Title: Assessing the Relationship of Virtual and Face-to-face Teaching on Adolescence Motivation Depends on Self-esteem and Procrastination

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Abstract

Pandemics have a substantial effect on education, forcing the teaching mode from traditional to virtual online mode, and there is even a need to use mixed teaching mode to support inadequate teaching periods at school. Even a professional teacher, encouraging students to learn is always a difficult issue. Therefore, this study focuses on examining the effect of teaching mode on motivation and also the relationship between motivation, self-esteem, and procrastination. Previous research showed an inverse relationship between these three constructs. For instance, motivation is usually negatively related to procrastination, while a study argues that it depends on critical factors. This study verified the effect of teaching mode and the relationship between the constructs. The study sample included 73 adolescents aged 18 to 25 in Hong Kong. Participants are asked to fill out a questionnaire that consists of three scales: the Situational Motivation Scale, Rosenberg Self-esteem Scale, and General Procrastination Scale. Pearson Correlation and multiple regression analysis were used to examine the associations of motivation, self-esteem and procrastination. It was found that teaching mode has a significant extrinsic but not intrinsic effect on motivation. It also showed a significant correlation between procrastination and self-esteem, while an insignificant association was found between motivation towards procrastination and self-esteem. The educational implication of this study is to encourage teachers to help build self-confidence of students to reduce their procrastinating behaviors.

Assessing the Relationship of Virtual and Face-to-face Teaching on Adolescence Motivation Depends on Self-esteem and Procrastination

Introduction

Scholars indicated that the transformation of teaching mode occurred after COVID-19 and emphasized the emergent needs of virtual learning pedagogical designs (Hodges et al., 2020). In recent years, due to the pandemic, the teaching mode in Hong Kong has changed comprehensively from traditional to virtual teaching. Being a future educator, I would like to investigate the relationship between motivation and other possible factors that affect students learning. Thus, I can better understand the learning mechanism and how to maintain quality teaching with suitable approaches in the future.

According to Graham (2019), a shifting trend from these two modes turns into a hybrid mode by combining virtual and traditional face-to-face modes. Digital technologies created a paradigm shift in entire education in that teachers can be students' co-creators, mentors, or assessors (Haleem et al., 2022). Online teaching involves more technology, like Padlet, Kahoot, Mentimeter, etc., that promotes online-class student interaction. Teachers always want to deliver teaching effectively but it is not easy for novice users of technology. Some studies compare the motivation level between the two teaching methods. Researchers argued that online teaching exhibited a comparable level of motivation to those in the face-to-face classroom (Baran & Maskan, 2010; Joo et al., 2018; Richardson & Swan, 2003; Kim et al., 2014). In contrast, due to the extensive change in the teaching environment, students are generally more passive in learning and procrastinating, and their motivation is lower than in physical classrooms (Melgaard et al., 2022). Some findings revealed a higher level of motivation in

traditional classrooms than in virtual teaching settings (Hew & Cheung, 2014; Huang et al., 2010; Martin et al., 2017).

Aside from teaching mode, procrastination might be another factor affecting students' motivation levels. People have a poor sense of self-control as they always look for distractions to avoid doing the current tasks, so we call it procrastination (Ferrari et al., 1995). The delay in completing the tasks is often linked to the motivation level (Serdar et al., 2021). It might explain the underlying mechanism of low motivation of individuals.

On the other hand, self-esteem plays a crucial role in motivation, and personal belief about their self-worth influences the level of motivation. Study from Hajloo (2014) found that higher self-esteem can enhance one's confidence, resulting in a higher motivation to work.

Literature review

Motivation

According to Deci and Ryan (2002), motivation can be classified into three various types, which are intrinsic motivation, extrinsic motivation and amotivation. Intrinsic motivation refers to engaging in an activity for one's own interest or being pleasured and satisfied after the experience (Deci, 1975). Individuals are motivated purely and internally because of innate desires, satisfaction and enjoyment. Extrinsic motivation focuses more on working on rewards and outcomes as a means to an end (Deci & Ryan, 1985). It could be in terms of identified regulations and external regulations. Identified regulations mean one conscious self-determination to value a certain outcome that is associated with the behaviors, while external regulation corresponds to being directly

controlled by stimuli with a low level of self-determination (Mercader-Rubio et al., 2022). In identified regulation, motivation is externally driven by an individual's own purposes and beliefs, for instance, recognizing the importance of education so that an individual wants to gain knowledge. For external regulation, motivation comes from external factors like pressures or demands without personal interest, such as avoiding punishment to hand in homework. For amotivation, it refers to the disengagement of specific goals or tasks that lack a sense of purpose towards them (Barkoukis et al., 2008).

Face-to-face and Virtual Teaching

Face-to-face lessons have been a fundamental learning approach to education for over a century and are commonly used in kindergarten, primary school, secondary school, etc. The pandemic forced educational institutions to shut down face-to-face interactions into other alternative learning modes (Dayagbil et al., 2021). Smith and Johnson (2020) revealed that virtual teaching mode is the process of providing educational information and promoting students' learning remotely via the use of digital technology and online platforms. Teachers might use online platforms, such as Padlet or Mentimeter, to encourage interactions with students and facilitate virtual teaching, as teachers cannot interact physically during virtual teaching. Virtual teaching became more common, and some schools even combined the two teaching approaches to maximize the efficiency of learning. A big trend of mixed mode is applied in many of the Hong Kong schools.

Self-esteem

Self-esteem refers to one's subjective evaluation of their own value, belief, and overall sense of self (Rosenberg, 1965). It involves individuals' self-perception of themselves regarding their attitudes or understanding. People with high self-esteem are more likely

to associate with positive self-regard and believe in their abilities. On the other hand, low self-esteem might result in a negative self-image, which leads to a sense of insecurity and a low level of self-worth. According to Mruk (2006), self-esteem is described in terms of trait, state, domain-specific, or in general. In this paper, self-esteem is measured in the form of global self-esteem, which is an overall evaluation of self-esteem.

Procrastination

Aside from the teaching mode and self-esteem altering the level of motivation, procrastination could be a pivotal factor to consider. Procrastination refers to voluntary delay or postponement of activities that have to be completed despite knowing the fact that the postponement results in a negative consequence (Steel, 2007). People procrastinate because of the nature of the task, such as low task importance, many immediate alternatives, or high aversiveness of tasks, resulting in a higher tendency of procrastination. Besides, perfectionism could be a factor affecting the level of procrastination that they are positively related (Rice et al., 2012). Perfectionists tend to have excessively high standards of being overly self-critical and aiming for perfection. People who are afraid of not being able to meet such high standards might result in a higher delay in tasks.

The Relationship of Motivation and the Two Teaching Modes

Students tended to be motivated in physical class due to better understanding and more interactions with teachers and peers. According to research from Brenda (2017), students are more motivated in traditional than virtual classrooms. Some studies also reported that online students drop out more often than in face-to-face environments due

to lower satisfaction in learning (Boston & Ice, 2011; Patterson & McFadden, 2009). However, the online learning approach offers a high range of flexibility, and students can learn at their own pace (Yang et al., 2015). Face-to-face lessons offer more opportunities for social interaction and real-time communication, while virtual teaching results in a higher dropout rate and feelings of isolation. The environment of teaching affects motivation because of distinct factors.

The Relationship of Self-esteem and Motivation

Research has shown that these two constructs' relationship is bidirectional and could be positively or inversely related. The study reported that people with high self-esteem are more likely to be motivated to pursue goals and face different challenges, and they have more persistence when facing obstacles (Moyano et al., 2020; Waschull & Kernis, 1996; Van der Kaap-Deeder et al., 2016). Individuals have high self-efficacy and believe they can achieve the desired outcomes, so they are more willing and confident to exert effort on tasks. However, the research argued that the relationship between self-esteem and motivation is not always positively related and that an adverse effect exists towards motivation (Ferrari, 1994; Uribe Hernández et al., 2022 & Vancouver et al., 2002). Since people with high esteem want to maintain a good self-image, they are afraid of situations that potentially result in failure and underestimate self-competence, which eventually results in low motivation. Individuals have a defensive mechanism that picks an avoidance strategy in many situations to protect their self-esteem, which undermines motivation.

In addition, research reported According to Covington (2000), self-esteem is an essential factor driving students to succeed. Those students are described as success-

oriented (Atkinson, 1957; Covington, 1992). However, students who are success-oriented are likely to avoid failure and risk. As a result, they are tied with grades, called performance goals (Fried-Buchalter, 1992; Thompson et al., 1998). Students with high self-esteem are goal-oriented, motivating them to succeed and bring happiness. When the goal is risky or not worth it, they might lose the motivation to achieve it. This research is going to answer whether self-esteem affects motivation. Understanding such relationships helps teachers apply the more appropriate way of teaching and determine whether cultivating high self-esteem is good.

The Relationship of Procrastination and Motivation

Previous research highlighted a significant connection between motivation and procrastination, that they are negatively related to each other (Klingsieck, 2013; Steel, 2007; Serdar et al., 2021). However, the relationship between motivation and procrastination could be influenced differently by considering whether they are intrinsic or extrinsic motivations (Lee, 2005). Some research argued that active procrastinators intentionally work with procrastination so that they are strongly motivated by not wasting time and making deliberate choices to complete deadlines (Chu & Choi, 2005). According to the definition from Deci & Ryan (1985), pushing oneself to meet deadlines is identified as an extrinsic motivation. Even though they had a high level of intrinsic motivation, it might result in a low level of extrinsic motivation. People will easily link high procrastination with low motivation, but it depends on which kind of procrastinator people are, like passive or active.

