

DIVERGENT THINKING IN A STANDARDIZED TEST

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Abstract: In dealing with standardized tests, including TOEFL test, there is a common propensity for test-takers to adopt convergent thinking which is a cognitive process in retrieving a pre-existing answers using concepts, knowledge, and understandings. On the contrary, the use of divergent thinking in standardized tests is scarce because the test-takers do not create new knowledge or ideas during the test. This study sought whether higher divergent thinking ability could affect TOEFL score. A case study was employed to gather the data from 143 respondents (divided into two groups: each 73 and 70 students) whom of which were 3rd year Economics students at Syiah Kuala University. Guilford's Alternative Uses Test was used as the instrument where the students should name the functions of a stone in 5 minutes. The total of 538 responses from group A and 366 from group B were obtained from this test. The data were analyzed using the descriptive statistics in terms of its originality. The results showed that the group whose ability in divergent thinking is higher could achieve average score reaching 523, while those with less ability in employing divergent thinking could only attained 477 in average. The findings imply that in teaching TOEFL preparation or other standardized tests, divergent teaching technique needs to be employed as the instructors should expands students' thinking by not only limiting it to Question-Answer technique.

Keywords: *divergent thinking; language teaching; language tests; Test of English as a Foreign Language (TOEFL); thinking skills.*

INTRODUCTION

Test of English as a Foreign Language, or shortly known as TOEFL, is an English standard test for non-native speakers of

English (Phillips, 2001). This test measures English capability level of non-native English speakers. The authority of this test is significantly vital for students as well as for

those who look for jobs. It is important to say that TOEFL has been around for quite a long time as an estimating test since quantities of colleges, both local and worldwide, demand on having their candidates to achieve certain score in the test to be conceded (Ananda, 2016). As now we see loads of Indonesian students are making a decent attempt to ace every of the TOEFL question on the test as a genuine effort to achieve a specific score, or much higher, to apply to the coveted local or worldwide college. Later to that, most prominent colleges in Indonesia oblige their students to tolerate no less than 450-500 TOEFL score as a fundamental prerequisite for both their confirmation and graduation.

Conversely, the instructing domain has indicated doubtful certainties concerning the TOEFL test when the test-takers answer the reading section questions. By and large, most of the test-takers make sure that as often as possible they tend not to answer this segment thoroughly for a few reasons, for example, lackness of vocabulary, time inadequacy, and so forth. This condition is totally upheld by Farrell (2001) specifying that most L2 students still utilize essential reading strategies to be specific. It is word-by-word reading and interpretation technique (Ismail, 2017). Both of these techniques are naturally restrained by the lackness of vocabulary.

Various ways and attempts that have been executed but it seems that the problems have not shown any end-points. It is worth to look at the students' thinking style specifically in this study, convergent and divergent thinking style. Divergent thinking is what spurs the creativity, which primitively has no concerns in standardized tests like TOEFL. It is assumed a vital part in advancement, improvement, and wellbeing. Ongoing exploration has utilized neuroscientific strategies to ponder innovation, oddity,

knowledge, dissimilar reasoning, and different procedures identified with imaginative mental process. Discoveries show that both hemispheres of the brain are engaged with dissimilar reasoning, which is joined by both occasion related increments and declines in the neural actuation. Unique reasoning is by all accounts related with high neural actuation in the focal, transient, and parietal areas, signs of semantic handling and re-blend of semantically related data (Yoruk & Runco, 2014). So that, it is clear that scientifically, there is a connection between creativity and reading comprehension process which actively involves semantic processings.

Indeed, the process of both convergent and divergent thinking happen simultaneously during the thinking process. However, the second type promotes more analogy and reasoning ability in semantic processings. Hence, to specify the intention of this study, it tries to figure out whether the divergent thinking ability for TOEFL test-takers matters to their score level.

