# The effect of teacher immediacy on academic self-efficacy: Exploring differential effects of immediacy on students over time

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22 June 2025

**Abstract**

This study examines the influence of teacher immediacy, gender, and initial levels of academic self-efficacy (ASE) on the development of ASE over time. A total of 57 first-year psychology students at the University of Groningen completed three surveys throughout the semester, measuring both their perception of their mentor's immediacy behaviors and their own ASE. Results showed a significant increase in ASE between the first and second measurements, particularly among students who initially reported low ASE. Furthermore, higher perceived immediacy predicted increases in ASE over time. However, this effect was not significantly moderated by students' initial ASE levels. Gender differences were also observed, with male participants reporting higher overall ASE than their female peers. No significant gender differences were found in the way participants rated their mentors' immediacy. These findings emphasize the importance of emotional closeness in building academic self-confidence and highlight the potential of immediacy behaviors as a tool for enhancing student outcomes.

*Keywords*: academic self-efficacy, teacher immediacy, gender differences

# The effect of teacher immediacy on academic self-efficacy: Exploring differential effects of immediacy on students over time

Confidence in one's ability to handle schoolwork is important for academic success and overall well-being (Zhou et al., 2021). Understanding and enhancing this academic self-efficacy (ASE) is therefore important for psychologists, teachers, and students alike (Witt et al., 2004). The way teachers and mentors behave play a crucial role in the academic development of the students. Teachers get the most out of the students if they are perceived as emotionally close or warm; this is referred to as immediacy. While immediacy is generally associated with positive outcomes, there is no consensus on the way emotional closeness works (Witt et al., 2004). This paper examines the influence of the mentors' emotional closeness on ASE. Additionally, the moderating effects of gender and initial level of ASE are examined. This could shed light on for whom emotional closeness is most important. In this study, first-year psychology students were surveyed on three separate occasions over the course of a semester about their behaviors and feelings of their education and the behavior of their student mentor. The student mentors teach a weekly class about academic writing to a group of 12 students.

ASE refers to an individual's belief in their capability to plan, carry out, and manage actions required to achieve specific performance goals (Sharma & Nasa, 2014). It is relevant for understanding educational outcomes as ASE encourages effective behaviors and enhances motivation for education. Additionally, ASE influences the way a student feels, thinks, and behaves (Sharma & Nasa, 2014). ASE is associated with a variety of positive outcomes including academic performance, task value and overall wellbeing (Jonicke & Broadbent, 2016 ; Velez, J. J.& Cano, J., n.d.; Zhou et al., 2021). The relationship between academic performance and ASE is complex as there are multiple variables that seem to moderate the relationship (Naami & Ebrahimi, 2023). For example, if students report high levels of anxiety

and shame, the strength of the correlation diminishes (Bolalina et al., 2012). It is important to note that psychologists view ASE to be situational, rather than a stable trait such as personality (Sharma & Nasa, 2014) is malleable as it is shaped not only by the person itself, but also by past experiences, knowledge of a subject, and their environment.

Bandura (1997) identifies four primary sources through which ASE develops: mastery experiences, vicarious experiences, social persuasion, and physiological and affective states. Mastery experiences involve personal success and failure, vicarious experiences arise from observing others succeed, social persuasion includes verbal encouragement, and physiological and affective states refer to how individuals interpret their emotions and physical responses in academic situations. Together, these four sources provide a framework for understanding how ASE is built and influenced. Drawing on this framework, it is expected that ASE levels will increase over time. In this paper, students' ASE was measured at three time points across a four-month period. Tracking changes in ASE over this interval allows for a better understanding of how these experiences shape students' academic confidence at the beginning of their studies. Although we did not measure vicarious and mastery experiences, as students progress through their studies, they engage in academic tasks and observe their peers doing the same. It can therefore be hypothesized that the participants gradually develop higher levels of ASE as the year progresses.

*H1:* ASE scores improve as time goes on.

