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Implicit Theory of Intelligence: Growth Mindset

Örtük Zekâ Teorisi: Gelişime Açık Zihin İnancı

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ABSTRACT

There has been a long-standing debate among scientists as to whether intelligence is something innate, tangible, fixed, and relatively unchanging, or whether intelligence is not fixed and unchanging, but rather something that can be developed, dynamic, shaped, and strengthened with effort. Carol Dweck and her colleagues, who have focused their studies in this field, have developed the implicit theory of intelligence, which deals with this topic. According to the implicit theory of intelligence, which is based on people's beliefs about the nature of their intelligence, these beliefs are the perspectives on whether the intellectual abilities of individuals are fixed or whether they can be developed or not. Implicit theory of intelligence; expresses people's beliefs related to their intelligence as a structure consisting of two parts: the growth mindset and the fixed mindset. The implicit theory of intelligence see intelligence as ranging from either being stable, fixed, unchangeable, and innate (fixed mindset) or being improvable, dynamic, malleable, and could be changed by effort or hard work (growth mindset). This theory has been renamed as growth mindset in the recent period. Shortly, growth mindset interventions express that human abilities are not fixed and these abilities can be developed. However, as a result of a detailed search in the national literature, it has been determined that there is no study of growth mindset. Therefore, in this study, it is aimed to introduce growth mindset, whose effectiveness has been tested by many studies and evidence-based, especially to young researchers working in the academic field and field workers in Türkiye.
Keywords: Implicit theory of intelligence, intelligence, learning, growth mindset, fixed mindset

ÖZ

Bilim insanlarınca zekânın doğuştan gelen, somut, sabit ve nispeten değişmez bir şey mi, yoksa zekânın sabit ve değişmez olmadığını aksine zekânın geliştirilebilir, dinamik, şekil verilebilir ve çaba ile güçlendirilebilir bir şey olduğuna yönelik tartışma uzun zamandan beri süregelmiştir. Özellikle bu alanda çalışmalarını yoğunlaştıran Carol Dweck ve arkadaşları da bu konuyu ele alan örtük zekâ teorisini geliştirmişlerdir. İnsanların zekâlarının doğasına ilişkin inançlarını temel alan örtük zekâ teorisine göre bu inançlar bireylerin sahip oldukları entelektüel yeteneklerinin sabit olup olmadığına ya da geliştirip geliştirilmeyeceğine dair bakış açılarıdır. Örtük zekâ teorisi; insanların zihin yapılarıyla ilişkili inançlarını gelişime açık zihin (growth mindset) ve sabit zihin (fixed mindset) olmak üzere iki kısımdan oluşan bir yapı olarak ifade eder. Örtük zeka teorisi zekayı ya istikrarlı, sabit, değişmez ve doğuştan gelen (sabit) ya da geliştirilebilir, dinamik, şekillendirilebilir ve çaba ya da sıkı çalışma ile değiştirilebilir olmak arasında değişen bir şey olarak görür. Bu kuram yakın dönemde daha çok gelişime açık zihin olarak kullanılmaktadır. Kısaca gelişime açık zihin yapısına yönelik uygulamalar insan yeteneklerinin sabit olmadığını ve bu yeteneklerin geliştirilebildiğini ifade eder. Fakat ulusal alan yazında yapılan detaylı tarama sonucunda gelişime açık zihin inancına yönelik herhangi bir çalışmanın olmadığı belirlenmiştir. Bu yüzden de bu çalışmada Türkiye'de akademik alanda çalışan özellikle genç araştırmacılara ve saha çalışanlarına böylesi etkililiği çok fazla çalışma ile test edilmiş ve kanıta dayalı olan gelişime açık zihin inancının tanıtılması amaçlanmıştır.
Anahtar sözcükler: Örtük zekâ teorisi, zekâ, öğrenme, gelişime açık zihin inancı, sabit zihin inancı

Introduction

The question of "How can students' learning be improved and how applied education systems can be made more effective and efficient?" is one of the most important topic that researchers have been dwelling on for a long time. One of the researchers looking for an answer to this question is Carol Dweck, she presented her thoughts in the implicit theory of intelligence, which helps us to understand the reasons behind why some people strive to develop their potential while others do not (Dweck 1986, Hong et al. 1999, Dweck 2000). The implicit theory of intelligence is related to people's beliefs about the nature of their intelligence. These beliefs are the perspectives on whether the intellectual abilities of individuals are fixed or can be developed. These beliefs also include people's thoughts about whether they can develop their own abilities with the necessary guidance, mentoring and support from others or not (Dweck and Yeager 2020). Thus, the implicit theory of intelligence allows us to understand why some individuals resist, challenge, make an effort, and do not give up easily and

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even try harder in the face of threatening or negative events (such as failure) while others do not struggle and fail although these individuals are have similar abilities. In this context, this current review study was aimed to introduce the implicit theory of intelligence to Turkish readers.

