How do mentor immediacy and liking of the student mentor influence academic self-efficacy in students?

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Abstract

This study examines the immediacy of student mentors, how much the students like their mentors, and what effects these have on academic self-efficacy of the students. The sample is made up of 57 first-year psychology students from the University of Groningen. A cross-sectional moderated regression design was used to analyze the data in this study. The questions included immediacy behaviors of the mentors, how likable the students find them, and concerning the student's performance, how capable they feel in completing their own tasks. There was no support found for the initial hypothesis which expected to discover a positive correlation between immediacy and self-efficacy, as well as liking and self-efficacy, moderated by immediacy. Immediacy and liking showed a statistically significant zero-order correlation between each other, so some partial support had been found for the hypothesis. The findings of the current study suggest that immediacy and liking are not related to self-efficacy in the presupposed way. For future considerations, perhaps this research could be re-done in a different context, as the results of these self-reported variables can be very context-dependent, and more sensitive measures might be required to better understand the relationship between the behavior of a student mentor and the academic performance of a student.

Keywords: student mentor, immediacy, academic self-efficacy, liking, moderation analysis

How do mentor immediacy and liking of the student mentor influence academic self-efficacy in students?

In today's world it is becoming increasingly more prevalent for students to be in closer contact with their mentors and teachers throughout their academic career (U.S. Department of Education, National Center for Education Statistics, 1993). Large classes and lectures with dozens or even hundreds of people are common these days, but smaller and smaller working groups with a student mentor are also becoming more prevalent in educational settings. Due to this tendency, it is vital to explore how the relationship between a student and their mentor functions, so that the learning process can be made most efficient, and the development of the student can be optimized to be most beneficial. Decades of preceding literature has explored several variables of the behavior of the student mentor, how the mentor is perceived, and the link with academic performance. For example, Trolian et al. (2016) found that meaningful interactions with student mentors increase pupils' academic motivation, while Komarraju et al. (2010) highlighted that those students that receive frequent feedback from faculty staff improve numerous skills related to their studies, such as communication and problem-solving, and heighten their competence in their field. Mentoring in youth has also been linked to longitudinal positive academic effects in students' lives, such as more academic engagement, higher grades, and higher likelihood of attaining the desired educational qualification (Fruiht & Wray-Lake, 2013; Miranda-Chan et al., 2016). While most of these studies were conducted in adolescence and during high school, it is fair to assume that the positive effects are analogous or similar regarding higher education student mentoring, as is the focus of the current study.

This paper will take a closer look specifically at the effects of the immediacy of student mentors and the effects of how much the students like their mentor, on academic self-efficacy of the students.

Immediacy

When talking about immediacy, one of the first definitions, coined by Mehrabian (1967) defined immediacy as communication behaviors that enhance closeness and non-verbal interaction between individuals. Other sources define immediacy in the healthcare field and social sciences as „approach behaviors" that convey interpersonal closeness and warmth (Bartlett et al., 2016). The man who coined the original term has contextualized the phrase approach behaviors as people approaching things they like and that appeal to them, and avoiding things that they dislike, ones that don't appeal to them, or might even induce fear in them (Mehrabian, 1971). Previous studies have highlighted some examples of what constitutes immediacy behaviors in the classroom. This includes smiling, vocal varieties, direct body positioning, and close proxemics as identified by Pogue and Ah Yun, (2006). Mentor immediacy has been shown to have a significant positive relationship with student motivation (Furlich, 2016), and a positive relationship with students' affective learning (Pogue & Ah Yun, 2006). Research has shown a link between immediacy behaviors and student self-efficacy. Velez and Cano (2012) found significant relationships between both verbal and non-verbal teacher immediacy with students' self-efficacy and task value. What task value stands for, is how worthwhile the student judges a specific task to complete. The authors of this paper encourage educators to praise students' efforts more often, to use humor and self-disclosure, and to engage students in conversation in order to display a willingness to interact with them (Velez & Cano, 2012). Similarly, another study exploring the connection between being part of a youth mentor program, quality of the mentor-mentee relationship, and self-efficacy as one of the outcome variables, found that just having a mentor already has a positive correlation with academic self-efficacy (McClain et al., 2021). Furthermore, a good quality mentor-mentee relationship was positively associated with all the above-mentioned outcome variables and had a stronger effect than did duration of the mentoring relationship,

the student's gender, race, and even whether they are first-generation nationals or not (McClain et al., 2021).

