

# A CORRELATIONAL STUDY OF SELF-EFFICACY AND MINDSET: BUILDING GROWTH MINDSET THROUGH MASTERY EXPERIENCE AND EFFORT-BASED VERBAL PERSUASION

TAROSH WANGWONGWIROJ<sup>1</sup>, PRATCHAYAPONG YASRI<sup>2</sup>

<sup>1</sup>Shrewsbury International School, Thailand

<sup>2</sup>Institute for Innovative Learning, Mahidol University, Thailand

## Abstract

Growth mindset and self-efficacy are two important characteristics to help learners in the 21st century constantly develop themselves to become more skillful and to be confident in their own ability to accomplish certain tasks. It is hypothesised in this study that these two are theoretically associated in that mastery experience and verbal persuasion (both form one's self-efficacy) play essential roles in the development of one's mindset. However, there is a lack of empirical evidence to show their statistical correlations. Therefore, this quantitative study is set to explore such relationships. An online survey using 18 closed-ended items based on a 5-Likert scale with 206 high school respondents was carried out. Correlation tests revealed that the theoretical assumption was valid from a statistical point of view. There were weak positive correlations between growth mindset and mastery experience ( $r = 0.3$ ), growth mindset and verbal persuasion focused on effort ( $r = 0.4$ ), as well as mastery experience and verbal persuasion focused on effort ( $r = 0.4$ ). Not only statistical confirmation of the theoretical perspective, this study does also raise awareness for teachers and parents to help provide direct experiences and give compliments that focus on their effort rather than their intelligence, as these would potentially help them develop a growth mindset. In addition, educational implications can be made that it is crucial to adopt active learning approaches where students can expose themselves to hands-on experiences and interact with one another.

**Keywords:** Self-efficacy, Mastery experience, Verbal persuasion, Growth mindset, Fixed mindset

Article Received: 18 October 2020, Revised: 3 November 2020, Accepted: 24 December 2020

## 1. INTRODUCTION

It is commonly known that confidence is one of the most required characteristics that individuals seek for in life as it helps them feel ready for life's experiences regardless of their hardship. Traditionally, a psychological framework namely self-efficacy has been primarily used to explain one's belief in the ability to accomplish a given task (Bandura, 1977). Recently, this is explained by present researchers through the lens of mindset (Dweck (2006)). Little attempt has been made to integrate these two frameworks to make sense of daily life experiences based on a theoretical point of view. Also, there is a lack of empirical study to convey statistical associations between these two frameworks. It is therefore hypothesised in this article that the two are interrelated both theoretically and statistically. The context being focused in this work is students' learning experiences and how they view their dependence on various forms of confidence which in turn form their own self-efficacy. In addition, it seeks to explore their types of mindset whether it belongs to the growth type of mindset or another one which is rather fixed. Besides

theoretical discussion and descriptive statistics, correlational tests are performed to provide empirical evidence that some aspects of the two frameworks can be related. Findings from this study can raise some concern for teachers as well as parents to be aware of experiences that they would provide for their children to interact with and how they would encourage them in order to grow their positive mindset in the long run.

### 1.1 Self-efficacy

Fundamentally, self-efficacy refers to the belief in one's own ability to accomplish a certain task successfully and the influence in one's own behaviour in order to avoid negative outcomes or unsatisfactory performances (Bandura, 1977). Bandura and Schunk (1981) explain that people who have a low level of self-efficacy tend to avoid challenging tasks whereas others who attain a high level of self-efficacy are more likely to accept challenges that they have to encounter and work persistently toward their goals, which results in achieving more desirable outcomes. Lazarus and Launier (1978) also suggest that people who perceive that they are ineffectual and undermined by obstacles, especially in stressful

circumstances, tend to surrender to challenges and withdraw their action from participation. According to the social learning perspective, Bandura (1982a) posits four main sources of self-efficacy consisting of mastery experiences, vicarious experiences, verbal persuasion, and psychological states. Interrelationship between these four aspects build up one's self-efficacy which can be constantly evaluated by individuals' performances. Schunk (1989) suggests that if a task is successful, efficacy will be heightened until it reaches the point where failure does not impact them.

