More Than New, Creative Design Solution: Factors Necessary For Delivering a Creative Design in the New Product Development Process

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Design creativity is a rarely studied topic in the area of new product development; nevertheless, its importance has been recognized by many researchers in a variety of fields. This study examines the relationship among five variables: analogical thinking ability, self-confidence, perceived length of experience, team culture, and design creativity. The results of a multiple regression indicates that analogical thinking ability is an antecedent of design creativity, and that self-confidence is a full mediator between them. The results also show that perceived length of experience and team culture have significant moderating effects. These findings implicate both person- (i.e. ability, confidence, and perception of career) & situation-based (team culture) variables are key factors in developing a creative design of a new product.

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Many companies are struggling with successful new products development. As pointed out by Brethauer (2002), only a small percentage of new products released into the market are successful, and the creative design of a product is one of the most critical elements in the successful launching of a new product. The importance of creative design in new products has often been emphasized. Nevertheless, surprisingly little research has examined design creativity in the NPD process. In the present research, we explore the factors influencing design creativity of a new product and their relationships.

Although previous studies emphasized the relationship between firm- (e.g., market orientation)/project-level (e.g., team characteristics) variables and creativity in the NPD context (Im and Workman, 2004; Sethi, Smith, and Park, 2001), the role of individual-level variables has not been considered. In this study, we adopt a designer’s ability factor as an independent variable and the output, design creativity, as dependent variable. So that we can answer our research question: do creative designers necessarily translate into creative designs?

In today’s business, the design solutions of new products come from the interactions of individual designers (Kristensson and Norlander, 2003). Thus, we follow the view proposed by Burroughs and Miek (2004); we adopt the person-situation perspective from social psychology (e.g., Higgins, 1990). Specifically, this research focuses on defining the roles of the three person-based variables (analogical thinking ability, perceived length of experience, and self-confidence) and one situation-based variable (team culture).

Our hypotheses are as follows:

H1: Higher analogical thinking ability of a designer will increase the design creativity of a new product.

H2: Higher self-confidence to produce a creative design will increase design creativity.

H3: Self-confidence will mediate a positive relationship between analogical thinking ability and design creativity.

H4: The effect of analogical thinking ability on self-confidence will be stronger when a designer's perceived length of experience is higher rather than lower.

H5: The effect of self-confidence on design creativity will be stronger when team culture encourages creativity.

This study has two different parts: one experiment with 164 design school students and another with 164 consumers. In the first part, we measure all independent variables and collect each participant’s photocopy of the design output from his/her previous team project. In the second part of the study, another group of participants (consumers) is asked to evaluate the design creativity of the photocopies (dependent variables). As a result, this study is able to be free from the effect of common method bias. Also, in this way, design creativity of a new product can be examined from a consumer’s perspective, not from a designer’s perspective.

Upon analysis, we first conducted two-stage regression analysis to test the mediating effect of self-confidence between ATA (analogical thinking ability) and design creativity. Support for the mediating effect was expected to emerge in the last procedure of four consecutive regression procedures. ATA positively affected self-confidence (Procedure 1: $\beta = .492, t = 7.193, p < .001$), and both ATA and self-confidence positively influenced design creativity (Procedure 2: $\beta = .394, t = 5.462, p < .001$, and Procedure 3: $\beta = .356, t = 4.852, p < .001$). In the Procedure 4, however, the coefficient of ATA was insignificant ($\beta = -.005, t = -.553, p, NS$), while that of self-confidence was significant ($\beta = .136, t = 3.699, p < .001$). It was, therefore, substantiated that self-confidence has a full mediating effect between ATA and design creativity. Consequently, H1, H2, and H3 were supported, but H4 was rejected.

For testing $H_4$—the moderating effect of PLE (perceived length of experience) between ATA and self-confidence, Aiken and West’s (1991) regression analysis was conducted. Actual length of experience was included as a control variable. Support for our predictions was emerged in the form of interaction between ATA and PLE ($\beta = .252, t = 3.355, p < .001$). Also, the effect of ATA on self-confidence was significant ($\beta = .675, t = 5.839, p < .001$), while the effect of PLE was not ($\beta = -.063, t = -1.068, NS$). Thus, it was proven that the effect of ATA on self-confidence was greater when PLE was higher rather than lower.

$H_5$ (the moderating effect of team culture between self-confidence and design creativity) was proven true through beta-slope tests. The effect of self-confidence on design creativity was greater when team culture was individuality-oriented, as opposed to collectivity-oriented ($t = 2.137, p < .05$).

The present study extends our understanding of the underlying process in which design creativity can be promoted both by the individual designer’s traits and perceptions and by the design team’s culture during NPD projects. Our findings contribute to research on creativity in broader contexts, as well as to on the qualified context of design creativity in the NPD. Most of the extant research on creativity has focused on the effect of analogical thinking ability on person’s creativity, not on the outcome of creative process. By examining the effect of analogical thinking ability on the creativity of an outcome, we show that the ability has more direct relationship with an outcome. More importantly, we find that self-confidence should be accompanied for a creative outcome. Given that the most likely response to a new idea will be extremely negative, one needs high self-confidence to believe that he or she is right and that the rest of the world is wrong (Martindale, 1989).
However, there was little empirical evidence to the extent that individual differences in self-confidence affect creativity of an outcome. In the current study, we demonstrate that self-confidence is motivated by analogical thinking ability, and that it facilitates creative outcome.