Furthermore, finding the relationship is important in helping educators understand the student's learning behavior. Realizing the underlying mechanism and reasons for

procrastinating behavior, teachers can design more effective tasks to reduce procrastination and increase intrinsic motivation.

The Relationship of Self-esteem and Procrastination

Researchers reported a negative correlation between procrastination and self-esteem, while procrastinators showed lower self-esteem and high social anxiety (Rafique, 2012; Duru & Balkis, 2017). Individuals want to protect their self-worth and avoid failure, so they procrastinate on doing something that tends to lead to failure. People with high self-esteem have a positive self-perception that can enhance their sense of competence and persistence (Hajloo, 2014). With a positive mindset, people have a greater willingness to tackle the tasks, which reduces the level of procrastination.

To conclude: The research questions for this study are:

1. Do the virtual and face-to-face teaching methods affect the level of motivation?
2. What is the relationship between the level of motivation and self-esteem?
3. What is the relationship between the level of motivation and procrastination?
4. What is the relationship between the level of self-esteem and procrastination?
5. If the relationships are observed for the above research question, does the level of self-esteem act as a moderator in the relationship between the level of motivation and procrastination?

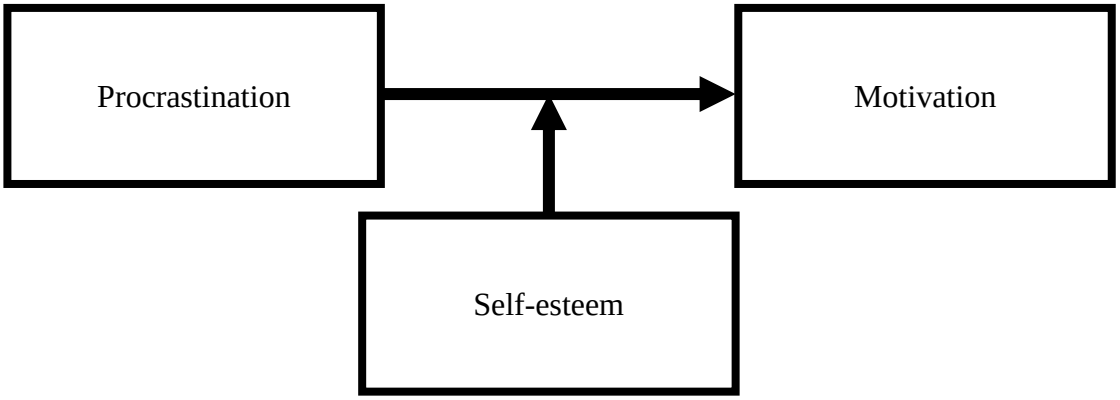

Figure. 1. Conceptual model of the effect of procrastination and self-esteem on motivation

In this study, the impact and relationship among motivation, teaching modes, self-esteem and procrastination are hypothesized as below:

H1: There is a significant impact that face-to-face teaching mode promotes a higher level of motivation.

H2: There is a significant positive correlation between the level of motivation and self-esteem.

H3: There is a significant negative correlation between the level of motivation and procrastination.

H4: There is a significant positive correlation between the level of self-esteem and procrastination.

In order to answer these questions, this project will explain the discrepancy between the results of these studies and those of those research papers and whether motivation is higher in physical classrooms or virtual classrooms. Besides, to determine whether

the relationship of the three constructs to see if it is possible to create moderate effect.

Methodology

Participants

A survey is conducted for collecting data. The research project had 73 participants in total who had experienced both virtual teaching and face-to-face teaching in the past five years. By focusing on specific demographic characteristics, our study recruited Hong Kong students aged 18-25. Since there were few studies focusing on this specific age group, the research focused on emerging adulthood, which refers to the late teens to mid-20s (Arnett, 2020). During the study, participants are requested to fill in the survey for around 10 to 15 minutes that includes various scales not limited to The Situational Motivation Scale (SIMS), The Rosenberg Self-Esteem Scale (RSES), and also The General procrastination scale (GPS) to measure motivation, self-esteem, and also the tendency of procrastination respectively. Participants are selected due to convenience that convenience sampling was used as a sampling method. The survey will be conducted online via email and social media to reach the participants while the destination is uncertain and cannot be controlled.

Research design

Our research project aims to investigate whether this affects undergraduates due to the mode of teaching, one's self-esteem, and the tendency of procrastination toward one's motivation.

All the participants are required to measure their motivation level in both teaching modes. In order to compare the impact of teaching modes towards the level of motivation, participants are divided into two groups. Random assignments for dividing

the virtual and F2F teaching class into two groups are used to ensure that every participant has an equal chance of being chosen into two groups. It helps minimize the selection bias and increases the internal validity of the study.

Measure of Motivation

Participants are asked to complete the Situational Motivation Scale (SIMS) (Guay et al., 2000) (Appendix 1) to measure their motivation in the survey. There were 16 items on the Likert scale with seven levels in each statement, from strongly disagree to Strongly agree. Same questions are asked for both scenarios which are virtual and face-to-face teaching. For instance, "I attend this class, but I am not sure if it is worth it" and Because I think that this class is good for me."

While 'Strongly disagree' will be given 1 point, 2 points for 'Disagree,' 3 points for 'Somewhat agree,' 4 points for 'Neutral,' 5 points for 'Somewhat agree,' 6 points for 'Agree' and 7 points for 'Strongly agree.' The scale labels and wordings in the statements are slightly changed for better understanding in reading questions, such as 'the activity' is changed 'the class'. The scale includes four sub-scores with four items each of measures that are intrinsic motivation (items: 1, 5, 9, 13), identified regulation (items: 2, 6, 10, 14), external regulation (items: 3, 7, 11, 15) and amotivation (items: 4, 8, 12, 16). As mentioned in the literature review, the sum of scores in identified regulation and external regulation items are grouped as extrinsic motivation while amotivation is classified as reversed items. The average motivation is calculated from the sum of scores in intrinsic and extrinsic motivations minus the scores in amotivation. After calculating the scoring of 16 items, all items are averaged into a single score with higher values indicating a greater tendency towards motivation.

The construct validity of the scale is supported by correlations with other constructs as well, such as self-determination theory (Deci & Ryan, 1985). The measure of the 7-point Likert scale offered a Cronbach's α is .85 while the SIMS is .78 (Guay et al., 2000). The SIMS demonstrated adequate construct validity based on three correlational analyses (Guay et al., 2000).

When analyzing the relationship of motivation, self-esteem and procrastination, this study will take the average motivation level of virtual and face-to-face teaching. Since mixed-mode learning is widespread and many schools are using it recently, this research took the average motivation level as a reference, which reflects the real situation in Hong Kong.

Measure of Self-esteem

In order to assess each participant's level of self-esteem, the survey will ask them to complete the Rosenberg Self-esteem Scale (RSES) (Rosenberg, 1965) (Appendix 2). The Likert scale has 10 statements with a 4-point scale from strongly agree to strongly disagree. Such as "I feel that I am a person of worth, at least on an equal plane with others," and "I wish I could have more respect for myself,".

Those who strongly disagree will receive 1 point, disagree will receive 2 points, agree will receive 3 points, and strongly agree will receive 4 points. Five items are reversed scoring: items 2, 5, 6, 8, and 9. The accumulated total score would be determined by adding up the scores from items 1, 3, 4, 7, 10 and minus the reversed items. The measure of the SIMS offered a Cronbach's α is .86 (Vermillion & Dodder, 2007), and it

demonstrated a good convergent validity.

Measure of Procrastination

The participant's survey will include the General Procrastination Scale (GPS) (Lay, 1986) (Appendix 3). There are 20 statements on the Likert-scale, from strongly agree to strongly disagree with a 5-point scale that assesses global, trait-like tendencies towards procrastination across a variety of tasks, such as "I generally delay before starting on work I have to do" and "I do not do assignment until just before they are to be handed in." Participants rated their agreement with each item on a 5-point Likert scale from strongly disagree to strongly agree. 'Strongly disagree' will be given 1 point, 2 points for 'Disagree,' 3 points for 'Neutral,' 4 points for 'Agree,' and 5 points for 'Strongly disagree. The reversed items including items 3, 4, 6, 8, 11, 13, 14, 15, 18, 20. After reverse scoring ten items, all items are averaged into a single score with higher values indicating a greater tendency towards chronic procrastination. The GPS has demonstrated good internal consistency previously, and Cronbach's α is 0.82. (Lay, 1986) and has excellent 10-year test-retest reliability (Steel, 2007).

Reliability

Reliability analysis is conducted for the above three measuring scales, which assess the internal reliability of this research study. The Cronbach's alpha value of the combined scores in motivation is 0.823, including the two teaching modes. The sub-scale of Cronbach's alpha value in intrinsic motivation, extrinsic motivation and amotivation are 0.829, 0.784 and 0.861, respectively. The reliability of motivation and its sub-scale items are at a good and acceptable level. The self-esteem scale has a Cronbach's alpha value of 0.888, representing good reliability. In comparison, Cronbach's alpha value in

procrastination is 0.629, which is classified as questionable reliability.