The behavior of teachers plays a key role in the development of ASE. Research has shown that the behavior of the teachers can improve ASE, passion for a subject (Trung et al., 2022; Zhou et al., 2021; Sharma & Nasa, 2014). This paper examines teachers' immediacy behaviors. Over half a century ago, Mehrabian (1969) introduced the concept of immediacy. It is defined as communication that impacts the perception of physical and psychological closeness between teacher and student (Richmond, et al., 1987). The two types of immediacy

are verbal- and nonverbal. An example of verbal immediacy is verbal inclusivity, such as saying ‘we’’ instead of ‘’I’’. Nonverbal immediacy was assessed through items that reflected behaviors such as smiling while addressing the class. The effects of this metaphorical closeness can be understood by the ‘approach-avoidance’ theory (Mehrabian 1971). The theory states that people approach things they like and avoid things they do not like. A teacher’s immediacy behavior creates an environment in which students are more approached or engaged with their education (Hu & Wang, 2023). Similarly with motivation, students are more motivated if their teacher is immediate (Liu, 2021).

This increase in motivation might be at least partially explained by a reduction in anxiety (Bolalin et al., 2022; Ahmad et al., 2023). In the context of the approach-avoidance theory, if schoolwork is perceived as less anxiety laden then students are more willing to engage with it more. Witt and colleagues (2007) performed a meta-analysis of the impact of immediacy on different forms of learning. They found that perceived learning, or the belief of how much a person has learned, is moderately correlated with nonverbal and verbal immediacy. If a person has the belief that they learned something, they are more likely to be satisfied with the education and teacher (Elliott & Shin, 2012). Contrary to perceived learning, immediacy only had a weak correlation with higher grades. This suggests that immediacy does not necessarily make students learn better, but it makes students happier, less anxious, and more content. This makes the learning process less mentally taxing. Immediacy has shown to increase motivation, overall well-being, and reduce anxiety (Frymier, 1993; Tang, L & Zhu, X 2024; Zhou et al., 2021). It is therefore hypothesized that:

*H2:* Immediacy increases academic self-efficacy

Personal characteristics can influence how individuals perceive and respond to immediacy. Frymier (1993) found that the motivational impact of teacher immediacy was strongest among students with low to moderate trait motivation, while highly motivated

students maintained their motivation regardless of teacher behavior. Similarly, students with lower ASE may benefit more from immediacy, as it can help compensate for initial uncertainty or lack of confidence. While research shows that students with higher ASE tend to rate their teacher's verbal and nonverbal immediacy more positively (Gorham, 1988), this could reflect perception rather than effect. In other words, although students with high ASE notice immediacy more, its actual impact may be greater for students with low ASE, for whom supportive behaviors may be more meaningful. Moreover, low ASE is often linked to lower self-esteem (Luo et al., 2022), and individuals with low self-esteem tend to perceive less immediacy (Ethridge, 2013). These findings highlight that it remains unclear how immediacy is perceived and experienced by students with different levels of ASE, underscoring the need for further research. Building on these insights, the present study examines whether the effect of immediacy on ASE is moderated by students' initial levels of ASE.

*H3:* The effect of immediacy on academic self-efficacy will be greater on people who initially have lower self-efficacy.

In addition to the possible effect of the initial level of ASE, there is evidence to suggest that a mentors' immediacy could have a greater effect on women compared to men. Hall et al. (2006) concluded that women are better at remembering and recalling nonverbal immediacy. Moreover, when judging a close friend, women perceive more nonverbal immediacy compared to men. (Morrison & Von Glinow, 1990) These effects were greater with low power distance, such as with a mentor. Additionally, women are found to be more accurate when recognizing vocal emotions (Thompson & Voyer, 2014). It could be that if the female participants have a mentor high in immediacy, they will perceive the emotional warmth more strongly. Conversely, if a female participant happens to have a mentor who is lower in immediacy behavior, then they might rate their mentor lower on the immediacy

compared to a male participant. In this case, we expect that female participants would be more varied than the male participants in their perception of the mentor's immediacy behavior. It is therefore hypothesized that:

*H4a*: Women have more variation in their immediacy scores compared to men.

