

Influence of perceived control on persistence: A study on the moderating effect of mindsets

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INFLUENCE OF PERCEIVED CONTROL ON PERSISTENCE: A STUDY ON THE
MODERATING EFFECTS OF MINDSETS

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Abstract

This study examined the moderating effect of growth and fixed mindset on the relationship between perceived control and persistence. The participants in this study consisted of 30 university students (age 18-23). The study employed an experimental research design. Their levels of mindset were assessed, then manipulated for perceived control by completing a cognitive task. The participants were presented with a trial that aimed to manipulate the participants' level of perceived control through the difficulty of the task. The easy task was used to induce high sense of perceived control while the hard task aimed to induce low sense of perceived control. Then, their persistence level was measured by asking them to report their willingness to keep working on the given task and timing how long they worked on the given task. The data collected was analysed using descriptive statistic, normality, correlation, and PROCESS for SPSS (Hayes, 2012) Model 1. The results of this study are below.

1. Perceived control was positively related to level of their willingness to work on the task, but no significant relationship was found for the length of time spent on the task; $b = .37$, $p < .05$.
2. Growth mindset significantly moderated the relationship between perceived control and persistence level only for their willingness to work on the task, but not for the length of time spent; $b = .43$, $p < .05$.

Our finding suggested the importance of perceived control in workplace setting, altogether with extending knowledge about Dweck’s theory of intelligence into the different cultural context.

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Chapter 1

Introduction

Persistence has been found to have connections with factors that determine academic and career success. Green, (2011) found that students with higher persistence had better academic performance, mental and physical health, and stress management. These characteristics can be predictors of future career success, as the trait allows one to be able to work on a task for a long period of time without losing focus, they will also make the work process go faster and more efficient (Grimes, 1997). From these findings, it can be inferred that persistence is a desirable trait in employees, and by there are studies that the relationships between persistence and other factors in their participants.

Bhanji, Kim and Delgado (2016) found that participants' level of persistence was unaffected by stress when they were in a high perceived control condition. This means that perceived control can help maintaining one's level of persistence in a workplace setting where there stress is common. Perceived control can also improve one's level of productivity, as they feel as their actions have an impact on the environment, they might understand that if they make good decisions and take good courses of actions, they can make a differences for those around them (Skinner, Wellborn & Connell, 1990). Perceived control is also a major factor that are accompanied by the other factors mentioned.

As presented, perceived control have a positive effect on those who have it, and it can be practically implemented into a work setting. In addition, according to Bhanji, Kim and Delgado, (2016), perceived control is accompanied by job satisfaction and group identification, which leads to a more productive work environment, but the other two factors might be more difficult to induce appropriately in a workplace setting.

This study also took in consideration the mindset of a person, as it is related to how one perceives and approach challenges that might not be in their control. Dweck and Leggett, (1988) proposed that there were 2 types of mindsets, growth or incremental and fixed or entity mindset. People with growth mindset tend to perceive hardship to be a learning opportunity while those with fixed mindset tend to think that one's ability or intelligence cannot be changed. According to this perception, it would seem that persistence should have a relationship with mindset as a moderator, thus we included it in our study.

Literature review

Persistence. Due to the inevitability of pressure and stress of organizational work; one must be able to endure and perform under sub-optimal circumstances, to not lose focus and give up when faced with difficult situations. This trait is termed: persistence; the ability to endure hardship and function within given circumstances. There is a myriad of factors that influence the persistence in challenging situations. Green (2014) conducted a study on African-American students from different universities across the US. The study found that factors that affected persistence were (a) academic performance and faculty-student relationships, (c) health, (d) stress handling skills, and (e) ethnic identification. Furthermore, there is also evidence that supports the effect socioeconomic and childhood chaos have on long-term task persistence (Fuller-Rowell et al., 2015). In this study, it was found that children who experienced turmoil early in their childhood had reduced task persistence, while poverty only affected the level of persistence in those with chaotic childhood. As suggested in these findings, persistence can be affected by a number of variables in an individual's life that they may not have control over. Increased persistence in academic and professional contexts can improve the overall functionality, workplace performance and quality of work (Grimes, 1997, Lent, Brown & Larkin,

1984). Thus, finding a factor that can increase a person's persistence can benefit the organization greatly, due to its potential to reduce turnover rate. This is what we included in our main hypothesis: persistence would be higher in the group with high perceived control.

As stated, being able to retain competent employees is beneficial to an organization; therefore it is important to understand the cause of labor turnover to prevent it from happening on a large scale. Studies have found that a contributing factor that plays a role in reducing discouragements in work setting is the perception of control or the sense of autonomy. There are a variety of studies that show the link between perceived control and positive traits; such as higher job satisfaction, lower stress, lower alcohol consumption (Pikhart et al., 2016, Bahnji, Kim & Delgado, 2016, Fila, Paik & Griffeth, 2014). However, perceived control might not be the only factor that contributes to the higher turnover rates in a high-stake work environment. Mindset also seems to be a factor that requires consideration regarding its effects on the persistence on a given task, when one has low or no control over the situation (Dweck & Leggett, 1988). Additionally, mindset as a moderating factor of persistence is not well studied; therefore we aim to fill the gap in the previous literature. We hypothesized that the theory of intelligence; termed "mindset," which is the way one copes with negative feedbacks, might be one of the contributing factors to the rise in turnover rates. This is what gave rise to our moderation hypothesis, as shown before that multiple factors can contribute to the higher persistence in certain contexts, we hypothesized that growth and fixed mindset would show a moderating effect on the relationship between perceived control and persistence. Namely; participants who show growth mindset should be more likely to show higher persistence in low perceived control condition than their fixed mindset counterparts in the same condition.

In this study, we aim to see the effects of perceived control on persistence behavior, as moderated by the fixed and growth mindset. The purpose of this study is to explore the gaps in the literature concerning persistence and its causes. We hypothesized that participants with a growth mindset would maintain similar levels of persistence in both situations where they have high and low perceived control, whereas the participants with fixed mindset will show reduced persistence when lack perceived control. The findings of this study can be integrated into a model that can be used to help with designing a work environment that promotes persistence and reduce turnover rates; reducing the profit loss of business. Additionally, this study could fill the literature gap in regards of the moderating effects mindset has on persistence behavior, which can be studied further using different correlation factors.

Perceived control. According to Skinner (p.243, 1995), perception of control is one's beliefs about how the consequences and causality in their environment are related to their actions or external causes. Having a high perception of control means that the individual believes that the events that occur around them are products of their efforts. Moreover, a meta-analysis revealed that elevated levels of perceived control in employees have shown to positively correlate with job satisfaction, involvement commitment, performance and motivation (Spector, 1986). The findings from Spector (1986) suggests that high perceived control in employees will benefit companies and enhance their productivity.

A study by Skinner, Wellborn & Connell (1990) found a positive correlation between perception control in elementary school children and their engagement in class. In this study, engagement is conceptualized as the children's effort, initiation, and persistence on schoolwork and their emotional states during class which was rated by their teachers. To assess the children's perception of control, three sets of beliefs was assessed, firstly "Strategy beliefs" which are

beliefs about what it takes for the child to do well in school (this includes effort, luck, powerful others, and unknown factors). Secondly, “Capacity beliefs” or expectations about the child’s potential e.g. “am I smart?” Lastly, “Control beliefs” which are expectations of whether the child thinks they can do well in school. According to the results, students who reported low capacity for ability, powerful others, and luck and high strategy showed the lowest levels of class engagement while children who reported high capacity beliefs for effort and high strategy showed the highest levels of engagement. The results indicate that children who attribute control to themselves (high capacity beliefs for effort) shows greater engagement in class than those who attributed control to external factors (low perception of control). These results were congruent with Spector’s (1986) where perceived control positively correlates with involvement. From the findings of Skinner, Wellborn & Connell (1990) it could be said that perceived control is correlated with effort and persistence since they are both conceptualized into engagement. To further expand the scope of Skinner, Wellborn & Connell’s (1990) research, our study will directly examine the relationship between perception of control and persistence. Currently, there are not many studies that examine the relationship between perception of control and persistence which is also why it will be explored in this study. We also hypothesized that mindset would have a moderating effect on the relationship between the level of perceived control and persistence behavior, with a stronger positive relationship among those high in fixed mindset.

Although the area of literature of perceived control and persistence is quite novel, a study by Bhanj, Kim, and Delgado (2016) looked at perceived control, acute stress and persistence, the researchers focused on the effects of a prior acute stressor on persistence throughout controllable and uncontrollable setbacks. They hypothesized that perceived control would moderate the effect of stress. In the study participants were separated into either acute stress or control condition, in

both conditions the participants had to put their hands into cold water for two minutes. For the stress condition, participants were videotaped by experimenters wearing lab coats, whereas in the control condition the experimenter did not wear lab coats and did not videotape the activity. After that the participants were asked to rate their subjective stressfulness, unpleasantness, and painfulness, they then participate in the PAS (Persistence After Setbacks) task which is a game designed to test their persistence. In the PAS task, the participants had to choose a path and try to earn as much point as possible, and in each turn, they are presented with setbacks which they have to press the correct button to avoid the setback. There are two types of setbacks in the task, namely controllable and uncontrollable, in controllable setbacks the correct button always remain the same and in uncontrollable setbacks the correct button was randomized. The task will end either when the path is complete or the time runs out. The experimenter rated the participant's persistence by the number of time they choose to continue after setbacks. Following the PAS task, they were asked to complete a choice preference task which assesses their preference for control. It is worth noting that during the experiment skin conductance and salivary cortisol measurements were taken at four different times. The results of the study show that pre-existing stress decreases persistence during uncontrollable setbacks and increases preference for control, and that perceived control showcased a protective effect against stress. In other words, the participant's persistence is not affected by stress when the setbacks are viewed as controllable. Overall, this study points out the relationship between perceived control and persistence that we will further investigate in our study.