Most experts concur that creativity is the capacity to produce satisfying performance and social results that are valuable and useful (Sternberg & Lubart, 1996). In this manner, imagination is considered as an execution or capacity, showed in unique, important, and socially acknowledged thoughts or items. The creativity level of an individual can be surveyed by methods for execution measures got from creative reasoning errands. Guilford (1971) who can be viewed as the founder of present day creativity proposal, drew a refinement amongst divergent and convergent thinking. Convergent thinking goes for a single, exceptionally compelled answer for an issue, though disparate reasoning includes the age of various answers to a regularly defined (Chermahini, Hickendorff, & Hommel, 2012).

A lot of discussions about creativity started to rise in 1949 by Guilford's 1949 presidential address to the American Psychological Association (Cropley, 2006). Besides, he also pay attention to other factors such as as personality which is specified into the ideas of convergent and divergent thinking. Indeed, he acknowledges the importance of not only divergent thinking but also convergent thinking, although in the later period, these two are competed and conflicted as one is superior to the other. Convergent thinking is sometimes considered to me more inferior than divergent thinking. A fact that needs to be taken into account is that the creativity production, for sure, does not appear independently from the divergent thinking alone, the convergent thinking also plays its parts (Cropley, 2006).

Divergent thinking is a demanding part of the process if creativity (Dippo, 2013). Designing a solution to a problem commonly does not have one right and frequent arrangement, there are numerous answers for a given problem, instead. It is imperative to see how distinct are a person's ideas for a certain problem and how she/he makes relationship to consider original thoughts. The ability is measured using a test named Alternative Uses Test. This test can be utilized to comprehend the connection between amount of ideas and oddity of thoughts. We can likewise perceive the number of thoughts individuals deliver before getting to the highest level of exceptionally original thoughts. It is important that in this test, novelty (or originality) is an essential constituent of imagination (Dippo, 2013).

On the other hand, convergent thinking is situated towards inferring the single best response to an unmistakably characterized question (Cropley, 2006). It accentuates speed, exactness, rationale, and so forth, and

spotlights on perceiving the commonplace, reapplying set systems, and aggregating data. It is accordingly best in circumstances where an instant answer exists and needs just to be reviewed from put away data, or worked out from what is now known by applying ordinary and sensible pursuit, acknowledgment and basic leadership procedures. A standout amongst the most imperative parts of convergent thinking is that it prompts a solitary best answer, and in this manner rules out uncertainty: answers are either right or wrong. In a more focalized manner, it is likewise personally connected to information from one perspective only. It certainly includes control of existing learning by methods for standard strategies (Cropley, 2006; Jones & Estes, 2015).

Both divergent and convergent thinking are significant thinking skills to create unique or inventive answers for an issue or problem. The students need to plan an arrangement or item by creating potential arrangements by deduction from divergent points of view and assess them dependent on advantages and disadvantages investigation and imperatives on convergent thinking model (Bryan, 2008).

Unlike convergent thinking style, divergent model is creating thoughts with spotlight on quantity and not on quality (Basadur, *et al.*, 1990). The sub-skills related with divergent thinking are flexibility which is the capacity to produce numerous reactions or thoughts, adaptability which is the capacity to create fluctuated thoughts from alternate points of view, or the capacity to change the structure, adjust data, or move viewpoints, originality which is the capacity to produce unordinary or novel reactions and elaboration which is the capacity to decorate a thought with subtleties (Runco & Acar, 2012). Meanwhile, convergent thinking is related with critical thinking where the significance is

given to deliberately settling on choices dependent on judgment, proof, suppositions and standards or ideas (Kathleen, 1991; Niu, *et al.*, 2013). The attention is on systematically assessing and choosing a solitary right arrangement dependent on suppositions, limitations and standards. The sub-skills required in the convergent thinking are various solution arrangements, making appropriate presumptions for a given issue, determination of exact arrangement dependent on limitations distinguished in a given issue and advocating chosen arrangement (Madhuri, 2015).