First and foremost, personal accomplishments are influenced by the principle of *mastery experiences*. This source of progress in self-efficacy is the most effective method to develop a strong sense of efficacy. Individuals' efficacy will surge if they can accomplish the task by using their own skills and abilities to handle new challenges. However, occasional failure at the early course of events will lower efficacy, unless they are diligent and determined enough to overcome these mistakes as skills are being developed (Bandura, 1982b). At a certain stage where the skills are fully intensified, these can be applied into other completely different situations that require similar competency levels (Bandura, Jeffery, & Gajdos, 1975). In addition, mastery experience also refers to how individuals interpret their own performance in a particular task which may influence self-efficacy. An example of this would be how different students perceive their test result as the way to improve and vice versa (Bandura, 1977).

Secondly, although mastery experience is the most effective means to cultivate self-efficacy, another source of confidence in one's ability should also be considered and that is *vicarious experience*. People tend to develop their self-efficacy from the experiences and knowledge of others (Rosenthal and Zimmerman, 1978). When people observe a model accomplishing a certain task without any negative impact to them, the notion will be induced that if they dedicate more time and effort to the same task that the model achieved, they are also likely to improve or even achieve the same task as well (Bandura & Barab, 1973). On the other hand, if the model that has the similar competency fails the task, the observer's judgement will be reduced in spite of their high effort (Brown & Inouye, 1978). However, vicarious experience must be presented in the environment that is excluded from social comparison of one's own capabilities. Otherwise, the expectation generated by the

model alone will be less influential (Kazdin, 1973). In addition, the more apparent the task performed by the model, the higher chance of developing self-efficacy juxtaposed to that of the model with ambiguous actions in terms of consequences (Kazdin, 1974c).

Furthermore, *verbal persuasion* is the constructive impact that someone's words are positively affecting self-efficacy. Even though this resource has limitations in its effectiveness, it relies on whether the praise or verbal encouragement is practical or not (Bandura, 1982a). This type of resource is appropriate for people who have high self-esteem and know that they are capable of participating in a certain challenge (Chambliss & Murray, 1979a, 1979b) and also those who do not rely on their innate ability (Martocchio, 1994). Verbal persuasion can be more efficient if they are linked with action. That is to say, when people are being encouraged verbally but there are no challenges being faced, self-efficacy is less likely to be developed (Meyer, 1992).

Lastly, our *physiological state* and emotional arousal in different circumstances are also aspects to be considered. People tend to envision success when there is no arousal. In contrast, in a situation where there are high levels of stress or adverse situations, self-efficacy will be lowered (Bandura, 1982b). However, these factors can be reduced if individuals can develop skills to cope with these threatening circumstances. In order to achieve these skills, one must confront their fear and anxiety so that they gain personal experiences from these situations (Averill, 1973; Szpiler & Epstein, 1976).

## 1.2 Mindset

Mindset is a set of beliefs an individual has that guides how one responds to or interprets a situation and an established attitude in one's ability to succeed in certain areas. The mindset theory focuses on the responses of people toward challenges and explains the rationale behind why some people are discouraged by failure or why they withdraw when experiencing obstacles (Dweck, 1986).

People's belief in their intelligence or academic competency levels can be classified into two main types: *fixed mindset* (entity theory) and *growth mindset* (incremental theory) (Dweck et al., 1995). Individuals who have a fixed mindset believe that skills and abilities are innate and unchangeable. In other words, these skills

cannot be developed since they are born with or without. Dweck (2006) found this to be true in her study, negative attitudes that people with a fixed mindset tend to develop towards themselves in difficult situations. For instance, common phrases such as "It is no good for me trying because I do not have the ability" and "I do not listen to feedback as it will not help me to improve" are often used to lower their intellectual confidence (Dweck, 2006). This may lead to their views on challenges as an indicator of intelligence. If they cannot overcome these challenges, they might interpret this situation in a way that they lack skills and knowledge (Blackwell et al., 2007). Likewise, it can also be interpreted as people with a fixed mindset tend to focus on how someone will perceive or whether someone will criticise them because of their failure (Dweck et al., 2011). Blackwell (2007) conducted a study on children who have fixed mindset such as distrust in effort and panic about their failure. He revealed that these children tend to achieve a lower academic performance over time.

