



# Effects of the interaction between exercising self-control and PhoPhiKat on divergent and convergent thinking

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## ABSTRACT

This study investigated how the interaction between exercising self-control and PhoPhiKat disposition influences divergent and convergent thinking. In Study 1, 77 university students completed the PhoPhiKat-45 before being randomly assigned to the exercising self-control or neutral group. After experimental manipulation, participants were asked to complete the divergent thinking test. The results indicate that the students with high gelotophilia in the exercising self-control group were more fluent and flexible in generating ideas compared with those in the neutral group. Regarding originality, compared with the students with low katagelasticism, the students with high katagelasticism in the self-control group demonstrated a higher degree of originality than those in the neutral group. In Study 2, 66 students were randomly assigned to the exercising self-control or neutral group, and the dependent variable was the convergent thinking test (i.e., the critical thinking test). The results show that those with high gelotophobia in the self-control group demonstrated a higher degree of convergent thinking than did those in the neutral group. However, those with low gelotophobia in the neutral group exhibited a higher degree of convergent thinking compared with those in the self-control group. Thus, PhoPhiKat dispositions influenced the effect of exercising self-control on divergent and convergent thinking.

## 1. Introduction

In the twenty-first century, creative thinking (e.g., divergent thinking), critical thinking (which is a type of convergent thinking), and problem solving are considered necessary abilities (Kalelioğlu & Gülbahar, 2014), as well as core abilities for work (Shalley, Zhou, & Oldham, 2004). Therefore, a comprehensive exploration of the factors influencing divergent and convergent thinking is crucial.

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Self-control is a fundamental ability, particularly given the numerous temptations they are faced with in society. To live a successful and happy life, people must possess some ability to resist temptation (Huang, Liu, & Zhu, 2015); thus, exercising self-control (e.g., quitting smoking; Wilson, Sayette, & Fiez, 2014, and dieting to lose weight; Leahey, Xu, Unick, & Wing, 2014) is a crucial ability. Previous studies have explored how individuals' ability to exercise self-control influences their divergent and convergent thinking. Regarding convergent thinking, previous studies have shown that after exercising self-control, people become less able to solve analytical problems (Schmeichel, Vohs, & Baumeister, 2003) and anagrams (i.e., convergent thinking; Baumeister, Bratslavsky, Muraven, & Tice, 1998). However, Chiu (2014) found that after exercising self-control, people exhibit enhanced ability to improve divergent thinking, indicating that exercising self-control influences divergent and convergent thinking differently.

Other variables can moderate the degree of influence that exercising self-control has on divergent and convergent thinking. The moderating variable investigated in this study was dispositions toward laughter and ridicule. Previous studies have found that conscientiousness negatively correlates with gelotophilia and katagelasticism (Đurka & Ruch, 2015; Ruch, Harzer, & Proyer, 2013). Dispositions toward laughter and ridicule are common in interpersonal communication, and understanding how they moderate the influence of exercising self-control on divergent and convergent thinking is crucial. Ruch and Proyer (2009) categorized dispositions toward laughter and ridicule into three types: gelotophobia (fear of being laughed at), gelotophilia (enjoyment of being laughed at), and katagelasticism (enjoyment of laughing at others). People exhibit various responses when they are laughed at: Some people are fearful of being laughed at (gelotophobes), some enjoy being laughed at (gelotophiles), and some enjoy laughing at others (katagelasticists; Ruch & Proyer, 2008). These three concepts are collectively known as PhoPhiKat. Because of the three dispositions toward laughter and ridicule, the influence of exercising self-control on divergent and convergent thinking differs. This study was conducted to investigate how PhoPhiKat moderates the relationship between exercising self-control and divergent and convergent thinking.

### 1.1. Divergent and convergent thinking

Divergent thinking implies that one person can propose multiple or unique solutions for a problem or task (Guilford, 1967). An example is Guilford's Alternative Uses Test, in which participants must create as many uses for a simple object (e.g., a pen) as they can think of. Test results are evaluated according to the indicators of fluency (i.e., the ability to generate numerous ideas), originality (i.e., the ability to generate novel ideas), and flexibility (i.e., the ability to generate ideas for several conceptual categories).

In contrast to divergent thinking, convergent thinking refers to the ability to generate an optimal solution for a particular problem (Reitman, 1965). The crucial aspect of convergent thinking is that the most appropriate answer must be derived without ambiguity, with all answers dichotomized as being either correct or incorrect (Cropley, 2006). Convergent thinking tasks include critical thinking (Watson & Glaser, 1994), reasoning (Cheng, Holyoak, Nisbett, & Oliver, 1986), grammatical transformation of a logical proposition (Chamorro-Premuzic & Reichenbacher, 2008), and creating anagrams (Walker, Liston, Hobson, & Stickgold, 2002). In the present study, we used the "unusual uses for newspapers" test (Hsu, Chen, & Chiu, 2012) to measure divergent thinking as well as a critical thinking test (Chen, Chen, Chen, Chen, & Chen, 2006) to measure convergent thinking.

### 1.2. PhoPhiKat

Titze (1996) first proposed the concept of gelotophobia, and Ruch and Proyer (2009) later proposed the concepts of gelotophilia and katagelasticism. The three concepts are explicated as follows.

According to Titze (1996, 1997), gelotophobes cannot positively evaluate laughter or smiles, appreciate humor, or consider such behaviors as acts of joy; by contrast, they consider laughter to be threatening. Gelotophobes fear being laughed at because they believe that they are being ridiculed; consequently, they lack vitality, spontaneity, and enjoyment, and they tend to have low self-esteem. Gelotophobes are extremely sensitive to derogatory humor (Ruch & Proyer, 2009). Therefore, their negative responses to a supportive smile or friendly laugh indicate that they are fearful of being criticized or insulted by people exhibiting such behaviors. Titze has indicated that gelotophobes typically have a rigid posture because of muscle tightness resulting from their anxiety. By contrast, when gelotophiles are laughed at, they do not feel ashamed. They often laugh at themselves to entertain other people, and they enjoy telling jokes and interesting stories (Ruch & Proyer, 2009). Katagelasticists enjoy laughing at other people and often observe others, taking every opportunity to make fun of them. Katagelasticists do not consider laughing at other people to be inappropriate behavior (Ruch & Proyer, 2009).

Ruch and Proyer (2009) demonstrated that gelotophobia and katagelasticism are uncorrelated, whereas gelotophobia correlated negatively with gelotophilia; therefore, gelotophobes do not actively laugh at themselves to entertain other people. Gelotophilia, however, correlated positively with katagelasticism, indicating that gelotophiles not only tend to make fun of themselves to entertain other people, but also tend to laugh at other people when the opportunity presents. To measure the three dispositions toward ridicule and being laughed at, Ruch and Proyer (2009) developed the PhoPhiKat questionnaire (Pho, Phi, and Kat represent gelotophobia, gelotophilia, and katagelasticism, respectively), which was employed in the present study to measure these three dispositions.

### 1.3. Moderating influence of PhoPhiKat on the relationship between exercising self-control and divergent and convergent thinking

The research hypotheses proposed in this study were derived from the relationships among conscientiousness, PhoPhiKat, trait self-control (TSC), convergent thinking, and divergent thinking. Ruch et al. (2013) indicated that conscientiousness was uncorrelated with gelotophobia but negatively correlated with gelotophilia and katagelasticism. Đurka and Ruch (2015) found that conscientious-

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