While there is extensive research supporting a positive correlation between these variables, there have also been studies that found no significant relationship. For example, Frymier (2009) found no direct correlation between teacher immediacy and learning tendencies of students. They only found support for a link between immediacy and motivation of students (Frymier, 2009).

Liking

When talking about liking of the student mentor what is meant is sympathy and positive interpersonal affect that the students have felt toward their group coordinator throughout their experience. It has been established that fostering a close connection between mentor and mentee can be aided by the mentor taking on typical helper characteristics that would normally be seen in therapeutic settings, such as empathy, authenticity, and attunement (Spencer, 2006). It has been shown that if the mentor builds a positive relationship with the mentee this can, in turn, enhance the student's motivation to study (Allen, Pianta, Gregory, Mikami, & Lun, 2012) and the value they place on schoolwork (O'Connor, 2010). The paper by Allen et al. outlines several dimensions on which teachers need to perform well in order to best support students' emotional and academic development. These being sensitivity – so responding proactively and in a careful and personalized manner to students' individual needs-, positive regard for students' perspectives, and creating a safe and warm emotional climate in the classroom, for instance (Allen et al., 2012). Further research has found support for the fact that liking one's teacher has a positive influence on self-efficacy in the classroom context. Hughs et. al (2011) recruited relatively low-performing children for a longitudinal study of over three years, where the results showed a reciprocal, positive relationship between

the quality of the teacher-student relationship and the academic self-efficacy of the children (Hughs et. al, 2011).

Self-efficacy

Self-efficacy of students stands for; to what extent a student believes that they are capable of completing the tasks that they have to, tasks that they might potentially come across, and goals they will set in the future, which are necessary for their self-fulfillment and reaching their full potential (Bandura, 1986). Self-efficacy is the basis for confidence in our actions, and so consequently also the basis for our achievements (Bandura, 2001). What is meant by this statement is that in order to feel and act confident and capable in our actions, we must feel that we are self-efficient individuals (we are high in self-efficacy), and will be able to do those things in the first place. Therefore, self-efficacy is step zero to successfully completing our desired actions in our lives. Arising from these facts, it is often observable that people will choose to take on ventures and challenges that they deem to be within their capabilities and avoid ones which they are unsure that they can complete (Klassen & Klassen, 2018). Students with higher self-efficacy beliefs tend to set higher goals for themselves, while also simultaneously outperforming their peers who are lower in self-efficacy (Honicke & Broad-bent, 2016). Additionally, a strong positive link has also been highlighted between academic self-efficacy and positive learning-related emotions (Hayat et al., 2020).

Self-determination theory

Self-determination theory is the overarching background framework for the hypothesis of this current study. Developed by Deci and Ryan in the 1980s, SDT says that human behavior is motivated by three innate desires. These are the need for autonomy, the need for competence, and the need for relatedness (Deci & Ryan, 1985). The autonomy need stands for being in control of one's own actions and decisions, the need for competence covers feeling

mentally effective and able in one's tasks and activities, and the need for relatedness stands for our aspiration of connecting with others and our desire to be part of a community (Deci & Ryan, 1985). Only when these needs are all fulfilled do individuals experience genuine motivation stemming from within, as well as bettered well-being and a feeling of greater fulfillment (Deci & Ryan, 1985). When talking about the implications of self-efficacy in professional and academic successes, this can mostly be tied to the need to feel competent.

Hypotheses

We expect that immediacy and liking will have a positive relationship with student self-efficacy, similar to what the findings of Velez and Cano (2012) and Hughs et al., (2011) already suggest. Furthermore, we hypothesize that the immediacy of the mentor will act as a moderator in the relationship between liking the mentor and students' self-efficacy. I am basing these hypotheses on the extensive previous literature surrounding the topic as well as the idea of self-determination theory as an overarching background framework (Deci & Ryan, 1985).