On the other hand, people with a growth mindset believe that skills and abilities can be developed through hard work and persistence. That is to say, they believe that skills and intelligence can be cultivated. Dweck (2006) suggested that people with a growth mindset often use positive, common phrases such as "I can put effort and change my abilities" and "I do not think that intelligence is fixed at birth" more often. These people view challenges as positive and see it as an opportunity to increase their ability (Heyman and Dweck, 1988). In addition, a trait of this incremental framework is to be adaptive and "mastery-oriented" during setbacks (Blackwell et al., 2007). In the long-term, people who achieve a growth mindset tend to perform better when being placed in an adverse circumstance (Good et al., 2003). In an experiment conducted by Yeager and Dweck (2012), researchers found that low achieving students who learned to develop a growth mindset did the task better compared to a group of students who did not have that learning framework. Other studies also demonstrated that college students who believe that their intelligence is malleable shows an improvement in their academic performance (Good et al., 2002; Good et al., 2003).

However, these mindsets can be developed or diminished by certain types of compliments given by their parents, peers or teachers. Both belief systems depend on the type of praise people obtain. In other

words, individuals who get praised because of their effort tend to have a different belief system compared to those who receive praise because of their trait and ability (Mueller & Dweck, 1998; Kamins & Dweck, 1999). Indeed, the term process praise refers to praise for their effort in a certain task which may lead to their focus on their effort that they dedicate to a certain task and develop their skills, whereas the term person praise refers to praise for their intelligence which may lead to the development of a fixed mindset (Zentall & Morris, 2010).

## 2. THEORETICAL FRAMEWORK

According to the definition of growth mindset proposed by Dweck who claims that skills and abilities are malleable and not innate (2006). However, these frameworks can be adversely affected by different types of praising (Mueller & Dweck, 1998; Kamins & Dweck, 1999). In the study conducted by Gunderson and his team (2013), results show that children who received process praise in early childhood would later develop a growth mindset whereas children who received person praise would develop a fixed mindset later on in their life (Corpus & Lepper, 2007; Kamins & Dweck, 1999; Mueller & Dweck, 1998). This result led to an idea that verbal persuasion (Bandura, 1982a) may also be associated with determining individuals' types of mindsets (Dweck, 2006). In the case that verbal persuasion is used to encourage people to achieve their goals, these encouragements may be emphasised on individuals' ability rather than effort, so they can perceive that their skills and ability are unalterable, which is a form of fixed mindset. However, when compliments focused on their effort to accomplish a given task may help them feel more motivated to face future hardship which is a form of growth mindset (Zentall & Morris, 2010; Bandura, 1982a).

Taking both growth mindset and mastery experience into a greater consideration, mastery experience is the experience we gain after accomplishing challenges using our own ability and effort through the challenges (Bandura, 1982a). However, along the way to success there must be obstacles, so there are chances for mistakes. Some people decide to retract from the challenges as they do not believe that their ability can be developed as stated by a fixed mindset. On the other hand, people learn from their mistakes and find possible ways to overcome these challenges as they believe that

ability can be malleable (Dweck, 2006). This leads to an idea that if people gain the experience by themselves, they will be more exposed to failure which allows them to obtain feedback and improvement to an extent that they can avoid making these mistakes and reach their goals. Therefore, mastery experience and growth mindset might show a positive relationship once statistical data is obtained.

This study is therefore conducted to investigate the statistical relationship between self-efficacy aspects and mindsets via experimental methods of correlational study. In addition, this study also investigates the possible ways that individuals can develop their mindsets from their self-efficacy resources which may lead to the application for becoming competent learners in the 21st century.