The theory of intelligence. The theory of intelligence by Dweck includes two types of beliefs, entity and incremental. Entity belief is the belief that intelligence is a fixed trait which could not be changed or developed. This type of belief would drive an individual to pursue

performance goal. The performance goal is the way people thrive for gaining positive judgment from other people, at the same time, avoiding adverse judgment from them (Dweck & Leggett, 1988). Whereas, individuals who obtain incremental belief would see intelligence as malleable or flexible. They would believe that intelligence is a growth trait which will make them thrive for learning goal or the goal that focus on learning to increase their competencies (Dweck & Leggett, 1988). These two types of beliefs make individual differ from each other in the domains of cognition, behavior and affect. A person with incremental belief is more likely to develop mastery oriented behavioral patterns than an individual with entity belief. Incremental belief also contribute to one's desire to seek challenges and the higher level of persistence relative to individual with entity belief. On the other hand, an individual with entity belief might develop helpless oriented which would make them avoid challenge and obtain low persistence. The difference is that people with incremental belief would use mastery oriented when they perceived themselves to either possess high or low ability. Individuals with entity belief would use mastery oriented when they perceived high ability but being helpless when they perceive themselves to have low ability. That is because they know that the task is challenging and they could not do it very well, so they try to avoid the judgment by being helpless.

In the past, many researchers have tried to test Dweck's theory of intelligence, some got the same results, but some did not. Leondari and Gialamas's (2002) study found empirical support for the previous study that an incremental belief was positively related to a task or mastery orientation. While there was no association between incremental beliefs and the performance goal orientations. In other words, the implicit belief that ability is increasable appeared to orient individuals toward pursuing the learning goal of developing that ability further. Moreover, incremental beliefs were not related to academic achievement. An explanation

for this finding might be that incremental beliefs influence achievement indirectly through the adoption of a specific goal orientation. After that, Blackwell, Trzesniewski, and Dweck (2007) once again, did a longitudinal research about the theory of intelligence through the life transition. The results from 373 7th graders who identified as holding the belief that intelligence is malleable (incremental theory) predicted an upward trajectory in grades over the two years, while a belief that intelligence is fixed (entity theory) predicted a flat trajectory. Then, they used an intervention in teaching an incremental theory to 7th graders. It was found to promote a positive change of grades in classroom motivation, compared with a control group.

The connection of theory of intelligence and persistence was established when it was replicated in “Using Dweck's Theory of Motivation to Determine How a Student's View of Intelligence Affects Their Overall Academic Achievement” by P'Pool K. (2012). The researcher discovered the findings inconsistent with the original study. In the study, motivation was categorized into intrinsic and extrinsic motivation. Intrinsic motivation was associated with people who have incremental belief of intelligence, therefore they are more willing to put effort to be a master in task and content knowledge with more persistence in the challenging tasks. In the other hands, extrinsic motivation was mostly associated with people who hold the entity belief since they tend to seek for positive comments and avoid any negative feedback from other people. She found no significant difference between students who were classified as entity theorists and those classified as incremental theorists in regards to academic achievement using GPA scores. Another result also found to be inconsistent with the original study since there was no significant difference between entity theorists and incremental theorists concerning their theory of intelligence determining if their second semester GPA score would rise or drop when compared to their first semester GPA score. However, another hypothesis stated that

approximately 15% of students were identified in the “undecided” category in that they did not strongly identify with either the entity or incremental view of intelligence is consistent with the original study. However, incremental theory in the study predicted performance goal rather than mastery goal that was stated to be the goal that would make them success in learning. However, the limitation of this study is that the sample was the gifted students who already more talented than other types of students.

Theory of intelligence also has been studied in "The relation of the theory of intelligence to academic motivation and academic outcomes" by Clevenger (2013). She studied the relationship between theory of intelligence, motivation, and academic performance. Motivation in this case defined as "a student's drive or persistence, desire to succeed, tendency to enjoy challenging tasks, and ability to work well without encouragement or reinforcement" (Pfeiffer & Jarosewich, 2003). The motivation of this research was measured from motivation subscale in School Motivation and Learning Skills Inventory (SMALSI). While academic performance was measured by GPA. The researcher found a significant relationship between theory of intelligence and motivation. Motivation appears to directly influence academic achievement and related to theories of intelligence; it is possible that motivation could be the agent for increasing academic achievement. Also, an incremental theory of intelligence in children was significantly associated with a performance goal orientation which contradicts to Dweck's work because it is said to associate with mastery goals. This study showed that the base of the theory still could not generalize to the population.

The history of intelligence has long been investigated. At first, Dweck stated that incremental belief would directly relate to performance, but after many studies had done, they found that it was associated motivation rather than performance. Also, because obtaining

persistence is the key to achievement. However, to achieve that goal with persistence, individuals have to feel that they can control themselves over the situations or environments surrounded them. Therefore, this study would bring all old theory to the light of novel method and hypothesis. Since it was stated that perceived control directly affects people obtaining growth and fixed mindset differently. Which then it might also influence individual's level of persistence. Therefore, this study will examine the moderating effect of these three factors.

Operational definition

Theory of Intelligence – A way of viewing intelligence, whether as a fixed (entity) trait or a malleable (incremental) trait. It is measured by the total score of the response from The Dweck Mindset Instrument which higher scores indicating higher level of growth mindset

Perceived Control – belief about the the degree control of an individual has over their environment. Measured by the total score of the response from Paulhus' Sphere of control scale (1990) where high scores indicates high sense of perceived control

Persistence – ability to endure hardship and function within given situations. Measured using Constantin et al's, (2012) Motivational Persistence scale ,where higher scores indicates higher level of persistence and willingness to complete the task, and the amount of time the participant takes to complete the cognitive task.

Hypotheses

In this study, we aim to see the effects of perceived control on persistence behavior, as moderated by mindset. The purpose of this study is to explore the gaps in the literature concerning persistence and its causes.

1. Mindset will have a moderating effect on the relationship between the level of perceived control and persistence behavior, with a stronger positive relationship among those high in fixed mindset.
2. There will be a positive relationship between perceived control and persistence level.

Research Framework

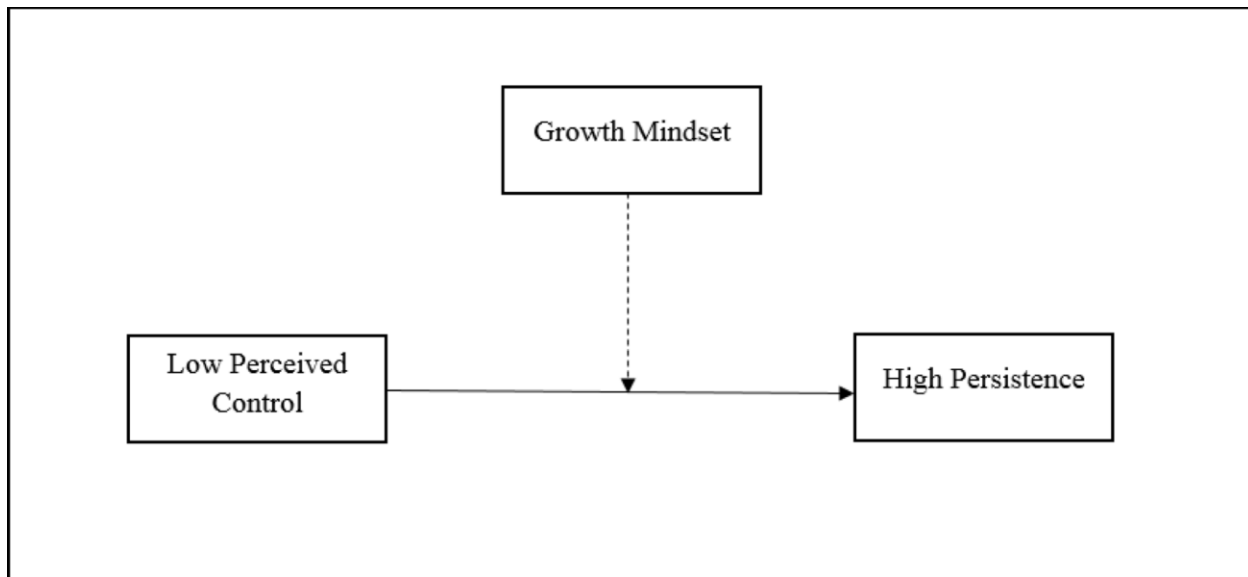


Figure 1. Illustration of our theoretical Model and Hypotheses.

Chapter 2

Method

Participants

The participants in this study consist of 30 University students, 18 of them are female with the average age of 21.1 years old ($SD= 1.21$). They will be asked for their voluntary partaking in the study.

Measures

Perceived control. Paulhus' Sphere of control scale (1990) The SOC inventory measures the degree to which people perceive control over three spheres of life: the personal achievement, interpersonal relations, and social and political institutions. However, in this study we've chosen only personal control dimension which related to other variables such as mindset and persistence. Since all of them are personal trait that does not associate with interpersonal relationship or social institution. Then, we changed some wordings to match with our study which the version we adapted from Paulhus received high internal consistency ($\alpha=.88$). The scale is a 5-point Likert scale ranging from 1: strongly disagree, to 5: strongly agree. It contains 10 items which half of them are reverse questions. The scale aims to retrieve information about the level of control the participants have over the task they had just engaged in. For example, During the activity, I feel like I could achieve the task if I wanted to, If I got high marks on the activity that is because I worked hard to get it. Also, an example for the reverse questions, if I got low marks on this activity that is because of bad luck, I didn't want to do this activity because it is too hard.

Persistence. It was measured using a self-report question asking the participants' willingness to work on a given task and a length of time working on the task. The original scale was developed by Constantin et al's, (2012) called Motivational Persistence scale. It was adjusted to measure participants' level of willingness to work on a given task ($\alpha=.79$). Then, after we changed the scale to match our experiment context, it received the internal consistency of .77. The scale is a 5-point Likert scale ranging from 1: strongly disagree, to 5: strongly agree. The scale is comprised of 3 items that focus on whether the participants would continue to do the task if more were given. The scale was originally contained three dimensions of persistence: past, present, and future. However, in this experiment we picked out only past and present dimension since it is more associated with perceived control variable in the study. It is important to note that the items in this survey are worded to avoid mentioning career or personal preferences on certain behaviors, as the persistence that is affected by factors such as internal motivation or monetary necessity as these factors could contaminate the results of this survey if included. Examples of the items in this scale are as listed: "I find myself thinking about how to solve the task I had just finished even after I had already finished it."; "The more difficult the task is, the more willing I am to complete it.", "Even after receiving bad initial results, I can maintain my focus on the given task."

Mindset. The Dweck Mindset Instrument (DMI) was developed by Dweck (2008). It is used to identify how students view their own intelligence. The test was concluded to be inclusive and comprehensive concerning the questions students could answer in order to ascertain their mindsets about their overall academic performance. The test contains 13 items, which required test takers to rank on an agreement scale of 1-6. The scale consists of the following scores: 1 (strongly agree), 2 (agree), 3 (mostly agree), 4 (mostly disagree), 5 (disagree), and 6 (strongly

disagree). Test takers were told to read each of the individual 13 items and then rate their level of agreement or disagreement. The original version of the tests contained reverse scoring in question 1, 2, 4, 6, 9, 10, and 12. There are seven items focusing on student intelligence, and there are six items focusing on student talent development. Also, higher scores indicated growth mindset. The scale was developed by Dweck which is considered as a pioneer in theory of intelligence. The test was evaluated to obtain high internal consistency ($\alpha=.78$), also the value of test-retest reliability of .77. Moreover, when we conducted the study, we received high internal consistency ($\alpha=.86$).

Procedure

Participants were recruited through invitation of our group members. Some are our friends and some are stranger. The participants were asked to complete a consent form which stated the purpose of the study, the confidentiality of their responses and also their anonymity would all be preserved. The participants were told that the purpose of this study was to examine their IQ level, in order to prevent the expectancy effect. The participants were told that they were allowed to withdraw from the experiment at any time for any reason. They were also informed via a consent form that they Then, we gave them the consent form to sign. Participants were randomly assigned to the conditions: hard and easy (15 in each condition). Then, they had to take the mindset survey prior to completing the cognitive tests. After they had finished the mindset survey, they were asked to take a cognitive task as a practice trial according to the condition they were in. People who were in low perceived control condition were given the hard task while who were in high perceived control condition had to do the easy task. Therefore, there are two sets of cognitive tasks; set A was for the easy task condition while set B was for the hard task condition. And the rest was for moderate difficulty task (See Appendix B). To manipulate the level of

perceived control, the participants in the high perceived control condition were shown the scores of their practice trial: The score was set in full marks. The participants in the low perceived control condition were told that only one answer was correct, thus reducing the sense of control. Their marks were reported using Google Form that was fixed to show their marks after they had filled up every question. It was done this way to make them believe that the scores they received were genuine. After the participants had been informed of their practice trial scores, they were asked to complete the perceived control scale and another moderate-difficulty cognitive task respectively. The participants were informed that their scores in this trial would be recorded and interpreted, in addition, the trial would be timed. The time it took for each participant to complete the second task was considered as indicative of the participant's persistence altogether with the persistence scale that they were asked to complete after they had finished the task. Also, it is important to mention that the mindset survey was in paper form as well as cognitive tasks and other questionnaires. After they had complete the timed trial, the participants received a short debriefing of the experiment. We told them about the independent variable, dependent variable, and moderator of the study. Moreover, we told that the scores that they received was not real but it was intended to manipulate their perceived control level. We apologized for that and told them their real scores if they wanted to know. Then, thanked them for their participation.

Data analysis

Prior to hypothesis testing, descriptive statistics were analyzed. Means, normality, correlations, outlier test and reliability of the scales we used will be examined. For hypothesis testing, PROCESS for SPSS (Hayes, 2012) Model 1 using Matrix was employed to examine the

moderating effect of mindset on the relationship between the level of perceived control and persistence (willingness to continue working on a given task and the length of time spent).

Chapter 3

Results

Manipulation check

There was a significant difference between perceived-control level in participants who were assigned to hard ($M=3.24$, $SD=0.79$) and easy task ($M=4.19$, $SD=0.47$); $t(28) = 4.04$, $p < .001$. Therefore, it means that the manipulation was successful.

Main findings

To investigate whether there was a positive relationship between perceived control and persistence level, descriptive statistics and zero-order correlations for the study are presented in Table 1 below. It shows that level of perceived control was positively significantly associated with level of persistence ($r = .35$, $df = 28$, $p = .029$). Therefore, our second hypothesis is supported by the results. Also, for normality test, we found that persistence was normal distributed (KS = .0105, $df = 30$, $p = .20$, SW= 0.969, $df=30$, $p = .50$).

Table 1. Means, Standard Deviations and Bivariate Correlations for Perceived control, Persistence, and Mindset

Variables	M(SD)	Min	Max	Perceived Control	Mindset	Persistence
Perceived Control	3.72(.80)	1.70	4.90	(.88)		.
Mindset	3.34(.67)	1.92	4.54	.09	(.86)	
Persistence(Willingness to continue working on the given task)	3.38(.64)	2.33	5.00	.35*	.22	(.77)
Length of time	6.00(1.45)	4.14	10.50	-.05	-.07	-.15

*Note: * $p < .05$, (Cronbach's alpha of the scale)*

From the first hypothesis that mindset will have a moderating effect on the relationship between the level of perceived control and persistence behavior, with a stronger positive relationship among those high in fixed mindset. PROCESS program for SPSS, model 1 was used to examine the interaction of level of mindset and perceived control on persistence level. Criterion was the persistence level, the predictors were perceived control, mindset level, altogether with the interaction between them. Firstly, persistence, perceived control and level of mindset were entered into the program. In this step, the variables was mean-centred to avoid the phenomenon of multicollinearity. It was found that the model was significant, $F(3,26) = 3.41$, $p = .032$, $R = .28$. It was also found that perceived control has a significantly positive relationship with persistence level, $b = .37$, $t(26) = 2.19$, $p < .05$. Also, there was the interaction effect that significantly accounted for the overall model, $b = .42$, $t(26) = 2.14$, $p < .05$ (See table 2). Therefore, we looked into the simple slope of perceived control on persistence level at each level of mindset. Noted that we did not have cutoff score for fixed or growth mindset, but we treat it as

a continuous variable. Growth mindset is one SD above the mean and fixed mindset is one SD below the mean to represent those low and high on growth mindset. A significant positive relationship between perceived control and willingness to keep working (persistence) was found for those high on growth mindset, $b = .27$, $t(26) = 2.91$, $p = .007$. While there was no significant relationship for those low on growth mindset (fixed mindset), $b = -0.06$, $t(26) = -0.24$, $p = .810$ (See figure 2).

Table 2

Table explaining effects of mindset, perceived control and mindset x perceived control interaction on persistence level's self report (willingness to keep working on a given task)

	<i>b</i>	<i>se</i>	<i>t</i>	<i>p</i>	<i>Tolerance</i>	<i>VIF</i>
Constant	-.04	.16	-.23	.82		
M	.26	.17	1.52	.14	.98	1.02
PC	.37	.17	2.19	.04	.98	1.02
MxPC	.43	.20	2.14	.04	.99	1.01
	$R = .28$					
	$F = 3.42$,					
	$p = .03$					