H_1: There is a significant positive relationship between immediacy and student self-efficacy.

H_2: There is a significant positive relationship between liking and student self-efficacy, and immediacy acts as a moderator in this relationship.

Methods

Procedure

The current cross-sectional 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 Table 1. The final sample consisted of 103 participants.

Table 1

Flowchart Participants

Sample characteristics

After cleaning the data set (see Table 1), the final sample consisted of 103 participants. Of these, 90 (87.4%) were female, 12 (11.7%) were male, and 1 (1%) identified as other. Ages ranged from 17 to 28, with a mean age of 20. Of all participants, 56 (54.4%) were Dutch, 11 (10.7%) were German, and 36 (35%) 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 ($\alpha = 0.74$), along with the corresponding mean and standard deviation ($M = 3.8$, $SD = 0.48$).

Liking

To what extent the students liked their mentor was measured by the Interpersonal Attraction Scale developed by McCroskey and McCain in 1974. Out of the 30 potential items 4 items were used during this assessment. For example, items such as “I think my student mentor could be a friend of mine” and “I would like to have a friendly chat with my student mentor”. The reliability of the questionnaire was established using Cronbach’s alpha ($\alpha = 0.78$), with a mean score of $M = 3.54$ and a standard deviation of $SD = 0.73$.

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 ($\alpha = 0.83$), with a mean score of $M = 3.73$ and a standard deviation of $SD = 0.59$.

Data analyses

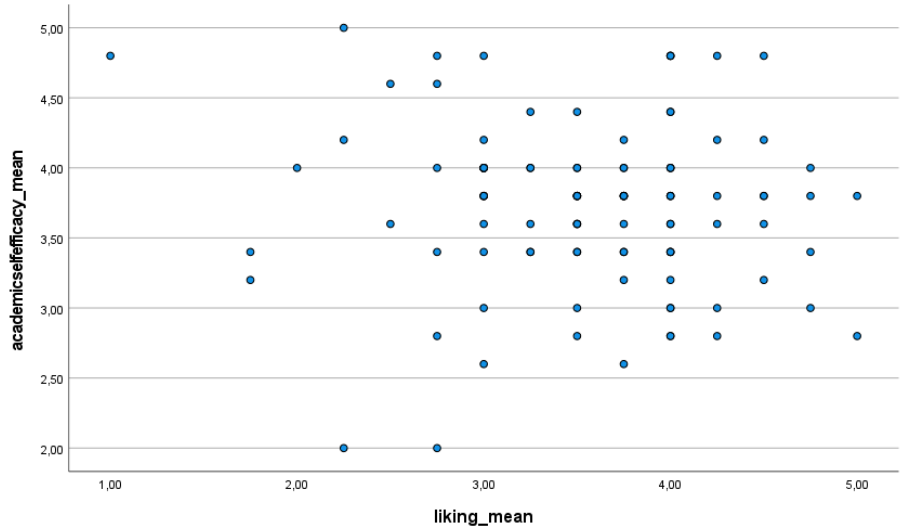
The data was analysed using IBM SPSS software (version 28). Following preliminary analysis of regression assumption checks (these being normality, homoscedasticity, independence of observations, no multicollinearity, and linearity), obtaining descriptive statistics, and pairwise correlations, a moderated multiple regression analysis was performed using the bootstrapping technique to obtain more robustness in light of linearity not being met. The number of samples used in bootstrapping was 1000 and the level of the confidence interval was 95%. The variables in this model were as follows: liking as an independent variable, immediacy as an independent variable as well as functioning as a moderator in the relationship between liking and academic self-efficacy, and self-efficacy as the dependent variable. The analysis used $p= 0.05$ as the significance level. P-values this low or lower meant that the corresponding effect was statistically significant. As per the model, both independent variables' correlations were examined independently, followed by a moderated multiple regression analysis.

