 1997). We tested for the presence of this moderator (general versus academic-specific) in our studies.

Previous research on attributional style had faced some methodological problems regarding the parameters of OAS (Peterson 1984) which led to a decrease in the reliability of the results obtained. In our research we focused only on the stability and globality dimensions of attributional style, as recommended by Abramson et al. (1989) and Seligman (2002; see also Houston 1994). This is because the locus dimension has been shown to be problematic at a methodological level (i.e., low reliability, Cutrona et al. 1985; Smith et al. 2013; Xenikou et al. 1997), as well as at a conceptual level (i.e. questionable construct validity, Travers et al. 2015).

In sum, our main research hypothesis was that OAS\_P would be more strongly associated with academic achievement than OAS\_N. Our second hypothesis was that the effect of OAS on

achievement would be moderated by academic level and our third hypothesis was that type of questionnaire (general versus achievement-specific) would also moderate that effect.

In Study 1 we conduct a formal meta-analysis of the existing literature, to confirm the idea that attributions for positive events matter more, as well as test secondary hypotheses concerning participant academic level and type of questionnaire. In Studies 2-3 we collect new data from high schoolchildren and university students, using a longitudinal design in Study 3 to evaluate whether having an OAS (positive or negative) can help students to increase their academic achievement over time; in Study 2 we also intended to test the role of type of ASQ test for this link (for both OAS\_P and OAS\_N).

## Study 1

### Method

Study 1 was a meta-analysis of the existing literature, focusing on the associations of OAS\_N and OAS\_P with academic achievement. We found 61 publications in Scopus, Web of Science and ProQuest Dissertations databases using the following keywords: attributional style, explanatory style, optimism, pessimism, academic achievement (“(optimis\* OR pessimis\*) AND (attribution\* OR explanatory) AND style AND (achievement OR performance OR success)”); we also asked colleagues for unpublished studies, posters, presentations, etc. We included in the final analysis 43 publications, because the rest ( $k = 18$ ) did not contain the necessary information about the size and/or direction of the effects. Because some publications reported multiple effects regarding OAS for different outcome variables (e.g., different exams, SAT, etc.), we had data on 66 effects of OAS\_N, and 30 effects of OAS\_P (all data are presented in Table 1).

Pearson correlation ( $r$ ) was used as an effect size measure. For findings presented using multiple regression, we used the  $\beta$ -to- $r$  imputation formula (Peterson and Brown 2005) to estimate the effect size. All correlation coefficients were transformed to the Fisher’s  $z$  scale prior to data analysis. Collected effect sizes were not all independent, because findings based on one sample sometimes contained more than one relevant effect size. To deal with dependency of effect sizes and to retain statistical power the meta-analysis we used the robust variance estimation (RVE) approach with



small-sample adjustments (Hedges et al. 2010) via the *robumeta* package for R (Fisher and Tipton 2015). To evaluate the heterogeneity of effects across studies, we used the  $I^2$  coefficient (Higgins et al. 2003), which describes the percentage of total variation across studies that is due to heterogeneity rather than chance.

To estimate the effect sizes of OAS\_P and OAS\_N, an intercept-only meta-regression model was implemented. The intercept of this model can be interpreted as the overall effect size. For all analyses, the in-study effect size correlation ( $\rho$ ) was set at 0.8. We conducted sensitivity analyses across varying values of  $\rho$  (0.0, 0.2, 0.4, 0.6, 0.8, 1.0) to check the robustness of the coefficient of meta-regression, standard error, and between-study variance in study-average effect sizes values.

We performed our moderator analyses within the RVE meta-regression model framework. Two separate meta-regression models were run for each moderator variable. The regression coefficients for categorical moderators represent the differences in mean effect sizes between the reference level of the moderator (intercept) and the comparison level (contrast).

The results of analyses were made more practically meaningful by converting the correlations to Cohen's  $d$  (Olejnik and Algina 2000), which in this case can be interpreted as equivalent to the number of standard deviations between the mean levels of academic performance in groups that are either high or low on a specific OAS measure. It has been previously suggested that  $d$  effect sizes of around 0.2 can be considered as small, of around 0.5 medium, and of around 0.8 large (Cohen 1988).

## Results

The estimate of the mean effect size of the association between OAS\_P and academic performance was  $d = 0.21$ , indicating a small positive effect (see Table 2 for details). The sensitivity analysis showed that the estimates of between-study variance in study-average effect sizes ( $\tau^2 = 0.021$ ) and, consequently, the estimate of the average effect size were robust to different values of within-study effect size correlation (at different values of  $\rho$ , these estimates remained invariant up to four decimal places). However, the  $I^2 = 84.09$  indicated a rather high level of heterogeneity, suggesting that most of the observed variance in effect sizes was not due to chance.

For OAS\_N the estimate of the mean effect size was 0.11, indicating a weak but still significant effect. The sensitivity analysis showed that the estimates of between-study effect size

variance ( $\tau^2 = 0.017$ ) and the average effect size were robust to different values of within-study effect size correlation. However, the  $I^2 = 75.25$ , again, indicated a rather high level of heterogeneity, suggesting that most of the observed variance in effect sizes was not due to chance.

Additional analyses showed that the moderating effect of academic level was statistically significant for OAS\_P, indicating tangible difference in the effects of OAS\_P between schoolchildren and university students. The effect of OAS\_P in schoolchildren was moderate and highly significant ( $d = 0.39$ ) while in university students this effect was significantly lower and close to zero. The moderation effect of academic level on OAS\_N was not significant, but the analysis showed that there was weak yet significant effect of OAS\_N in schoolchildren ( $d = 0.26$ ). Not significant moderation effect means that the effects found in university samples do not formally differ from the effects found in schoolchildren.

Next we divided all studies into two types according to the measure of OAS that was used. The first category included studies where OAS was measured using questionnaires containing only achievement situations - AASQ (Peterson and Barrett 1987) and EASQ (Houston 2016). The second category included studies that used a general measure of OAS (ASQ, Peterson et al. 1982, and CASQ, Thompson et al. 1998) composed from both achievement and interpersonal situations. Using type of the test as a moderator we discovered that effect of the OAS\_N on academic achievement was tangible and statistically significant when AS was measured using tests based on achievement situations ( $d = 0.26$ ), while it was significantly weaker for studies with general AS measures. The effect size of OAS\_P was also much higher for the tests based on achievement situations ( $d = 0.52$ ), but there were only two studies with three effects for the analysis in this category so estimation of significance was impossible.

We also performed an additional meta-analysis on the studies reporting simultaneous effects of OAS\_N and OAS\_P. This analysis is relevant, because such simultaneous regressions remove the common variance of OAS\_P and OAS\_N and show their unique relationships with the outcome. Twenty two such studies were found ( $k = 29$ ,  $N = 6182$ ). The results of the meta-analysis showed a significant positive effect of OAS\_P ( $d = 0.20$ ,  $B = 0.099$ ,  $SE = 0.034$ ,  $t(20) = 2.91$ ,  $p = 0.009$ , 95%  $CI [0.028, 0.17]$ ,  $I^2 = 84.14$ ,  $\tau^2 = 0.02$ ) and a non-significant negative effect of OAS\_N ( $d = 0.11$ ,  $B = -$

0.056,  $SE = 0.029$ ,  $t(19) = -1.94$ ,  $p = 0.067$ , 95%  $CI [-0.116, 0.004]$ ,  $I^2 = 70.66$ ,  $\tau^2 = 0.01$ ). All the estimates of effect sizes and  $\tau^2$  in this additional meta-analysis were also quite stable across varying values of the in-study effect size correlation ( $\rho$ ). Thus, the results of this more rigorous comparison were analogous to the results based on the full sample of studies, although the very weak effects of OAS\_N became insignificant as a result of diminished sample size.

## Discussion

Study 1's meta-analysis supported the conclusions of the informal literature review which began this article. Specifically, OAS\_P was a reliable predictor of academic achievement, and OAS\_N was less so. The results for OAS\_N do not fully corroborate the findings of a previous meta-analysis of Richardson et al. (2012), which showed that OAS\_N is not related to academic achievement ( $k = 8$ ,  $r = 0.01$ , 95%  $CI [-0.12, 0.13]$ ). However they reported data on university students only, and the number of studies was much smaller. Also we found good evidence that within schoolchildren, there is a significant relation between OAS\_N and academic performance.