### 3. METHODOLOGY

A self-administered online questionnaire was distributed to high school students residing in Bangkok, Thailand. A total of 206 responses were received which included 15.5%, 45.6%, and 17.5% of students in grades 10, 11, and 12, respectively. The remaining number included school leavers and home-schoolers. The sampling method used in this study was a convenience sampling method taking information from those easy to reach and

willing to take part in the online survey during the COVID-19 pandemic. The respondents were informed about the purpose of this study before proceeding with their online response so that their assumed consent could be implied.

This survey included 18 questionnaire statements which were designed to be close-ended 5-point Likert-type scales ranging from strongly disagree (scale 1) to strongly agree (scale 5). The statements were divided into six categories (three for each), comprising growth mindset (GM), fixed mindset (FM), mastery experience (ME), vicarious experience (VE), verbal persuasion based on intelligence (VP-I), and verbal persuasion based on effort (VP-E). Table 1 below shows the statements and their identified category. The order of these statements was shuffled to prevent demand of characteristics produced. In order to complete the survey, the respondents had to choose only one out of five choices that reflects their level of agreement. However, it is important to note that psychological states, one of the four sources that form self-efficacy is excluded from this survey. The rationale for this is that this source particularly varies depending on situations individuals are in. If a situation is new, they tend to be nervous and that their self-efficacy tends to be lower than in normal situations.

Table 1: Self-efficacy and mindset questionnaire items

No	Statement	Category identified
1	I become confident in my ability when I complete a certain task.	ME
2	I become confident in my ability when other people tell me that I am good at what I am doing.	VP-I
3	I become confident in my ability when other people tell me to improve on something	VP-E
4	I become confident in my ability when I see someone demonstrate a certain task beforehand.	VE
5	I accept others' feedback on areas to improve my own ability.	GM
6	I believe the reason why I am good at some skills is because of my natural ability.	FM
7	I become confident in my ability when I gain direct experience from a certain task.	ME
8	I become confident in my ability when other people give me compliments on my learning performance.	VP-I
9	I become confident in my ability when other people tell me that I can overcome challenges by working hard.	VP-E
10	I become confident in my ability when I see someone with a similar skillset as me accomplishing a certain task.	VE

No	Statement	Category identified
11	I can manage to solve difficult problems if I try hard enough.	GM
12	I believe that talents are something that is born with and cannot be developed.	FM
13	I become confident in my ability when I have a chance to do a certain task no matter what the result would be.	ME
14	I become confident in my ability when other people tell me that I am perfect.	VP-I
15	I become confident in my ability when other people tell me that I have done my best, even though the result is not desirable.	VP-E
16	I become confident in my ability when I see someone who has a similar level of competency as me doing a certain task.	VE
17	I believe that learning from mistakes is the path to success.	GM
18	I believe that the reason why I make mistakes is because of my own limited ability.	FM

The online survey was closed when the number of respondents reached 206. The collected data was analysed using descriptive statistics in which mean scores and standard deviation values were used to indicate the distribution of the data. The statements that belong to the same category were then averaged which enabled correlation between the categories to be analysed. The interpretation of correlation coefficients was based on Mukaka (2012) in which values between 0.3 and 0.5, 0.5 and 0.7, 0.7 and 0.9, and those values above 0.9 represent weak, moderate, strong, and very strong correlations, respectively; whereas, those below 0.3 are considered negligible correlation. However, where appropriate, this study points out a possible tendency of related variables, even though the values are

lower than 0.3 for the purpose of discussion, without having intention to generalise the findings.

#### 4. RESULTS AND DISCUSSION

According to Table 2, the data analysis revealed that the mean score of growth mindset among the respondents was statistically the highest ( $x\bar{ } = 4.4$ ) at the significance level of 95%, followed by the mean score of mastery experience ( $x\bar{ } = 4.0$ ). There were statistical differences among the mean scores of vicarious experience ( $x\bar{ } = 3.6$ ), verbal persuasion based on effort ( $x\bar{ } = 3.7$ ) and verbal persuasion based on intelligence ( $x\bar{ } = 3.7$ ). In addition, the lowest among the available categories was the mean score of fixed mindset ( $x\bar{ } = 2.6$ ) which was statistically significant at the confidence level of 95%.