Results

Assumptions

Our preliminary analysis shows that the assumptions of normality, homoscedasticity, independence of observations, and no multicollinearity seem to be met. However, the assumption of linearity based on a scatter plot does not seem to be met, which suggests questionable significance for the regression (see Figure 1). However, the regression model was used nevertheless due to the fact that the variables are continuous and the nature of the study is explorative. The bootstrapping used is aimed at compensating for this violation.

Figure 1. Linearity assumption check



Descriptive statistics

Descriptive statistics of means, standard deviations, minimums, and maximums, as well as pairwise correlations can be seen in the table below, for both the independent variables *immediacy of the mentor*, *liking of mentor*, and the dependent variable, *academic self-efficacy of the student* (see Table 1). The sole statistically significant pairwise correlation was found between liking and immediacy, with $p < 0.001$.

Table 1

	Self-eff.	Liking	Immediacy	*M*	*SD*
Immediacy	-0.25	0.36**		3.8	0.48
Liking	-0.89			3.54	0.72
Self-eff.				3.73	0.59

**Correlation is significant at the 0.01 level (2-tailed).

Hypotheses

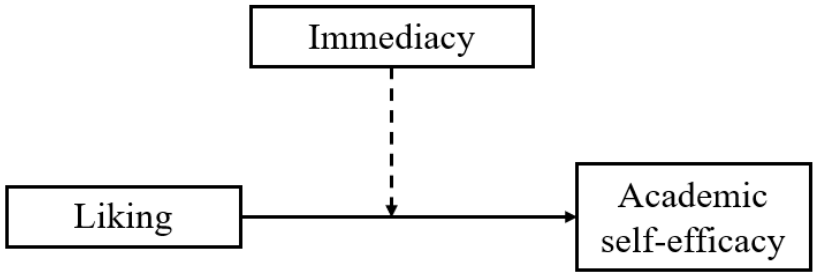
The initial hypotheses of this research are that immediacy of the mentor will have a positive relationship with self-efficacy and that liking of the student mentor has a significant positive effect on academic self-efficacy of students, but only if immediacy of the mentor is also present.

Moderated multiple regression

A moderated multiple regression analysis was conducted with liking as the initial predictor, immediacy acting as a moderator, and academic self-efficacy as the dependent variable. The bootstrapping technique has also been used. Both variables of liking and immediacy have been centered for the analysis, and an interaction term was created to run the moderated analysis. The results show that none of the expected effects yielded a statistically significant result. The following statistics were obtained for variables liking ($B = – 0.04$, $p = 0.633$), immediacy ($B = 0.03$, $p = 0.83$), and the interaction term ($B = 0.21$, $p = 0.14$). The overall model was not statistically significant. This is further confirmed by the 95% bootstrap confidence interval including a zero value [-0.244, 0.292]. Therefore, no support was found for the initial hypotheses. However, there seemed to be a notable relationship between

immediacy and liking, and while not significant at the standard statistical level of 0.05, the interaction term still produced a comparatively lower p-value when contrasted with either of the main effects.

Figure 2: Moderation diagram



Discussion

Findings

This paper delved into the relationship of immediacy and liking of the student mentor with academic self-efficacy of students. Precisely two hypotheses were tested. Whether immediacy had a positive effect on self-efficacy, and whether liking had a positive effect on self-efficacy with immediacy acting as a full moderator between dependent and independent variable in this case. The results of the statistical analysis of the data showed no significant relationship arising from either of the dependent variables or their interaction term, only a null effect was found. The original hypothesis is therefore not supported, contrary to expectations, and also not in line with the majority of previous studies (Furlich, 2016; Pogue & Ah Yun, 2006; Velez & Cano, 2012).

Implications

The findings of this study seem to suggest that student mentors' immediacy behavior, and how well they are liked is not linked to self-efficacy in students, or at least that we did not find a significant effect here. This is in contrast with previous literature on the topic. Our null-effect finding suggests that perhaps training and studying the behavior of student mentors could rather potentially focus on other aspects of teaching, ones that are significantly related to self-efficacy in students.