Apparently, one type of optimistic attributional style is more helpful for promoting academic achievement: the type which views positive outcomes as being due to stable, global and internal factors. As discussed earlier, such beliefs may help people to maintain motivation, expect success, cope with failure, make plans, and hold themselves accountable for results. Given the likelihood that academic successes really do reflect effortful striving by the student, OAS\_P may also serve to positively reinforce academic striving, and serve to cognitively link past expenditures of effort with expectancies of future success and expanding life-implications.

The principal limitations of the meta-analysis pertain to the relatively small number of studies that directly compared OAS\_P and OAS\_N. Thus, the two substantive effects that we observed (OAS\_P > OAS\_N, and moderation of effects by academic level) require further support. In Studies 2 and 3 we endeavored to test our Study 1 conclusions anew, by measuring both types of attributional style using samples of two academic levels – high school children and university students. We also used both types of ASQ – general and achievement-specific. We expected to replicate the general patterns revealed in the meta-analysis.

In sum, there are two problems in meta-analysis that we have conducted. The first one is that a comparison of the effects of OAS\_P for the two types of test (general vs domain-specific) was impossible, since most of the research was carried out using the general ASQ. Information on the role of achievement situations could be derived from two studies only with three effects, and these results show that OAS\_P is strongly related to GPA if the test is domain-specific.

The second problem with the analysis of meta-analytic moderators is that the existing studies are unevenly distributed across different levels of moderators, so that in the group of schoolchildren and achievement tests there was only one study (see table 3 for details). Thus, we planned two new studies. One of them allowed to analyze the role of type of test in a schoolchildren sample, and another allowed us to analyze the role of positive achievement situations in a university student sample. The latter study also contained a longitudinal component.

## **Study 2**

### **Method**

#### **Participants and Procedure**

Participants were 202 10th and 11th graders drawn from five regular secondary schools located in Moscow. The sample comprised 74 boys and 128 girls;  $M$  age = 15.37,  $SD$  = 1.02, age range: 14–18 years. The questionnaires were administered to students in group settings during regular class hours. The research was introduced as “a study of adolescents’ views on life.” Parental consent to participate was obtained for all students.

#### **Measures**

*Attributional style.* A modified for adolescents version of the ASQ (Peterson et al. 1982) was used (the Success and Failure ASQ, SFASQ-adolescent version; see Gordeeva et al. 2009, Gordeeva and Osin 2011, for reliability and validity information). The measure was comprised of 24 hypothetical life scenarios, including academic, sport and interpersonal. An example situation is: “You have successfully passed an important exam.” After having written down the likely cause of this situation, the respondent assessed it using these items: “The cause of my successfully passing the important exam... will never re-emerge / will exist forever” (unstable-stable dimension) and “This cause is associated... with only this situation / with every situation in my life” (specific-global

dimension). As in original ASQ participants were instructed to imagine that each situation had actually happened to them, and to write down the most likely cause. OAS\_P was the sum of the stable and global ratings across the 15 positive event situations (Cronbach's  $\alpha = .77$ ), and OAS\_N was the sum of the unstable and local (after recoding) ratings of the 9 negative event situations (Cronbach's  $\alpha = .84$ ). Also as described below, in our confirmatory analyses we modeled both the positive/negative dimension and the globality and stability dimensions.

Our prior studies have examined the relationship between OAS\_N and OAS\_P and well-being and found that both these relationships are significant (Gordeeva and Osin 2011).

*Academic achievement.* In addition to completing the questionnaires, students were asked to indicate their last term's grades in three principal school subjects (Math, native language, and Literature). The three grades were averaged to form an overall academic achievement indicator (Cronbach's  $\alpha = .79$ ).

## Results

To establish the reliability of the ASQ measure, following Liu and Bates (2014) we conducted a CFA for our ASQ questionnaire, testing a hierarchical model consisting of two second-order factors (OAS\_P and OAS\_N) and four first-order factors (positive-stable, positive-global, negative-stable, negative-global). Twelve parcels were used as indicators of these factors (3 parcels per each factor; the distribution of items between the parcels was random, Bandalos and Finney 2001). Each second-order factor was defined by two first-order factors (stable and global), with the loadings of the first-order factors set equal to each other to achieve convergence. The covariance between the second-order factors (OAS\_P and OAS\_N) was not significant and was deleted from the model. Estimation of the resulting factor model yielded a satisfactory fit: *MLR*,  $\chi^2 = 85.49$ ; *df* = 52; *p* = 0.002; *CFI* = 0.942; *NNFI* = 0.927; *RMSEA* = 0.056; *90% CI for RMSEA*: 0.034-0.077; *PCLOSE* = 0.293; *N* = 202. All paths were significant at *p* < .01. The hierarchical model with one second-order factor (OAS) showed lack of fit:  $\chi^2 = 154.56$ ; *df* = 51; *p* < 0.001; *CFI* = 0.822; *NNFI* = 0.769; *RMSEA* = 0.100; *90% CI for RMSEA*: 0.082-0.119; *PCLOSE* = 0.000; *N* = 202.

Table 4 presents descriptive statistics and correlations for the major study variables. *T*-tests conducted upon the five study variables revealed that girls earned a significantly higher GPA than

boys; however gender did not moderate any of the results below, so it is not considered further. At the zero-order level only OAS\_P showed a significant correlation with academic performance. The same results we obtained in multiple regression analysis using OAS\_P and OAS\_N as predictors of GPA. Standardized coefficient beta was significant for OAS\_P ( $\beta = 0.25, p < 0.001$ ), but not significant for OAS\_N ( $\beta = 0.07, p = 0.29$ ).

During further analysis we divided the scenarios in SFASQ into two types: achievement and general events. For each type of scenario the sum score was calculated (but negative events estimates were inverted before scoring). Further, scores by academic achievement events were calculated separately for negative ( $N=4$ ) and positive ( $N=5$ ) events. In this case both OAS\_P and OAS\_N showed significant associations with GPA (see table 5), although again as shown in the meta-analysis, the correlation of OAS\_P with academic performance was stronger and more significant. In particular, the correlations presented in Table 5 show that the OAS\_P score was significantly associated with grades for every single subject and cumulative GPA both in case of the general OAS and academic OAS, although the correlations were slightly stronger in case of academic-specific OAS.

### Study 3

In Study 3 we assessed college students, in whom much weaker relationships were observed between both types of OAS and GPA, according to our meta-analysis. However most previous studies with this group used either a general ASQ or an academic ASQ (AASQ, Peterson and Barrett 1987) that measures only OAS\_N. In our study we used the extended AASQ which allowed us to measure both OAS\_P and OAS\_N. Finally, Study 3 employed a longitudinal design, to evaluate the effects of initial OAS\_P and OAS\_N upon changes in academic achievement, measured prior the study (Time 0), simultaneously with OAS at Time 1, and at a later Time 2. Showing such effects would strengthen the case for causal nature of relationships between OAS and academic performance, showing that the disposition to explain optimistically positive events can help a person to improve upon their own achievement levels.

### Method

#### Participants and Procedure

Initial participants were 151 university freshmen from Chemistry Department of Moscow State University, 83 males and 68 females;  $M$  age = 17.69;  $SD$  = 0.96, age range: 16–26 years. Participants completed the modified AASQ in the spring of their freshman year (T1). To control base level of achievement we used prior GPA for autumn session (T0). The longitudinal effect on achievement was estimated using the next year GPA for autumn session (T2). Nine participants left the university during the study, but attrition analyses comparing means between the subsamples with full and missing data revealed no significant differences, indicating that participants were missing at random. The questionnaires were administered to students in group settings during class. The research was introduced as “a study of youths’ views on life”.