Table 2: Descriptive statistics results based on the self-efficacy and mindset questionnaire (N = 206)

Category	Mean	SD.
1 Growth mindset	4.4	0.4
2 Fixed mindset	2.6	0.9
3 Mastery experience	4.0	0.5
4 Vicarious experience	3.6	0.7
5 Verbal persuasion based on intelligence	3.7	0.8
6 Verbal persuasion based on effort	3.7	0.7

It is encouraging to see among the 206 respondents that their level of growth mindset was statistically greater than that of fixed mindset. Researchers suggest that the greater the level of growth mindset, the better learning performance students tend to achieve. Part of the learning phenomenon can be explained in the light that students with a growth mindset are willing to take up challenging tasks as they think these tasks form a process of self-betterment (Leroy et al., 2007). In addition, they tend to be persistent in working towards difficulties and enjoy such challenges more than fixed mindset students would do (Dweck, 2009). Constructively learning would be their preferred choice of learning as they are prone to self-develop after feedback given by their advisors (Dweck, 2014). In addition, it is encouraging also to see that among them they appear to rely more on mastery experience compared to the other sources of confidence in their own ability according to the theory of self-efficacy. Psychologists perceive that direct experience is built-in opportunities for active engagement in a learning environment which decisively shapes individual understandings. Their self-efficacy is likely to be maintained persistently in the long-run which helps grow their confidence in facing further tasks regardless of their levels of difficulty (Pajares et al., 2007).

According to Table 3, statistical tests to determine the degree of correlation showed that there was a weak positive correlation between growth mindset and mastery experience ( $r = 0.3$ ). This finding surprisingly supports the proposed theoretical framework (described in Section 2) and provides empirical evidence linking the concept of self-efficacy and growth mindset from a statistical perspective. If individuals participate in a different challenge that requires a similar set of skills, they will be able to handle it better than the previous one as they have developed their skills and ability. They will

obtain a growth mindset which makes them more tolerable with occasional mistakes and obstacles to achieve during their path to achieve their own goals. This can be interpreted that by experiencing certain challenges on their own, individuals may be exposed to more opportunities for mistakes so that they learn how to improve and overcome these challenges, thus leading to the development of a growth mindset in which they believe that ability and skills are flexible and accept feedback for improvement (Bandura, 1982a; Dweck, 2006).

Also, the analysis revealed that there was a weak positive correlation between growth mindset and verbal persuasion in the form of effort ( $r = 0.4$ ). The positive relationship might be due to the fact that when individuals receive encouragement, this may heighten the confidence level of individuals in order to complete a certain task. In addition, people tend to develop their self-efficacy from the experience and knowledge of others (Rosenthal and Zimmerman, 1978), particularly if a good example is set and verbal encouragement is given to individuals, they will be more likely to improve and accomplish the same task (Bandura and Barab, 1973). Apart from this, this finding provides statistical evidence to support the theoretical perspective proposed by Dweck (2006) whose qualitative study shows that students received compliments related to their effort and hard work are more likely to develop a growth mindset, compared to those being praised by their intelligence. In addition, this finding also supports the theoretical framework (described in Section 2) that praise by effort in certain tasks may lead to the development of a growth mindset. Gunderson et al. (2013) suggest that this type of mindset will be effectively developed, if it is fostered in an early age.

Table 3: Correlation coefficients based on the self-efficacy and mindset questionnaire (N = 206)

Category	FM	ME	VE	VP-I	VP-E
GM	-0.1	<b>0.3</b>	0.2	0.0	<b>0.4</b>
FM		-0.1	0.0	0.2	-0.2
ME			0.2	0.1	<b>0.4</b>
VE				0.2	<b>0.3</b>
VP-I					0.1

Unfortunately, the statistical results in this study do not show any negative relationship between growth mindset and verbal persuasion based on intelligence, nor any positive relationship between fixed mindset fixed mindset and verbal persuasion based on intelligence as hypothesised. Their values nonetheless suggest a possible tendency that growth mindset and verbal persuasion based on intelligence might be negatively correlated. Also, the finding shows a possible tendency that there might be a positive correlation between fixed mindset and verbal persuasion based on intelligence. To advance this current understanding, further quantitative studies may be required to verify the results from this current study. However, this well supports the idea that praising by effort can alter individuals' belief that their ability and skills are malleable and can be developed (Mueller &Dweck, 1998; Kamins&Dweck, 1999).