There can also be several theoretical explanations as to why only a null effect has been found, regarding our hypotheses. First off, it is possible that the classes of the Academic Skills course do not foster a very close relationship between mentors and students for this to significantly influence the students' image of themselves. The meetings for Academic Skills only take place for four hours, once a week, and despite the in-person meetings, a large part of the course is still made up of students doing individual work. It would be logical to assume that since performance in class does not closely depend on in-class relationships formed, but rather the work the students put in themselves later, at home, then the behaviors of the student mentor are consequently not as influential.

It is also plausible that we would be able to observe much larger changes in self-efficacy and self-image of the students if we examined them on attempting an extremely challenging subject. Maybe then the quality of the relationship with the student mentor would come out being much more influential in either direction. As it so happens Academic Skills is not usually the course that psychology students struggle with the most. That would rather be statistics, for example. This phenomenon is reported in an article by Kaufmann et al. (2022), where they mention that 80% of psychology students report high levels of statistics anxiety, as they name it, which is a prevalent form of special performance anxiety among psychology graduates (Kaufmann et al., 2022). In this same study, it is mentioned that self-efficacy of the student is nevertheless an overwhelmingly stronger predictor of success at statistical subjects,

than statistics anxiety (Kaufmann et al., 2022). Therefore, it might be more useful to study the effects around self-efficacy in this context. The relationship between building students' self-efficacy and their performance in their statistics courses has been previously explored in an article by Zakariya, Y. F. (2022), and he classified several behavioral interventions that educators could imply, in order to elevate students' self-efficacy, and, in turn, make them perform better in their statistics assessments.

The somewhat low standard deviations in responses (Table 1) suggest there was little variance in how students responded. Few students veered into either of the extremes when rating their teachers, most answers are distributed around the middle option. This either means that all student mentors made a fairly good impression on their groups, but not an outstanding one, or that simply this experience wasn't as defining to the students as we had hoped they would report. The implication being that student mentors' immediacy is not so important for students' self-efficacy seems to form a juxtaposition with previous literature, contrasting with the findings of Pogue & Ah Yun (2006) or Velez & Cano (2012), and the like.

None of the correlations are significant at the statistical level, but several of them returned negative results instead of positive ones, which is interesting to observe. It could possibly be that those student mentors who are friendly and laid back, or the opposite -overly helpful- create an environment in which students feel like they don't have to do that much on their own, as they can just leave everything up to the direction and handling of their mentor. Hypotheses of the like are supported by a few preceding studies as well. Namely the paper by Cuddy et al. (2008) talks about how people perceive others on two scales; warmth and competence. There seems to be a trade-off between these two dimensions, however, as being perceived as overly warm can reduce their perceptions of us as competent, and vice versa (Cuddy et al., 2008). If this particular feature of perceiving others seeps into the classroom context, even subconsciously, it could affect student's respect for their teacher and how much

emphasis they might place on intellectual work in class, versus on focusing on interpersonal interactions.

When discussing practical implications of this we might advise student mentors not to be too lenient or immediate with their students, as it may encourage social loafing in classroom work, though this advisory feels counter-intuitive when talking about a person-centered profession. More evidence from a new sample would be needed and statistical significance would need to be established in order to concretely conclude that there are indeed significant negative relationships between these variables.

Future outlook

It might be a useful idea going forward to perhaps change the subject from which we are testing people and try to examine an experience that is more defining, maybe even more academically decisive in a university student's academic career. That could mean inquiring about their experiences with a harder subject, or perhaps seeking out students who had experience with one-on-one tutoring for example, as it would be logical that these settings would produce a much more intense and personal learning experience than group lessons.

Methodological limitations

Some limitations of the current research include too little diversity- perhaps both in responses and respondents. The sample was solely taken from psychology students, only at the University of Groningen, and drawn only from those who signed up to complete the questionnaires for course credit. These characteristics of the sample could influence the results and the generalizability of the findings, bringing into question how good external validity was in this case.

If a similar experiment is to be conducted in the coming years as well, we could potentially opt for using a scale measure with more answer options, so as to give students a

chance to present more variety in their responses. This would be an attempt at remedying the low variance mentioned previously, and for this, we could utilize more detailed Likert scales, with scores ranging from 1 to 10, for instance.

