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Abstract

Discrepancies exist among research findings regarding the relationship between media multitasking and creativity. This review systematically examines their relationship from two dimensions—creative thinking and creative behavioral performance—and offers explanations from multiple perspectives. From the executive function perspective, the positive association between media multitasking and divergent thinking is examined, revealing that enhanced cognitive flexibility required for media multitasking is associated with improved divergent thinking. From the attentional style perspective, the relationship between media multitasking and convergent thinking is explained, indicating that the greater attentional breadth required for media multitasking facilitates convergent thinking, though diminished cognitive persistence complicates this relationship. