



Developmental trends of divergent thinking and feeling across different grades for Taiwanese adolescence between 1990's and 2010's

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ABSTRACT

Previous studies regarding developmental trends of creativity in adolescence rarely focused on both cognitive and affective factors of creativity. In Taiwan, the survey in this field also lacked during these two decades. Therefore, this study aimed to understand Taiwanese students' developmental trends of creativity in both cognitive and affective aspects. The researchers analyzed the difference between divergent thinking and divergent feeling of Taiwanese adolescent students across different grades as well as the linear trend. The difference of divergent thinking and divergent feeling scores between this study and the 1990s' was also examined. Participants included 1674 fifth-grade to eleventh-grade students (866 boys, 51.73%). The results showed that divergent thinking scores as cognitive aspect significantly enhanced as grade levels increased. The divergent feeling scores as affective aspect slightly enhanced as grade levels increased, but slumped in the sixth grade and steeply ascended in the eleventh grade. When the divergent thinking scores of the current students were compared with the scores of the students in 1990s, the types of developmental trend were different, which was the fluctuation of developmental trend was larger than the current trend which was smoother. The mean scores of current participants for each grade level had less variation than 1990s'. The divergent feeling scores in both 1990s' and 2010s' increase and showed a similar linear upward trend. The results would suggest further investigation and promotion of creativity in education policy.

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1. Introduction

Development of creativity in individuals is an important topic in education and psychology. The best known research on developmental trends of creativity is that of Torrance (1968a,b), who, using the Torrance Tests of Creative Thinking (TTCT), conducted a large-scale study in seven countries and introduced the 4th-grade slump phenomenon. Since then, there have been many studies related to developmental trends of creativity (e.g., Chae, 2003; Charles & Runco, 2001; Cheung, Lau, Chan, & Wu, 2004; Kim, 2011; Lopez, Esquivel, & Houtz, 1993; Lubart & Lautrey, 1995; Urban, 1991); however, the findings have generally been inconsistent (Makera, Jo, & Muammar, 2008). For example, among studies of the 4th-grade slump, several

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supported the findings of Torrance (Georgsdottir, Ameel, & Lubart, 2002; Lubart & Lautrey, 1995; Rosenblatt & Winner, 1988; Smolucha & Smolucha, 1985), whereas others yielded different trends (Besançon and Lubart, 2008; Lopez et al., 1993; Maker et al., 2008; Rosenblatt & Winner, 1988; Runco, 1989). Lau and Cheung (2010) analyzed the reasons for these mixed results of past studies of the development of creativity in children and adolescents. They claimed that (1) a relatively narrow age range was included in many studies and (2) sample sizes were small in most studies.

In addition, most of these studies included only the childhood stage, whereas only a few focused on development of creativity in adolescence (Kleibeuker, De Dreu, & Crone, 2013). However, adolescence is a key period in an individual's development and includes changes in many cognitive abilities (Casey, Jones & Hare, 2008; Collins, Gleason & Sesma, 1997; Hill & Holmbeck, 1986; Steinberg, 2005). Adolescent development plays an important role in shaping an individual's development of creativity and therefore should be included in future studies.

Creativity is a syndrome with multiple aspects (Mumford & Gustafson, 1988). In addition to cognitive abilities, essential factors in creative performance also include affective characteristics such as personality, motivation, and attitude (Amabile, 1983; Csikszentmihalyi, 1988; Gruber, 1988; Rhodes, 1961; Runco, 2007; Sternberg & Lubart, 1995). These characteristics may not necessarily determine an individual's current creativity but can serve as indices of future creativity (Jauk, Benedek, & Neubauer, 2014; Runco, 2008). Therefore, in addition to cognitive factors, affective features of development need to be studied when investigating creativity development in students. However, the majority of research related to developmental trends of creativity focused on cognitive process and included only a few factors related to other dimensions.

Moreover, many studies indicated that development of creativity was influenced by social and cultural climates (Ng, 2001; Niu & Sternberg, 2001; Simonton, 1984; Williams et al., 1995). Developmental trends of creativity in individuals may vary from one region and time period to the next. In the previous two decades, Taiwan has gradually expanded the scope of creative education, previously limited to gifted students, to all students across grade levels (Chen, Wu, & Chen, 2005). However, there is still a lack of evaluation and research on the developmental trends of creativity in local Taiwanese students and the changes in developmental trends with time. (Hui & Lau, 2010). Therefore, the goal of the present study was to use a large sample spanning many grade levels to investigate trends in creative development among children and adolescents in Taiwan from both the cognitive and affective perspectives and to compare the results with scores of creativity reported during the previous two decades.

1.1. The theory of development of creativity from childhood to adolescence

Creativity is an integrated aggregate of many abilities and psychological processes that are naturally impacted by physical and mental development as one grows. Different views of continuous versus staged development formed when developmental psychologists explored human development (Brim & Kagan, 1980; Smith & Carlsson, 1985). The above views differ regarding whether an observed developmental trend in creativity is due to maturation and experience or due to other changes during various stages in life (Runco & Pritzker, 1999). Certain scholars such as Keegan (1996), who performed a case study, concluded that processes related to creativity develop continuously. Other scholars such as Plucker, Beghetto, & Dow (2004) suggested that while certain processes involved in creativity are general and others are specifically defined, they cannot be classified as merely continuous or stage-based but instead are a blend of both.

The conclusions that scholars have presented regarding developmental trends in creativity in childhood, adolescence, and adulthood are primarily of two tracks: trends associated with cognitive development and those associated with psychosocial development. The cognitive view is primarily based on the theory of cognitive development proposed by Piaget (1970, 1976). Different stages were defined in Piaget's theory. Children between ages 7 and 11 are in the concrete operational stage, and children older than 11 are in the formal operational stage. Piaget believed that creative imagination is an active assimilation behavior, the frequency of which will not decrease with age. Rather, creative imagination will gradually blend with one's intellectual development as a result of related accommodation processes. In other words, based on Piaget's view, creativity development is present in different forms at different developmental stages. Therefore, in a test of creative thinking (e.g., divergent thinking), a certain age group may exhibit a slump trend with time; such a finding does not necessarily represent a real decrease in ability but instead may indicate a change in the way that creativity is presented. When the formal operational stage begins, children start to develop the hypothetico-deductive reasoning ability. The development may influence children to less rely on intuitive thinking (Guignard & Lubart, 2006). Divergent thinking is a more intuitive process compared to logical reasoning. As a result, we speculate that although a slump trend in scores on tests of creative thinking might be observed during the transition from the concrete operational stage in childhood to the formal operational stage in adolescence, creative thinking will gradually advance as adolescents' cognitive abilities develop during the formal operational stage.

Neuropsychological development also affects development patterns in divergent thinking (Kleibeuker et al., 2013). The prefrontal cortex, which is in charge of cognitive abilities (primarily executive functions), is fully developed in adolescence, although inhibitory abilities are still developing (Casey et al., 2008; Spear, 2000). Therefore, adolescents tend to be more attracted to external stimuli and exhibit more curiosity or risk-taking exploratory behavior (Johnson & Wilbrecht, 2011) and even display more divergent thinking capabilities than do adults (Gray, Buhusi & Schmajuk, 1997). However, development of cognitive abilities does not necessarily lead to creativity. Certain scholars, in contrast, concluded that cognitive development leads to a decrease in creativity in adolescence. For example, Runco et al. (Charles & Runco, 2001; Runco & Charles, 1997) noted that adolescents display a decrease in creativity as their critical thinking skills mature. Lubart and his colleagues

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