The trend of the interaction term not being recognized at the standard significance level in the current study, but still producing comparatively better results than either of the main effect variables alone, could also be attributed to low statistical power, which could be bettered by different measuring as well.

Conclusion

On the whole, the findings of the current study are not in line with the majority of previous literature on the topic, except for the occasional no-effect findings, such as Frymier (2009). Current analysis has only returned a null effect, suggesting that there is no effect of mentor immediacy and mentor liking on self-efficacy. Applying this finding in the real world may suggest to student mentors that they need not be overly immediate with their class, or perhaps to put more emphasis on other aspects of their teaching, as how well-liked they are and their immediacy behaviors do not seem to have a significant positive relationship with self-efficacy of the students.

References

Bandura, A. (1986). The explanatory and predictive scope of self-efficacy theory. *Journal of social and clinical psychology*, *4*(3), 359-373.

Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology*, *52*, 1-26. https://doi.org/10.1146/annurev.psych.52.1.1

Bartlett Ellis, R. J., Carmon, A. F., & Pike, C. (2016). A review of immediacy and implications for provider-patient relationships to support medication management. *Patient preference and adherence*, *10*, 9–18. https://doi.org/10.2147/PPA.S95163

Cuddy, A. J. C., Fiske, S. T., & Glick, P. (2008). Warmth and Competence as Universal Dimensions of Social Perception: The Stereotype Content Model and the BIAS Map. In M. Zanna (Ed.), *Advances in Experimental Social Psychology* (pp. 61-149). (Advances in Experimental Social Psychology; Vol. 40). https://doi.org/10.1016/S0065-2601(07)00002-0

Deci, E. L., & Ryan, R. M. (1985). Intrinsic motivation and self-determination in human behavior. *Springer*. https://doi.org/10.1007/978-1-4899-2271-7

Eccles, J. S. (2005). Subjective task value and the Eccles et al. model of achievement–related choices. In A. J. Elliot & C. S. Dweck (Eds.), Handbook of competence and motivation (pp. 105–121). New York, NY: Guilford Press

Filsinger, E. E. (1981). A measure of interpersonal orientation: The Linking People Scale. *Journal of Personality Assessment, 45*(3), 295–300. https://doi.org/10.1207/s15327752jpa4503_11

Fruiht, V. M., & Wray-Lake, L. (2013). The role of mentor type and timing in predicting educational attainment. *Journal of Youth and Adolescence, 42*(9), 1459–1472. https://doi.org/10.1007/s10964-012-9817-0

Frymier, A. B. (1994). A model of immediacy in the classroom. *Communication Quarterly*, *42*(2), 133–144. https://doi.org/10.1080/01463379409369922

Furlich, S. A. (2016). Understanding Instructor Nonverbal Immediacy, Verbal Immediacy, and Student Motivation at a Small Liberal Arts University. *Journal of the Scholarship of Teaching and Learning*, *16*(3), 11–22. https://doi.org/10.14434/josotl.v16i3.19284

Honicke, T., & Broadbent, J. (2016). The influence of academic self-efficacy on academic perform-ance: A systematic review. Educational Research Review, 17, 63–84. https://doi.org/10.1016/j.edurev.2015.11.002

Hughes, J. N., & Chen, Q. (2011). Reciprocal effects of student-teacher and student-peer relatedness: Effects on academic self efficacy. *Journal of applied developmental psychology*, *32*(5), 278–287. https://doi.org/10.1016/j.appdev.2010.03.005

Kaufmann, L., Ninaus, M., Weiss, E. M., Gruber, W., & Wood, G. (2022). Self-efficacy matters: Influence of students' perceived self-efficacy on statistics anxiety. *Ann NY Acad Sci.*, 1514, 187–197. https://doi.org/10.1111/nyas.14797

Klassen, R.M., Klassen, J.R.L. Self-efficacy beliefs of medical students: a critical review. *Perspect Med Educ* **7**, 76–82 (2018). https://doi.org/10.1007/s40037-018-0411-3

Komarraju, M., Musulkin, S., & Bhattacharya, G. (2010). Role of student–faculty interactions in developing college students' academic self-concept, motivation, and achievement.