*H4b*: The effect of immediacy on academic self-efficacy will be greater on women compared to men.

Females, on average, have lower levels of ASE compared to males. These differences can be explained through the lens of personality theory (Zhang et al., 2014). Women tend to score lower than men on the Neuroticism/ stability, which is a component of the 'Big Five' personality traits. This trait is the strongest predictor of ASE. Meaning that if a person has high scores on Neuroticism/ stability, then it is likely that they have high levels of ASE. This paper examines whether gender moderates the effects of immediacy, when controlling for initial level of ASE. It is therefore hypothesized that:

*H4c:* The effect of immediacy on academic self-efficacy will be greater on women with initially lower academic self-efficacy compared to men with initially lower academic self-efficacy.

While there is research about ASE, immediacy, and the importance of a mentor, there are still questions about to whom this is most important. Additionally, there is no clear answer as to how a mentor's immediacy could increase the academic performance of the students (Witt et al., 2004). As this paper makes both the distinction between gender and group, it explores the impact and possible moderators surrounding immediacy. Being aware of which people are influenced most by immediacy could be insightful for understanding the ways immediacy affects people. Additionally, this study could have implications when it is crucial for a teacher to be emotionally close.

# Methods

## Procedure

The current longitudinal study was conducted through an online survey via Qualtrics (Qualtrics, Provo, UT) and was approved by the Ethics Committee of the Faculty of Behavioral and Social Sciences at the University of Groningen (ECP #PSY-2425-S-0013). The sample consisted of first-year Psychology students at the University of Groningen. Participants were recruited through the SONA system (Sona Systems, n.d.), with study credits awarded upon completion of the study. Registration was voluntary. To participate in the study, students were required to be enrolled in the first-year course "Academic Skills." Prior to the study, potential participants were informed about the study's purpose, procedure, and expected time commitment. They then signed a form granting informed consent for participation in the study. The processing of personal data and other data from this study was subject to the General Data Protection Regulation (GDPR). To ensure participants' anonymity and privacy, their identity was linked to a self-chosen identification code. If a participant withdrew or did not meet the inclusion criteria, their corresponding data were excluded, as shown in Figure 1. The final sample consisted of 57 participants.

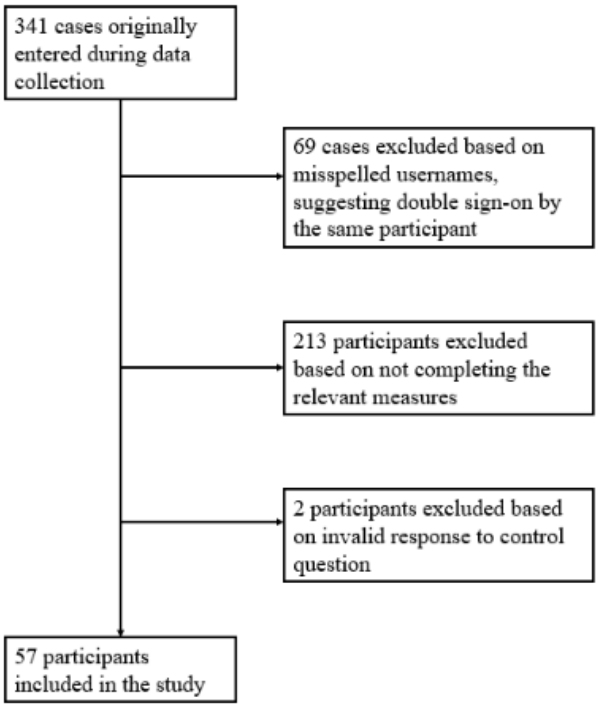


**Figure 1**

*Flowchart of participant drop-out*

**Sample Characteristics**

After cleaning the dataset, (see figure 1), the final sample consisted of 57 participants. Of these, 48 (84.2%) were female, 8 (14.0%) were male, and 1 (1.8%) identified as other. Ages ranged from 17 to 29, with a mean age of 19. Of all participants, 31 (54.4%) were Dutch, 5 (8.8%) were German, and 21 (36.8%) had other nationalities.