### Measures

*Attributional style.* To measure attributional style the SFASQ for University students was used, which included only achievement situations. Specifically, the measure comprised 12 hypothetical scenarios related to students’ academic events, with 5 positive and 7 negative situations. The scenarios were all within the achievement domain, befitting our primary focus on academic achievement as an outcome. As before, participants were instructed to imagine that a situation actually happened to them and to report the most likely cause. Then, using a 6-point Likert scale, participants rated the cause on two main dimensions of attributional style: stable-unstable and global-specific. Again the internality parameter was not used due to the methodological and conceptual reasons (and recommendations) described above. An OAS\_P score was computed by summing the stable and global ratings for positive situations (Cronbach’s  $\alpha$  = .80), and an OAS\_N score was computed by first reversing the ratings of the negative situations, then summing the two kinds of ratings (Cronbach’s  $\alpha$  = .89).

*Academic achievement.* The actual academic performance of undergraduate students was measured using average grades for end-of-term examinations (usually 4 exams), which take place twice a year (Fall and Spring semesters). We used an average score for session 1, which was previous to measurement of OAS time (T0) and prospective to the measurement time session 2 (T1) and session 3 (T2).

### Results

We used MPlus to test a hierarchical model with two second-order factors (OAS\_P and OAS\_N) and four first-order factors (positive-stable, positive-global, negative-stable, negative-global) allowing correlations within each pair of items referring to the same situation. Each second-order factor was again defined by two first-order factors (stable and global factors), with the loadings of the first-order factors set equal to each other in order to achieve convergence. The covariance between the second-order factors (OAS\_P and OAS\_N) was non-significant so it was deleted from model.

Estimation of this model yielded a good fit: MLR,  $\chi^2 = 314.35$ ;  $df = 238$ ;  $p < 0.001$ ;  $CFI = 0.933$ ;  $TLI = 0.922$ ;  $RMSEA = 0.046$ , 90% CI for RMSEA: 0.031-0.059,  $PCLOSE = 0.672$ ,  $N = 151$ . All paths were significant at  $p < 0.01$ . A hierarchical model with only one second-order factor showed worse fit:  $\chi^2 = 349.28$ ;  $df = 235$ ;  $p < 0.001$ ;  $CFI = 0.899$ ;  $NNFI = 0.882$ ;  $RMSEA = 0.057$ ; 90% CI for RMSEA: 0.044-0.069;  $PCLOSE = 0.185$ ;  $N = 151$ .

Table 6 presents descriptive statistics and correlations for the major study variables. *T*-tests conducted upon the five study variables revealed that again women earned a significantly higher GPA at the end of the year than men; however, gender did not moderate any of the results below, so it is not considered further.

To simultaneously analyze the predicted relations we used structural equation modeling. We tested longitudinal effects of OAS\_P and OAS\_N on students' academic achievement controlling for prior level of their GPA. As in Study 2 we used a full-information maximum likelihood method (FIML) (Enders and Bandalos 2001) to analyze missing data. The model fit the data very well: MLR,  $\chi^2 = 3.790$ ;  $df = 3$ ;  $p = 0.285$ ;  $CFI = 0.996$ ;  $NNFI = 0.990$ ;  $RMSEA = 0.042$ ; 90% CI for RMSEA: 0.000-0.149;  $PCLOSE = 0.440$ ;  $N = 151$ . As can be seen in Figure 1, the cross-sectional effects were not significant: OAS\_P and OAS\_N were not associated with concurrent GPA (T1). Turning to the longitudinal part of the model, OAS\_P significantly predicted GPA at T2 controlling for GPA at T1 and T0, indicating that OAS\_P predicts *change* in GPA. So, having a strong OAS\_P at T1 may help people to improve their achievement levels at a later time, compared to their own initial baselines.

### General Discussion

In these three studies we re-examined some lingering issues in the literature linking attributional style and academic performance. We have shown that the way students explain the *good*



things that happen to them may ultimately be more important for their achievement than how they explain the *bad* things that happen to them. These results are generally in line with positive psychology theories and research showing asymmetries of positive and negative emotions (Fredrickson 2001; Bryant and Veroff 2007). This result also echoes findings showing that OAS for explaining positive events is more important for daily life satisfaction and relationship well-being than is OAS for explaining negative events (Gable et al. 2004).

In our two new studies we were able to demonstrate a clear two factor structure in the ASQ. According to these analyses, ASQ data are primarily characterized by a distinction between the *type* of event being explained: negative or positive. Also, Studies 2 and 3 found that within each type of event globality and stability factors can also be found, the two major dimensions of attributions typically employed by attributional style researchers. We suggest that for many, if not most purposes, these two dimensions of attributional style can be collapsed together to create OAS\_P and OAS\_N scores, given that they are associated at approximately  $r = .50$ . However, in some cases researchers may want to examine the separate effects of globality and stability. We ourselves did not find consistent-enough effects, in this regard, to be worth reporting.

In both our studies OAS\_P predicted academic achievement, and OAS\_N did not, in line with the general results of our Study 1 meta-analysis. Furthermore, the pattern was shown in longitudinal as well as cross-sectional data, indicating that OAS\_P is not just a disposition that develops *after* students begin performing well. Instead, an initially high OAS\_P score can help students to do even better than they have been doing. We suggest that a propensity to explain good outcomes as due to factors that will last, and that will spread to other areas of one's life, helps students to stay intrinsically motivated, set achievable goals and be persistent in the face of minor setbacks that occur. Such a propensity can also help people to savor and capitalize on their minor successes, using them as positive emotional springboards for the expansion of self-efficacy (Bandura 1997) and the "broadening and building" of cognitive resources (Fredrickson 2001).

We have also shown that the type of ASQ measure (domain-specific versus domain-general) also matters: optimism measured specifically for academic outcomes predicts academic performance, whereas domain-general ASQ is less related to GPA. This result is generally in line with Bandura's

self-efficacy theory (Bandura 1997), showing that domain-specific efficacy beliefs better predict academic performance than domain-general efficacy beliefs. However further research is needed to confirm this, because in the meta-analysis we found fewer studies that tested the domain-specific effect, especially domain-specific regarding attributions for positive events.

Why was OAS\_N less related to academic achievement than OAS\_P? Seemingly, the ability to perceive academic failures as being caused by local/unstable factors should help students cope with distress and re-focus their energies. As alluded to earlier, however, OAS\_N may instead reflect a short-term or emotion-focused coping style, designed to deflect bad feelings in the present. However at times, this may blind strivers to actual problems that need to be resolved, making OAS\_N problematic for actual achievement

Why were both OAS\_P and OAS\_N more related to academic performance in schoolchildren than in University students, as found in our meta-analysis and our two new studies? One possibility involves the fact that academic performance is assessed differently at the university level than at the school level (Poropat 2009, Erickson 2011). Specifically, at the school level, interactions between students and teachers are more immediate and direct, such that students can affect their own grades by affecting teachers' interpersonal evaluations of them. Another interpretation of the current findings is that traditionally educators in secondary and high schools tend to assess students on behavioral and personality (character) factors, not separating them from measures of students' performance. Conversely, student-professor relationships are much more distant, removing interpersonal evaluations from the equation.

The current findings have a number of practical implications providing an opportunity to enrich attributional retraining. Most importantly, they suggest that attributional retraining within the academic context should especially focus on students' explanations for positive events. Rather than teaching students how *not* to "catastrophize" when things go wrong, it may be more important to teach them to *celebrate* when things go right – or more specifically, to teach them to recognize when stable and global aspects of their own personality and life-strategies have caused good things to happen. Indeed, these results could extend the Penn resilience program (Gillham et al. 1995) which show that OAS\_N can be actively cultivated, giving young people the tools to protect against

depression and achieve long-lasting success within ever-wider and broader spheres of life.

Recognizing and appreciating these positive characteristics within oneself may serve to further reinforce and support those characteristics, causing an “upward spiral” of self-reinforcing activity (Sheldon and Houser-Marko 2001).

### **Limitations and Future directions**

We did not study the mechanisms that link OAS\_P and OAS\_N with academic achievement, such as academic goals, coping strategies, self-efficacy, and persistence. Furthermore, the causal relation between OAS\_P and academic achievement still requires further evidence. Although our Study 3 was longitudinal and controlled for baseline achievement, it lasted only a year, and used only university students. It will be important to replicate these results with middle school and high school students, also using domain-specific ASQs. Another limitation is the absence of achievement data within domains other than academic. That is, the generalizability of the achievement findings to the domains of work, sport, or recreation remains to be demonstrated.

### **Conclusions**

Many studies have shown that optimistic attributional style is positively related to well-being (Sweeney et al. 1986). However, attempts to extend the role of OAS to achievement have yielded unclear results. Our meta-analysis and two new studies found that OAS\_P is more strongly associated with academic performance than OAS\_N. We also found that participant’s Academic level (school/university) and the type of ASQ test (domain-specific/general) moderated associations with academic performance. Our findings thus highlight the importance of encouraging students to think optimistically not only regarding failures, but also regarding successes they experience.

### **Acknowledgments**

This work was supported by the Russian Academic Excellence Project '5-100' (Study 2 and 3) and by the Russian Foundation for Basic Research (project # 16-36-0037, Study 1).

## References

- Abramson, L.Y., Metalsky, G.I., & Alloy, L.B. (1989). Hopelessness depression: A theory-based subtype of depression. *Psychological Review*, *96*, 358–372. doi: 10.1037/0033-295X.96.2.358
- Abramson, L.Y., Seligman, M.E.P., & Teasdale, J.D. (1978). Learned helplessness in humans. *Journal of Abnormal Psychology*, *87*, 49–74. doi: 10.1037/0021-843X.87.1.49
- Bandalos, D.L. & Finney, S.J. (2001). *Item parceling issues in structural equation modeling*. In G. A. Marcoulides and R. Schumacker (Eds.), *New developments & techniques in structural equation modeling* (pp. 269–296). Mahwah, NJ and London: Lawrence Erlbaum.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- \*Bernieri, F., Fultz, A.A., & Brown, J. A. (2018). *Attributional Style and Self-Reported*. High School and College Grade Point Average. Oregon State University. Unpublished data.
- \*Berry, S. R. (2007). *An exploration of defensive pessimism, explanatory style, and expectations in relation to the academic performance of college and university students* (Doctoral Dissertation). University of Louisville, Louisville. doi: 10.18297/etd/104
- Blackwell, C. C. (2003). *Academic orientation: The effects of attributional styles and motivation on achievement in college students* (Doctoral Dissertation). University of Virginia, Charlottesville.
- \*Boyer, W. (2006). Accentuate the positive: The relationship between positive explanatory style and academic achievement of prospective elementary teachers. *Journal of Research in Childhood Education*, *21*(1), 53–63. doi: 10.1080/02568540609594578
- \*Bridges, K.R. (2001). Using attributional style to predict academic performance: How does it compare to traditional methods? *Personality and Individual Differences*, *31*(5), 723–730. doi: 10.1016/S0191-8869(00)00174-4
- Bryant, F. B., & Veroff, J. (2007). *Savoring: A new model of positive experience*. Mahwah, NJ: Lawrence Erlbaum.

- Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology*, *56*(2), 267–283. doi: 10.1037/0022-3514.56.2.267
- Chamorro-Premuzic, T., & Furnham, A. (2006). Intellectual competence and the intelligent personality: A third way in differential psychology. *Review of General Psychology*, *10*, 251–267.
- Cheng, H., & Furnham, A. (2001). Attributional style and personality as predictors of happiness and mental health. *Journal of Happiness Studies*, *2*, 307–323. doi: 10.1023/A:1011824616061
- Cheng, H., & Furnham, A. (2003). Attributional style and self-esteem as predictors of psychological well-being. *Counseling Psychology Quarterly*, *16*(2), 121–130. doi: 10.1080/0951507031000151516
- Ciarrochi, J., Heaven, P. C., & Davies, F. (2007). The impact of hope, self-esteem, and attributional style on adolescents' school grades and emotional well-being: A longitudinal study. *Journal of Research in Personality*, *41*(6), 1161–1178. doi: 10.1016/j.jrp.2007.02.001
- Cohen, J. (1988). *Statistical power analysis of the behavioral sciences* (2<sup>nd</sup> ed.). New York: Academic Press.
- Cutrona, C. E., Russell, D., & Jones R. D. (1984). Cross-situational consistency in causal attributions: Does attributional style exist? *Journal of Personality and Social Psychology*. *47*, 5, p. 1043–58. doi:10.1037/0022-3514.47.5.1043
- Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction with Life Scale. *Journal of Personality Assessment*, *49*, 71–75. doi: 10.1207/s15327752jpa4901\_13
- \*Dostal, P. (2000). *An examination of explanatory style and habits of the mind as correlates of academic achievement in 7th-grade gifted students* (Master's thesis). California State University, Long Beach, USA.
- Duckworth, A.L., Peterson, C., Matthews, M.D., & Kelly, D.R. (2007). Grit: Perseverance and passion for long-term goals. *Journal of Personality and Social Psychology*, *92*(6), p. 1087–1101. doi: 10.1037/0022-3514.92.6.1087

- Dykema, J., Bergbower, K., Doctora, J. D., & Peterson, C. (1996). An attributional style questionnaire for general use. *Journal of Psychoeducational Assessment, 14*(2), 100–108. doi: 10.1177/073428299601400201
- Enders, C. K., & Bandalos, D. L. (2001). The relative performance of full information maximum likelihood estimation for missing data in structural equation models. *Structural Equation Modeling, 8*(3), 430–457. doi: 10.1207/S15328007SEM0803\_5
- \*Eppler, M. A., Carsen-Plentl, C., & Harju, B. L. (2000). Achievement goals, failure attributions, and academic performance in nontraditional and traditional college students. *Journal of Social Behavior and Personality, 15*(3), 353.
- Erickson, J. A. (2011). A Call to Action: Transforming Grading Practices. *Principal Leadership, 11*, 6, p. 42-46.
- \*Fallah, N. (2014). *Familial, academic, and interpersonal predictors of attributional style in Latino youth* (Doctoral Dissertation). The University of North Carolina, Greensboro.
- Fazio, N. M., & Palm, L. J. (1998). Attributional style, depression, and grade point averages of college students. *Psychological Reports, 83*(1), 159–162. doi: 10.2466/pr0.1998.83.1.159
- Fisher, Z., & Tipton, E. (2015). *Robumeta: An R-package for robust variance estimation in meta-analysis* (arXiv preprint, arXiv:1503.02220).
- \*Flores, A. (2007). *Attributional style, self-efficacy, and stress as predictors of academic success and academic satisfaction in college students* (Doctoral Dissertation). University of Utah, Salt Lake City.
- \*Fox, L. A. (2006). *An exploration of the relationship of explanatory style to academic achievement, college student persistence, ACT/SAT composite scores, and college student inventory measures* (Master's Dissertation). Montana State University-Bozeman, College of Agriculture.
- Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist, 56*, 218–226. doi:10.1037/0003-066X.56.3.218.

Gable, S.L., Reis, H.T., Impett, E.A., & Asher, E.R. (2004). What do you do when things go right?

The intrapersonal and interpersonal benefits of sharing positive events. *Journal of Personality and Social Psychology*, *87*, 228–245. doi: 10.1037/0022-3514.87.2.228

\*Gibb, B.E., Zhu, L., Alloy, L.B., & Abramson, L.Y. (2002). Attributional styles and academic achievement in University Students: a longitudinal investigation. *Cognitive Therapy and Research*, *26*(3), 309–315. doi: 10.1023/A:1016072810255

Gillham, J.E., Reivich, K.J., Jaycox, L.H., Seligman, M.E.P. (1995). Prevention of depressive symptoms in schoolchildren: Two-year follow-up. *Psychological Science*, *6*(6), 343-351.

\*Gordeeva T.O., Lunkina M.V., Sychev O.A. (2018). Optimistic attributional style and parent-child relationships as predictors of adolescents well-being. *Voprosy Psikhologii*. In Press.

\*Gordeeva, T.O., & Osin, E.N. (2011). *Optimistic attributional style as a predictor of well-being and performance in different academic settings: A new look at the problem*. In I. Brdar (Ed.), *The Human Pursuit of Well-Being: A Cultural Approach* (pp. 159–174). Dordrecht, Springer. doi: 10.1007/978-94-007-1375-8\_14

Gordeeva, T.O., Osin, E.N., & Shevyakhova, V.Yu. (2009). *Measurement of optimism as attributional style for negative and positive life events: Success and Failure Attributional Style Questionnaires for adults and adolescents*. Moscow: Smysl.

Gordeeva T.O., Sychev O.A., Osin E.N. (2017). Evaluating optimism: Developing children's version of Optimistic Attributional Style Questionnaire. *Kul'turno-istoricheskaya psikhologiya [Cultural-Historical Psychology]*, *13*(2), 50–60. doi:10.17759/chp.2017130206.

\*Hale, B. D. (1993). Explanatory style as a predictor of academic and athletic achievement in college athletes. *Journal of Sport Behavior*, *16*(2), 63. doi: 10.1037/h0076270

Hedges, L. V., Tipton, E., & Johnson, M. C. (2010). Robust variance estimation in meta- regression with dependent effect size estimates. *Research synthesis methods*, *1*(1), 39-65. doi: 10.1002/jrsm.5

\*Henry, J. W., Martinko, M. J., & Pierce, M. A. (1993). Attributional style as a predictor of success in a first computer science course. *Computers in Human Behavior*, *9*(4), 341–352. doi: 10.1016/0747-5632(93)90027-P

- \*Hernandez, M. (1995). *The relationship of cultural and class variables to attributional style and academic performance among college students* (Doctoral Dissertation). Oklahoma State University, Stillwater.
- Higgins, J. P., Thompson, S. G., Deeks, J. J., & Altman, D. G. (2003). Measuring inconsistency in meta-analyses. *British Medical Journal*, 327(7414), 557–560. doi: 10.1136/bmj.327.7414.557
- Hiroto, D. S. & Seligman, M. E. P. (1975). Generality of learned helplessness in man. *Journal of Personality and Social Psychology*, 31, 311–327. doi: 10.1037/h0076270
- Hilsman, R., Garber, J. (1995). A test of the cognitive diathesis-stress model of depression in children: Academic stressors, attributional style, perceived competence, and control. *Journal of Personality and Social Psychology*, 69(2), 370-380.  
<http://dx.doi.org/10.1037/0022-3514.69.2.370>
- \*Houston, D. M. (1994). Gloomy but smarter: The academic consequences of attributional style. *British Journal of Social Psychology*, 33, 433–441. doi: 10.1111/j.2044-8309.1994.tb01039.x
- \*Houston, D.M. (2016). Revisiting the relationship between attributional style and academic performance. *Journal of Applied Social Psychology*, 46, 192–200. doi:10.1111/jasp.12356.
- Hu T., Zhang D., & Yang, Z. (2015). The relationship between attributional style for negative outcomes and depression: A meta-analysis. *Journal of Social and Clinical Psychology*, 34(4), 304–321. doi: 10.1521/jscp.2015.34.4.304
- Huebner, E.S. (1994). Preliminary development and validation of a Multidimensional Life Satisfaction Scale for children. *Psychological Assessment*, 6, 149–158. doi: 10.1037/1040-3590.6.2.149
- Hunter, J. E., & Schmidt, F. L. (2004). *Methods of meta-analysis: Correcting error and bias in research findings*. Thousand Oaks, CA: Sage.
- Jackson, B., Sellers, R.M., Peterson C. (2002). Pessimistic explanatory style moderates the effect of stress on physical illness. *Personality and Individual Differences*, 32, 3, p. 567-573. Doi: 10.1016/S0191-8869(01)00061-7
- Jensen, A. R. (1980). *Bias in mental testing*. New York: Free Press.



- Kent, R. L., & Martinko, M. J. (1995). The measurement of attributions in organizational research. In M. J. Martinko (Ed.), *Attribution theory: An organizational perspective* (pp. 17–75). Delray Beach, FL: St. Lucie Press.
- \*Khodayarifard, M. (1996). *Students' and their parents' attributional style, trait anxiety, and socio-demographic factors as predictors of teachers' perceptions of a academic performance in late childhood* (Doctoral Dissertation). University of Wollongong, Wollongong.
- \*Khodayarifard, M., Brinthaup, T. M., & Anshel, M. H. (2010). Relationships of parents' and child's general attributional styles to academic performance. *Social Psychology of Education, 13*(3), 351–365. doi: 10.1007/s11218-010-9114-2
- Kovacs, M. (1992). *Children's Depression Inventory: Manual*. North Tonawanda, NY: Multi-Health Systems.
- \*LaForge, M. C., & Cantrell, S. (2003). Explanatory style and academic performance among college students beginning a major course of study. *Psychological Reports, 92*(3), 861–865. doi: 10.2466/pr0.2003.92.3.861
- \*Lee, Y.-T., & Seligman, M. E. P. (1997). Are Americans more optimistic than the Chinese? *Personality and Social Psychology Bulletin, 23*(1), 32–40. doi: 10.1177/0146167297231004
- Leeson P., Ciarrochi J., Heaven P. (2008). Cognitive ability, personality, and academic performance in adolescence. *Personality and Individual Differences, 45*, 630—635. doi: 10.1016/j.paid.2008.07.006
- Lewis, S.P., Waschbusch, D.A., Sellers, D.P., Leblanc, M., & Kelley, M.L. (2014). Factor structure of the Children's Attributional Style Questionnaire-Revised. *Canadian Journal of Behavioural Science, 46*(2), 125–133. doi: 10.1037/a0035646
- \*Lieber, E. (1996). *The Teenage Attributional Style Questionnaire (TASQ): A valence and dimension-sensitive methodology for exploring attributional style in adolescent populations* (Doctoral Dissertation). University of Illinois at Urbana-Champaign, Urbana-Champaign.
- Lynd-Stevenson, R.M. & Rigano, L.M. (1996). Threat expectancy mediates the relationship between attributional style for negative outcomes and anxiety. *Cognitive Therapy Research, 20*, 6, 637–651. doi: 10.1007/BF02227966

Lyubomirsky, S., & Lepper, H. (1999). A measure of subjective happiness: Preliminary reliability and construct validation. *Social Indicators Research, 46*, 137–155. doi:

10.1023/A:1006824100041

\*Maleva, V., Westcott, K., McKellop, M., McLaughlin, R., & Widman, D. (2014). Optimism and college grades: predicting GPA from explanatory style. *Psi Chi Journal of Psychological Research, 19*(3), 129–135.

\*Martinez, R., & Sewell, K. W. (2000). Explanatory style as a predictor of college performance in students with physical disabilities. *Journal of Rehabilitation, 66*(1), 30–36.

Martin-Krumm, C., & Salama-Younes, M. (2008). Mode explicatif et résultats scolaires chez des enfants préadolescents. *Carrefours de l'éducation, 1*(1), 103–114.

\*McKenzie, K., & Schweitzer, R. (2001). Who succeeds at university? Factors predicting academic performance in first year Australian university students. *Higher Education Research & Development, 20*(1), 21–33. doi: 10.1080/07924360120043621

\*Morris, M., & Tiggerman, M. (2013). The impact of attributions on academic performance: A test of the reformulated learned helplessness model. *Social Sciences Directory, 2*(2), 3–15. doi: 10.7563/SSD\_02\_02\_01

\*Musgrave-Marquart, D., Bromley, S. P., & Dalley, M. B. (1997). Personality, academic attribution, and substance use as predictors of academic achievement in college students. *Journal of Social Behavior and Personality, 12*(2), 501–511.

Needles, D. J., & Abramson, L. Y. (1990). Positive life events, attributional style, and hopefulness: Testing a model of recovery from depression. *Journal of Abnormal Psychology, 99*(2), 156.