When the theory was first developed by Carol Dweck, it was called the Implicit Theory of Intelligent. However, in recent time the theory has been mostly used as a Growth Mindset by her and those who work on the subject. In the present study, both names are used interchangeably. In addition, as a result of a detailed search in the Turkish national literature, it has been determined that there is no study on the growth mindset. Therefore, in the current study, it was aimed to introduce the growth mindset, which has been tested by many studies and is evidence-based, especially to young researchers working in academia and in the field in our country. For this purpose, firstly the implicit theory of intelligence was discussed, and then the effectiveness of growth mindset interventions was examined.

Implicit Theory of Intelligence

Implicit theory of intelligence is people's beliefs in regarding to the nature of their intelligence consisting of two parts: the growth mindset and the fixed mindset (Dweck and Leggett, 1988, Dweck 2000, Dweck 2006, Dweck and Master 2009). The view that sees intelligence as primarily innate, concrete, fixed, and relatively unchanging is the belief of fixed mindset. The fixed mindset is the belief that intelligence is inherently fixed and nothing can be done to increase or change it. At the same time, the fixed intelligence beliefs are the beliefs that individuals are born with certain unchangeable characteristics that cannot be changed by experience and time. On the other hand, individuals with growth mindset beliefs accept that intelligence is not fixed and unchanging; on the contrary, it is something that can be developed, changeable, malleable, dynamic, shaped and strengthened with effort over time (Dweck 1986, Dweck et al. 1995, Dweck 2007). In other words, growth mindset means that human abilities and skills are not fixed and can be improved over time.

It can be said that through education, it is aimed to develop students' abilities, knowledge and skills to use their full potential and self-actualize themselves. Therefore, it is important to determine the factors affecting the level of success in the learning process, and to determine the different characteristics between students with high academic achievement and students with low academic achievement. At this point, the implicit theory of intelligence tries to shed light on this process. According to the implicit theory intelligence (growth mindset), students with fixed mindset beliefs view their intelligence as a something fixed and unchangeable thing, while students with a growth mindset view their intelligence as something that can be changed, increased, and strengthened over time. While students with growth mindset believe that they can learn new things and improve their abilities with effort, students with a fixed mindset do not believe that. In short, students tend to view their intelligence either as stable, fixed, unchanging, and innate (fixed mindset) or developable/ improvable, flexible, dynamic, malleable through effort or hard work (growth mindset). Students who agree with statements like “You have a certain amount of intelligence, and you really can’t do much to change it” are believe that intelligence is something fixed and unchangeable, while those who agree with statements such as “You can always greatly change how intelligent you are” or “Everyone no matter who they are can substantially increase their intelligence” are believe that intelligence is something that can be developed (Dweck, 1999).

According to Dweck and Master (2009), these beliefs about intelligence have very important implications for and effects on students. It affects students' goals in school, their belief in the benefits and usefulness of effort, the way they explain their failures, and the strategies they use after or coping with a possible failure and a setback. Based on these beliefs, students may be smart-oriented or learning-oriented, viewing effort more positively or negatively. They may attribute their failures to lack of talent, ability, intelligence, effort or a poor strategy and may give up after some failures or become more challenging and resilient (Dweck and Master 2009).

Belief in growth mindset also means and predicts the adoption or displays that students have more positive beliefs about making effort (the idea that hard work can build new abilities), adopting learning-oriented goals (desire to improve one's ability by engaging in challenging learning tasks), and being resilient (viewing and attributing setbacks and failures as indicative of a need to change the used strategy and not a lack of ability and their intelligence or personal deficits). As a result, it can provide improved learning or performance with more mastery-oriented strategies and mastering on information (sticking to challenging tasks rather than returning to easier ones) in the face of difficulties or failures (Dweck and Yeager 2020). On the other hand, believing that intelligence is something fixed means that students adopt or display negative beliefs about their efforts (the belief that the need for high effort means low ability or effort will be ineffective with low ability) (Blackwell et al. 2007, Miele et al. 2013).