Both divergent and convergent thinking abilities are significant in producing imaginative or innovative answers for an open problem. These abilities can be supported in educational plan by fusing following instructive changes. First, undertaking the teaching model that configure classes with open-ended solution and problem arrangements (Bryan, 2008). Second, consider an assessment model that trains students to think divergent to convergent in all phases of critical thinking (Basadur & Finkbeiner, 1985). This, students are urged to take various perspectives while taking care of issues (Brown, 2009). Last, evaluate procedure that should be followed on critical thinking process rather than just on the results (Bryan, 2008).

Problem solving is ordered into deduction models and imaginative and creative models. The convergent models have following basic stages, there are setting up a need, investigation of errands, structure and execution. These are concurrent models which are centered around the assessing and choosing a solitary right arrangement which in this way it can lead to structuring a customary arrangement. The cognitive psychology research proposes inventive thinking models which separate the thought between age and assessment stages. The phases of imaginative

procedure models are analysis, generation and evaluation (Howard, Stephen, & Dekoninck, 2008).

Basadur, Wakabayashi, and Graen (1990) propose a coordinated model in which divergent and convergent is fused in every one of the three periods of critical thinking issue discovering, comprehending and execution. The study is done to explore the impacts of preparing in coordinated critical thinking model. The members of the preparation are experts at various levels. They are made to rehearse the intellectual procedure and strategies of divergent thinking to unravel real world, open innovative issues. The frame of mind towards divergent and convergent thinking about the members is estimated when the preparation utilizing survey in this study. The expansion in inclination for divergent thinking is noteworthy for more experts-administrators rather than non-expert respondent.

In the following is provided the Basadur's coordinated model to settle genuine and open structure problems to prepare students in creating both divergent and convergent thinking as demonstrated as follows. First, establishing a need and examination of errand (result is issue articulation). This initial phase a divergent to convergent model. Second, it is the design phase in which the result is planned as a solution to a problem. This is also employs divergent to convergent thinking style. Finally, the implementation in which the outcome or solution is stated. This is again employing divergent to convergent thinking model.

In the first period of critical thinking setting up a need and analysis, students need to comprehend the issue and repeat the issue explanation. In this stage, divergence is energized utilizing the structure thinking standards expressed as taking a principle at the

issue from various perspectives (Brown, 2009) and afterward join to repeat the issue dependent on the pre-requisites and requirements of the issue.

In the second phase of problem solving which is design, the student begin with divergent thinking by giving prompts to produce numerous solutions and after that unite to assess and choose the best arrangement among the solutions created. During divergent thinking, students ought to be urged to utilize various divergent analogical procedures such as analogical thinking which means moving an idea from one setting to another one; conceptualizing which is urging to exclusively create thoughts with spotlight on amount and not quality in less measure of time; mind mapping which is making variation of conceptualizing, where thoughts are spoken to in pictures just as words and characteristic listing which is recognizing traits of a subject and brainstorm approaches to adjust, turn around, join or enhance each (Zhiqiang & Schonwetter, 2004). When the conceivable collection of arrangements are accessible, perform upsides and downsides examination and select an answer or channel them dependent on imperatives, inclinations, presumptions and converge to one single solution.

In third period of problem solving which is execution, the chosen ideas are to be actualized utilizing suitable innovation. The divergent thinking is expected to list potential advancements to actualize the ideas and join to choose innovation dependent on suitability and plausibility. In addition, the problem solving mode would get activated when there are triggers questions. There are various sorts of inquiry prompts which we went over while attempting to discover their adequacy with regards to sick structure issues. The sorts of inquiries prompts and their subjective just as

metacognitive capacities which thusly encourage open critical thinking procedure are referenced underneath. Various exact investigations in regards to address prompts uncover that question prompts can fulfill number of psychological and metacognitive capacities which thus empower genuine open critical thinking. Question prompts can be categorized as procedural, elaborative and intelligent prompts (Ge & Land, 2003).