Table 1: Reliability Analysis of Scales

Constructs	No. of items	Cronbach's Alpha
Motivation	**32**	**0.834**
Intrinsic motivation	8	0.829
Extrinsic motivation	16	0.784
Amotivation	8	0.861
Self-esteem	**10**	**0.888**
Procrastination	**20**	**0.629**

Procedure

Participants who expressed their interest in joining the research are provided with the survey link. The information sheet introduced the study's aims and procedure at the beginning of the survey. They are informed that they have the right to withdraw from the study at any time without any consequence. The consent form for this study is presented to the participants, indicating that they agree with the terms to participate and accept the possible risks. A signature is required to ensure participants are clear with the study. Since no participants were under 15, no parental consent form was required. Participants were anticipated to fill in the survey for around 10 minutes. For the first instrument, when measuring the level of motivation, participants are asked to recall the memory of both virtual and face-to-face classes who need to experience these two settings within the past five years. They are required to answer the same questions twice to measure motivation in both face-to-face and virtual settings. Participants are then assessed based on their level of self-esteem and procrastination. They were invited to

finish a 62-item questionnaire, including questions about their motivation for learning, their self-esteem, and also their tendency to procrastinate. Demographic information is asked in the last part of the survey. The data are collected and inputted into SPSS for analysis.

Data Analysis

Regarding the methodology for data analysis, once the data had been collected and inputted, the researchers proceeded to data cleansing. Nine samples were shown with empty data, while twelve samples did not finish the whole questionnaire, and these data were deleted as incomplete responses that will not be included in the analysis.

A descriptive analysis was acquired to summarise the data and generate the following descriptive statistics for the variables, not limited to the demographic information, the motivation level in two teaching modes, the sub-scale of motivation level, the level of self-esteem and procrastination. Scatterplots are presented to visualize the relationship between intrinsic motivation and extrinsic motivation, as well as procrastination and self-esteem. After that, a Pearson correlation was conducted to investigate the relationship among different constructs. Finally, a multiple regression analysis was applied to model the relationship between a dependent variable and various independent variables, which helped to predict and estimate the value of the dependent variable based on the independent variables.

A 5% statistical significance was used for all analyses and all the analysis were carried out through IBM SPSS.

Results

Descriptive Analysis

Table 2 shows the participants' basic personal information and their field of study. Among the 73 participants, 58.9% were female, and the mean age was 21.77 years. The participants were focus on year three to graduated, nearly 90% of the sample size. At the same time, the fields of the program were mainly education, humanities and social science, and business and management, which was over 50%.

Table 2: Baseline characteristics of participants (N = 73)

Demographic information	*N*	Percentage %
Gender		
Female	30	41.1
Male	43	58.9
Age		
18-20 years old	13	17.8
21-23 years old	51	69.9
24-25 years old	9	12.3
Year level		
Year 1	3	4.1
Year 2	6	8.2
Year 3	15	20.5
Year 4	13	17.8
Year 5	16	21.9
Graduated	20	27.4
Programme		
Education	24	32.9
Humanities and Social Science	8	11
Natural Sciences	3	4.1
Engineering and Technology	6	8.2
Business and Management	10	13.7
Health and Medicine	6	8.2
Arts and Design	4	5.5

Law and Legal Studies	0	0
Communication and Media	4	5.5
Economics and Finance	2	2.7
Other	6	8.2

Table 3 displayed the comparison between two groups of participants in intrinsic motivation, extrinsic motivation and amotivation. Overall, the motivation of all sub-scales exhibited a higher mean in virtual teaching than in face-to-face teaching. The difference between the two groups ranged from 0.09 to 0.4. No matter the motivation is intrinsic or extrinsic, students are more motivated in face-to-face teaching than in virtual teaching.

Table 3: Mean and standard deviation of motivation in groups one and two

	Mean	Standard Deviation
Motivation		
Intrinsic Motivation		
Group 1: Virtual teaching*	4.48	1.13
Group 2: Face-to-face teaching**	4.65	1.23
Extrinsic Motivation		
Group 1: Virtual teaching*	5.14	0.67
Group 2: Face-to-face teaching**	5.54	0.65
Amotivation		
Group 1: Virtual teaching*	4.25	1.07
Group 2: Face-to-face teaching**	4.34	1.14

*N=36

**N=37

Table 4 indicated the mean and standard deviation. The SIMS is a 7-point Likert Scale, the RSES is a 4-point Likert Scale, and the GPS is a 5-point Likert Scale. In general, the mean score of the three scales is above the mid-point of the scale.

Table 4: Descriptive statistics of the three measuring scales

Measurement (*N* =73)	Mean	S.D.
Situational Motivation Scale (SIMS)	**4.68**	**0.54**
Intrinsic Motivation*	4.52	0.95
Extrinsic Motivation**	5.3	0.59
Amotivation***	4.38	1.06
Rosenberg Self-Esteem Scale (RSES)	**2.65**	**0.49**
General Procrastination Scale (GPS)	**2.99**	**0.41**

SIMS = higher score indicated higher motivation

RSES = higher score indicated higher self-esteem

GPS = higher score indicated higher procrastinations

S.D. = Standard Deviation

*Statement: 1,5,9,13

**Statement: 2,3,6,7,10,11,14,15

***Statement: 4,8,12,16

Independent Sample T-test

An independent samples t-test was conducted to compare intrinsic and extrinsic motivation levels between virtual teaching classes and face-to-face teaching classes.

There was an insignificant difference in intrinsic motivation level for virtual teaching class (M = 4.48, SD = 1.13) and face-to-face teaching class (M = 4.65, SD = 1.23), t (71) = -.61, p = .54 (two-tailed).

While the results of the independent samples t-test revealed that virtual teaching class (M = 5.14, SD = 0.67) led to significantly lower extrinsic motivation than face-to-face teaching class (M = 5.54, SD = 0.65), t (71) = -2.62, p = .011 (two-tailed).

To conclude, the teaching mode did not affect students in intrinsic motivation, while the mode of teaching influenced students externally in motivation. Whether teaching mode affects the level of motivation depends on the type of motivation that answers the first research question.

Pearson Correlation

According to the scatterplots generated, positive linear relationship is found between intrinsic motivation and extrinsic motivation (Fig. 2). While negative linear relationship is found between procrastination and self-esteem (Fig. 11). It is found that intrinsic motivation is moderately related with extrinsic motivation, r = .462, p <.001, whereas a strong negative correlation is reported in between procrastination and self-esteem, r = -.508, p <.001. All other scatterplots are generated as well (Fig. 3 – Fig. 10). Although they are not significant enough to prove any correlation, three of the correlations are

almost significant such as intrinsic motivation with amotivation, r = -.203, p =.085, extrinsic motivation with procrastination, r = .204, p =.083, and also amotivation with procrastination, r = .219, p =.062. To conclude, only procrastination and self-esteem are correlated. Assuming that there is no moderator effect, procrastination, motivation, and self-esteem are not correlated with each other. In this study, moderator analysis was not conducted.

Figure 2: Relationship between intrinsic motivation and extrinsic motivation.

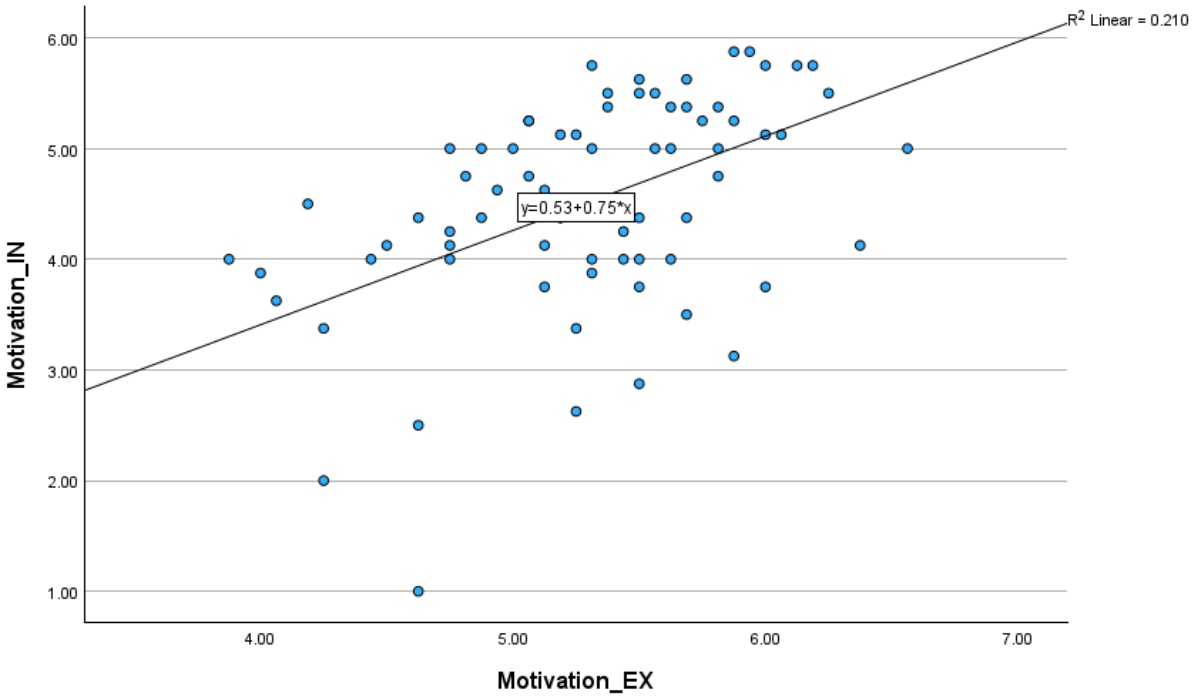

Figure 3: Relationship between intrinsic motivation and amotivation

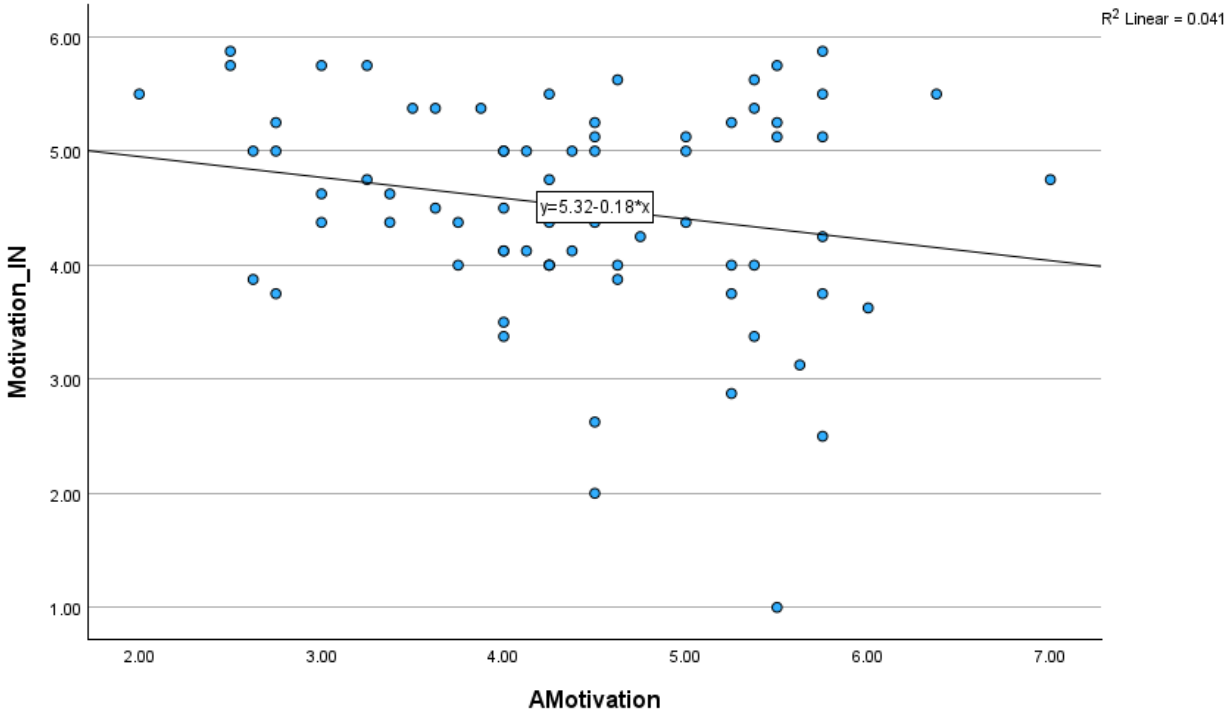

Figure 4: Relationship between intrinsic motivation and self-esteem

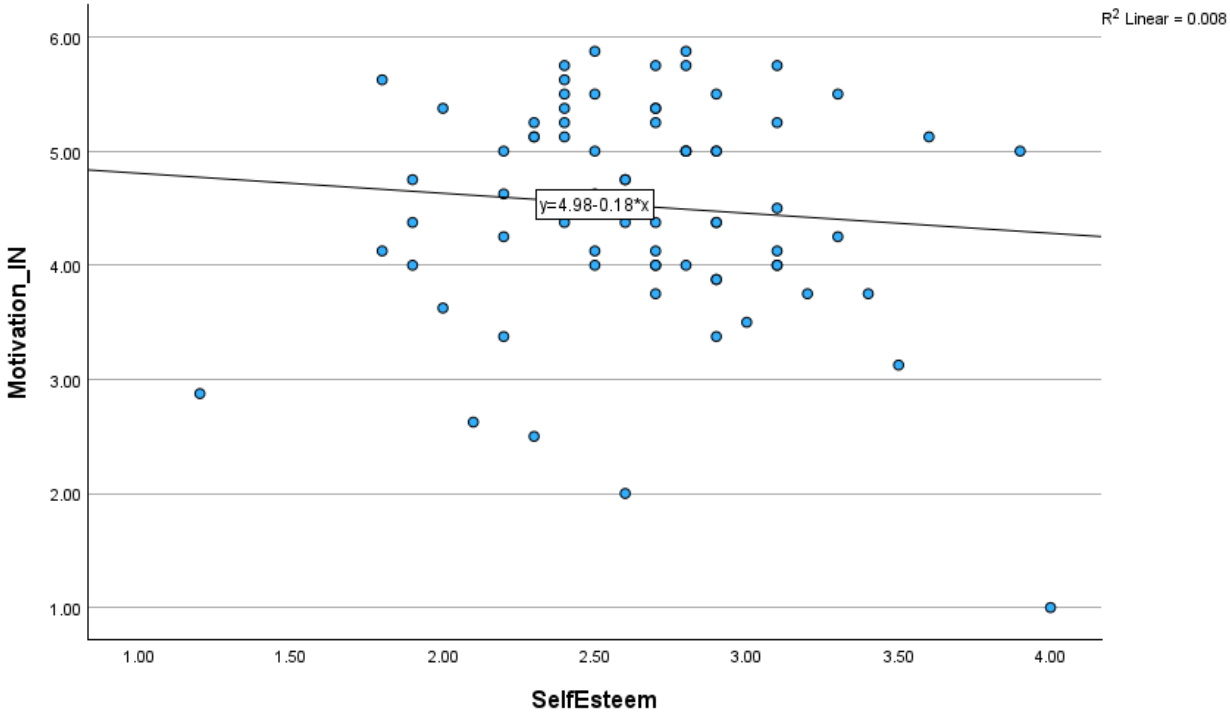

Figure 5: Relationship between intrinsic motivation and procrastination

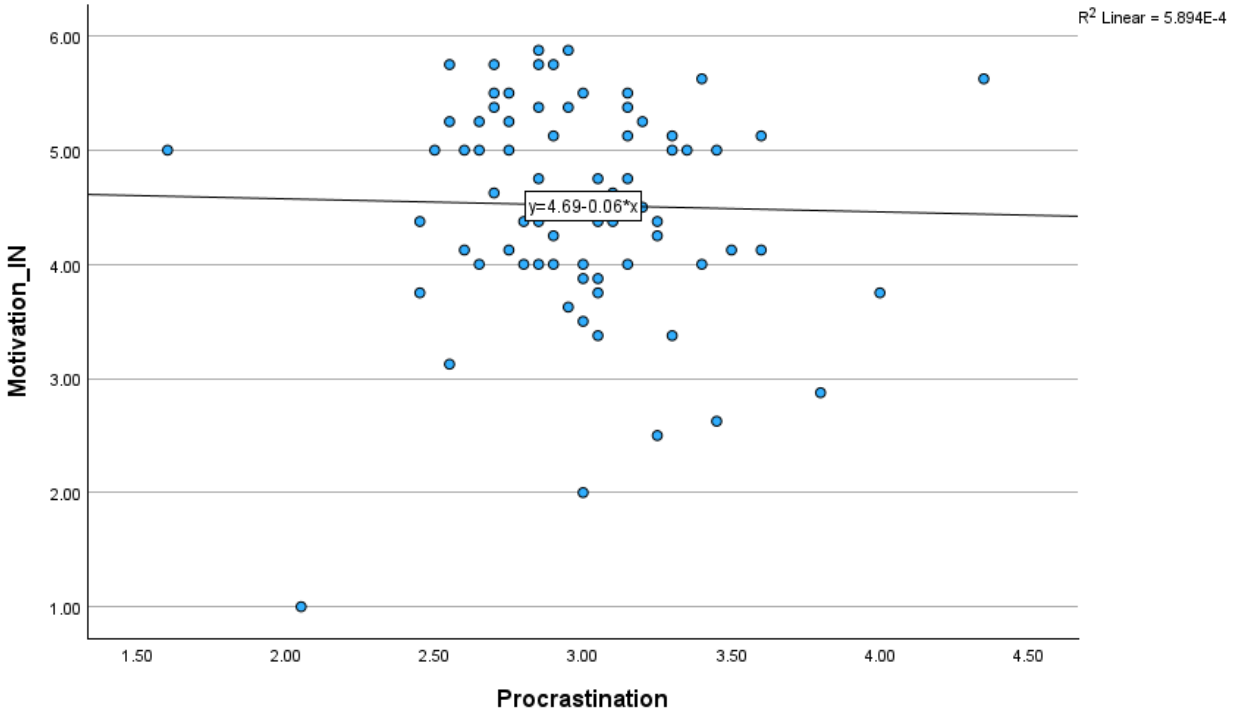

Figure 6: Relationship between extrinsic motivation and amotivation

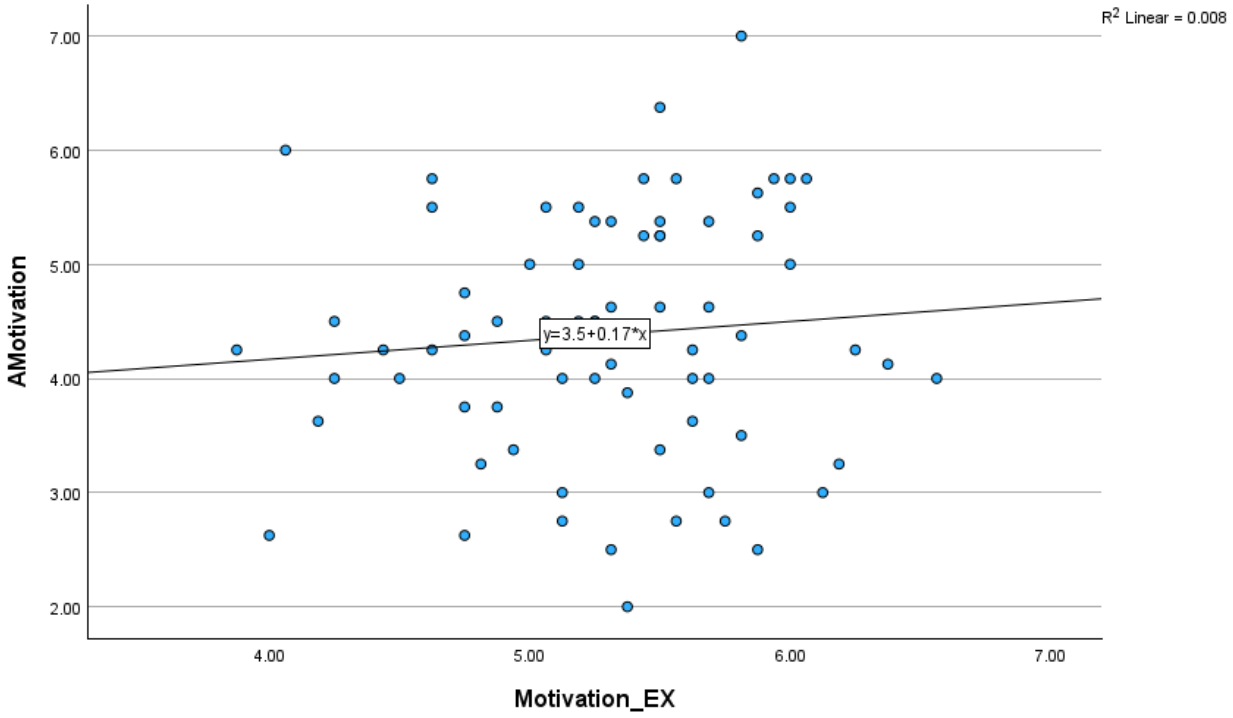

Figure 7: Relationship between extrinsic motivation and self-esteem

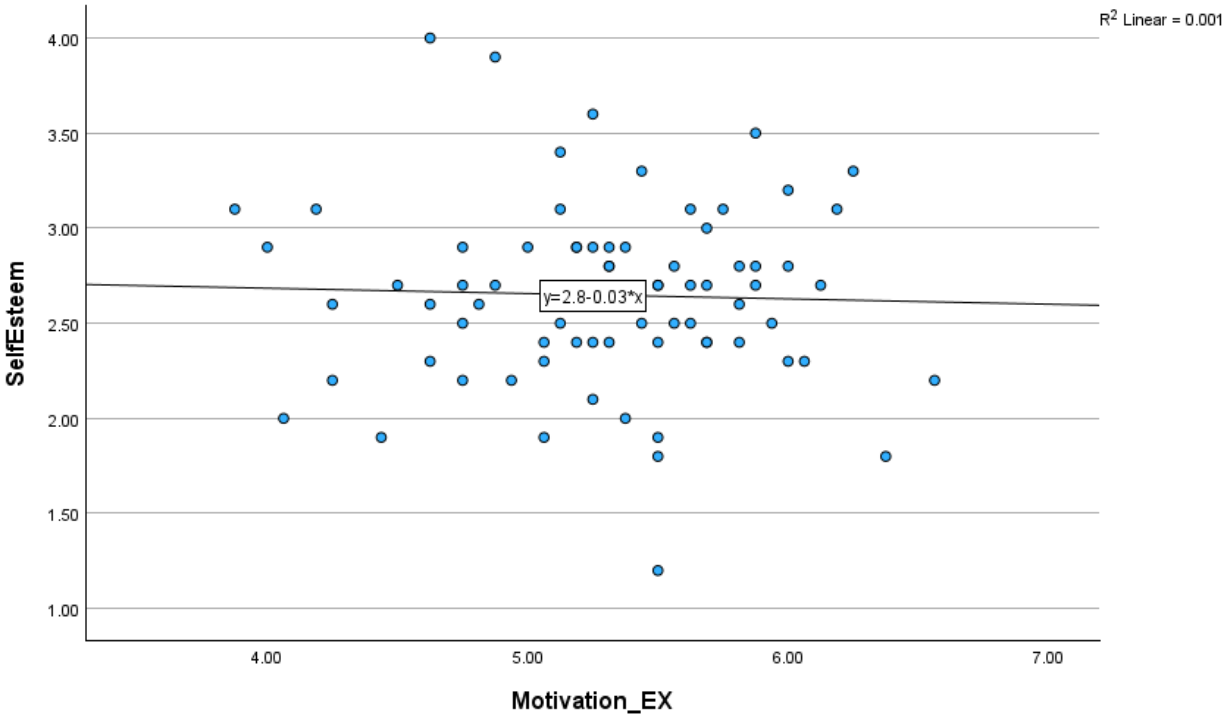

Figure 8: Relationship between extrinsic motivation and procrastination

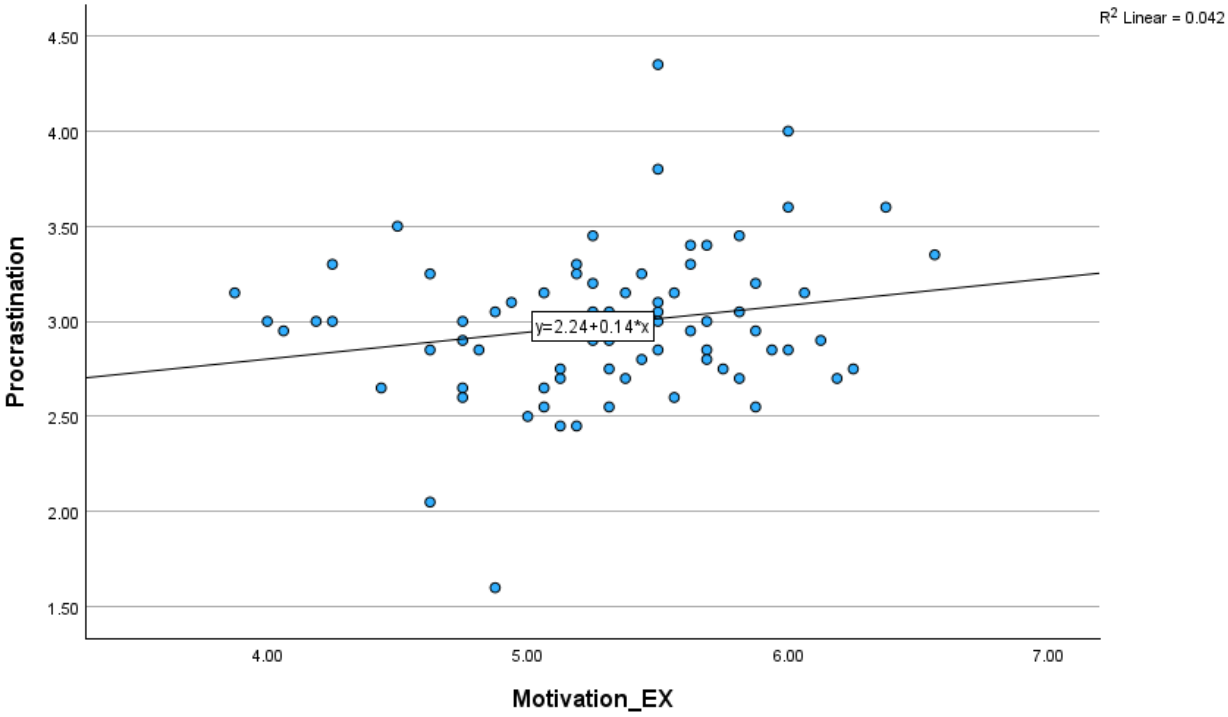

Figure 9: Relationship between amotivation and self-esteem

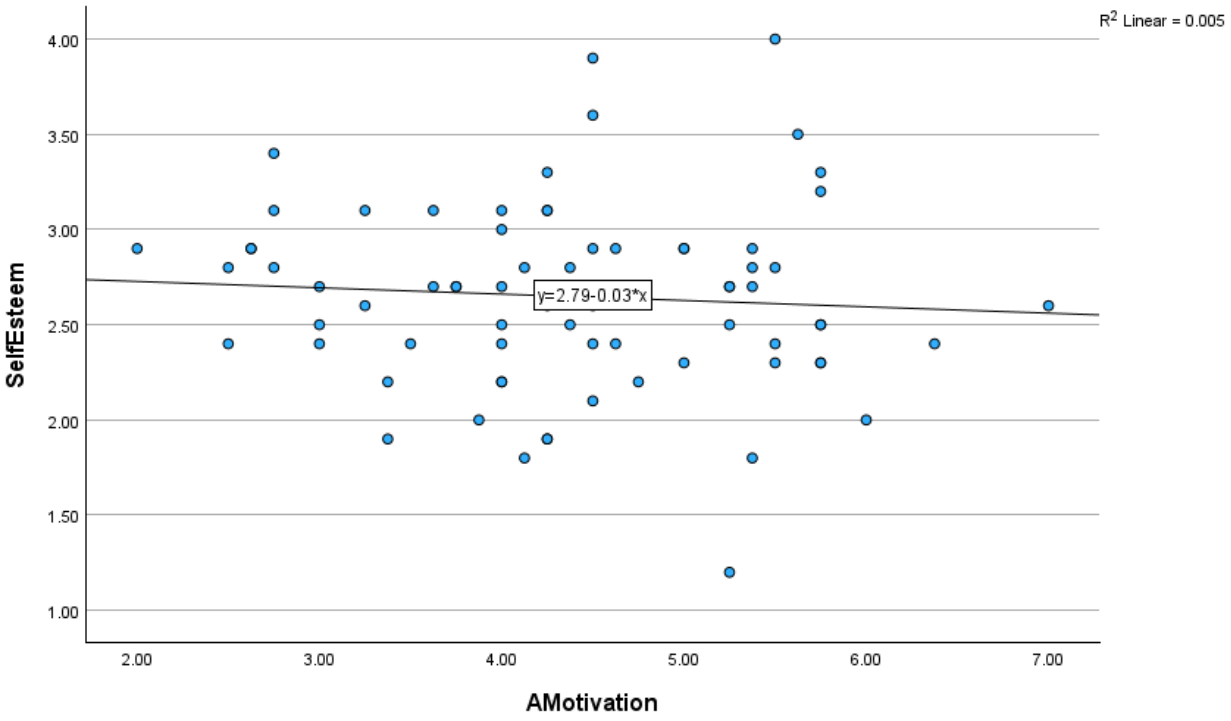

Figure 10: Relationship between amotivation and procrastination

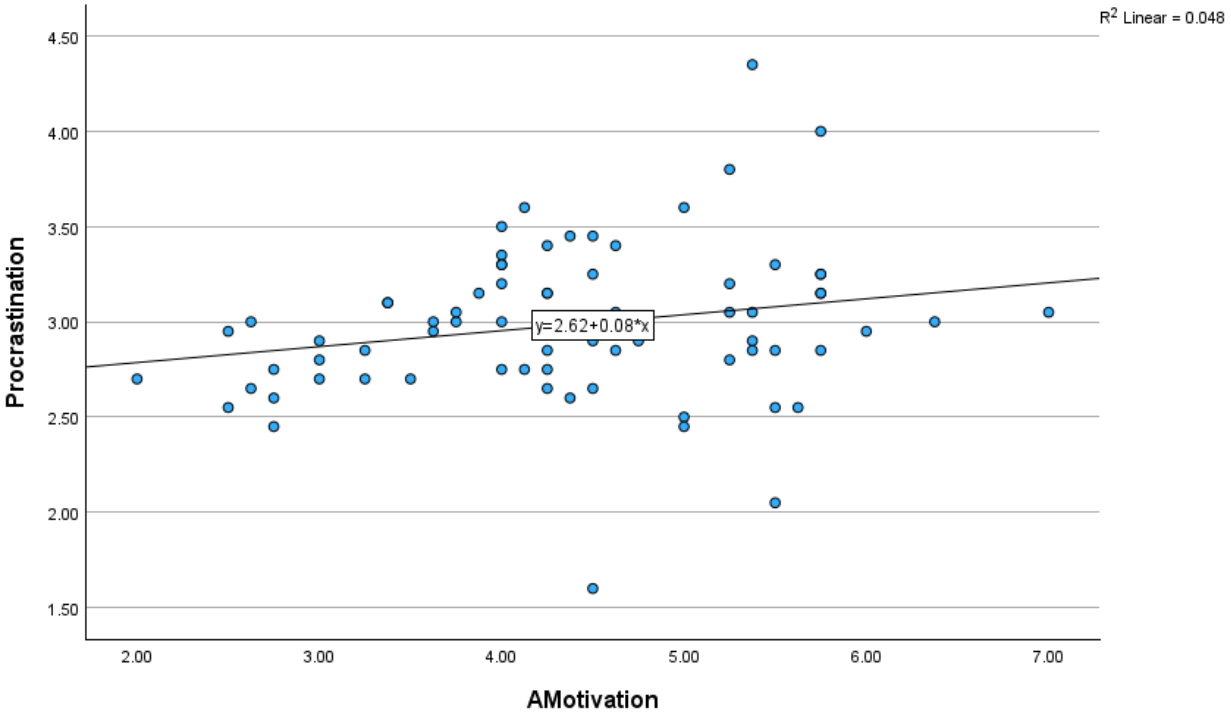

Figure 11: Relationship between self-esteem and procrastination

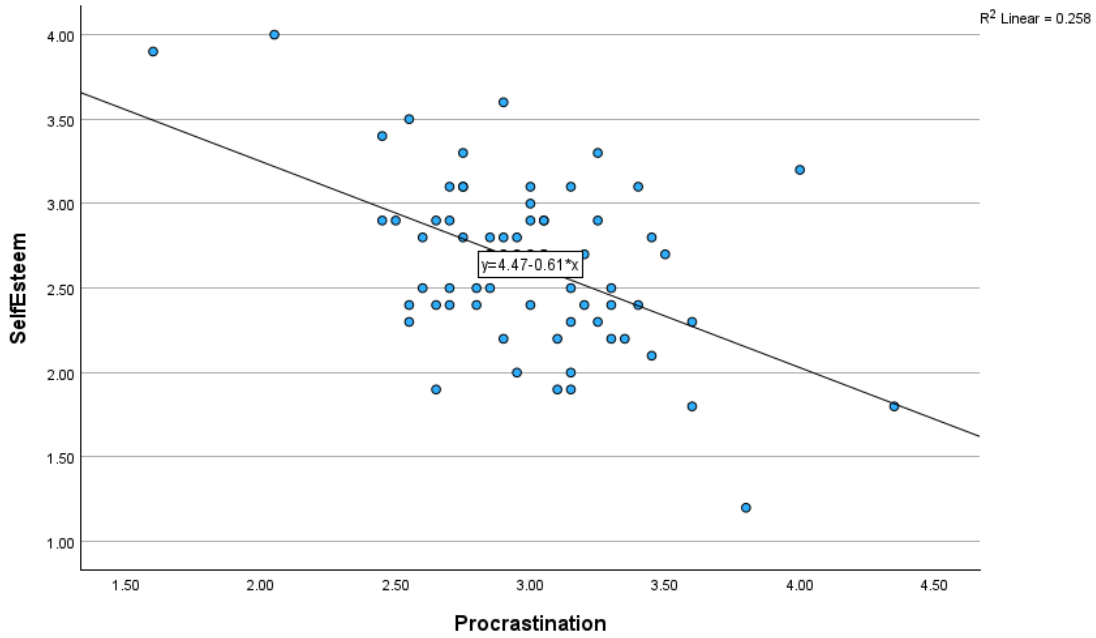

Table 5: Correlations between motivation, self-esteem and procrastination

	Pearson correlation coefficient, *r* (*P*-value)				
	1.			**2.**	**3.**
Measurement (*N* =73)	Intrinsic Motivation	Extrinsic Motivation	Amotivation		
1. Motivation (SIMS)					
Intrinsic Motivation	-	-	-	-	-