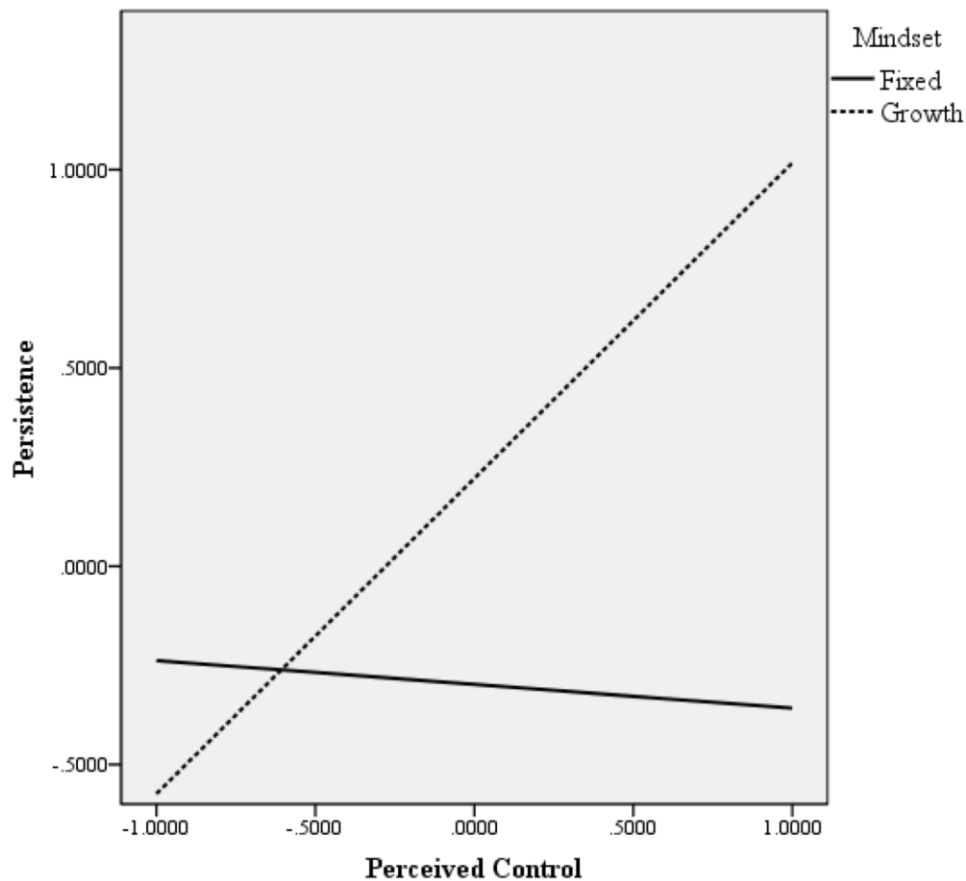


Figure 2. Simple slope of perceived control predicting persistence for growth mindset and fixed mindset.

Table 3

Table explaining effects of mindset, perceived control and mindset and perceived control interaction on Time used to complete the task

	<i>b</i>	<i>se</i>	<i>t</i>	<i>p</i>	<i>Tolerance</i>	<i>VIF</i>
Constant	-.0451	.1643	-.2365	.8149		
M	-.0951	.1704	-.5594	.5807	.978	1.023
PC	-.0809	.1676	-.2157	.8309	.978	1.023
MxPC	-.3141	.1995	-1.5244	.1395	.991	1.009
	<i>R</i> = .08					
	<i>F</i> = 1.04,					
	<i>p</i> = 26.00					

Our first hypothesis which states that mindset will have a moderating effect on the relationship between the level of perceived control and persistence behavior, with a stronger positive relationship among those high in fixed mindset, was not supported by the results. Contrast to our expectation; as shown in Figure 2, the relationship between perceived control and willingness to keep working on a given task was found for only those high on growth mindset. Furthermore, no moderating effect was observed for the length of time spent on the task.

Chapter 4

Discussion

The aim of this study was to examine the effects of perceived control on persistence, as moderated by mindset and to expand the existing knowledge of the literature these areas. First of all, the results indicated that the manipulation check for perceived control was successful, meaning that we were successful at inducing low or high sense of perceived control to the participants according to their condition. Furthermore, we found that mindset had a moderating effect on perceived control and the willingness to work on a given task, however, the direction of the moderating effect was contradicting to our expectation. For hypothesis 1, those low in growth mindset (fixed mindset) will have a stronger positive relationship between perceived control and persistence, conversely, our findings showed that those high in growth mindset showed a stronger positive relationship between perceived control and persistence behavior. Moreover, there was no significant relationship between perceived control and persistence among those low on growth mindset. This suggests that in this sample the more easier the task is the more those high on growth mindset tend to be willing to keep working on the task, while the difficulty of the task had no effect on those fixed mindset people's willingness to keep working on the task.

Although our findings, which states that people with fixed mindset will be show more persistence when they have a high sense of perceived control might not support dweck's theory of intelligence (Dweck & Leggett, 1988), it is similar with Leondari and Gialamas's (2002) study because they also failed to find the effect of mindset, found in Dweck's study. We also found a positive relationship between perceived control and the willingness to keep working on a given task, suggesting that participants who rated their perceived control to be high showed more persistence during the cognitive task. Moreover, our findings are also congruent with that of Bhanj, Kim, and Delgado (2016) who found the same positive relationship between persistence and perceived control as well as Skinner, Wellborn & Connell's (1990) study which found that perceived control predicted children's engagement and persistence in class. Similarly, our findings indicate that those with higher perceived control showed more engagement and persistence while completing the cognitive task. However, it is worth noting that the relationship found between perceived control and persistence was only in the self report scale of persistence but with the time that the participants took to complete the task. Therefore, we can conclude that hypothesis stated that mindset will have a moderating effect on the relationship between the level of perceived control and persistence behavior, with a stronger positive relationship among those high in fixed mindset is partially supported by our findings.

Limitations

In this study, we used Dweck's Mindset Instrument (DMI) to assess the participants' types of mindset, with high scores on the DMI indicate growth mindset, while low scores indicate fixed mindset. One flaw this scale has is the fact that it uses the same question to assess one's mindset, as we should take into consideration that fixed mindset might not be the complete opposite to growth mindset. The scale we used to determine the participants' mindset were

designed in a way that categorized those who scored low on the DMI in the fixed mindset group, while those who scored high would be put into the growth mindset group. However, considering that it is possible that growth and fixed mindset are not the complete opposite of one another, this could cause a contamination between two different set of scores that were not supposed to be compared to one another. An example of this is the social desirability response bias. Because having high growth mindset is what the current state of the society drives people to become, people could fake the results to abide that trend, creating a bias (Van de Mortel, 2008) Therefore, it might be beneficial for future studies to investigate the individual differences of growth and fixed mindset in a variety of domains to create more domain specific mindset models which can be useful for future studies on mindset as a focused variable.

Also, we should also consider that a number of items given in the timed trial for persistence test could be too few. For the participants who had finished fewer numbers of items were more likely to retire themselves from the study earlier. However, most of the participants had almost finished the task by five minutes, thus it might be the desire to finish the task that drives people to ask for the small amount of time to finish it, rather than to leave it be unfinished. To fix this problem, future studies can choose to use sessions that participants come to rather than time, or at the very least increase a number of items that the participants will have to complete to avoid participants being near the goal at the end of their time limit. A study suggests that people are more likely to show higher persistence when they are approaching the goal, as finishing the activity becomes an intrinsic motivation rather than an extrinsic one (Vansteenkiste et al., 2004).

The social interaction could also be the reason why the participants showed more persistence in their requested time (Eisenberger, Kuhlman & Cotterell, 1992). The study found

that the sense of cooperativeness can increase the persistence in a cooperation task. Due to us allowing the participants to ask us questions and that we knew most of the participants personally, they might have been able to feel the sense of cooperativeness and thus showed higher persistence in the form of extra time asked.

Also, a study by Pfeiffer and Jarosewich (2003) found that growth mindset is also correlated with performance goal orientation. This means that it is possible that the participants with growth mindset could also have been more focused on getting scores without deeply considering how to improve their overall ability to solve the cognitive task. Thus, it becomes more difficult to differentiate between the growth and fixed mindset. Because the motivation of the participant's willingness to complete the task was not shown in the results, it would be more complicated to conclude that mindset would actually have a moderating effect on persistence, even if it had been found. Additionally, in the study by Pfeiffer and Jarosewich (2003) found that an incremental theory of intelligence in children was significantly associated with a performance goal orientation which contradicts to Dweck's work because it is said to associate with mastery goals. This study showed that the base of the theory still could not generalize to the population.

Additionally, another problem that this study has is its small sample sizes, both in the total amount of participants. Since small sample size might increase the chance of type 1 and type 2 error. Also, if the effect is really there, it might not strong enough to pass the critical point. However, there were some significant effects in our study, but the problem of generalizability is still existed since the sample is very small.

Furthermore, most of our scales were self-reported. As there was no significant correlation between the actual measure for persistence, which was the extra time participants

asked to complete the task. Therefore, the participants might be giving answers that do not reflect their task persistence. Similarly, the mindset scale also had the same problem. Judging from the data most participants had a high score on the mindset scale, indicating that believe intelligence and ability can be changed, which is reflected in the majority of the mindset survey showing the trend for growth mindset, they answered the survey accordingly. But when they were faced with the situation that they have to make a change and improve themselves, in reality, some participants might show the real tendency for fixed mindset. Therefore, future studies can devise a way to make participants work on a task that reflects the participant's' actual mindset.

Lastly, the cognitive task we used could breach into the new area of study, as when we use the Raven inspired IQ test as a cognitive task, the participants might be interested in knowing their scores. This curiosity could be what drive them to persist through the task, rather than the actual desire to finish the task. Thus, if we had used other domains for the persistence test, the results could differ. Additionally, the IQ test that we used in the study could be seen by the participants as a challenge for them to complete. For those with fixed mindset, they might be focusing on the evaluation of their scores rather than the completing the task, this may cause them to feel de-motivated and not persist in the task as they do not want to be evaluated. Therefore, future studies can aim to use different domains of tasks to find the more suitable task that participants with distinct mindset scales show the most significant differences.

Implication and future direction

The findings of this study could be used to point out a possible trend shift in mindset or cultural differences in the effect of mindset. The fact that our findings were different from Dweck and Leggett (1988) presents a gap in the literature which allows future studies explore. In

addition, Future research that examines the moderating effect of Dweck's intelligence theory can use this study to compare the effect found with their own. Moreover, this also supports existing literature in the area of perceived control and persistence, reaffirming the relationship between the two variables. Knowing that perceived control predicts persistence can have many implications for an organization. For example, employers may try to make their subordinates feel like they are in control of their job, by delegating more work or power, so that they are more persistence and engaged in their work.