Surprisingly, when the variables of mastery experience and verbal persuasion by effort are examined separately, an unexpected trend emerges. The two show a weak positive correlation with the R-value of 0.4 Although it is somewhat distinguished from what is proposed in the theoretical framework, it shows an interesting result which suggests that it was likely that individuals could possibly overcome challenges if they received positive, verbal encouragement from others. This might be due to the fact that while individuals are coping with challenges, some sort of verbal encouragement by effort might help to boost their self-efficacy, especially at the early stage where failure might be the most impactful to reduce self-efficacy (Bandura, 1982b). With the presence of verbal persuasion by effort, people are more likely to be focused on their improvement rather than viewing their ability as unchangeable and innate (Dweck, 2006). This leads to the idea of process praise as proposed by Zentall& Morris (2010) suggesting that praising by effort can transform individuals' mindset to growth mindset in the long run, thus increasing their mastery experience skills when confronting or handling new challenges in the future.

Turning to another unpredicted correlation between verbal persuasion by effort and vicarious experience, the results show that there was a weak positive correlation with the R-value of 0.3. The positive relationship between these two variables might be due to the fact that when individuals receive encouragement referring to their effort by a role model that is doing that same task.

This may heighten the confidence level of individuals in order to complete the task just like the model. In addition, people tend to develop their self-efficacy from the experience and knowledge of others (Rosenthal and Zimmerman, 1978), particularly if a good example is set and verbal encouragement is given to individuals, they will be more likely to improve and accomplish the same task as well (Bandura and Barab, 1973).

Recommendations can be made for both parents and teachers who are responsible for growing students' growth mindset. Allowing children to acquire mastery experience, it is important to consider active learning approaches in which students can cultivate direct experiences on their own. Examples of active learning that are believed to develop students' self-efficacy include game-based learning (Threekunprapa&Yasri, 2020a, 2020b; Piyawattanaviroj et al., 2019), hands-on learning, STEM-challenge activities (Changtong et al., 2020), and blended learning (Seangdeang&Yasri, 2019; Maleesut et al., 2019). In addition, verbal persuasion both from adults and peers is crucial to grow students' growth mindset. However, this has to be primarily focused on their effort to complete given tasks, not their intelligence. In order to achieve this, teachers are suggested to adopt cooperative learning that allows students to interact with each other (Praputpittaya&Yasri, 2020) and let them reflect on their learning progress and how to develop themselves to become better (Maneejak&Yasri, 2019). Nonetheless, it is crucial for them to reflect to receive some comments that help them grow, while exclude other forms of comments that prompt them to appreciate praises on intelligence

## 5. CONCLUSION

Emphasized in this study is the investigation of statistical relationships between factors forming self-efficacy (belief in one's ability to accomplish a certain task) and types of mindset (growth and fixed mindsets). It provides empirical evidence to support statistical links based on 206 high school respondents. There were weak positive correlations between growth mindset and mastery experience, growth mindset and verbal persuasion focused on effort, as well as mastery experience and verbal persuasion focused on effort. In addition, this study offers new evidence to point out a weak correlation between verbal persuasion focused on effort and vicarious experience. Recommendations can be made for

both parents and teachers who are responsible for growing students' growth mindset. Firstly, it is essential for them to allow their children to expose to a variety of direct experiences as they would enhance their self-efficacy which in turn can help develop their growth mindset. Secondly, both parents and teachers are suggested to be aware of their praise for their children. This study suggests that verbal persuasion focused on effort can potentially help cultivate a growth mindset, while compliments on intelligence may potentially lead to a constant development of a fixed mindset. Last but not least, students themselves are suggested to learn to exclude some forms of verbal persuasion that may trap them to appreciate praises on intelligence, but keep on exposing to direct experience to grow their self-efficacy and allow their mastery experience to nurture their process of self-betterment.