METHOD

The capacity to create a wide range of conceivable answers for an issue is an essential part of divergent thinking and has been particularly converted into the psychometric convention by methods Alternative Uses Test (Guilford, 1971) in which respondents were requested to create the functions of stone for as many as they can.

The test was administered in March 2017 involving 143 Economics students at Syiah Kuala University who were sitting for TOEFL preparation class. They were divided into two groups. Group A consisted of 73 students, and they had higher TOEFL score compared to Group B. Meanwhile Group B consisted of 70 students. Both groups were given three minutes to generate and write down all alternative uses of a stone (Bennett, 1973). Boden (2004) points this test a personal-psychological creativity which means that a person is producing a new idea even for him/herself, regardless of how many other people have used those ideas previously.

The data were analyzed using the protocols given by the Guilford Test itself. There are four components that are needed to utilize in the scoring process: originality, fluency, flexibility, and elaboration. Originality was determined by the unusualness and uniqueness (if only 5% respondents of the group mention an object', then it is considered

‘unusual’; if only 1% of the group does so, then the object is ‘unique’). Flexibility was the total responses. Flexibility was the object category such as weapon, jewelry, etc. Then, elaboration was the explanation entailing the

object, for example ‘a stone to put in the yard so that the yard is not muddy when raining’.

RESULTS AND DISCUSSION

The responses were all digitized and provided in the following graph.

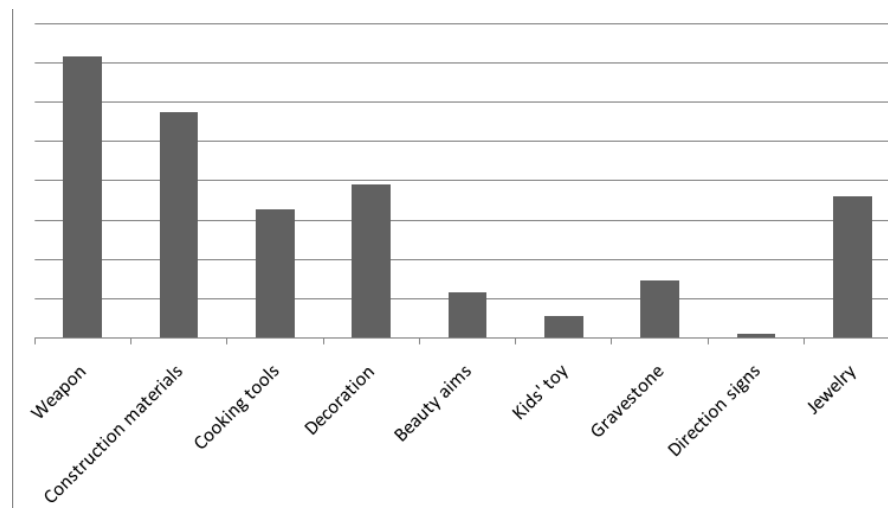


Figure 1. Variables come as the alternate uses of a stone group A

The graph above showed all of the alternative uses of a stone that was posed by Group A. There were 538 responses altogether from this group. As we could see that the most frequent thought that come to their mind was the use of a stone a weapon (143 responses) and as construction materials (115 responses). Next, it was followed by the use of a stone a decoration, which was 78 responses, jewelry (72 responses), and cooking tools (65 responses). What came least frequent were the functions as gravestone and beauty aims, 29 and 23 responses, respectively. The least thought they could bear were as kids' toy (11 responses) and direction sign, only 2 responses.

To the originality of the idea and how it affected their TOEFL score, the following table was provided. If there was 0.10 percent of the meanscore, it meant that 10% of the

whole population also think of the similar thought(s) (Dippo, 2013). Originality was seen as the measure of creativity. A factor that showed a connection between divergent thinking and creativity in problem solving was the idea of the semantic systems found in most of creative people. Inventive thoughts were thoughts emerged from the capacity to interface disconnected ideas in more approximately organized semantic systems (Nusbaum & Silvia, 2011). Evidences demonstrate that profoundly imaginative people see less semantic separation between irrelevant word combinations when contrasted with less imaginative people (Rossmann & Fink, 2010). Kenett, Anaki, and Faust (2014) explored the semantic systems of high innovative versus low innovative people, and they found that the innovative ones had more extensive interconnected semantic systems.