According to Dweck and Yeager (2020), research on learned helplessness has shown that animals exposed to uncontrollable negative events eventually give up trying to avoid or escape from these events. Later, it was observed that these animals remained passive even when the environment was changed and their efforts were rewarded. This behavior is perhaps similar to the behavior of students who have the ability to learn and succeed but give up in the face of difficulty.

Students with fixed mindset tend to focus on performance goals or performance-avoidance goals (the desire to protect one's ability, usually by avoiding difficulties that may reveal inadequacies) (Hong et al. 1999), display attributions of helplessness that their failure means having low ability or intelligence, and as a result, they adopt less positive strategies (perseverance, making up deficiencies, and seeking appropriate help) in the face of failures (Blackwell et al. 2007, Nussbaum and Dweck 2008, Dweck and Yeager 2019), which leads to less than optimal learning or performance. Growth mindset beliefs leads students to choose mastering on information and learning instead of being performance goal-oriented and to believe that effort will lead to positive academic results (Blackwell et al. 2007). Based on these explanations, it can be said that students' beliefs about their intelligence ultimately influence their grades, achievement (Dweck and Master 2009) and how they will behave when faced with setbacks or failure.

Those who believe that intelligence is fixed tend to perceive their failures as an indication of personal inadequacy, deficits and shortcomings, while those who believe that intelligence can be enhanced see failures as learning opportunities to mastering on (Dweck 1986). Unlike those who believe that intelligence is fixed, those who believe that intelligence can be improved do not internalize difficulties or setbacks as failures. Because their focus is on mastering/learning knowledge, they are not concerned with appearing smart or stupid to others (Dweck 2000). In this context, students who share fixed mindset beliefs underestimate the importance of effort and work, as they believe that they must have great abilities to complete a difficult task before starting to study on it. They may even just give up without trying. Due to the fixed mindset they have, they often miss new learning opportunities. On the other hand, students with growth mindset, who view intelligence as something that can be increased and improved, tend to see effort as an indicator and prerequisite for learning, no matter how smart they are (Dweck 1986). Thanks to these views, those who believe in a growth mindset seek challenging tasks to master on knowledge, regardless of perceived ability level.

As noted above, belief in intelligence can lead to different beliefs about or attribution to the value of effort. When students believe that their intelligence or abilities are fixed, they do not attribute too much importance to effort. They may think that those with talent and ability need no effort, and that if someone has low talent or skill, then their effort will not help change anything. The idea here is that trying or working harder won't change how smart they are, even worse, trying or working harder may also approve their own unintelligent from their personal point of views. They may think in this way after any possible setback and failures (Blackwell et al. 2007). For those who believe that intelligence is fixed (even if they are intelligent), it can be said that the harder they try, the more they feel they lack the ability, and this will be confirmed. Contrary to this way of thinking, effort can be just as beneficial if students believe that their intelligence is malleable, not unchangeable, and not fixed. These students with growth mindset are more likely to agree with statements such as “The harder you work at something, the better you will be at it”. As a result, believing in the power of effort helps students choose the path to greater success (Dweck and Master 2009).

When we examine how students with different mindset beliefs react to failure, Dweck and Master (2009) stressed that low achievement means low ability for students who believe that intelligence is stable and fixed, whereas low achievement is a sign of not trying hard enough for students who believe that intelligence can be improved. For example, seventh grade students with a fixed mindset made "helpless" explanations for their low success, they thought they failed because "I am not smart enough", "the exam is not fair", and these students do not change their behavior and make no effort to change the results by attributing their failures to external factors. On the other hand, students with growth mindset who believe intelligence can be improved express their low achievement as "I didn't work hard enough" or "I didn't study properly". In this way, by attributing failure to their own level of effort, they are ready to take control of the situation and make an effort to change the results (Blackwell et al. 2007).

As a result, students who believe that the intelligence is stable (fixed mindset) may give up easily or do not make any effort to change the situation, while students who believe that the intelligence is not stable and can be improved (growth mindset) may try hard to change the situation and do not give up easily and become more persistent. Over time, students who believe that intelligence is fixed perform lower than students who believe that intelligence can be increased and improved (Dweck and Master 2009). This theory of intelligence shows

that students' implicit beliefs - especially about their own intelligence - have significant effects on their motivation at school, their participation in classes and their performance (De Castella and Byrne 2015).

