Thinking Skills and Creativity 9 (2013) 96–106

Contents lists available at SciVerse ScienceDirect

Thinking Skills and Creativity

journal homepage: http://www.elsevier.com/locate/tsc

Different attentional traits, different creativities

Wei-Lun Lin[a], Kung-Yu Hsu[b,*], Hsueh-Chih Chen[c], Wan-yun Chang[d]

[a] Department of Psychology, Fo Guang University, No. 160, Linwei Rd., Jiaosi Shiang, Yilan County 26247, Taiwan
[b] Department of Psychology, National Chung Cheng University, No. 168, University Rd., Minhsiung Township, Chiayi County 62102, Taiwan
[c] Department of Educational Psychology and Counseling, National Taiwan Normal University, No. 162, Sec. 1, Heping E. Rd., Taipei City 10610, Taiwan
[d] General Education Center, National Taiwan University of Arts, No. 59, Sec. 1, Ta-kuan Rd., Panchiao, Taipei, Taiwan

ARTICLE INFO

Article history:
Received 1 February 2012
Received in revised form
18 September 2012
Accepted 11 October 2012
Available online 16 November 2012

Keywords:
Effortful control
Orienting sensitivity
Divergent thinking
Insight problem-solving

ABSTRACT

This study examines the relationships between two aspects of "breadth of attention" (orienting sensitivity and effortful control) and two forms of creativity (divergent thinking and insight problem-solving). It suggests that the two forms of creativity relate differently to the two modes of attention. This distinction has not been made in previous studies. Intelligence and other personality traits were also assessed as control variables. Over 300 participants' responses to the Adult Temperament Questionnaire, the Abbreviated Torrance Test for Adults, insight-problem tasks, the HEXACO Personality Inventory, and Raven's Advanced Progressive Matrices were collected. The results showed that, after the effects of intelligence scores and personality traits were controlled for, individuals' performance on insight problem-solving was predicted only by orienting sensitivity, while effortful control could only predicted divergent thinking performance. The relationships between attentional traits and creative performances were discussed.

1. Introduction

The *breadth of attention* trait has been proposed as a characteristic of creative individuals. For example, the biographies and personal anecdotes of many eminent creators have revealed that they were sensitive to environmental stimuli such as noise (for a review, see Kasof, 1997). Moreover, research studies have found that highly creative individuals had more intrusion errors on dichotic listening tasks (Dykes & McGhie, 1976), and they tended to describe themselves as more "distractible" (Domino, 1970) than did those with low creativity. It was suggested that this wide breadth of attention enables creative individuals to attend to more concepts at a given time, increasing the likelihood of novel and appropriate combinations (e.g., Martindale, 1999; Mendelsohn, 1976). However, various measures of *attentional breadth* and creative performance have been adopted, indicating that different constructs or processes might be involved in those measurements and that different relationships might exist between breadth of attention and creative performance in relation to these distinct conceptions. The present study aims to explore this issue by specifying two constructs of attention in the Adult Temperament Questionnaire (ATQ; Evans & Rothbart, 2007) that might contribute to breadth of attention, as well as two measures of creative performance that, it has been suggested, involve different processes (Lin & Lien, in press); subsequently, the study explores how these specific constructs/measures might interact.

* Corresponding author. Tel.: +886 5 2720411x32214; fax: +886 5 2720857.
E-mail address: kungyu@ntu.edu.tw (K.-Y. Hsu).

1871-1871/$ – see front matter © 2012 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.tsc.2012.10.002

1.1. Constructs of breadth of attention

Breadth of attention generally refers to the number and range of stimuli that an individual can attend to at any one time (Kasof, 1997; Mendelsohn, 1976). This construct can be empirically assessed by various measures when investigating its relationship with creativity. Some researchers (Domino, 1970; Kasof, 1997) have used self-reported questionnaires to assess this breadth of attention trait in individuals by using descriptors such as "I am tremendously affected by sudden loud noises" (quoted from Kasof, 1997). It was found that the breadth of attention trait in individuals was positively correlated to their creative performance. Other studies utilized different cognitive tasks. For example, Mendelsohn (1976) used a cue utilization paradigm in which the irrelevant peripheral cues later became the targets to attend to (see also Ansburg & Hill, 2003). Individuals were asked to focus on visually presented items while another list of to-be-ignored items was presented acoustically as background noise. Some words from both lists were the solutions to the anagram tasks presented later. It was found that highly creative individuals utilized both focal and peripheral cues more efficiently and solved more anagrams than individuals with low creativity, indicating that the former may have possessed a wider breadth of attention and larger attentional resources (e.g., Ansburg & Hill, 2003; Mendelsohn, 1976). On the other hand, increased attentional breadth was considered to reflect a decreased inhibitory process in which irrelevant task distractions were not properly filtered or inhibited, enabling participants to attend to more peripheral stimuli (Eysenck, 1995; Friedman & Miyake, 2004). For example, researchers (Rowe, Hirsh, & Anderson, 2007) adopted the flanker task, in which individuals were asked to respond quickly and correctly to central stimuli that were presented coupled with irrelevant peripheral stimuli (e.g., NNHNN). It was found that highly creative individuals could not inhibit peripheral cues properly and responded more slowly to the targets when distracters were incompatible with it.