The implication of this study is the fact that the significant correlation between perceived control and persistence was found. This finding can be used to open up new areas of research in different domains. For example, future studies that are interested in the effect of persistence on other variables can use high perceived control as a moderator in a study to induce persistence.

Our studies also have limitations, as discussed in the previous section, but these limitations can be developed further in future research. Firstly, the study can refine the measurements of the DMI to be two separate scales for growth and fixed mindset, in order to avoid contamination between the two, as the two types of mindset have a more complicated relationship to one another rather than being the complete opposite of each other. This opens up new areas of study in terms of the differences of growth and fixed mindset in different domains, and how the two types of mindset manifest themselves in specific contexts.

Secondly, the future studies should take into consideration the mastery versus performance type of mindset. Which are tied to the growth and fixed mindset, and these relationships can be explored further in future studies to find the more effective way to use these concepts to produce desired outcomes in a given setting. For example, future studies can design a

measurement for performance and mastery mindset, and use it to find a correlational relationship with growth and fixed mindset in a given context, such as the performance of sports team members or the productivity of employees of an organization.

Thirdly, if the researchers are interested in the use of cognitive tasks in future studies, they should at the very least include more items to reduce the end-goal orientation effect when nearing the end of the task. As mentioned earlier, many participants who required more time to finish only asked for a minute amount of time. Participants who had only finished a small numbers of items at the end of the first five minutes showed much higher dropout rates than those who were almost finished with the task. Thus, if the participants were to endure more items, it would help reducing the end-goal directed burst of persistence. However, future studies can also take the new direction and use longitudinal design and measure the session the participants come in and time to see the change in persistence. The research can promise rewards to see the goal-directed persistence, which might reflect the fixed mindset tendency to not focus on improving one's ability, but how to achieve the originally set goals. Additionally, if they are able to, they should gather a larger sample size from a target group that would be affected more by their mindset. For example, a person who works in an environment with low career growth opportunity might have a higher tendency to have fixed mindset than someone whose career path requires him to consistently excel at his work. Therefore, future studies should specify which group would they explore and give a rational explanation as to why the groups are chosen.

Another important future directions that future studies should keep in mind is the effect of social interaction on persistence. As most of the participants know the experimenters personally, the presence of the experimenters might be comforting to the participants, giving them the boost in enjoyment and persistence. To avoid this issue, future studies might use

softwares that are designed to minimize human contacts while carrying out experiments and gathering data. However, social interaction can also be a focus of new studies. For example, the relationship of mindset and social interaction with a moderating effect can be what future studies build on, in order to form the most productive atmosphere for employees with distinct mindsets.

In conclusion, the study has many flaws, due to limited time and resources. However these flaws might show the potential to tap into new areas of research for future studies. These research can lead to a deeper understanding of the interactions between our variables with other domains such as social interaction, goal-orientation and performance.

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Appendix A

Questionnaire

Part 1 Demographic

ส่วนที่ 1 : ข้อมูลทั่วไป

คำชี้แจง โปรดตอบคำถามลงในช่องว่างให้ตรงกับความเป็นจริงของท่าน (โปรดตอบให้ครบทุก

ข้อ)

อายุ: _____ เพศ: _____ คณะ: _____ ชั้นเรียนปี

ที่: _____

Part 2 Mindset

ส่วนที่ 2 ขอให้ท่านอ่านข้อความแต่ละข้อ และวงกลม O ล้อมรอบหมายเลข “1, 2, 3, 4, 5” ที่ตรง

กับความรู้สึกของท่านมากที่สุดเพียงหมายเลขเดียวในแต่ละข้อ ไม่มีคำตอบที่ถูกหรือผิด และโปรด

ตอบทุกข้อ

ให้วงกลมล้อมรอบตัวเลข 1 หากท่านรู้สึกไม่เห็นด้วย

ให้วงกลมล้อมรอบตัวเลข 2 หากท่านรู้สึกค่อนข้างไม่เห็นด้วย

ให้วงกลมล้อมรอบตัวเลข 3 หากท่านรู้สึกเห็นด้วยและไม่เห็นด้วยพอๆ กัน

ให้วงกลมล้อมรอบตัวเลข 4 หากท่านรู้สึกค่อนข้างเห็นด้วย

ให้วงกลมล้อมรอบตัวเลข 5 หากท่านรู้สึกเห็นด้วย

ข้อความ	1	2	3	4	5
1. แม้คุณมีสติปัญญาระดับหนึ่ง แต่คุณไม่สามารถทำอะไรได้มากนักที่จะ เปลี่ยนมันอย่างแท้จริง	1	2	3	4	5
2. สติปัญญาเป็นสิ่งที่เกี่ยวกับตัวคุณที่คุณไม่สามารถเปลี่ยนแปลงได้มากนัก	1	2	3	4	5
3. ไม่ว่าคุณจะเป็นใคร คุณสามารถที่จะเปลี่ยนแปลงสติปัญญาของคุณได้เป็นอย่างมาก	1	2	3	4	5
4. อันที่จริงแล้ว คุณไม่สามารถเปลี่ยนแปลงระดับสติปัญญาได้อย่างแท้จริง	1	2	3	4	5
5. คุณมักจะสามารเปลี่ยนแปลงระดับสติปัญญาของคุณได้มากพอสมควร	1	2	3	4	5
6. คุณสามารถเรียนรู้สิ่งใหม่ๆ แต่คุณไม่สามารถเปลี่ยนแปลงระดับสติปัญญาพื้นฐานของคุณได้อย่างแท้จริง	1	2	3	4	5
7. ไม่ว่าระดับสติปัญญาที่คุณมีจะมีมากสักแค่ไหน คุณมักจะสามารเปลี่ยนแปลงมันได้พอสมควร	1	2	3	4	5
8. คุณสามารถเปลี่ยนระดับสติปัญญาพื้นฐานของคุณได้มากทีเดียว	1	2	3	4	5

9. แม้คุณมีความสามารถในระดับหนึ่ง แต่คุณไม่สามารถทำอะไรได้มากนักที่จะเปลี่ยนแปลงมันอย่างแท้จริง	1	2	3	4	5
10. ความสามารถของคุณในเรื่องๆหนึ่ง เป็นบางสิ่งที่คุณไม่สามารถเปลี่ยนแปลงมันได้มากนัก	1	2	3	4	5
11. ไม่ว่าคุณจะเป็นใคร คุณสามารถจะเปลี่ยนแปลงระดับความสามารถได้เป็นอย่างมาก	1	2	3	4	5
12. อันที่จริงแล้ว คุณไม่สามารถเปลี่ยนแปลงความสามารถที่คุณมีได้อย่างมาก	1	2	3	4	5
13. คุณสามารถเปลี่ยนแปลงความสามารถที่คุณมีได้มากพอสมควรอยู่เสมอๆ	1	2	3	4	5
14. คุณสามารถเรียนรู้สิ่งใหม่ๆ แต่คุณไม่สามารถเปลี่ยนแปลงระดับความสามารถพื้นฐานของคุณได้อย่างแท้จริง	1	2	3	4	5
15. ไม่ว่าคุณจะมีความสามารถแค่ไหน คุณสามารถเปลี่ยนแปลงมันได้เรื่อยๆเสมอ	1	2	3	4	5
16. คุณสามารถเปลี่ยนแปลงระดับความสามารถพื้นฐานได้มากที่สุดทีเดียว	1	2	3	4	5

Part 3 Persistence

ส่วนที่ 3 ขอให้ท่านอ่านข้อความแต่ละข้อ และวงกลม O ล้อมรอบหมายเลข “1, 2, 3, 4, 5” ที่ตรงกับความรู้สึกของท่านมากที่สุดเพียงหมายเลขเดียวในแต่ละข้อ ไม่มีคำตอบที่ถูกหรือผิด และโปรดตอบทุกข้อ

ให้วงกลมล้อมรอบตัวเลข 1 หากท่านรู้สึกไม่เห็นด้วย

ให้วงกลมล้อมรอบตัวเลข 2 หากท่านรู้สึกค่อนข้างไม่เห็นด้วย

ให้วงกลมล้อมรอบตัวเลข 3 หากท่านรู้สึกเห็นด้วยและไม่เห็นด้วยพอๆ กัน

ให้วงกลมล้อมรอบตัวเลข 4 หากท่านรู้สึกค่อนข้างเห็นด้วย

ให้วงกลมล้อมรอบตัวเลข 5 หากท่านรู้สึกเห็นด้วย

ข้อความ	1	2	3	4	5
1. ถึงแม้ว่าฉันจะทำกิจกรรมเสร็จแล้ว แต่ฉันยังคิดหาคำตอบให้กับบางคำถามในกิจกรรมที่ได้ทำไป	1	2	3	4	5

2. ฉันสามารถรักษาความตั้งใจในการทำกิจกรรมที่ได้รับมอบหมายตั้งแต่ต้นจนจบ	1	2	3	4	5
3. ในระหว่างทำกิจกรรม ฉันรู้สึกอยากเลิกทำกิจกรรมกลางคัน	1	2	3	4	5
1. การทำกิจกรรมที่ได้รับมอบหมายไม่สำเร็จเป็นเรื่องที่ทำให้ฉันรู้สึกอึดอัด	1	2	3	4	5
1. การทำกิจกรรมที่ได้รับมอบหมายไม่สำเร็จเป็นเรื่องที่ทำให้ฉันรู้สึกอึดอัด	1	2	3	4	5
6. ฉันคิดว่าฉันอดทนกับกิจกรรมนี้ได้ดีกว่าคนส่วนมาก	1	2	3	4	5
7. ถึงแม้ว่าฉันจะทำกิจกรรมเสร็จแล้ว แต่ฉันยังคิดหาคำตอบให้กับบางคำถามในกิจกรรมที่ได้ทำไป	1	2	3	4	5
8. ยิ่งกิจกรรมยากขึ้นเท่าไร ฉันยิ่งรู้สึกมุ่งมั่นที่จะทำให้มันเสร็จมากขึ้นเท่านั้น	1	2	3	4	5
9. การทำกิจกรรมที่ได้รับมอบหมายไม่สำเร็จเป็นเรื่องที่ทำให้ฉันรู้สึกอึดอัด	1	2	3	4	5