Growth Mindset Interventions

The aim of the growth mindset interventions is to make students with fixed mindset beliefs more successful by directing them to the belief in growth mindset. These interventions of the growth mindset express a situation where human abilities are not fixed and these abilities can be developed. In this context, interventions can support continued academic development through self-reinforcing motivational cycles and mastery learning orientation. For example, having a growth mindset or belief in improvability of intelligence can motivate students to turn to more challenging learning experiences and not to give up and be persistent when they encounter difficulties or possible setbacks (Yeager et al. 2019). These programs not only communicate and convey the idea of malleable ability to students, but also make students become willing to embrace this idea and apply it in their schoolwork and life. The belief that intelligence can be developed also instills the belief that abilities are not fixed but can be developed, for example, through hard work, good strategies, and help and guidance from others. In addition, interventions growth mindset, convey that effort or difficulties faced in school is a sign that you are improving your abilities, not your lack of ability. Shortly, intervention helps students understand how to put growth mindset beliefs into practice in their schoolwork and grasp how it can personally help them in their life goals.

When students enter challenging or uncertain academic environments, such as when they start a new school or attend a difficult course, they often worry about whether their abilities are appropriate for the task or not. Students with fixed mindset, where abilities and intelligent are viewed as limited and unchanging, may wonder whether they will be seen as inadequate or stupid by others. Students may fear from these difficulties, be reluctant to make an effort, view failures as proof of their greatest fear (inadequacy) and this may continue in an iterative cycle. The purpose of interventions of the growth mindset is to break this cycle and shift students from fixed mindset to growth mindset belief system.

In growth mindset, students may also be anxious when they start to a new school with unknown standards and requirements, but they can also be excited about exposure to new topics and what they will learn. They try to make an effort even if they have a disappointing experience. They may be more likely to make more positive conclusions and attributions for their setbacks and failures and to engage in more constructive strategies to achieve effective learning, especially if they have more a supportive environment. Because as Dweck and Yeager (2020) emphasized, growth mindset intervention programs are more effective among students who (1) face ongoing academic difficulties and (2) are in school or classroom environments that support the growth belief and behaviors.

As an overview, interventions for growth mindset teach students that their intellectual abilities are not fixed but can be developed with effort, good strategies, and inputs, advice, and support from others. They are taught that they can build a stronger brain, and this is backed up by compelling scientific research on how the brain changes and developed with learning.

The intervention for the growth mindset generally involved three elements. The first is scientific reliability. The interventions, through studies of new and emerging brain neuroscience, explain the surprising potential of the brain for change and development and stronger neuronal connections through practicing, intensive learning, and good nutrition and sleep habits. The first purpose of interventions is to persuade students by conveying scientific knowledge about the brain and its malleability and plasticity.

The second factor is the metaphor that the brain is like our muscles which gets stronger with exercise. Participants in the intervention program learn that similar to how strenuous exercise strengthens their muscles, their academic life and learning strengthens the brain's connections. The purpose of this framing, again, is to weaken students' negative beliefs about effort and fixed mindset beliefs, and instead evoke the value of effort and challenge in a development-mindset-meaning system. Scientifically, the brain is made up of networks of neurons that become "powerful" and more efficient when people learn new and challenging things. Intervention, therefore, tries to explain that struggling or experiencing setbacks or failures to master on something new are not signs of inadequacy, but rather tools to strengthen connections in people's brains and make them smarter (Dweck and Yeager 2019) as in muscles.

The third critical factor includes features that help transfer these ideas to life. These include testimonies of older students who are exposed to and use growth mindset messages to enhance their learning in school (through effort, usage of effective strategies, and asking for help). In more recent interventions, students meet with one

or more acclaimed figures who use the growth mindset principles to achieve their goals in life. There are also writing assignments for participants in this stage. One of the most commonly practiced exercises in the growth mindset intervention is the assignment to write a "letter to a future student" by students who received intervention.

Students imagine a future student in their own age who has a hard time and struggling at school and does not yet know the growth mindset messages and possibly benefit from knowing a growth mindset. These students are then asked to write a persuasive and encouraging letter to the future student who can use their newly learned ideas about the growth mindset to overcome the difficulties and struggles they have face. These ideas or messages of growth mindset are listed for them as a reminder of what they might include.