Table 1. *Originality of ideas on TOEFL score (group A)*

Alternate Use	Originality (mean)	Originality (unusualness)	Originality (uniqueness)	TOEFL score in average
Weapon	0.97			
Construction materials	0.95			
Cooking tools	0.74			
Decoration	0.82			
Beauty aims	0.40	√		523
Kids' toy	0.23	√		
Gravestone	0.54			
Direction sign	0.10		√	
Jewelry	0.79			

In the table above, we could see that the most common ideas were “weapon” and “construction materials” as we could see the means were 0.97 and 0.95. This meant that from the entire population, there were 97% of them who think of weapon and 95% of them who think of construction materials. So, this idea was not considered original as it was written by more than either 5% or 1% of the group members. While the ideas with higher originality were “direction sign” and “kids’ toy”, as their meanscores were 0.10 and 0.23, respectively. Specifically, ‘direction sign’ was considered unique because only 1% of the respondents wrote it, and ‘kid’s toy’ was considered unusual as less than 5% of them thought of it. The other unusual idea was ‘beauty aims’.

In addition to that, we could see that this group proposed more alternatives to the use of a stone; and we could see it was ranging from the usual such as weapon and construction materials to unusual uses, such as kids’ toy and direction signs. Indeed, there was a correlation between the students’ advanced proficiency in English (in general) and their ability to think divergently. As it was supported by Ghonsooly and Showqi (2012) that learning English could expand students’ creativity in terms of

divergent thinking skills fluency, elaboration, originality and flexibility.

Divergent thinking style was utilized to create an expansive arrangement of related ideas and classes, including the capacities of shaping free connections, and familiarity as well as adaptability of ideas (Jones, Caulfield, Wilkinson, & Weller, 2011; Jones & Estes, 2015). It is further viewed as a crucial norm for creativity capacity (Acar & Runco, 2012).

Divergent thinking was frequently estimated by innovative assignments (Beaty, Nusbaum, & Silvia, 2014), for example the *Alternative Uses Task* (Guilford, Christensen, Merrifield, & Wilson, 1978), in which members were required to produce the same number of and differed utilizes for an ordinary object like a stone within a limited period of given time. A conceivable purpose behind the relationship between divergent thinking and problem solving was the familiarity and adaptability of idea required in unique intuition errands as the number and variations of possibly pertinent ideas recovered was expanded toward a problem solving attempts (Ansburg, 2000; Kenett, Anaki, & Faust, 2014). Then, below was provided a graph showing the variables from Group B.