Given that various measures have been used to assess individuals' breadth of attention, we consider that different facets of attention should be further distinguished. For examples, one of the key differences between the cognitive tasks described above is whether the performance of the main task is hindered while a participant attends to peripheral stimuli. While some can nicely attend to and process both central and peripheral information, others are attracted to peripheral distractors and process the target less effectively. In the domain of questionnaire assessment, similar differentiations could also be made.

1.1.1. Orienting sensitivity versus effortful control

In the Adult Temperament Questionnaire, Evans and Rothbart (2007) differentiate *orienting sensitivity* and *effortful control* as two attentional constructs. Following Rothbart's framework of temperament (Rothbart, Derryberry, & Posner, 1994), Evans and Rothbart (2007) defined *orienting sensitivity* as awareness of a neutral or emotional stimulation of low intensity originating from the surroundings, or a spontaneous idea not directly related to an association with the surrounding environment. Further, according to Evans and Rothbart (2007) orienting sensitivity consists of three constructs: (1) general-perceptual sensitivity (for example, "I usually notice visual details in the environment," p. 885); (2) affective-perceptual sensitivity (for example, "I am always aware of how the weather seems to affect my mood," p. 884); and (3) associative sensitivity (for example, "When I am resting with my eyes closed, I sometimes see visual images.," p. 885). Various researchers (Evans & Rothbart, 2007; Komsi et al., 2010; Wiltink, Vogelsang, & Beutel, 2006) have shown that orienting sensitivity is strongly related to *openness/intellect* in the five-factor framework. Evans and Rothbart (2007) argued that orienting sensitivity could be the substrate of the openness/intellect in a framework of personality development. However, in the framework of creativity, which concerns this study, orienting sensitivity could include other cognitive characteristics. Based on his review, Feist (1998) differentiated two cognitive traits: *open and imaginative* and *open and flexible*. Nusbaum and Silvia (2011) distinguished intellect from openness and found that openness is related to creativity, and intellect is associated with fluid intelligence. Orienting sensitivity reflects individuals' broadly attending to low intensity and peripheral cues, possibly due to having more resources available, as suggested by the cue utilization paradigm (e.g., Ansburg & Hill, 2003; Mendelsohn, 1976), leading people be flexible and open to new perspectives or ideas.

Meanwhile, *effortful control* was defined as a set of regulatory processes to inhibit dominant (but inappropriate) responses, to perform subdominant (but avoidant) behaviors, and to control attention (Evans & Rothbart, 2007). It also consisted of three constructs, according to Evans and Rothbart (2007): *activation control* (for example, "I hardly ever finish things on time," coded in reverse); *attention control* (for example, "When interrupted or distracted, I usually can easily shift my attention back to whatever I was doing before,"); and *inhibitory control* (for example, "It is easy for me to hold back my laughter in a situation where it is not appropriate," p. 884). Effortful control is considered to be based on executive attention, which serves the functions of error detection, inhibition, and conflict resolution for emotional and cognitive control (Posner & Rothbart, 2007; Rueda, Posner, & Rothbart, 2005). Some evidence has supported the connection between effortful control and conflict resolution, response inhibition or error detection in different cognitive tasks across different age groups (Jones, Rothbart, & Posner, 2003; Posner & Rothbart, 2010; Zabelina & Robinson, 2010). For example, Kanske and Kotz (2012) found that adults with high effortful control could quickly resolve the conflict in the flanker task and Simon task. In relation to the discussion on attentional breadth mentioned above, the notion that wider breadth of attention is represented by lower inhibition with regard to peripheral stimuli may possibly be reflected by lower effortful control (inhibitory control, in particular), as evident by highly creative individuals' low inhibition to peripheral cues in the flanker task (Rowe et al., 2007).

Orienting sensitivity and effortful control were proposed in studies of adult temperament only recently. Past researches (Rothbart & Bates, 2006) have investigated effortful control in various domains of child development, but its effects on adult life are little known. The effects of orienting sensitivity as well have been seldom studied. Furthermore, no previous study