



## Curvilinear effects of openness and agreeableness on the imaginative capability of student designers



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### ABSTRACT

Every designer has a unique working style. The various working styles of designers reflect their distinct personality traits. Personality traits are a critical factor influencing design performance and play a decisive role in stimulating designer imagination. Research on designer personality and imagination is limited and overlooks the existence of curvilinear relationships among variables. We examined the curvilinear effects of openness and agreeableness on the imaginative capability of student designers, and collected data from 5 universities across Taiwan. The study participants consisted of 423 design majors. The results revealed that although the primary influence of openness on initiating imagination is linear, a curvilinear U-shaped relationship exists between openness and initiating imagination. The results for openness suggested that as the score for the trait increases, the possibility of conceiving and transforming imaginations increase. The results also indicated that agreeableness does not affect the initiating imagination, but reliably predicts the conceiving imagination of student designers. In addition, the association of agreeableness with transforming imagination exhibits an inverted U-shaped curvilinear relationship. This study uniquely contributes to the understanding of how various levels of openness and agreeableness affect the initiating and transforming imaginations of student designers in curvilinear aspects.

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## 1. Introduction

Design is the creation of a plan or convention to construct an object or a system (Dictionary.com). Because of the characteristics of the design profession, each designer is endowed with unique talents. From the embedded design philosophy to early inspection, the initial sketch, rapid prototyping, and model building, all designers engage in unique thought processes and interact with clients by using diverse approaches that reflect their preferences. The various working styles of designers reflect their distinct personality traits (Durling, 2003), which are a critical factor influencing design performance (Callaghan, 2008) and play a decisive role in stimulating imagination as the central motivation for creating any design object (Lin, Hsu,

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& Liang, 2013). However, studies devoted to a systematic investigation of the relationship between design imagination and designer personality are limited (Baskinger & Nam, 2006).

The five-factor model (FFM) of personality (McCrae & Costa, 1991) is a basic theory of how human personalities are shaped. Among the five factors in the framework, designers have been reported to possess high levels of openness and agreeableness (Kichuk & Wiesner, 1997). People who score highly on openness are curious, creative, possess broad interests, easily embrace atypical ideas, and are sensitive to aesthetic experiences. Openness has been consistently associated with design creativity (Durling, 2003). People who score high on agreeableness are altruistic, considerate, trusting, sympathetic, and generous. Agreeableness has long been considered a vital trait for performing team-based activities such as a design project (Barrick, Mount, & Judge, 2001).

Extant research on designer personality and imagination is limited and has a major drawback. Research to date has examined only the linear relationships between design imagination and designer personality (Liang, Chang, & Hsu, 2013; Lin et al., 2013). However, overlooking the existence of curvilinearity can lead to erroneous conclusions regarding the characteristics and magnitude of associations (Iversen, Malchow-Moller, & Sorensen, 2010), which includes associations between personality and its outcomes (Vasilopoulos, Cucina, & Hunter, 2007). This limitation suggests that additional studies on the subject may be beneficial. Therefore, we examined the curvilinear effects of openness and agreeableness on the imaginative capability of student designers. In this study, imaginative capability refers to the capability of design majors to initiate, conceive, and transform their mental images of what is not present into design artifacts.

## 2. Imaginative capabilities

Imagination is the basis for cultivating creative thinking and, thus, a driving force of innovation (Finke, 1996). Imagination can be used as a semiotic tool of engagement, which is transformative in the sense that learners become more knowledgeable in their thinking (Egan, 2005). Trotman (2006) stated that imagination is an essential human capacity in conducting various activities such as the pursuit of creativity and innovation, the symbolic expression of ideas, and critical thinking. Baskinger and Nam (2006) further explained that designers often engage in activities involving the visualization of ideas, which primarily relies on their imagination.

In addition to originality, Kunzendorf (1982) identified both the idealizing-constructing and transforming characteristics of creative imagination. Liu and Noppe-Brandon (2009) supported the claim asserted by Kunzendorf and defined imagination as the ability to conjure new realities and possibilities (p. 19); unfold in the conscious and deliberate, and in the unconscious and intuitive (p. 12), and form associations and analogies between objects that previously seemed disconnected (p. 182). Based on the aforementioned views, Lin et al. (2013) investigated design majors and categorized their imaginative capability into three types: initiating, conceiving, and transforming. Initiating imagination refers to exploring the unknown and originating novel ideas. Conceiving imagination refers to grasping the core of a concept by using personal intuition and sensibility, and formulating effective ideas by using concentration and dialectics to achieve a goal. Transforming imagination refers to crystallizing abstract ideas and reproducing knowledge across various domains and situations. We thus adopted the construct of imaginative capability proposed by Lin et al. (2013).

## 3. Hypotheses

In the present study, the hypotheses were developed primarily based on logical reasoning, and secondarily upon the findings of the limited extant research on imagination and personality according to student traits in the FFM. Although testing linear relationships is generally practiced in social sciences, curvilinear relationships also demand consideration, particularly when an adequate logical underpinning exists (Williams & Livingstone, 1994). Curvilinear relationships exist in two forms: U-shaped relationships indicate positive and negative associations for low and high values of predictor variables, respectively, and inverted U-shape relationships indicate the reverse pattern.

### 3.1. Openness

In addition to possessing a mastery of aesthetic performance and computer applications, contemporary designers are commonly required to be outstanding communicators with exceptional imaginations. Clients often experience difficulty in verbalizing their needs, or alter their requests unexpectedly, and designers are required to ask direct questions and translate their clients' visions into design artifacts. To adjust to this continually changing situation, certain personality traits are necessary for designers to work effectively in groups, and people with this trait are inclined to lead the group impartially (Wide, 1997). Kichuk and Wiesner (1997) stated that successful designers are characterized by a high cognitive ability, which is closely associated with the openness trait. Liang et al. (2013) studied media design majors and observed that openness reliably predicted creative and reproductive imaginations.

Although empirical studies have indicated openness as a robust predictor of student designers initiating, conceiving, and transforming their imaginations (Chang, W.-S., & Liang, C.-T, in press), evidence has suggested that a high level of openness might render people unable to focus on tasks that require intense concentration (Rose, Fogg, Helmreich, & McFadde, 1994). This may imply that people with high scores for openness (i.e., vivid imagination and a wide range of interests) have difficulty in dedicating themselves to intensive tasks that require conceiving imagination (Dougherty, Cheung, & Florea, 2007), but

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