This exercise not only prompts participants to further elaborate their growth mindset ideas (resulting in improved memory because of the intervention messages), but can also encourage internalization of the message through the "saying-is-believing" effect (Aronson 1999).

Effectiveness of Growth Mindset Interventions

Despite the results of many convincing study findings showing the effectiveness of growth mindset interventions, it should be kept in mind that these interventions alone do not have a 100 percent effect in achieving a sustainable outcome. It is undeniable that beliefs or thinking system play a central role in human development. Belief in growth mindset—a belief in the malleability of intelligence—can shape how adolescents interpret and respond to academic challenges and how they then progress through the education system. Hecht et al (2021) tried to answer the question that "Do these beliefs have the same implications for adolescents regardless of their context? They tried to provide new perspectives to the classical development questions about continuity and change in their study. Here, the researchers presented the Mindset x Context framework and applied this model to an instructive example of growth mindset interventions. Their study showed that teaching students growth mindset is most effective in educational contexts that provide opportunities for this; that is, contexts/environments that allow and encourage students to view talent/intelligence as malleable and act on that belief. This evidence contradicts the "beliefs-only" hypothesis, which argues that it is sufficient to teach adolescents about growth mindset and that students can benefit from these beliefs in almost any context, including unsupportive contexts.

Similarly, Yeager et al. (2022), in their study conducted with 9167 students who were matched with 223 mathematics teachers, sought answers whether students' growth mindsets/intelligence beliefs should be supported by teachers' own growth mindsets beliefs (i.e., growth mindset plus supportive environment/context hypothesis). The results of this study also showed that contextual support may be required for students to adopt the belief in growth mindset, maintain its effects and improve. In other words, the success of interventions about growth mindset belief alone is at a certain level, and in order to ensure its permanence and effectiveness of them, teachers' own mindsets and practices must be compatible with.

The Mindset x Context framework underlines that, in order to produce more pervasive and lasting change, interventions that change/improve students' belief in growth mindset must be complemented by new interventions. Teachers' classroom policies and practices that allow students to establish and benefit from growth mindset is needed (Hecht et al. 2021).

In the study conducted by Paunesku et al. (2015) with 13 schools and 1594 high school students, the growth mindset intervention program was found to be effective in improving the general grade point averages in "basic" courses (mathematics, science, English and social studies) for students who received lower grades than their peers before the interventions. In another study, it was found that students with low academic achievement increased approximately .10 grades in GPAs (twice in certain school) and 4 to 8 percent improvements in the success rates of lower achievers (Yeager et al. 2018).

In summary, growth mindset interventions begin by providing basic information about the malleability of intellectual abilities—the brain and its capacity for growth. This is done in a meaningful and persuasive way, first scientifically and then personally – that is, in the light of scientific evidence, students are prompted to reinterpret the meaning of effort and setbacks as tools for growth, not as negative things.

Conclusion

Implicit theory of intelligence is one of the theories that advocates increasing the effectiveness and efficiency of the learning for students in educational environments and shifting the role of students in the learning process

from a passive position to a more active one. According to the implicit theory of intelligence, some individuals with similar cognitive features (intelligence) make an effort against negative and threatening events, others tend to accept the situation without effort by adopting a more passive attitude in the learning process. The theory conceptualizes this differentiation by relating it to individuals' beliefs about the nature of their intelligence. It explains people's beliefs about their intelligence as fixed mindset and growth mindset. Individuals with fixed mindset beliefs believe that intelligence is a fixed and unchangeable thing; while individuals with growth mindset beliefs picture a different situation where human abilities and skills are not fixed and can be improved. These beliefs about intelligence can have significant effects on students (Dweck and Master 2009) in many ways. The type of belief held determines the student's reaction and attitude towards the difficulties encountered in the learning process. While students with a growth mindset adopt a more constructive and flexible attitude in the face of the difficulties they encounter, students with a fixed mindset define the difficulties they encounter as failures and avoid making efforts and have difficulty breaking the cycle they are in.

As a result, one aim of the implicit theory of intelligence is to increase the achievement level of students with fixed mindset beliefs by directing them to growth mindset beliefs through various intervention methods. In this way, students gain a new perspective to cope with the difficulties they encounter at school and their behavioral repertoire expands. When the literature is examined, these results are supported by evidence-based growth mindset interventions.

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