Part 4 Perceived control

ส่วนที่ 4 ขอให้ท่านอ่านข้อความแต่ละข้อ และวงกลม O ล้อมรอบหมายเลข “1, 2, 3, 4, 5” ที่ตรงกับความรู้สึกของท่านมากที่สุดเพียงหมายเลขเดียวในแต่ละข้อ ไม่มีคำตอบที่ถูกหรือผิด และโปรดตอบทุกข้อ

ให้วงกลมล้อมรอบตัวเลข 1 หากท่านรู้สึกไม่เห็นด้วย

ให้วงกลมล้อมรอบตัวเลข 2 หากท่านรู้สึกค่อนข้างไม่เห็นด้วย

ให้วงกลมล้อมรอบตัวเลข 3 หากท่านรู้สึกเห็นด้วยและไม่เห็นด้วยพอๆ กัน

ให้วงกลมล้อมรอบตัวเลข 4 หากท่านรู้สึกค่อนข้างเห็นด้วย

ให้วงกลมล้อมรอบตัวเลข 5 หากท่านรู้สึกเห็นด้วย

ข้อความ	1	2	3	4	5
	1	2	3	4	5

1. ระหว่างที่ทำงาน ฉันรู้สึกว่าฉันสามารถทำงานให้สำเร็จได้ ถ้าฉันตั้งใจทำ					
2. ฉันรู้สึกว่าฉันสามารถตอบทุกคำถามในกิจกรรมได้ถูกต้องตั้งแต่ก่อนเริ่มทำงาน	1	2	3	4	5
3. ฉันรู้สึกว่ากิจกรรมที่ทำไปนั้นต้องฟังโซคมมากกว่าทักษะ	1	2	3	4	5
4. ฉันสามารถเรียนรู้ที่จะทำงานให้สำเร็จได้ ถ้าฉันตั้งใจที่จะเรียนรู้มัน	1	2	3	4	5
5. ถ้าฉันได้คะแนนเยอะในกิจกรรมนี้ มันเป็นเพราะว่าฉันพยายามอย่างมากเพื่อทำให้คะแนนออกมาดี	1	2	3	4	5
6. ระหว่างการทำงาน ฉันแค่ต้องการทำงานให้เสร็จโดยไม่ได้ใส่ใจใจว่าจะได้คะแนนเท่าไร	1	2	3	4	5
7. ถ้าฉันได้คะแนนจากกิจกรรมนี้น้อย มันเป็นเพราะฉันโชคไม่ดี	1	2	3	4	5
8. ถ้าฉันต้องการ ฉันสามารถทำงานนี้ให้ได้คะแนนสูงได้	1	2	3	4	5
9. ฉันรู้สึกว่าอาจมีปัจจัยบางอย่างที่ฉันไม่สามารถควบคุมได้ซึ่งทำให้ฉันได้คะแนนน้อยในกิจกรรมนี้	1	2	3	4	5
10. ฉันไม่ชอบทำงานที่ทำได้ทำไปเพราะมันยากเกินไป	1	2	3	4	5

Appendix B

Cognitive task's instruction

Procedure This test has 15 questions which start on the next page. The last page has scoring instructions. The questions take the form of a 3x3 matrix from which one tile is missing. For each question there are eight possible answers A-H. You must choose the tile that completes that matrix best.

แบบทดสอบชุดนี้มี 15 คำถามซึ่งเริ่มตั้งแต่หน้าต่อไปเป็นต้นไป ในหน้าสุดท้ายของแบบทดสอบจะมี

เกณฑ์การวัดคะแนนอยู่

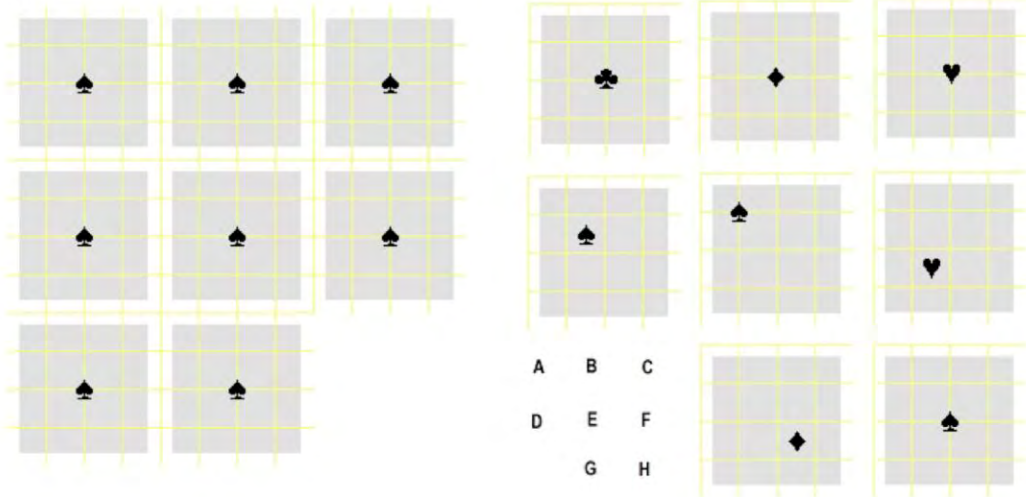
คำถามในแบบทดสอบนี้จะเป็นในลักษณะชุดภาพ 3x3 ซึ่งจะขาดรูปภาพไปหนึ่งรูป สำหรับในแต่ละ

คำถาม จะมีตัวเลือกแปดตัว (a-h) ผู้ทำต้องเลือกคำตอบที่ถูกต้องจากแปดรูปภาพที่อยู่ในตัวเลือก

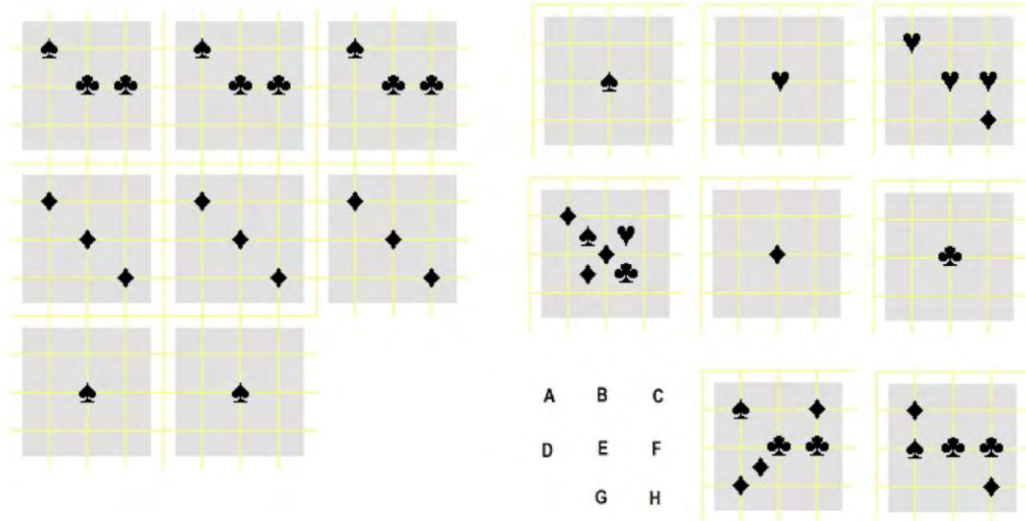
เพื่อเติมในชุดภาพให้สมบูรณ์และถูกต้อง

A.

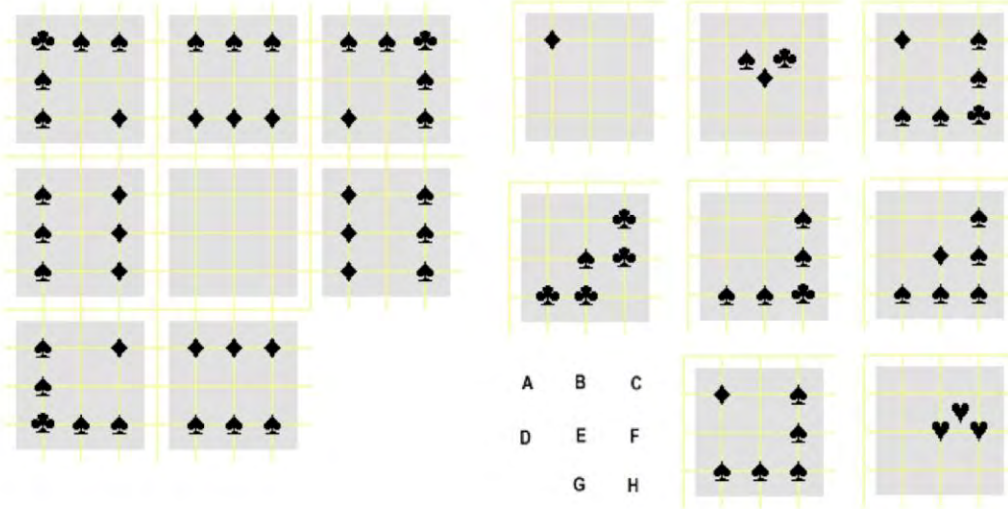
1.