Extrinsic Motivation	0.462 (<0.001)	-	-	-	-
Amotivation	-0.203 (=0.085)	0.091 (=0.442)	-	-	-
2. Self-esteem (RSES)	-0.089(=0.452)	-0.034 (=0.777)	-0.073 (=0.541)	-	-
3. Procrastination (GPS)	-0.024 (=0.838)	0.204 (=0.083)	0.219 (=0.062)	-.508(<0.001)	-

Multiple Regression Analysis

Multiple regression analysis was conducted to examine the degree of association between the dependent variable (motivation) and the independent variables (procrastination, self-esteem, gender, and, namely, age). The influence of demographic variables in gender and namely age was controlled through the regression analysis. Three regression models were tested to investigate the influence of independent variables on each dependent variable. Table 6 shows the standardized regression coefficient (*B*), the standard error (*SE*), and the *p*-values. The three types of motivation were the dependent variables that were separately input into the analysis.

The first regression model consisted of the amotivation (dependent variable) and seven other independent variables. It was found that the level of procrastination predicted amotivation statistically and significantly, $B = .297$, $SE = .363$, $p < .05$. Since the coefficient (*B*) was positive, it implied a higher level of procrastination resulted in a higher level of amotivation. Another predictor variable (self-esteem) is not statistically insignificant, and the *p*-value is 0.694, which is greater than the .05 level.

The second regression model included the intrinsic motivation (dependent variable), along with seven other independent variables. After entering the interactive predictor variables of procrastination and self-esteem, the model found that they are statistically insignificant, with the *p*-values of .548 and .334, respectively, which are greater than .05. Both of the predictor variables (procrastination and self-esteem) were not predictors of intrinsic motivation.

The third regression model involved the association between extrinsic motivation (dependent variable) and a set of seven independent variables. The model indicated a statistically insignificant predictor variable of both procrastination and self-esteem. The *p*-values are .082 and .508, respectively, which are higher than .05. None of the predictor variables (procrastination and self-esteem) predicted extrinsic motivation.

Results of the evaluation of the assumption for linear regression analysis led to exclusion variables, including 'male' and 'age 21-23 years old' to avoid multicollinearity. These variables could not display any output because some variables were duplicated and redundant with perfect collinearity, like gender and namely age.

Table 6: Simple linear regression result between variables

	B	*SE*	*p*-values
	Amotivation		
Procrastination	0.297	0.363	<0.05
Self-Esteem	0.054	0.295	0.694
Gender			
Male	-	-	-
Female	-0.105	0.264	0.394
Age			
18-20 years old	-0.054	0.326	0.652
21-23 years old	-	-	-
24-25 years old	0.140	0.399	0.264
	Intrinsic motivation		
Procrastination	-0.087	0.338	0.548
Self-Esteem	-1.36	0.275	0.334
Gender			
Male	-	-	-
Female	0.061	0.245	0.636
Age			
18-20 years old	-0.008	0.304	0.950

21-23 years old	-	-	-
24-25 years old	0.099	0.372	0.447
	Extrinsic motivation		
Procrastination	0.249	0.204	0.082
Self-Esteem	0.092	0.166	0.508
Gender			
Male	-	-	-
Female	0.049	0.148	0.698
Age			
18-20 years old	0.084	0.183	0.486
21-23 years old	-	-	-
24-25 years old	0.049	0.224	0.701

Discussion

This research aims to examine the relationship among the levels of motivation, self-esteem, procrastination, and teaching modes toward motivation. If the three constructs are associated, the moderating effect would be investigated to determine whether self-esteem acts as a moderator between motivation and procrastination. However, they are not correlated with each other, and no moderator analysis is conducted. According to the scholars' research, the study generated four hypotheses for investigation. Firstly, it was hypothesized that a significant impact was made when the face-to-face teaching mode promoted a higher level of motivation. Secondly, a positive correlation was anticipated between the relationship between the level of motivation and self-esteem. Thirdly, the relationship between the level of motivation and procrastination was expected to be negatively related. Finally, it was anticipated that the level of self-esteem and procrastination were positively related.

Referring to the first hypothesis, the independent sample t-test reported that the intrinsic motivation does not differ among virtual and face-to-face teaching modes which is

insignificant. Virtual teaching, such as virtual games and stimulation, can be effective in cultivating the intrinsic motivation that leads to an engaging and immersive learning experience for learners (Konetes, 2010; Wei et al., 2023). Virtual teaching tools induce students' internal motivation, drawing their attention and making them competitive in the class. The face-to-face class promotes more personal feedback and immediate interaction that enhances intrinsic motivation than virtual teaching (Keis et al., 2017). The face-to-face environment encourages students and teachers to communicate through an instant questions and answers section, which fosters the learning process and is internally motivated. Even though face-to-face teaching is considered more effective than virtual classes, the virtual class engages students to learn more interestingly with updated technological educational tools. Online classes also provide intrinsic motivation for learners, which can be compared with the favorable face-to-face teaching environment. Thus, this study reports a similar impact of teaching mode on intrinsic motivation.

The other independent sample t-test found that face-to-face teaching significantly displayed higher extrinsic motivation than in virtual environments. Attending face-to-face classes requires a high degree of commitment, so students are obligated to show up physically in class (Keis et al., 2017). With higher attendance, professors are more likely to recognize the students, which builds a positive impression, vice versa. At the same time, punishment would be implemented for skipping many classes. These factors lead to a higher external motivation for physical class. Through virtual teaching, the flexibility of class time, classwork, and the environment in which students take the course is so high that not many restrictions or timeframes are implemented (Keis et al., 2017). There is a lower chance of getting punishment for virtual classes as students can

pretend to attend lessons. It explains why the physical class is found to be more extrinsically motivated than the virtual class. With too many variables potentially affecting the effectiveness of class, offering punishment such as exclusion or deferring of class could help increase extrinsic motivation, especially for online class.

In addressing the second hypothesis, an insignificant finding manifested that the level of motivation and self-esteem are unrelated. No matter what type of motivation, it resulted in an insignificant finding. The alternative hypothesis is rejected. A possible reason is that motivation is primarily influenced by the satisfaction of basic psychological needs, which are autonomy, competence, and relatedness, while self-esteem focuses on one's self-perception, which is not considered a primary motivator (Deci & Ryan, 1985). Thus, it is challenging to predict motivation without a direct determinator, so it showed an insignificant result. Another relevant reason is referring to the goal orientation theory that individuals have various attitudes toward goals, which are strongly related to motivation, which are performance goals and mastery goals (Dweck, 2006), while self-esteem is concerned with how individuals perceive self-worth regardless of goals. Since self-esteem is not considered a primary predictor of motivation and the constructs focus on different natures, it was an insignificant relationship.

By answering the third hypothesis, the correlation analysis reported an insignificant relationship between motivation and procrastination. The alternative hypothesis is rejected. This result could be explained by the cultural factor that the effectiveness of intrinsic and extrinsic motivation can vary in different countries. Intrinsic motivation could be more negatively associated with procrastination in the Western sample than in

Eastern or Asian countries (Visser et al., 2018). This means that the correlation between intrinsic motivation and procrastination in the Eastern sample is weaker than that of the Western sample. Eastern people might have lower intrinsic motivation than Westerners and Asian families commonly use punishment or reward to promote learning attitudes (Seo, 2022). This might limit the potential of creativity and exploration of a child, which cultivates an attitude that only aims to achieve goals with some purpose instead of an intrinsic motivation. Thus, it infers that the collected data results in a lower level of intrinsic motivation. In addition, even though individuals present a high level of procrastination, it does not necessarily result in a low level of intrinsic motivation. It might be because of a high level of extrinsic motivation. Cultural effects clarify the possible reason for the result of an insignificant relationship in intrinsic motivation that the measurement.

On the other hand, it is accounted for an insignificant relationship between extrinsic motivation and procrastination, but it is nearly significant. The possible explanation is the inadequate sample size and response bias of the survey. The direction of the insignificant correlation showed a positive relationship between extrinsic motivation and procrastination. This direction could be explained by Chu & Choi (2005), who state that the relationship between motivation and procrastination could depend on a unique factor, which is the attitude toward procrastination. Since individuals are driven by deadlines, it is classified as an extrinsic motivation factor. Urging to meet deadlines enhances a high level of extrinsic motivation, but at the same time, they have a high level of procrastination. It illustrates that motivation is not always negatively related to procrastination, which might depend on particular situations.

Moreover, another explanation of the insignificant result of both intrinsic and extrinsic motivation could be the situational factor of procrastinators, regardless of the intrinsic or extrinsic motivation. When an evaluation is expected to be conducted on performance, individuals tend to have a higher level of procrastination, which takes a longer time to complete (Senécal et al., 1997). They worry and hesitate about the appraisal and want to perform better in those tasks, leading to higher procrastination.

By addressing the fourth hypothesis, the correlation analysis reported a significant negative relationship between self-esteem and procrastination. The finding aligns with the previous research studies that indicated self-esteem and procrastination could foretell each other (Rafique, 2012; Duru & Balkis, 2017). People with low self-esteem activate their self-protection mechanism by procrastinating to delay tasks and avoid poor performance (Hajloo, 2014). Since intense self-criticism is imaged in their mind, they engage in negative self-talk that exaggerates the outcomes badly. After focusing on the predicted performance that will not be completed successfully, they are even more procrastinated to avoid and delay the tasks. This is one kind of coping mechanism for individuals with low self-esteem. Teachers might need to start by increasing their self-esteem with more positive praise to reduce students' procrastination and hand in the homework on time.

Limitations and Suggestions for Future Studies

The reliability of the instrument in measuring procrastination referring to the General Procrastination Scale by Sirois (2019) is the limitation of the study. Even though the value of Cronbach's Alpha is acceptable, the procrastination instrument displayed relatively low reliability (Cronbach's Alpha = .629) compared to measurements in the

study. Furthermore, cultural factors affect the choice of filling in the survey, and Asians tend to be more conservative. According to Seo (2022), cultural differences are reflected in some Asian countries' picking a more conservative approach to education. Asian parents follow traditional values and chase family and social expectations that being a doctor must be good, which preservative cultural values and interrupts independent thought. Thus, participants are relatively conservative by not filling in their true thinking and avoiding filling in the extreme answer. This is the only 5-item scale that provides a middle option that participants are even more likely to choose.

Focusing on the homogeneous group would be a limitation of this study. According to the researchers, findings from homogenous convenience have narrowed the generalizability of heterogeneous sampling in the overall population (Jager et al., 2017). The study's findings indicate that the effect of self-esteem and procrastination on motivation is limited to individuals aged 19-25 and Hongkongers. It is suggested to research a more varied sample for future study because this paper ignored cultural diversity, age disparities, and ethnicity in a homogeneous group. Younger and older people may provide unexpected and divergent results, while distinct countries and ethnicities might potentially be the factors affecting human behavior. It is recommended that heterogeneous sampling be used to analyze the generality. We may fully understand the effects of low self-esteem and procrastination on motivation in various ways thanks to the moderating effects of culture, age differences and ethnicity.

Furthermore, response bias exists as self-report measurements are used, which diminish the control of data collection. This study relies on first-hand data from the survey, which requires participants to report their motivation, self-esteem, and procrastination based

on particular scales. Since the questionnaire uses a self-report rating scale, biases such as fundamental attribution bias and social desirability bias may likely be present. These biases may be used to exaggerate or conceal specific replies to make them more acceptable in society. The validity and accuracy of the results could be ruined if the results are inaccurate. To address this issue, further research may gather information from tests with a nonequivalent control group design. Finding a group that is comparable to the treatment group is important to compare the differences between the two groups.