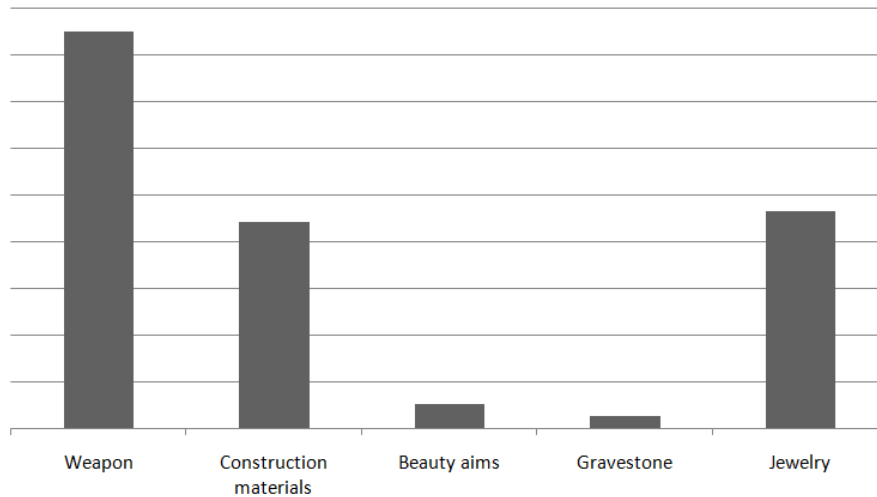


Figure2. Variables come as the alternate uses of a stone group B

Unlike the former graph with nine bars, this graph only showed five bars. This meant that group B was posing less alternatives to the use of a stone; there were 366 responses entirely. On the graph we could see that the most common idea was still the use of a stone as a weapon (170 responses). The uses as jewelry and construction materials were still rather usual since there were 93 responses and 88 responses. The least frequent thoughts were the use of a stone as beauty aims (10 responses) and gravestone (5 responses).

As supported by Ge and Land (2003) that indeed, an organized problem solving was very difficult task, and a student needed high measure of platform before arriving at this degree of skill. Since a novice student's information was delicate and came up short on a capacity to incorporate what had been

learned with current situation, the open idea of issue may wind up discouragingly. This may be because of a lot of reasons, for example, shallow information, absence of enthusiasm, coming up short on the ability, misconceptions, and improper reasoning skills, and so on.

Hence, exposing students only to a true, real-life problems would not generate powerful and adequate thinking skills. Because of the perplexing idea of not well organized critical thinking skills and multifaceted nature looked by beginner learners in figuring out how to take care of open problems, the problems would only captivate the students without knowing how to figure out the solution for them (Ge & Land, 2003). Below is provide the meanscore to outline their idea of originality.

Table 2. Originality of ideas on TOEFL score (group B)

Alternate Use	Originality (mean)	Originality (unusualness)	Originality (uniqueness)	TOEFL score in average
Weapon	0.98			
Construction materials	0.75			
Beauty aims	0.48	√		477
Gravestone	0.22	√		
Jewelry	0.79			

The table above showed that there were only five functions of a stone that came to the

thoughts of group B students. The most original one was “gravestone” with the

originality of 2% which was considered unusual. However, compared to the former group originality percentage which was 1%, this group revealed to be less original in ideas. While the most unoriginal idea was weapon (0.98) which meant that from the whole population, 98% of them would think that the function of a stone was as a weapon.

The participants might have presumed that the task was incomplete since there were no additional motives mentioned to support the reasons that they should find the alternative uses of a stone. A task of incomplete problem was not just road to different various arrangements yet in addition found that through this technique, different new methodologies emerge which was joined with information that was recently learned (Birenbaum & Tatsuoka, 1987). However, an inadequate problem emergence did not completely indicate the objective inquiry, rather incite or leave space for creative mind and presumptions for the issue solver.

Open-problems should be non-representative issues and should have these two significant fundamentals. Firstly, every student ought to have the option to relate the issue to some recognizable themes and it ought to intrigue (Diefes-Dux, *et al.*, 2004). Along these lines, the student would feel a solid association towards the issue and would accordingly understand the need of tackling it. Secondly, open problems should be reasonable so that it could meet the learning target necessities and furthermore ideally improve into new problems (Kwon, Park, & Park, 2006).

Hence, in accordance with the TOEFL score, we could see that the group with higher score tend to think more divergently compared to the group with lower score. It was marked by Hoffman (1962) in Powers and Kaufman (2002) that in originality, there was a tendency

they would think more deeply about one certain idea.

CONCLUSION

There are two conclusions that can be taken from the results corroborated above. First, there is a linear relation between the ability of divergent thinking and standardized test, in this case, TOEFL test. Second, the more divergent a person can think, the more alternatives for a problem can she/he design. It is suggested for English teachers especially TOELF trainers that posing our students to a classroom condition where they can think freely is not really a hard choice to make compared to forcing them to sit still for the whole timespan for the merely score oriented purpose. This recommendation is made without any propensity of judging any type of thinking is more superior to the other.

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