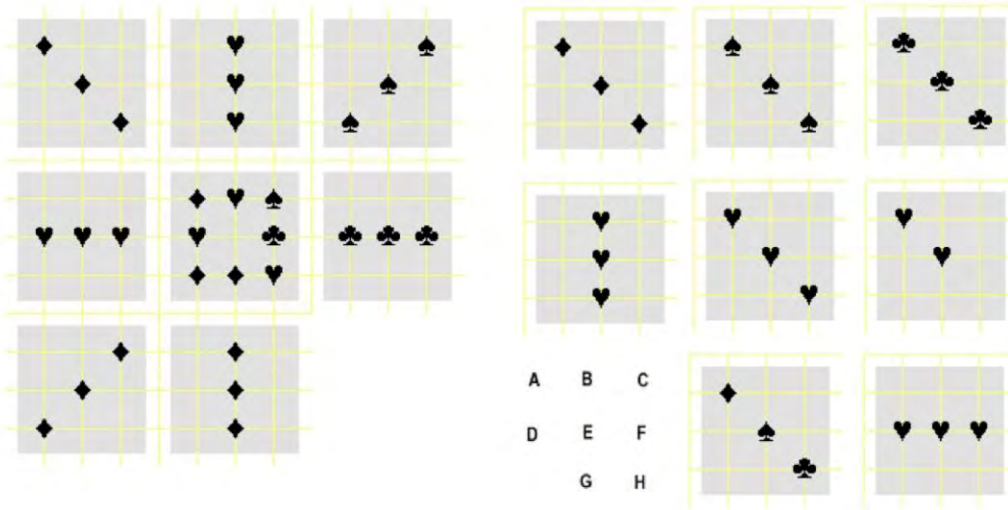
2.



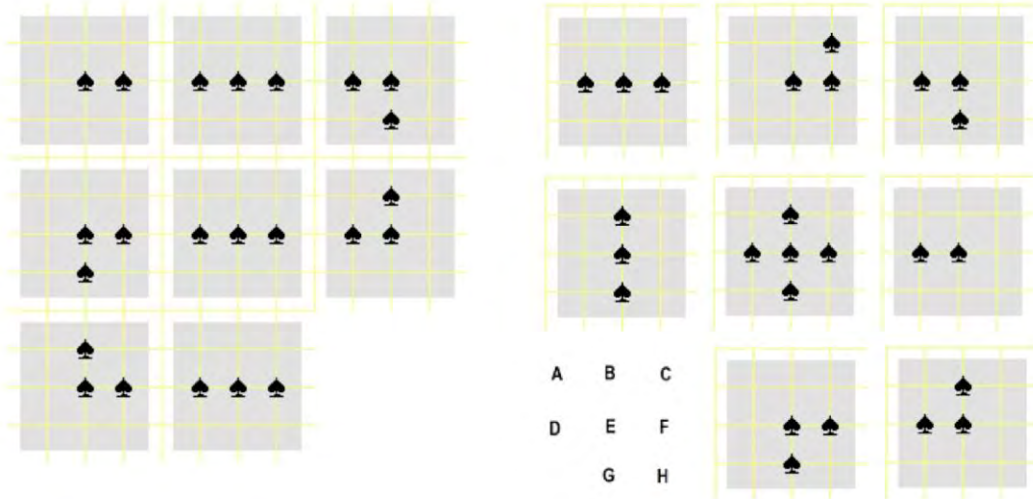
3.



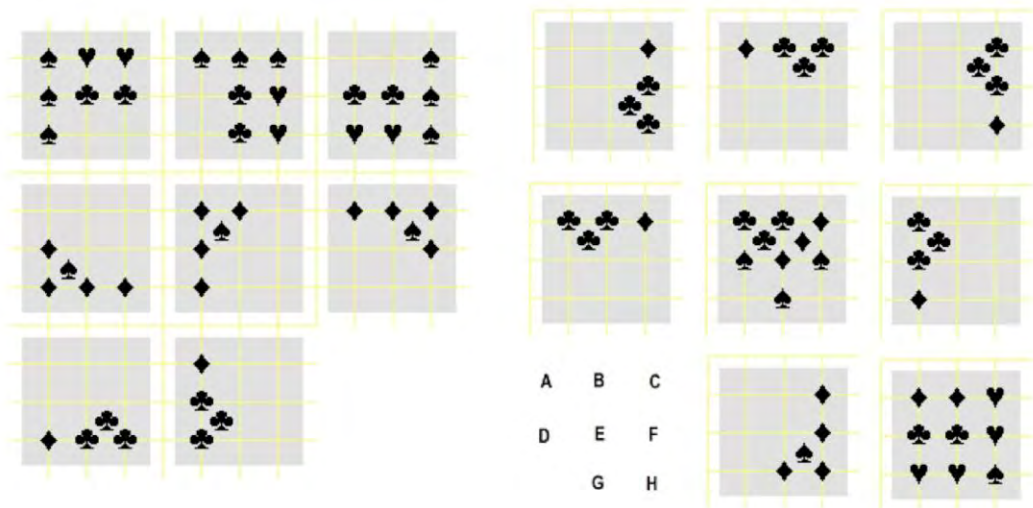
4.



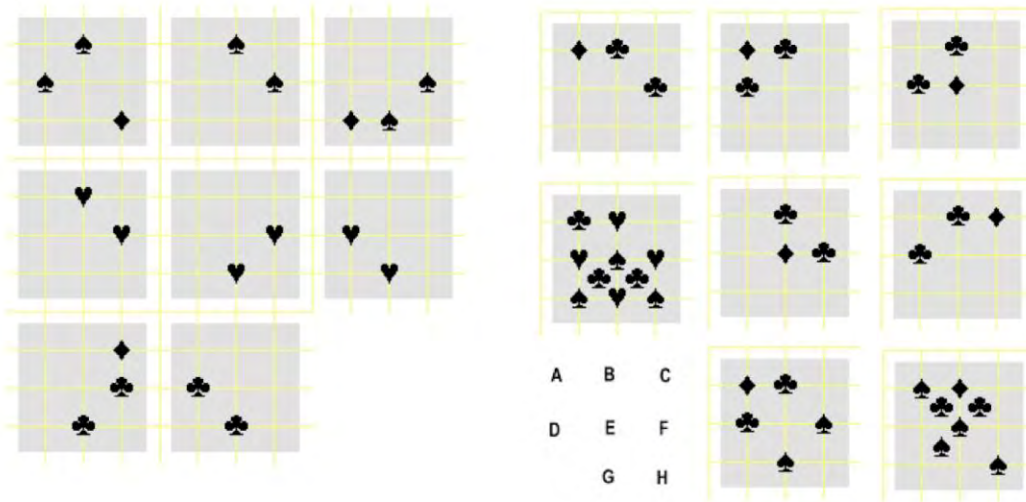
5.



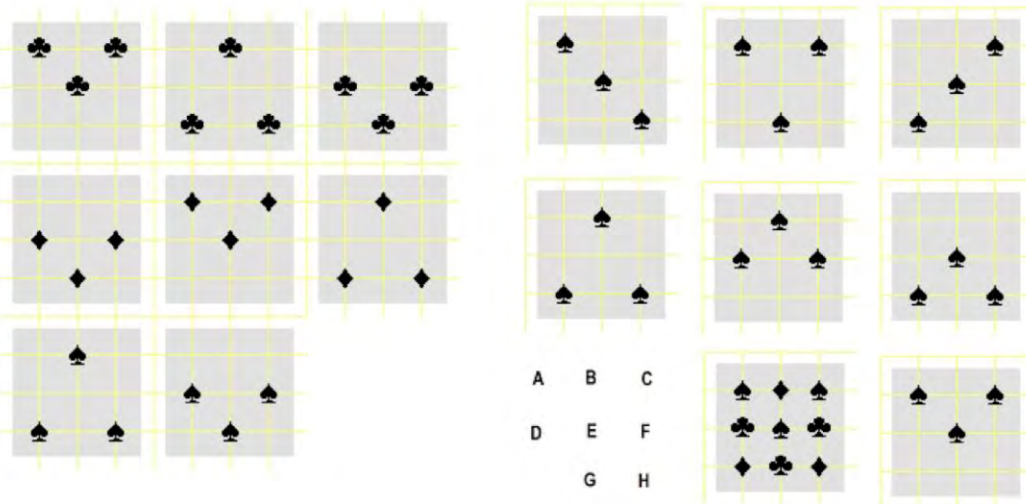
6.



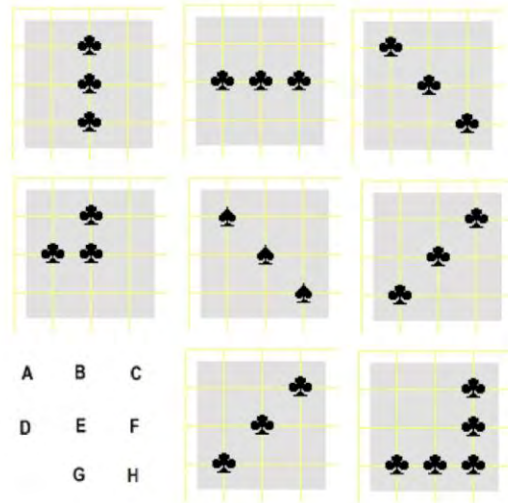
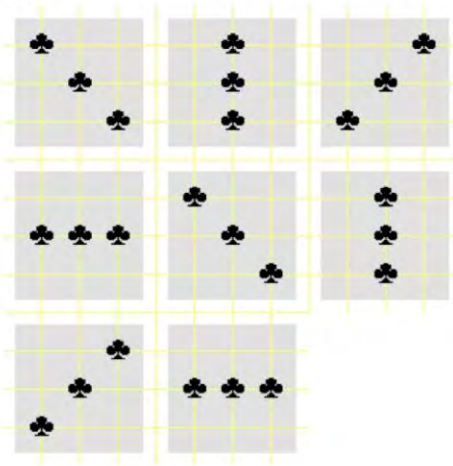
7.