**Measurement Instruments**

All variables in this study were measured using a composite questionnaire, composed of carefully selected items from various measurement instruments. For each variable, multiple questions were chosen that best aligned with the objectives of the current study. Each variable was measured using a 5-point Likert scale, where 1 indicated "strongly disagree" and 5 indicated "strongly agree." The measurements took place over a period of five months, with

three time points: T1 in October 2024 before the first exam period, T2 in December after the first exam period 2024, and T3 in January 2025 after the second exam period.

**Immediacy**

The immediacy of the student mentors was indirectly assessed by students using an existing questionnaire developed by Kwitonda (2017), consisting of 23 items, of which 10 relevant items were used in this study. These items evaluated the non-verbal behaviors (e.g., smiling and a relaxed posture) and verbal behaviors (e.g., addressing students by name and giving compliments) of the student mentor. The reliability of the questionnaire was determined using Cronbach's Alpha ($\alpha = .89$), along with the corresponding mean and standard deviation ($M = 3.77$, $SD = 0.48$).

**Academic Self-efficacy**

Students' academic self-efficacy was measured using the Academic Self-Efficacy Scale (Schoen & Winocur, 1988). The original questionnaire consists of 78 items, of which this study used five relevant items. Examples of these questions include, "How confident are you that you will remember everything you learned in this course next year?" The reliability of the questionnaire was established using Cronbach's alpha ($\alpha = 0.90$), with a mean score of $M = 3.56$ and a standard deviation of $SD = 0.52$.

**Initial level of Academic Self-efficacy**

This paper analyses the claim whether ASE has this moderating effect. This is done by dividing the participants into three equal groups (low, average, high), based on their ASE scores at the first measurement point and their gender. For example, the group ''low'' will be created by combining the lowest third of the male and female participants. This division into groups allows the possibility to analyze whether immediacy affects all participants uniformly

and it provides the ability to analyze the effect of immediacy on men and women with similar scores on ASE. The mean score of M and standard deviations of SD can be found in table 1.

### Data Analyses

The data were analyzed using IBM SPSS software (version 28). Hayes' PROCESS macro for modeling mediation was also applied to the current data (Hayes, 2013). To analyze the changes in ASE, a repeated measures ANOVA was conducted with a within-subject factor called TIME (T1, T2, T3). The between-subject factors were gender (Male, Female) and the category of initial level of ASE (Low, Average, High). Mentors' immediacy was included as a covariate. In addition to the main effects of Time, Gender, initial level of ASE, and mentors' immediacy, interaction effects were included in the model. To scrutinize the claim that immediacy affects people with initially low ASE more strongly (H3), an interaction effect of Initial level of ASE * Immediacy was included. Statistical significance was determined using p-values.

## Results

Prior to conducting the analyses, the assumptions were checked. Normality was tested using the Shapiro-Wilk test. The ASE scores at Time 1 showed a significant deviation ($p$ = .003), while scores at Time 2 and Time 3 did not ($p > .05$). The analysis proceeded, as a repeated measures ANOVA is robust to minor violations of normality. Mauchly's test of sphericity indicated that this assumption was met ($W = .96$, $p = .35$). Levene's test confirmed that the assumption of homogeneity of variances was satisfied across gender at all time points. However, a significant violation was found for performance group comparisons at T1 ($F(2, 54) = 6.87$, $p = .002$). At T2 and T3, the assumption was met. The assumption of independence of observations was met as participants completed the questionnaires individually.

This paper analyses the influence of immediacy, gender, and initial level of academic self-efficacy on the development of ASE. Using data collected at three time points across 3 months, we conducted a repeated measures ANOVA on this longitudinal data. One exception is hypothesis H4a. We have analyzed the variance of immediacy scores between men and women with a Levene's test for equality of variances.