Future educators are encouraged to compliment students more so that they believe in their abilities and are able to achieve goals, which can enhance working productivity and quality effectively. According to Merton (1948), self-fulfilling prophecy refers to the beliefs or expectations of somebody that can influence human behavior and ultimately bring the expected result. Being a teacher, having faith in students is really important and it drives the ultimate outcome. Even though it seems to be impossible, it is crucial to have high expectations so that students perform better. Building confidence starts with the teacher so that students can trust their capability and reduce procrastination.

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Appendix A

Situational Motivation Scale (SIMS)

Directions: Read each item carefully. Using the scale below, please circle the number that best describes the reason why you are currently engaged in this activity. Answer each item according to the following scale: 1: *corresponds not all*; 2: *corresponds a very little*; 3: *corresponds a little*; 4:*corresponds moderately*; 5: *corresponds enough*; 6: *corresponds a lot*; 7: *corresponds exactly*.

Why are you currently engaged in this activity?							
1. Because I think that this activity is interesting	1	2	3	4	5	6	7
2. Because I am doing it for my own good	1	2	3	4	5	6	7
3. Because I am supposed to do it	1	2	3	4	5	6	7
4. There may be good reasons to do this activity, but personally I don't see any	1	2	3	4	5	6	7
5. Because I think that this activity is pleasant	1	2	3	4	5	6	7
6. Because I think that this activity is good for me	1	2	3	4	5	6	7
7. Because it is something that I have to do	1	2	3	4	5	6	7
8. I do this activity but I am not sure if it is worth it	1	2	3	4	5	6	7
9. Because this activity is fun	1	2	3	4	5	6	7
10. By personal decision	1	2	3	4	5	6	7
11. Because I don't have any choice	1	2	3	4	5	6	7
12. I don't know; I don't see what this activity brings me	1	2	3	4	5	6	7
13. Because I feel good when doing this activity	1	2	3	4	5	6	7
14. Because I believe that this activity is important for me	1	2	3	4	5	6	7
15. Because I feel that I have to do it	1	2	3	4	5	6	7
16. I do this activity, but I am not sure it is a good thing to pursue it	1	2	3	4	5	6	7

Codification key: Intrinsic motivation: Items 1, 5, 9, 13; Identified regulation: Items 2, 6, 10, 14; External regulation: Items 3,7, 11, 15; Amotivation: Items 4, 8, 12, 16.

Appendix B

The Rosenberg self-esteem scale (RSES)

Scale:

Instructions

Below is a list of statements dealing with your general feelings about yourself. Please indicate how strongly you agree or disagree with each statement.

1. On the whole, I am satisfied with myself.

Strongly Agree Agree Disagree Strongly Disagree

2. At times I think I am no good at all.

Strongly Agree Agree Disagree Strongly Disagree

3. I feel that I have a number of good qualities.

Strongly Agree Agree Disagree Strongly Disagree

4. I am able to do things as well as most other people.

Strongly Agree Agree Disagree Strongly Disagree

5. I feel I do not have much to be proud of.

Strongly Agree Agree Disagree Strongly Disagree

6. I certainly feel useless at times.

Strongly Agree Agree Disagree Strongly Disagree

7. I feel that I'm a person of worth, at least on an equal plane with others.

Strongly Agree Agree Disagree Strongly Disagree

8. I wish I could have more respect for myself.

Strongly Agree Agree Disagree Strongly Disagree

9. All in all, I am inclined to feel that I am a failure.

Strongly Agree Agree Disagree Strongly Disagree

10. I take a positive attitude toward myself.

Strongly Agree Agree Disagree Strongly Disagree

Scoring:

Items 2, 5, 6, 8, 9 are reverse scored. Give "Strongly Disagree" 1 point, "Disagree" 2 points, "Agree" 3 points, and "Strongly Agree" 4 points. Sum scores for all ten items. Keep scores on a continuous scale. Higher scores indicate higher self-esteem.

Appendix C

General procrastination scale (GPS)

Instructions:

People may use the following statements to describe themselves. For each statement, decide whether the statement is uncharacteristic or characteristic of you using the following 5 point scale. Note that the 3 on the scale is Neutral – the statement is neither characteristic nor uncharacteristic of you. In the box to the right of each statement, fill in the number on the 5 point scale that best describes you.

Extremely Uncharacteristic	Moderately Uncharacteristic	Neutral	Moderately Characteristic	Extremely Characteristic
1	2	3	4	5

1.	I often find myself performing tasks that I had intended to do days before.	☐
2.*	I do not do assignments until just before they are to be handed in.	☐
3.*	When I am finished with a library book, I return it right away regardless of the date it is due.	☐
4.	When it is time to get up in the morning, I most often get right out of bed.	☐
5.	A letter may sit for days after I write it before mailing it.	☐
6.	I generally return phone calls promptly.	☐
7.	Even with jobs that require little else except sitting down and doing them, I find they seldom get done for days.	☐
8.	I usually make decisions as soon as possible.	☐
9.	I generally delay before starting on work I have to do.	☐
10.*	I usually have to rush to complete a task on time.	☐
11.	When preparing to go out, I am seldom caught having to do something at the last minute.	☐
12.	In preparing for some deadline, I often waste time by doing other things.	☐
13.*	I prefer to leave early for an appointment.	☐
14.*	I usually start an assignment shortly after it is assigned.	☐
15.	I often have a task finished sooner than necessary.	☐
16.	I always seem to end up shopping for birthday or Christmas gifts at the last minute.	☐
17.	I usually buy even an essential item at the last minute.	☐
18.	I usually accomplish all the things I plan to do in a day.	☐
19.	I am continually saying "I'll do it tomorrow".	☐
20.	I usually take care of all the tasks I have to do before I settle down and relax for the evening.	☐

Note: Reversed-keyed items: 3,4,6,8,11,13,14,15,18,20

Note: * indicates items that differ from student to non-student forms

Appendix D

THE EDUCATION UNIVERSITY OF HONG KONG

Department of Psychology

Assessing the Relationship of Virtual and Face-to-face Teaching on Adolescence Motivation Depends on Self-esteem and Procrastination

CONSENT TO PARTICIPATE IN RESEARCH

I ,_____, hereby consent to participate in the captioned project supervised by Dr. Yip Chi Wing Michael and conducted by Cheng Hoi Lam, who are staff and a student of the Department of Psychology in The Education University of Hong Kong.

I understand that information obtained from this research may be used in future research and may be published. However, my right to privacy will be retained, i.e., my personal details will not be revealed.

The procedure as set out in the attached information sheet has been fully explained. I understand the benefits and risks involved. My participation in the project is voluntary.

I acknowledge that I have the right to question any part of the procedure and can withdraw at any time without negative consequences.

Signature:

Name of participant:

Date:

Appendix E

INFORMATION SHEET

Assessing the Relationship of Virtual and Face-to-face Teaching on Adolescence Motivation Depends on Self-esteem and Procrastination

You are invited to participate in a project supervised by Dr. Yip Chi Wing Michael and conducted by Cheng Hoi Lam, who are staff and a student of the Department of Psychology in The Education University of Hong Kong.

The introduction of the research

This research aims to exhibit the discrepancy between these study results among those research papers on whether the intrinsic motivation is higher in physical classroom or virtual classroom by comparing the level of the factors in two environments. Also, to determine the factors that affect students in intrinsic motivation in both virtual and traditional teaching settings. This project proposed some factors that might potentially affect the intrinsic motivation of students in two different study environments.

The methodology of the research

Around 150 participants would be needed for this survey. By focusing on specific demographic characteristics, our study will recruit Hong Kong students aged 19-24. Participants are asked to recall the memory of both virtual and traditional classes who need to experience these two settings within the past 3 years.

Participants are requested to fill in the survey around 10 to 15 minutes that includes various scales not limited to The Situational Motivation Scale (SIMS), The Rosenberg Self-Esteem Scale (RSES), and also The General procrastination scale (GPS) to measure motivation, self-esteem, and also the tendency of procrastination respectively. The survey will be conducted online via email and social media to reach the participants while the destination is uncertain and cannot be controlled. Participants are required to answer the same questions twice in both face-to-face and virtual settings.

You may read this information sheet, ask questions if you have any, and complete the survey with your true experiences and feelings. Please feel free to make your own choice, as there is not a right or wrong answer for each game.

The potential risks of the research

The study involves no potential risk. Your participation in this survey won't result in any injury or harm neither physically nor psychologically. Your participation in the project is absolutely voluntary. You have every right to withdraw from the study at any time without negative consequences. All information related to you will remain confidential and will be identifiable by codes known only to the researcher. The results of the study will only be used for academic purposes, such as journal articles or educational presentations. All data will be completely anonymized while no individual will be identifiable from the final results. Data will be stored on a password-protected file and a password-protected computer until 5 years past publication. Only the project supervisor and his/her student can access the data. The final report will also be checked at by the Research Ethics Committee so as to protect your safety, rights, wellbeing, and dignity.

If you would like to obtain more information about this study, please contact me by email at , or my supervisor Dr. Yip Chi Wing Michael by email at . If you have any concerns about the conduct of this research study, please do not hesitate to contact the Human Research Ethics Committee by email at hrec@eduhk.hk or by mail to the Research and Development Office, The Education University of Hong Kong.

Thank you for your interest in participating in this study.

Cheng Hoi Lam