Nolen-Hoeksema, S., Girgus, J. S., & Seligman, M. E. (1986). Learned helplessness in children: A longitudinal study of depression, achievement, and explanatory style. *Journal of Personality and Social Psychology, 51*(2), 435–442. doi: 10.1037/0022-3514.51.2.435

Norem, J. K., & Cantor, N. (1986). Defensive pessimism: Harnessing anxiety as motivation. *Journal of Personality and Social Psychology, 51*(6), 1208–1217. doi: 10.1037/0022-3514.51.6.1208

- Olejnik, S., & Algina, J. (2000). Measures of effect sizes for comparative studies: Applications, interpretations, and limitations. *Contemporary Educational Psychology*, *25*, 241–286.  
<https://doi.org/10.1006/ceps.2000.1040>
- Perry, R.P. Stupnisky, R. H., Daniels, L. M., Haynes, T. L. (2008). Attributional (explanatory) thinking about failure in new achievement settings. *European Journal of Psychology of Education*. *23*, *4*, p. 459-475.
- Peterson, C. & Steen, T. (2005). *Optimistic explanatory style*. In C. R. Snyder & S. Lopez, *Handbook of positive psychology*, pp. 244-265. Oxford University Press.
- Peterson, C. (1991). The meaning and measurement of explanatory style. *Psychological Inquiry*, *2*(1), 1–10. doi: 10.1207/s15327965pli0201\_1
- Peterson, C. (1995). *Explanatory style and health*. In G. McClelland Buchanan & M.E.P. Seligman (Eds.), *Explanatory style* (pp. 233–246). Hillsdale, NJ: Lawrence Erlbaum Associates.
- \*Peterson, C., & Barrett, L. (1987). Explanatory style and academic performance among university freshmen. *Journal of Personality and Social Psychology*, *53*(3), 603–607. doi: 10.1037/0022-3514.53.3.603
- Peterson, C., & Seligman, M.E.P. (1984). Causal explanations as a risk factor for depression: Theory and evidence. *Psychological Review*, *91*(3), 347–374. doi: 10.1037/0033-295X.91.3.347
- Peterson, C., Semmel, A., von Bayer, C., Abramson, L., Metalsky, G., & Seligman, M.E.P. (1982). The Attributional Style Questionnaire. *Cognitive Therapy and Research*, *6*(3), 287–300. doi: 10.1007/BF01173577
- Peterson, C., Villanova, P., & Raps, C. S. (1985). Depression and attributions: Factors responsible for inconsistent results in the published literature. *Journal of Abnormal Psychology*, *94*, 165–168. doi: 10.1037/0021-843X.94.2.165
- Peterson, R. A., & Brown, S. P. (2005). On the use of beta coefficients in meta-analysis. *Journal of Applied Psychology*, *90*(1), 175–181. doi: 10.1037/0021-9010.90.1.175
- \*Pierce, M. A., & Henry, J. W. (1993). Attributional style as a predictor of success in college mathematics (Tech. Rep. No. 143). Georgia Southern University, Statesboro, GA.

- Poropat, A. E. (2009). A Meta-Analysis of the Five-Factor Model of Personality and Academic Performance. *Psychological Bulletin*, *135*(2), 322–338. <https://doi.org/10.1037/a0014996>
- \*Ralph, J. A., & Mineka, S. (1998). Attributional style and self-esteem: The prediction of emotional distress following a midterm exam. *Journal of Abnormal Psychology*, *107*(2), 203–215. doi: 10.1037/0021-843X.107.2.203
- Richardson, M., Abraham, C. & Bond, R. (2012). Psychological Correlates of University Students' Academic Performance A Systematic Review and Meta-Analysis. *Psychological Bulletin*, *138*, 353-387. doi: 10.1037/a0026838.
- Rigby, B.N., & Huebner E.S. (2005). Do causal attributions mediate the relationship between personality characteristics and life satisfaction in adolescence? *Psychology in the Schools*, *42*(1), 91–99. doi: 10.1002/pits.20026
- Ritterband, L.M., & Spielberger, C.D. (1996). Construct validity of the Beck Depression Inventory as a measure of state and trait depression in non-clinical populations. *Depression and Stress*, *2*, 123–145.
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.
- Rosenthal, R. (1991). *Meta-analytic procedures for social research*. Newbury Park, London, New Delhi, Sage.
- \*Rowe, J. E., & Lockhart, L. K. (2005). Relationship of cognitive attributional style and academic performance among a predominantly Hispanic college student population. *Individual Differences Research*, *3*(2), 136–139.
- Ryan, R.M., & Frederick, C. (1997). On energy, personality and health: Subjective vitality as a dynamic reflection of well-being. *Journal of Personality* *65*, 529–565. doi: 10.1111/j.1467-6494.1997.tb00326.x
- \*Satterfield, J. M., Monahan, J., & Seligman, M. E. (1997). Law school performance predicted by explanatory style. *Behavioral Sciences & the Law*, *15*(1), 95–105.

- Schlomer, G. L., Bauman, S., & Card, N. A. (2010). Best practices for missing data management in counseling psychology. *Journal of Counseling Psychology, 57*(1), 1–10. doi: 10.1037/a0018082
- Schneider, S. L. (2001). In search of realistic optimism: Meaning, knowledge, and warm fuzziness. *American Psychologist, 56*(3), 250–263. doi: 10.1037/0003-066X.56.3.250
- \*Schulman, P. (1995). Explanatory style and achievement in school and work. In G. Buchanan & M. E. P. Seligman (Eds.), *Explanatory style* (pp. 159–171). Hillsdale, NJ: Lawrence Erlbaum.
- Seligman, M.E.P. (1972). Learned helplessness. *Annual Review of Medicine, 23*, 407–412. doi: 10.1146/annurev.me.23.020172.002203
- Seligman, M. E. P. (2002). *Authentic happiness: Using the new positive psychology to realize your potential for lasting fulfillment*. New York: Free Press.
- Seligman, M. E., & Schulman, P. (1986). Explanatory style as a predictor of productivity and quitting among life insurance sales agents. *Journal of Personality and Social Psychology, 50*(4), 832–838.
- Seligman, M. E., Abramson, L. Y., Semmel, A., & Von Baeyer, C. (1979). Depressive attributional style. *Journal of Abnormal Psychology, 88*(3), 242–247. doi: 10.1037/0021-843X.88.3.242
- Sheldon, K. M., & Houser-Marko, L. (2001). Self-concordance, goal-attainment, and the pursuit of happiness: Can there be an upward spiral? *Journal of Personality and Social Psychology, 80*, 152–165. doi: 10.1037/0022-3514.80.1.152
- Shmulsky, S., & Gobbo, K. (2007). Explanatory style and college students with ADHD and LD. *Journal of Attention Disorders, 10*(3), 299–305.
- Smith, P., Caputi, P., & Crittenden, N. (2013). Measuring optimism in organizations: Development of a workplace explanatory style questionnaire. *Journal of Happiness Studies, 14*(2), 415-432. doi: 10.1007/s10902-012-9336-4
- Steel, P. D., & Kammeyer-Mueller, J. D. (2002). Comparing meta-analytic moderator estimation techniques under realistic conditions. *Journal of Applied Psychology, 87*, 96–111.

- Sweeney, P.D., Anderson, K., & Bailey, S. (1986). Attributional style in depression: A meta-analytic review. *Journal of Personality and Social Psychology*, *50*(5), 974–991. doi: 10.1037/0022-3514.50.5.974
- Tatar, M. (1998). Primary and secondary school teachers' perceptions and actions regarding their pupils' emotional lives. *School Psychology International*, *19*, 151–168.
- Taylor, S. E. (2011). *Positive illusions: How ordinary people become extraordinary*. In M. A. Gernsbacher, R. W. Pew, L. M. Hough, J. R. Pomerantz (Eds.), *Psychology and the real world: Essays illustrating fundamental contributions to society* (pp. 224–228). New York, NY: Worth Publishers.
- Tennen, H., & Affleck, G. (1991). The meaning and measurement of explanatory style: Unresolved issues. *Psychological Inquiry*, *2*(1), 39-43. doi: 10.1207/s15327965pli0201\_11
- Thompson, M., Kaslow, N. J., Weiss, B., & Nolen-Hoeksema, S. (1998). Children's Attributional Style Questionnaire-Revised: Psychometric examination. *Psychological Assessment*, *10*(2), 166–170. doi: 10.1037/1040-3590.10.2.166
- \*Tiggemann, M., & Crowley, J. R. (1993). Attributions for academic failure and subsequent performance. *Australian Journal of Psychology*, *45*(1), 35–39.
- \*Tippett, S. R. (2006). *Examination of class and cultural variables, explanatory style, and academic achievement among Native American and Caucasian college students* (Doctoral Dissertation). Oklahoma State University, Stillwater.
- Travers, K., Creed, P., Morrissey, S. (2015). The development and initial validation of a new scale to measure explanatory style. *Personality and Individual Differences*, *81*, 1-6. doi: 10.1016/j.oaid.2015.01.045
- \*Ward, C. W. (2003). Explanatory styles among undergraduate students in Christian higher education. Part 1: A single-institution case study. *Christian Higher Education*, *2*(2), 169–185.
- Weiner, B. (1972). Attribution theory, achievement motivation, and the educational process. *Review of educational research*, *42*(2), 203–215. doi: 10.2307/1170017
- Weiner, B. (1974). *Achievement motivation and attribution theory*. Morristown, NJ: general Learning Press.