The final sample included 56 first-year psychology students (8 male, 48 female). Immediacy ($M$ = 3.77, $SD$ = 0.48) and ASE ($M$ = 3.56, $SD$ = 0.52) were both measured on a 5-point scale. People were divided into low, average, or high based on their level of ASE on the first questionnaire. Descriptive information of the groups can be found in table 1.

**Table 1**

*Descriptive Statistics for ASE and Immediacy Scores by Initial Level of ASE*

| Initial level of ASE group | n | Mean ASE | Std. deviation ASE | Mean Immediacy | Std. deviation Immediacy |
|---|---|---|---|---|---|
| Low | 21 | 3.05 | 0.41 | 3.67 | 0.53 |
| Average | 17 | 3.75 | 0.3 | 3.93 | 0.44 |
| High | 19 | 3.99 | 0.22 | 3.75 | 0.44 |

**Table 2**

*Descriptive Statistics for ASE and Immediacy Scores by Gender*

| Gender | n | Mean ASE | Std. deviation ASE | Mean Immediacy | Std. deviation Immediacy |
|---|---|---|---|---|---|
| Female | 48 | 3.53 | 0.53 | 3.77 | 0.48 |
| Male | 8 | 3.79 | 0.43 | 3.73 | 0.49 |
| Total | 56 | 3.56 | 0.52 | 3.77 | 0.48 |

**Table 3**
*Descriptive Statistics for ASE and Immediacy Scores Across Time Points*

| Measure | n | Mean | Std. deviation |
|---|---|---|---|
| Immediacy T1 | 57 | 3.80 | 0.51 |
| Immediacy T2 | 57 | 3.79 | 0.55 |
| Immediacy T3 | 57 | 3.72 | 0.50 |
| ASE T1 | 57 | 3.37 | 0.70 |
| ASE T2 | 57 | 3.60 | 0.48 |
| ASE T3 | 57 | 3.74 | 0.59 |

Firstly, we examined whether ASE changed significantly over time (H1). The model revealed that on average, levels of ASE did not change significantly over time ($F(2, 98) = 3.81$, $p = .060$, partial $\eta^2 = .070$). However, the multivariate test revealed a significant effect ($F(2, 48) = 7.53$, $p = .001$, partial $\eta^2 = .239$). The pairwise comparisons suggest that ASE significantly increased from Time 1 (T1) to Time 2 (T2) ($p = .002$) and from Time 1 to Time 3 (T3) ($p < .001$), with no significant change between T2 and T3 ($p = .402$). This suggests that ASE first increases and then plateaus. However, when broken down by performance group, this effect of time was almost entirely driven by participants in the low ASE category ($F(2, 48) = 20.39$, $p < .001$, partial $\eta^2 = .459$). The average ASE group also showed a strong effect over time, but not as strong as the low category ($F(2, 48) = 4.31$, $p = .019$, partial $\eta^2 = .152$). The high group does not show any significant deviation from T1 to T3

Secondly, we examined whether immediacy increases ASE (H2). The analysis showed that higher ASE was reported if more immediacy behaviors were observed. ($F(1, 49) = 4.77$, $p = .034$, partial $\eta^2 = .089$). Contrary to our third hypothesis (H3), people in the low category react did not react more strongly to the effects of immediacy on ASE ($F(2, 49) = 2.82$, $p = .069$, partial $\eta^2 = .103$). Fourthly, we have analyzed the variances of immediacy between male

and female participants. No significant differences were found ($F(1, 54)= 0.07$ p = .797). When controlling for immediacy, gender differences were found. The Levene's test showed that that the male participants ($M = 3.96$) had higher levels of ASE than the female participants *(*$M = 3.53$), $F(1, 49) = 16.66$, $p < .001$, partial $\eta^2 = .254$."

It was not possible to analyze the 2-way interaction effect of gender and immediacy (H4b) and the 3-way interaction effect between gender, immediacy, and initial level of academic self-efficacy (H4c) because there were not enough male participants in the sample. Additionally, adding these interactions to the model would make the model too complex, drastically increasing the chances of a false negative.

This paper analyses how ASE changes over time and how it is influenced by immediacy, gender, and initial level of ASE. The analysis suggests that immediacy positively predicts an increase of ASE. Controlling for the effect of immediacy, males had higher rates of ASE than females. Gender did not influence the amount of immediacy that was perceived, nor did it influence the variance of the scores. Additionally, ASE increases between T1 and T2, then it plateaus between T2-T3. The size of this effect was inversely correlated with the initial level of ASE. It is important to note that the participants initially low in ASE did not respond differently to the effects of immediacy compared to the participants in the other categories.

## Discussion

This study examined the development of ASE over time and the influence of Gender, initial level of ASE, and immediacy. We found that ASE increased over time over time (H1), immediacy predicts increases in ASE (H2), and that men, on average, had higher scores than women. To interpret H1 and H2, Bandura's (1997) theory of academic self-efficacy offers a useful framework, emphasizing that ASE is shaped by personal experience and social context.

The theory posits that self-efficacy develops through four main sources: Mastery experiences, Vicarious experiences, social persuasion, physiological and affective states. The effect of time can be explained by looking at mastery experiences, which entails that ASE is developed by successful experiences. Additionally, it is important to consider that ASE is shaped by seeing your peers succeed, which are called vicarious experiences. At T1, the participants did not have their first exams yet, while at T2 they did. It could be hard to gauge the difficulty of the exam at T1. This also explains the fact that no increase was found on T2 to T3. At T2 the participants already got vicarious and mastery experiences.

The two other primary sources of academic self-efficacy, social persuasion and physiological and affective states can help explain the finding that immediacy behaviors are associated with higher ASE (H2). Social persuasion refers to encouraging feedback and expressions of confidence from others, which can strengthen students' belief in their abilities, while physiological and affective states involve emotional and physical responses, such as anxiety or comfort, that shape how capable students feel in academic settings. Immediacy behaviors may enhance students' confidence through supportive communication and may also reduce anxiety related to the subject matter, creating a more positive emotional climate for learning. A theoretical explanation for why these sources are influenced can be found in Mehrabian's approach-avoidance theory (1969). This theory suggests that individuals are inclined to approach stimuli perceived as rewarding and to avoid those that induce stress or anxiety. A mentor's immediacy behaviors could help make the subject matter feel safe and engaging. Consequently, students are more likely to approach the learning environment. This lays the groundwork for effective social persuasion and improvements in physiological and affective states. While these theoretical interpretations align with our findings, further research is needed to establish the causal mechanisms underlying the observed relationships.

The main effect of gender (H3) is in line with the relevant research of personality theory and ASE (Morrison & Von Glinow, 1990; Soto, 2016; Scholz et al., 2002; Zhang et al., 2014). The 'Big Five' personality trait that correlates with self-efficacy the strongest is Neuroticism/ stability. People with lower levels of neuroticism are less anxious and more agentic and they generally employ more effective coping strategies. These factors lead to more self-efficacy (Scholz et al., 2002). Women tend, on average, to have lower scores of ASE and have higher scores of neuroticisms (Soto, 2016). In addition to that, women also seem to score higher on traits not included in the Big Five, such as anxiety (Feingold, 1994). These personality differences can explain the difference in average ASE between men and women.

Beyond examining the main effect of gender, the variance in immediacy scores between male and female participants were also analyzed (H4a). No significant differences were found. However, it remains possible that a true gender effect exists, but the study lacked sufficient statistical power to detect it due to the small number of male and female participants.

In addition to gender, the initial level of ASE was also explored. However, the interaction effect between initial academic self-efficacy and immediacy was not statistically significant (H3), although the result trended in the hypothesized direction. Research examining differential effects of immediacy is limited, but studies have found such effects on motivation (Frymier, 1993). It is possible that of immediacy enhances ASE uniformly, regardless of their starting point. This is a pattern that differs from what has been observed in the context of motivation. Another possibility for the null finding is that the sample size was too small to detect significant interaction, with only twenty-one and nineteen participants in the low and high ASE groups, respectively. Another possibility is that the exposure to immediacy behavior was insufficient to produce a measurable impact. Participants in this

study interacted with their mentors for approximately four to six hours per week, which is relatively limited compared to, for example, high school students who typically see their teachers for several hours each day. It may be that more sustained or intensive exposure to immediacy is necessary for an interaction effect to emerge.

**Implications**

The findings of this study have several practical and theoretical implications. Understanding the sources of academic self-efficacy and the role of immediacy behaviors may inform more effective teaching strategies and support mechanisms for students. One relevant example is the teaching of statistics, a subject widely recognized as anxiety-inducing for students in the social and behavioral sciences (Williams, 2010). If immediacy behaviors help to enhance academic self-efficacy by reducing anxiety and related negative emotional states, then instructors' use of immediacy strategies may be especially beneficial in courses perceived as particularly challenging. This suggests that training educators to implement immediacy behaviors, such as personalized feedback, enthusiasm, and approachability, could play a key role in mitigating student anxiety while simultaneously boosting engagement and confidence.

In addition, the observed increase in academic self-efficacy following the first exam highlights the significance of mastery experiences in building students' beliefs in their academic capabilities. This finding supports the inclusion of formative assessments, such as practice exams, particularly early in the term and in contexts where students have limited prior experience. These opportunities allow students to simulate performance in low-stakes settings, fostering confidence through successful performance. When combined with structured feedback and opportunities for reflection, such sessions may further strengthen self-efficacy by offering both mastery and vicarious learning experiences.

**Limitations**

While these findings offer valuable insights, they should be interpreted with caution. As previously discussed, the study has a relatively small sample size, particularly within the low and high ASE categories, the underrepresentation of male participants, and the limited weekly contact between mentors and participants may have constrained the generalizability and robustness of the results. Additionally, the sample may have been subject to selection biases. First-year students are required to participate in psychological experiments and questionnaires to earn course credits, and the questionnaire for this study was published relatively early in the academic year. As a result, the sample may have disproportionately included students who are more proactive or academically engaged. Students who take a more laid-back approach and prefer to fulfill their participation requirements later in the year may have been underrepresented, potentially affecting the overall representativeness of the sample. For the interpretation of the results, it is important to note that the sample consisted exclusively of first-year psychology students. This limits the generalizability of the findings. Due to the nature of their field, psychology students may be more perceptive to nonverbal cues and emotionally attuned to interpersonal dynamics. As a result, the effect of immediacy may differ among students from more technically oriented disciplines, such as engineering or the natural sciences. In the same vein, the sample reflects a relatively academically privileged group, as all participants were university students. This may further restrict generalizability, as academic self-efficacy and responsiveness to mentorship could differ in non-university populations.

**Future research**

While it has been theorized that immediacy exerts its effects through factors such as academic engagement, motivation, and anxiety, this study did not measure these variables directly (Frymier, 1993; Tang, L & Zhu, X 2024; Zhou et al., 2021). As a result, it remains

unclear which mechanism is most relevant for different types of students. The data showed that peer mentor immediacy had positive effects across all performance groups, underlining the general positive effects of peer mentoring. However, it is possible that the underlying process varies by student characteristics. Future research could investigate which mediating variables are most influential for different subgroups of students, allowing for more targeted applications of immediacy behaviors. For instance, a student with low academic self-efficacy and high anxiety may benefit most from immediacy through a reduction in anxiety, whereas a more confident student may experience increased self-efficacy because immediacy from the peer mentor enhances their engagement during lessons. In addition, the study did not consider the context in which immediacy behaviors occurred. It is possible that immediacy has a stronger impact in high-stress moments, such as during feedback sessions or assessments. Future research could examine whether the effectiveness of immediacy varies depending on the emotional or academic demands of the situation.