8.

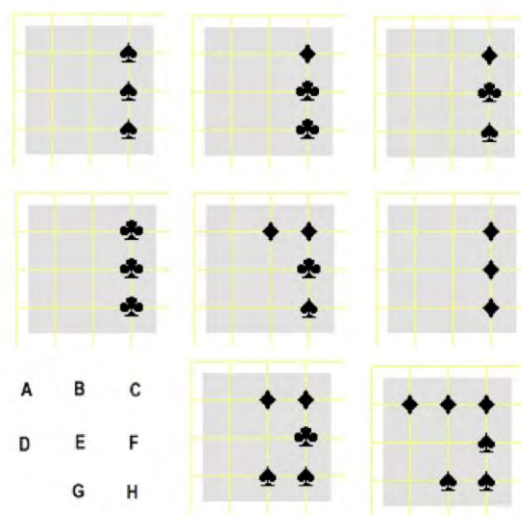
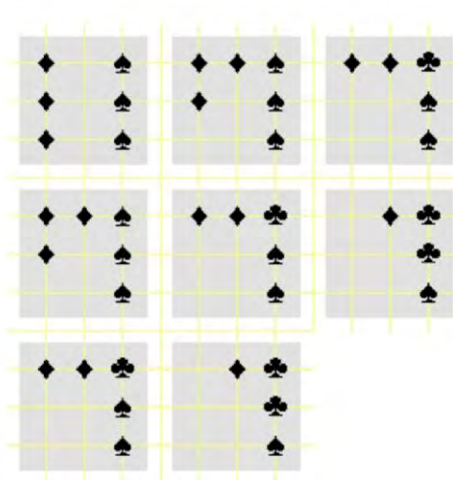


9.



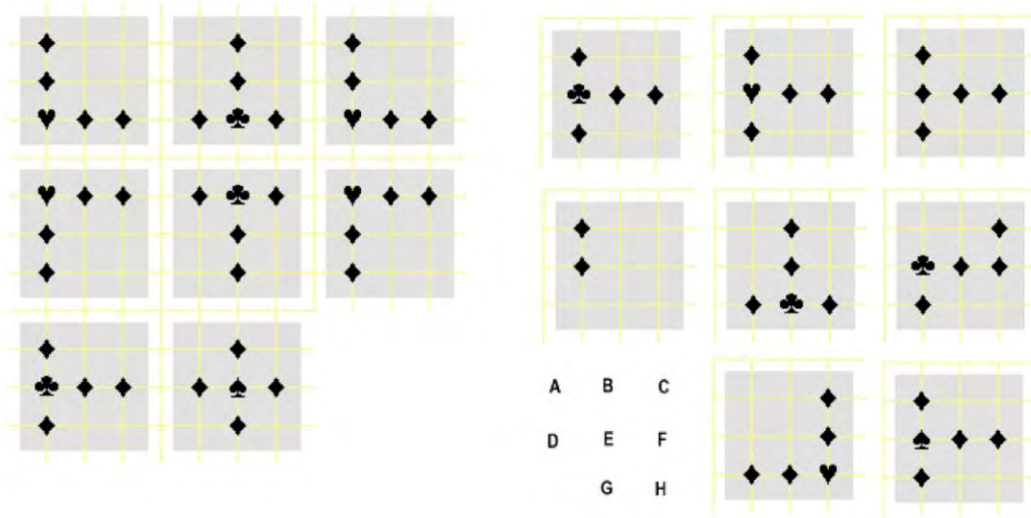
A	B	C
D	E	F
	G	H

10.

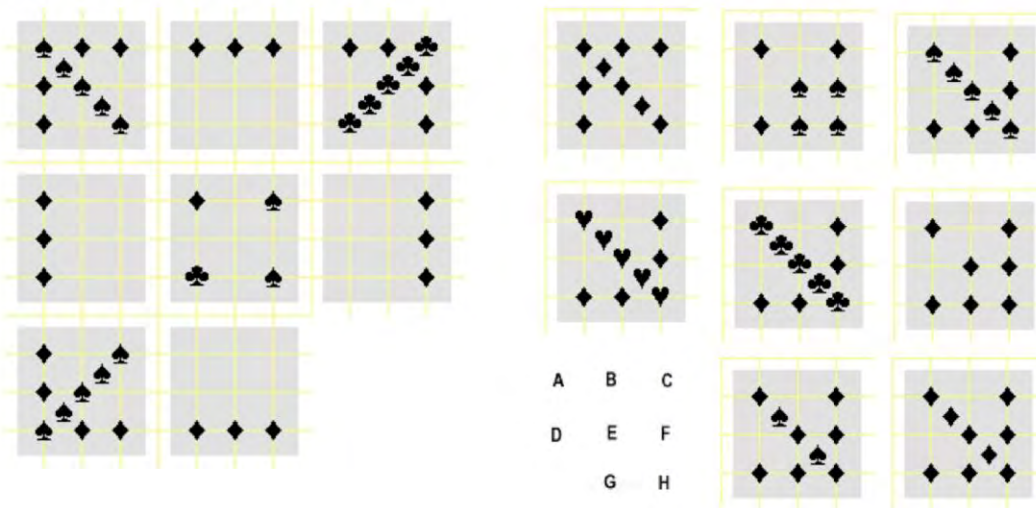


A	B	C
D	E	F
	G	H

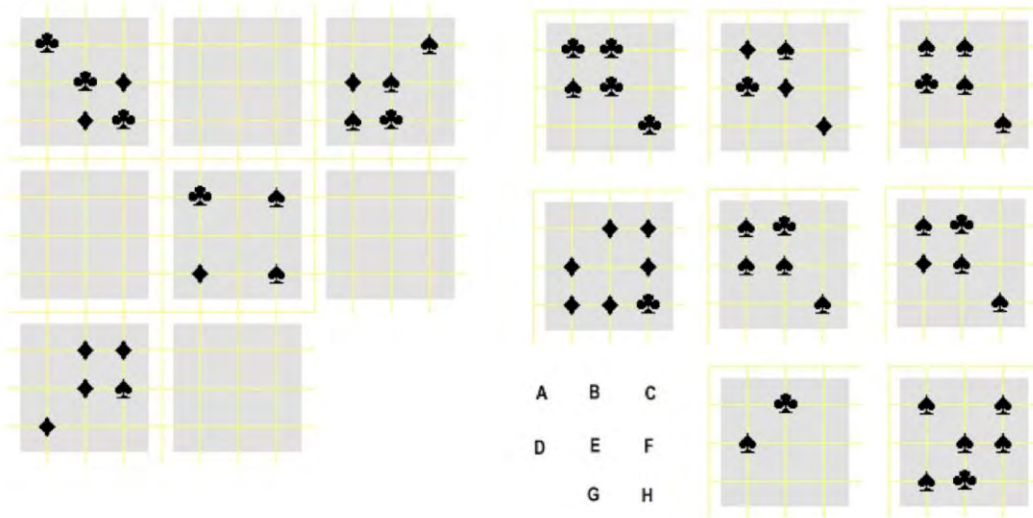
11.



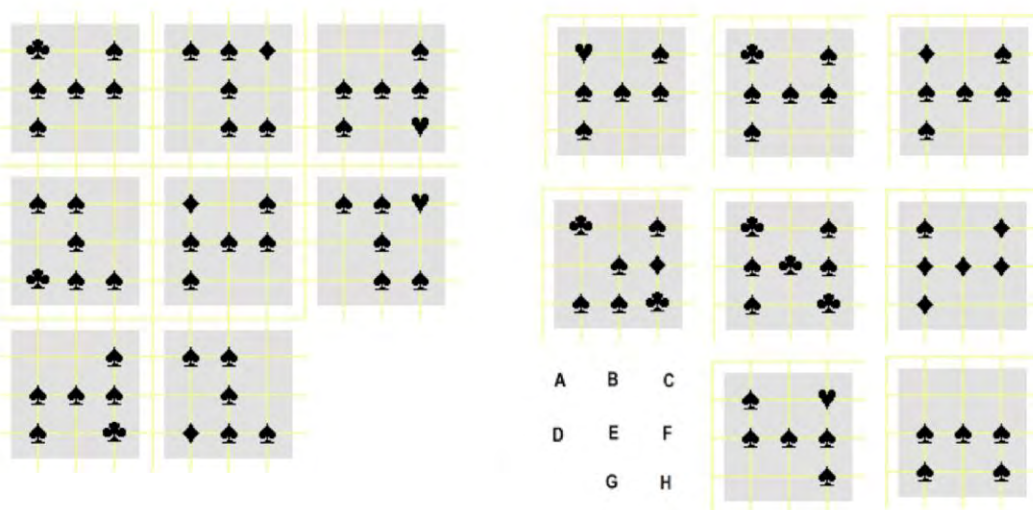
12.



13.



14.



15.