Weiner, B. (1979). A theory of motivation for some classroom experiences. *Journal of Educational Psychology, 71*, 3–25. doi: 10.1037/0022-0663.71.1.3

Xenikou, A., Furnham, A., & McCarrey, M. (1997). Attributional style for negative events: A proposition for a more reliable and valid measure of attributional style. *British Journal of Psychology, 88*, 53–69. doi: 10.1111/j.2044-8295.1997.tb02620.x

\*Yates, S.M., Yates, G. C., & Lippett, R. M. (1995). Explanatory style, ego-orientation and primary school mathematics achievement. *Educational Psychology, 15*(1), 23–34. doi: 10.1080/0144341950150103

\*Yates, S. M. (1999). Students' optimism, pessimism and achievement in mathematics: A longitudinal study. In *Proceedings of the 22nd annual conference of the Mathematics Education Research Group of Australasia (MERGA)* (pp. 561-567).

\*Yee, P.L., Pierce, G.R., Ptacek, J.T., & Modzelesky, K.L. (2003). Learned helplessness attributional style and examination performance: Enhancement effects are not necessarily moderated by prior failure. *Anxiety, Stress, and Coping, 16*(4), 359–373. doi: 10.1080/0003379031000140928

Zautra, A. J., Guenther, R. T., & Chartier, G. M. (1985). Attributions for real and hypothetical events: Their relation to self-esteem and depression. *Journal of Abnormal Psychology, 94*(4), 530–540. doi: 10.1037/0021-843X.94.4.530

\*denotes studies included in the meta-analysis

Table 1

*Study 1: Summary of Studies and Samples Included in the Meta-Analysis*

Study	<i>r</i> (OAS_P)	<i>r</i> (OAS_N)	<i>N</i>	Measure	Academic level	Dependent variable	Type of test
Bernieri et al. 2018	0.05	-0.14	138	ASQ-2	U	GPA	G
Berry 2007	0.25	-0.05	188	AASQ	U	Exam grades	A
Berry 2007	0.21	-0.10	188	AASQ	U	Course grades	A
Boyer 2006	0.37	0.19	48	CAVE	U	Final exam	G
Boyer 2006	0.07	0.27	48	CAVE	U	Midterm exam	G
Bridges 2001	-0.08	0.06	127	ASQ	S	Course-based objective examinations	G
Dostal 2000	0.44	-0.24	29	CASQ	S	SAT-9 subscale scores (reading total)	G
Dostal 2000	0.09	-0.35	29	CASQ	S	SAT-9 subscale scores (math total)	G
Dostal 2000	0.52	-0.11	29	CASQ	S	SAT-9 subscale scores (language)	G
Dostal 2000	0.24	-0.12	29	CASQ	U	SAT-9 subscale scores (spelling)	G
Eppler et al. 2000	—	-0.18	153	AASQ	S	GPA	A
Fallah 2014	—	0.05	442	ACSQ	U	Academic performance (self-reported 1 item)	G



Flores 2007	0.03	-0.06	250	ASQ	U	GPA	G
Fox 2006	—	-0.24	57	AASQ	U	GPA for the first semester	A
Fox 2006	—	-0.16	52	AASQ	U	GPA for the second semester	A
Fox 2006	—	-0.01	39	AASQ	U	GPA for the third semester	A
Gibb et al. 2002	—	0.11	109	CSQ	U	GPA, 5-year cumulative	G
Gordeeva and Osin 2011	-0.08	0.26	87	SFASQ- A	U	Average exam grade	G
Gordeeva et al. 2017	0,23	-0,13	182	CASQ	U	GPA	G
Gordeeva et al. 2018	0.37	-0.30	206	CASQ	U	GPA	G
Hale 1993	-0.08	0.01	92	ASQ	U	GPA at the end of their freshman year	G
Hale 1993	-0.01	0.10	92	ASQ	U	GPA in the middle of their junior year	G
Henry et al. 1993	0.26	-0.12	35	ASQ	U	Final grades of a computer course	G
Hernandez 1995, sample 1	—	0.33	39	AASQ	U	GPA	A
Hernandez 1995, sample 2	—	-0.31	39	AASQ	U	GPA	A
Houston 1994, study 1	—	0.28	58	ASQ	S	Voluntary mid-term multiple choice psychology assessment test	G
Houston 1994, study 2	—	0.11	158	ASQ	S	Compulsory end-of-term multiple choice	G

						psychology assessment examination	
Houston 1994, study 3	—	0.32	42	ASQ	S	A-level score	G
Houston 2016	0.27	-0.01	979	EASQ	U	GCSE public examinations	A
Khodayarifard 1996	0.00	-0.08	554	CASQ	U	Teacher ratings of academic performance	G
Khodayarifard et al. 2010	0.01	-0.12	179	CASQ	U	Teacher ratings of academic performance	G
LaForge and Cantrell 2003	—	0.19	116	ASQ	S	Accumulated course points	G
LaForge and Cantrell 2003	—	0.28	116	ASQ	U	GPA	G
Lee and Seligman 1997	0.12	0.09	312	ASQ	U	Higher GPA (better school performance)	G
Lieber 1996	0.22	—	169	TASQ	U	GPA	G
Maleva et al. 2014	—	-0.15	171	AASQ	U	GPA	A
Martinez and Sewell 2000, sample 1	—	-0.42	32	AASQ	U	GPA	A
Martinez and Sewell 2000, sample 2	—	-0.38	38	AASQ	U	GPA	A
McKenzie and Schweitzer 2001	0.18	-0.03	197	ASQ	U	GPA	G
Metalsky et al. 1987	—	0.03	94	ASQ	U	Midterm exam	G
Morris and Tiggemann 2013, sample 1	—	0.08	288	AASQ	U	Short Answer (SA) exam 1	A
Morris and Tiggemann 2013, sample 1	—	0.19	291	AASQ	U	SA exam 2	A
Morris and Tiggemann 2013, sample 1	—	0.13	276	AASQ	U	GPA	A

Morris and Tiggemann 2013, sample 2	—	-0.02	255	AASQ	U	SA exam 1	A
Morris and Tiggemann 2013, sample 2	—	-0.10	292	AASQ	U	SA exam 2	A
Morris and Tiggemann 2013, sample 2	—	-0.09	291	AASQ	U	GPA	A
Musgrave-Marquart et al. 1997	—	-0.12	161	AASQ	U	GPA	A
Peterson and Barrett 1987	—	-0.36	87	AASQ	U	GPA	A
Pierce and Henry 1993	0.03	-0.08	682	ASQ	U	Final grade in college algebra course	G
Ralph and Mineka 1998	—	0.02	141	EASQ	U	Grade received on introductory psychology course exam	G
Rowe and Lockhart 2005	—	-0.25	179	EASQ	U	Final grade at the end of the course of psychology and sociology	G
Satterfield et al. 1997	-0.135	0.05	387	ASQ	U	Cumulative GPA	G
Schulman 1995, study 2	-0.18	0.11	289	ASQ	U	Predictive index (a weighted average of SAT scores, achievement test scores, and high school rank)	G
Schulman 1995, study 3	0.15	-0.19	175	ASQ	U	Predictive index	G
Smith et al. 1988	—	-0.38	121	AASQ	S	Course grade	A
Tiggemann and Crowley 1993	—	0.03	37	AASQ	U	Performance on Reexamination (Grade)	A