**Conclusion**

This study examined the development of ASE over time, focusing on the effects of gender, initial ASE, and peer mentors' immediacy. ASE increased most after the first exam, especially among students with initially low ASE. The peer mentor's immediacy behaviors seem to have contributed to this growth, and male students reported higher ASE overall. These findings have practical implications for teaching strategies, particularly in anxiety-inducing subjects. However, interpretation should be cautious due to limitations such as small sample size and limited gender diversity. Future research could investigate the underlying mechanisms through which immediacy influences ASE.

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## Appendix A

In the making of this paper, AI has been used as a tool to aid in the writing process. The literature research has been partially done with the help of Perplexity AI (2024). If sources were provided by this AI, the contents were read through the library license provided by the Rijksuniversiteit Groningen. In addition, ChatGPT (2023) was used to assist with refining grammar, spelling, and phrasing. All suggestions generated by the AI were critically evaluated and manually implemented where appropriate. At no point were AI tools used to generate original content or interpret research findings independently.

## Appendix B

**Table 4**

*Tests of Within-Subjects Contrasts*

| Source | SS | df | MS | F | p | $\eta^2_p$ |
|---|---|---|---|---|---|---|
| TIME (Linear) | 0.462 | 1 | 0.462 | 3.713 | 0.06 | 0.07 |
| TIME (Quadratic) | 0.138 | 1 | 0.138 | 1.687 | 0.2 | 0.033 |
| TIME × PERFORMANCE_GROUP (Linear) | 0.087 | 2 | 0.044 | 0.351 | 0.706 | 0.014 |
| TIME × PERFORMANCE_GROUP (Quadratic) | 0.018 | 2 | 0.009 | 0.108 | 0.898 | 0.004 |
| TIME × GENDER (Linear) | 0.024 | 1 | 0.024 | 0.193 | 0.663 | 0.004 |
| TIME × GENDER (Quadratic) | 0.15 | 1 | 0.15 | 1.843 | 0.181 | 0.036 |
| TIME × MEAN_IMMEDIACY (Linear) | 0.221 | 1 | 0.221 | 1.774 | 0.189 | 0.035 |
| TIME × MEAN_IMMEDIACY (Quadratic) | 0.09 | 1 | 0.09 | 1.108 | 0.298 | 0.022 |
| TIME × PERFORMANCE_GROUP × MEAN_IMMEDIACY (Linear) | 0.038 | 2 | 0.019 | 0.153 | 0.859 | 0.006 |
| TIME × PERFORMANCE_GROUP × MEAN_IMMEDIACY (Quadratic) | 0.066 | 2 | 0.033 | 0.404 | 0.67 | 0.016 |
| Error (Linear) | 6.095 | 49 | 0.124 | | | |
| Error (Quadratic) | 4.0 | 49 | 0.082 | | | |

**Table 5**

*Tests of Between-Subjects Effects*

| Source | SS | df | MS | F | p | $\eta^2_p$ |
|---|---|---|---|---|---|---|
| Intercept | 44.598 | 1 | 44.598 | 213.217 | < .001 | 0.813 |
| Initial level of ASE | 0.133 | 2 | 0.067 | 0.319 | 0.728 | 0.013 |
| GENDER | 3.484 | 1 | 3.484 | 16.655 | < .001 | 0.254 |
| IMMEDIACY | 0.999 | 1 | 0.999 | 4.774 | 0.034 | 0.089 |
| Initial level of ASE × IMMEDIACY | 1.18 | 2 | 0.59 | 2.82 | 0.069 | 0.103 |
| Error | 10.249 | 49 | 0.209 | | | |

Note. M = mean; SE = standard error; LL = lower limit; UL = upper limit; p = significance value; $\eta^2_p$ = partial eta squared.