## REFERENCES

- Aronson, J., Fried, C. B., & Good, C. (2002). Reducing the effects of stereotype threat on African American college students by shaping theories of intelligence. *Journal of experimental social psychology*, 38(2), 113-125.
- Averill, J. R. (1973). Personal control over aversive stimuli and its relationship to stress. *Psychological bulletin*, 80(4), 286.
- Bandura, A., & Barab, P. G. (1973). Processes governing disinhibitory effects through symbolic modeling. *Journal of abnormal psychology*, 82(1), 1.
- Bandura, A., & Schunk, D. H. (1981). Cultivating competence, self-efficacy, and intrinsic interest through proximal self-motivation. *Journal of personality and social psychology*, 41(3), 586.
- Bandura, A., Jeffery, R. W., & Gajdos, E. (1975). Generalizing change through participant modeling with self-directed mastery. *Behaviour research and therapy*, 13(2-3), 141-152.
- Bandura, A., Reese, L., & Adams, N. E. (1982). Microanalysis of action and fear arousal as a function of differential levels of perceived self-efficacy. *Journal of personality and social psychology*, 43(1), 5.
- Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. *Psychological review*, 84(2), 191.
- Bandura, A. (1982). The psychology of chance encounters and life paths. *American psychologist*, 37(7), 747.
- Blackwell, L. S., Trzesniewski, K. H., & Dweck, C. S. (2007). Implicit theories of intelligence predict achievement across an adolescent transition: A longitudinal study and an intervention. *Child development*, 78(1), 246-263.
- Brown, I., & Inouye, D. K. (1978). Learned helplessness through modeling: The role of perceived similarity in competence. *Journal of personality and social psychology*, 36(8), 900.
- Chambliss, C. A., & Murray, E. J. (1979). Efficacy attribution, locus of control, and weight loss. *Cognitive therapy and research*, 3(4), 349-353.
- Changtong, N., Maneejak, N., & Yasri, P. (2020). Approaches for implementing STEM (Science, Technology, Engineering & Mathematics) activities among middle school students in Thailand. *International journal of educational methodology*, 6(1), 185 - 198.
- Dweck, C. S., Chiu, C. Y., & Hong, Y. Y. (1995). Implicit theories and their role in judgments and reactions: A word from two perspectives. *Psychological inquiry*, 6(4), 267-285.
- Dweck, C. S. (1986). Motivational processes affecting learning. *American psychologist*, 41(10), 1040.
- Dweck, C. S. (2006). *Mindset: The New Psychology of Success*. New York: Random House.
- Dweck, C. S. (2009). Mindsets: Developing talent through a growth mindset. *Olympic Coach*, 21(1), 4-7.
- Dweck, C. S. (2014). Mindsets and math/science achievement.
- Good, C., Aronson, J., & Inzlicht, M. (2003). Improving adolescents' standardized test performance: An intervention to reduce the effects of stereotype threat. *Journal of applied developmental psychology*, 24(6), 645-662.