This research also shows that both person and situation variables affect creativity in NPD settings. Burroughs and Mick (2004) showed that both influence creativity in the problem-solving settings. By extending the applicable settings, we suggest that research on creativity be approached from the person-situation perspective.

**Individual Differences in Interpersonal Touch: Development of the “Comfort with Interpersonal Touch” Scale**

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Communication is one of the cornerstones of the marketing field. While the marketing literature has heavily investigated various communication strategies between channel members, consumers, etc., nonverbal communication, specifically communication through touch, is often neglected. We often think of organizations or business units as forming alliances and partnerships, but it is really individuals who are interacting to form these relationships. This underscores the criticality of understanding individual preferences in communication, especially as it relates to the sense of touch.

The sense of touch can influence product decisions (McCabe and Nowlis 2003; Peck and Childers 2003a,b, 2006; Peck and Shu 2009); yet, we know relatively little about interpersonal touch, especially as it varies across individuals and cultures. This paper seeks to develop a measure of individual difference in touch, the Comfort with Interpersonal Touch (CIT) Scale. This paper is the foundation for a larger stream of research to investigate cultural- and business-specific interpersonal touch norms.

Previous research has shown that interpersonal touch can be persuasive and can greatly influence our perceptions. Some researchers suggest that more than half of the variability of response in interpersonal communication can be attributed to nonverbal factors such as touch (Mehrabian 1981). In a study done by Fisher, Ryting, and Heslin (1976), a university library clerk inadvertently touched the hand of students, and those who were touched rated the librarian, as well as the university’s library facilities, more positively than those who were not touched. This effect was found even for students who hadn’t noticed the touch. Interpersonal touch has also been shown to increase compliance. Hornik (1992) had an in-store marketer touch customers lightly on the upper arm, and those touched were found to be more compliant in both sampling and buying a new product. In related research, individuals who were asked to sign a petition were found to be more compliant if they were briefly touched (Willis and Hamm 1980), and shoppers who were touched were more willing to participate in mall intercept interviews (Hornik and Ellis 1988). Previous studies also show that restaurant servers who briefly touched customers received larger tips than servers who did not touch (Crusco and Wetzel 1984; Hornik 1992; Stephen and Zweigenhaft 1986). Thus, brief interpersonal touch in social exchanges can have significant effects on our perceptions. However, like product touch, some individuals are more comfortable with both touching and being touched in a social situation. We expect this individual difference to moderate the persuasive effects of interpersonal touch. As yet, there is no comprehensive scale to measure an individual’s comfort with interpersonal touch.

We believe that there are five latent dimensions that underlie an individual’s comfort with interpersonal touch. First is the source of the touch initiation. That is, we propose a distinction between one’s comfort with touching someone else and comfort with being touched by someone else. Second, one’s relationship to the other individual likely influences the perception of touch (friends, family, coworkers, etc.). Third, perceptions of touch are likely altered due to the gender of the individuals involved. Norms surrounding male-to-male touch have more variance than female-to-female or opposite gender touch. In order to understand a culture’s idiosyncratic touch norms, we need to include both the gender of the person touching and the gender of the person being touched. Fourth is the type of touch. There is likely a difference between a handshake, a hug, a touch on the arm, etc. in how comfortable an individual is with the touch. Finally, the fifth dimension is the context in which the touch occurs. Whether individuals are greeting each other, saying good-bye, mid-conversation, etc. the acceptance of touch will likely vary. These five dimensions are captured in the items that were developed for the CIT Scale.

Peck and Childers (2003) developed the ‘Need for Touch’ (NFT) scale to identify individual differences in preference for haptic information. The 12-item NFT scale consists of two dimensions, instrumental, the outcome-directed touch in which we touch to gain more information about an object, and autotelic, the touch that is for sensory pleasure in which touch is an end in itself. The NFT scale is tailored toward product touch, which is why we believe that CIT is capturing a different aspect of touch, namely, interpersonal touch. A pre-study was conducted to ensure that the CIT construct is significantly different from the NFT construct. A pre-study was conducted with 325 undergraduate students in which we used a preliminary 11-item scale (α = .92) to measure CIT. The CIT scale and the NFT scale (α = .92) were correlated at .34 (p < .001) thus supporting the distinctness of these two constructs.

In order to more accurately capture the CIT construct, 63 scale items were developed to capture the predicted underlying five dimensions. The scale was administered to a sample of 382 undergraduate students to provide preliminary estimates for reliability and scale structure. The CIT construct was measured using a 7-point Likert scale ranging from strongly disagree to strongly agree.

Long-run future research plans involve multi-national studies of interpersonal touch in business settings. Currently, we are fostering relationships in 5 different countries in order to collect data using this CIT scale. This collaboration will allow us to understand how business practice is affected by interpersonal touch across high and low touch cultures.

We anticipate that this research will contribute greatly to the marketing field. The sense of touch or haptics has been studied, as it related to product purchases; however, there is currently no available measure that captures individual differences in comfort with interpersonal touch. Managerially, this research should inform negotiation and persuasion across cultures. For example, a culture or person comfortable with interpersonal touch may find it offensive if touch is not initiated. Conversely, the result could be true if a person is not comfortable with