Tippett 2006, sample 1	—	-0.33	52	AASQ	U	GPA	A
Tippett 2006, sample 2	—	0.02	71	AASQ	U	GPA	A
Villanova et al. 1988	—	-0.39	60	AASQ	U	Test	A
Ward 2003	—	0.14	100	AASQ	S	GPA	A
Yates 1999	0.19	-0.21	243	CASQ	S	Progressive Achievement Tests in Mathematics	G
Yates 1999	0.18	-0.14	243	CASQ	U	Progressive Achievement Tests in Mathematics	G
Yates et al. 1995	0.20	-0.30	145	CASQ	U	Progressive Achievement Tests in Mathematics	G
Yee et al. 2003	—	0.01	96	ASQ	U	Introductory psychology course (IPC) exam 1	G
Yee et al. 2003	—	-0.01	96	ASQ	S	IPC exam 2	G
Yee et al. 2003	—	0.11	96	ASQ	U	IPC exam 3	G
Yee et al. 2003	—	0.24	96	ASQ	S	IPC exam 4	G

*Note.*  $r$  = Pearson correlation (raw), U = university, S = school; A = test contains achievement situations, G = test contains general life situations.

Table 2

*Study 1: Effects of OAS\_P and OAS\_N on Academic Performance and Moderation of Academic Performance–OAS Correlations*

	<i>k</i>	<i>B</i>	<i>SE B</i>	<i>t</i>	<i>df</i>	<i>p</i>	95% <i>CI</i>		<i>I</i> <sup>2</sup>	$\tau^2$	<i>d</i>
							<i>LL</i>	<i>UL</i>			
<b>Results for OAS_P (N = 6,351)</b>											
<i>Intercept-only model</i>									83.71	0.021	
OAS_P	30	0.105	0.033	3.17	21.1	0.005	0.036	0.173			0.21
<i>Moderator: Academic level</i>											
<i>School (constant)</i>	13	0.196	0.046	4.27	7.5	0.003	0.089	0.303			0.39
<i>University</i>	17	-0.155	0.060	-2.60	16.4	0.019	-0.282	-0.029			0.08
<i>Moderator: Type of test</i>											
<i>A (constant)</i>	3	0.258	0.021	12.07	1.0	0.053	-0.014	0.529			0.52
<i>G</i>	27	-0.173	0.040	-4.28	1.3	0.108	-0.498	0.153			0.17
<b>Results for OAS_N (N = 11,023)</b>											
<i>Intercept-only model</i>									74.61	0.016	
OAS_N	66	-0.054	0.025	-2.15	44.5	0.037	-0.105	-0.003			0.11
<i>Moderator: Academic level</i>											
<i>School (constant)</i>	13	-0.131	0.044	-2.98	7.5	0.019	-0.233	-0.028			0.26
<i>University</i>	53	0.097	0.053	1.85	12.0	0.090	-0.018	0.212			0.07
<i>Moderator: Type of test</i>											
<i>A (constant)</i>	26	-0.128	0.046	-2.81	16.3	0.012	-0.224	-0.032			0.26
<i>G</i>	40	0.114	0.054	2.11	33.0	0.043	0.004	0.224			0.03

*Note.* *N* = aggregate sample; *k* = number of effects; *B* = regression weight; *SE B* = standard error of *B*; *t* = *t*-statistic; *df* = Satterthwaite degrees of freedom; 95% *CI* = 95% confidence interval; *LL* = lower

limit; UL = upper limit;  $I^2$  = ratio of true heterogeneity to total variance across the observed effect sizes;  $\tau^2$  = between-study variance in study-average effect sizes;  $d$  = *Cohen's d*; A = test contains achievement situations, G = test contains general situations. If the Satterthwaite degrees of freedom are less than 4, the probability of a Type I error is much higher than .05 and one should not trust the results.

Table 3

*Study 1: Number of Effects for Each Level of Moderators in Meta-analysis*

Academic level	OAS_P, type of measure		OAS_N, type of measure	
	A	G	A	G
Schoolchildren	1	12	1	12
University students	2	15	25	28

*Note.* A = ASQ measure contains achievement situations only, G = ASQ measure contains general situations.

Table 4

*Study 2: Mean scores, reliability coefficients, and Pearson correlations for attributional style and academic performance (high school students, N = 202)*

Scale	<i>M</i>	<i>SD</i>	<i>α</i>	OAS_P	OAS_N
OAS_P	8.14	1.70	0.77	–	
OAS_N	8.89	1.36	0.84	0.05	–
GPA	3.66	0.53	0.79	0.25***	0.09

Note: \*\*\*  $p < 0.001$ ; \*\*  $p < 0.01$ ; \*  $p < 0.05$ .



Table 5

*Study 2: Pearson correlations for general attributional style, academic attributional style and academic performance (high school students, N = 202)*

Subject/ indicator	OAS_P (Positive- composite)	OAS_N (Negative- composite)	OAS_P (5 acad. events)	OAS_N (4 acad. events)
Language 0,041	0.24***	0.04	0.27***	0.13
Literature	0.18**	0.02	0.21**	0.10
Algebra	0.19**	0.12	0.26***	0.17*
Geometry	0.21**	0.11	0.25***	0.15*
GPA	0.25***	0.09	0.30***	0.17*
Cronbach's $\alpha$	0.77	0.84	0.73	0.68

*Note: \*\*\*  $p < 0.001$ ; \*\*  $p < 0.01$ ; \*  $p < 0.05$ .*

Table 6

*Study 3: Mean scores, reliability coefficients, and Pearson correlations for attributional style and academic performance (university students sample)*

Indicator	<i>N</i>	<i>M</i>	<i>SD</i>	$\alpha$	OAS_P	OAS_N	T0 GPA	T1 GPA
OAS_P	151	9.24	1.53	0.80	–			
OAS_N	151	7.63	1.94	0.89	–0.11	–		
T0 GPA	151	4.21	0.57	–	0.11	–0.04	–	
T1 GPA	151	4.30	0.57	–	0.16	–0.01	0.72***	–
T2 GPA	142	4.07	0.80	–	0.24*	–0.01	0.67***	0.80***

*Note:* \*\*\*  $p < 0.001$ ; \*\*  $p < 0.01$ ; \*  $p < 0.05$ .

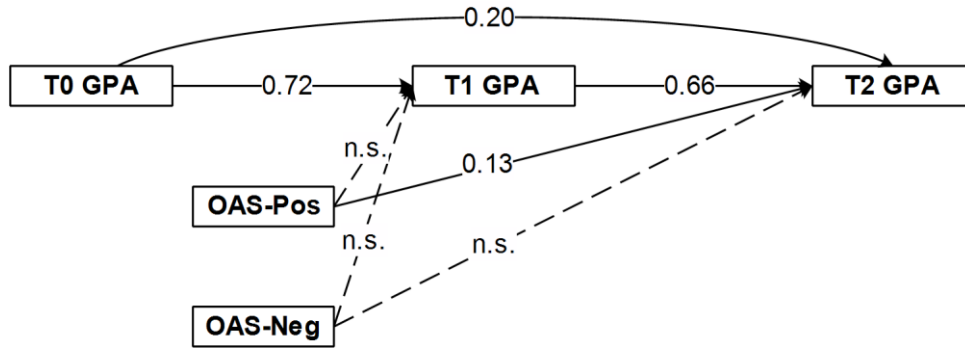


Figure 1. Study 3: Path model showing longitudinal relationships between OAS\_P and OAS\_N and academic achievement (all coefficients are standardized, dashed lines represent insignificant paths, other paths are significant at  $p < 0.05$ ).  $\chi^2 = 3.790$ ;  $df = 3$ ;  $p = 0.285$ ; CFI = 0.996; NNFI = 0.990; RMSEA = 0.042; 90% CI for RMSEA: 0.000-0.149; PCLOSE = 0.440; N = 151.