- Henderlong Corpus, J., & Lepper, M. R. (2007). The effects of person versus performance praise on children's motivation: Gender and age as moderating factors. *Educational psychology*, 27(4), 487-508.
- Heyman, G. D., & Dweck, C. S. (1998). Children's thinking about traits: Implications for judgments of the self and others. *Child development*, 69(2), 391-403.
- Kamins, M. L., & Dweck, C. S. (1999). Person versus process praise and criticism: Implications for contingent self-worth and coping. *Developmental psychology*, 35(3), 835.
- Kazdin, A. E. (1973). Methodological and assessment considerations in evaluating reinforcement programs in applied settings 1. *Journal of applied behavior analysis*, 6(3), 517-531.
- Kazdin, A. E. (1974). Reactive self-monitoring: the effects of response desirability, goal setting, and feedback. *Journal of consulting and clinical psychology*, 42(5), 704.
- Lazarus, R. S., & Launier, R. (1978). Stress-related transactions between person and environment. In *Perspectives in interactional psychology* (pp. 287-327). Springer, Boston, MA.
- Leroy, N., Bressoux, P., Sarrazin, P., & Trouilloud, D. (2007). Impact of teachers' implicit theories and perceived pressures on the establishment of an autonomy supportive climate. *European journal of psychology of education*, 22(4), 529-545.
- Maleesut, T., Piyanattanaviroj, P., & Yasri, P. (2019). Gen X STEM Teachers' Perceived Usefulness and Challenges of a Blended-Learning System. In *Proceedings of the 2019 3rd International Conference on Education and Multimedia Technology* (pp. 104-106).
- Maneejak, N. & Yasri, P. (2019). NSMU: A reflection model for nursing students practicing with High Fidelity Simulation. *International journal of innovation, creativity and change*, 5(2): 54-66.
- Martocchio, J. J. (1994). Effects of conceptions of ability on anxiety, self-efficacy, and learning in training. *Journal of applied psychology*, 79(6), 819.
- Meyer, W. (1992) Paradoxical effects of praise and blame on perceived ability. In W. Stroebe & M. Hewstone (eds), *European review of social psychology*, vol.3(pp.259-83). Chichester Wiley
- Mueller, C. M., & Dweck, C. S. (1998). Praise for intelligence can undermine children's motivation and performance. *Journal of personality and social psychology*, 75(1), 33.
- Mukaka, M. M. (2012). A guide to appropriate use of correlation coefficient in medical research. *Malawi medical journal*, 24(3), 69-71.
- Pajares, F., Johnson, M. J., & Usher, E. L. (2007). Sources of writing self-efficacy beliefs of elementary, middle, and high school students. *Research in the teaching of English*, 104-120.
- Piyanattanaviroj, P., Maleesut, T., & Yasri, P. (2019). An Educational Card Game for Enhancing Students' Learning of the Periodic Table. In *Proceedings of the 2019 3rd International Conference on Education and Multimedia Technology* (pp. 380-383).
- Praputpittaya, T., & Yasri, P. (2020). The COPE Model for Promoting Cooperative Learning in Classrooms. *International journal of innovation, creativity and change*. 12(6), 349-361.
- review, 84(2), 191.
- Rosenthal, T. L., & Zimmerman, B. J. (1978). *Social learning and cognition*. New York: Academic Press.
- Schunk, D. H. (1989). Self-efficacy and achievement behaviors. *Educational psychology review*, 1(3), 173-208.
- Seangdeang K. and Yasri P. (2019). Enhance lower secondary students' scientific literacy and conceptual understanding of tonicity through blended learning. In: Cheung S., Jiao J., Lee LK., Zhang X., Li K., Zhan Z. (eds) *Technology in Education: Pedagogical Innovations. ICTE 2019. Communications in Computer and Information Science*, vol 1048. Springer, Singapore.
- Szpiler, J. A., & Epstein, S. (1976). Availability of an avoidance response as related to autonomic

- arousal. *Journal of abnormal psychology*, 85(1), 73.
- Threekunprapa, A. & Yasri, P. (2020). Patterns of Computational Thinking Development while Solving Unplugged Coding Activities Coupled with the 3S Approach for Self-Directed Learning. *European journal of educational research*, 9(3), 1025-1045.
- Threekunprapa, A. & Yasri, P. (2020). Unplugged coding using flowblocks for promoting computational thinking and programming among secondary school students. *International journal of instruction*. 13(3), 207-222.
- Yeager, D. S., & Dweck, C. S. (2012). Mindsets that promote resilience: When students believe that personal characteristics can be developed. *Educational psychologist*, 47(4), 302-314.
- Yeager, D. S., Trzesniewski, K. H., Tirri, K., Nokelainen, P., & Dweck, C. S. (2011). Adolescents' implicit theories predict desire for vengeance after peer conflicts: Correlational and experimental evidence. *Developmental psychology*, 47(4), 1090.
- Zentall, S. R., & Morris, B. J. (2010). "Good job, you're so smart": The effects of inconsistency of praise type on young children's motivation. *Journal of experimental child psychology*, 107(2), 155-163.