Journal of College Student Development, 51(3), 332–342. https://doi.org/10.1353/csd.0.0137

Kwitonda, J. C. (2017). Foundational aspects of classroom relations: Associations between teachers' immediacy behaviours, classroom democracy, class identification and learning. *Learning Environments Research, 20*, 383–401. https://doi.org/10.1007/s10984-017-9231-3

Liu W. (2021). Does Teacher Immediacy Affect Students? A Systematic Review of the Association Between Teacher Verbal and Non-verbal Immediacy and Student Motivation. *Frontiers in psychology*, *12*, 713978. https://doi.org/10.3389/fpsyg.2021.713978

McClain, C. M., Kelner, W. C., & Elledge, L. C. (2021). Youth Mentoring Relationships and College Social and Academic Functioning: The Role of Mentoring Relationship Quality, Duration, and Type. *American journal of community psychology*, *68*(3-4), 340–357. https://doi.org/10.1002/ajcp.12539

Mehrabian, A., & Ferris, S. R. (1967). Inference of attitudes from nonverbal communication in two channels. *Journal of Consulting Psychology*, *31*(3), 248–252. https://doi.org/10.1037/h0024648

Mehrabian, A. (1971). *Silent messages*. Belmont, CA: Wadsworth.

Miranda-Chan, T., Fruiht, V., Dubon, V., & Wray-Lake, L. (2016). The Functions and Longitudinal Outcomes of Adolescents' Naturally Occurring Mentorships. *American journal of community psychology*, *57*(1-2), 47–59. https://doi.org/10.1002/ajcp.12031

O'Connor, E. (2010). Teacher-Child Relationships as Dynamic Systems. *Journal of School Psychology*, 48, 187-218. http://dx.doi.org/10.1016/j.jsp.2010.01.001

Pianta, R. C., Hamre, B. K., & Allen, J. P. (2012). Teacher-student relationships and engagement: Conceptualizing, measuring, and improving the capacity of classroom interactions. In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 365–386). Springer Science + Business Media. https://doi.org/10.1007/978-1-4614-2018-7_17

Pogue, L. L., & Ah Yun, K. (2006). The Effect of Teacher Nonverbal Immediacy and Credibility on Student Motivation and Affective Learning. *Communication Education*, *55*(3), 331–344. https://doi.org/10.1080/03634520600748623

Qualtrics. (2025). *Qualtrics software (Version XM)* [Computer software]. https://www.qualtrics.com

Schoen, L. G., & Winocur, S. (1988). Academic Self-Efficacy Scale [Database record]. *APA PsycTests*. https://doi.org/10.1037/t16666-000

Sona Systems. (n.d.). *Sona Systems: Cloud-based Participant Management Software* [Computer software]. Sona Systems, Ltd. https://www.sona-systems.com/

Spencer, R. (2006). Understanding the mentoring process between adolescents and adults. *Youth & Society*, *37*(3), 287-315.

Trolian, T. L., Jach, E. A., Hanson, J. M., & Pascarella, E. T. (2016). Influencing academic motivation: The effects of student-faculty interaction. *Journal of College Student Development, 57*(7), 810–826. https://doi.org/10.1353/csd.2016.0080

Velez, J. J., & Cano, J. (2012). Instructor verbal and nonverbal immediacy and the relationships to student motivation and self-efficacy. *NACTA Journal*, 56(3), 22-28. https://files.eric.ed.gov/fulltext/EJ993276.pdf

Witt, P. L., Wheeless, L. R., & Allen, M. (2004). A meta-analytical review of the relationship between teacher immediacy and student learning. *Communication Monographs*, *71*(2), 184–207. https://doi.org/10.1080/036452042000228054

Zakariya, Y. F. (2022). *Improving students' mathematics self-efficacy: A systematic review of intervention studies*. *Frontiers in Psychology*, 13, Article 986622. https://doi.org/10.3389/fpsyg.2022.986622

Appendix A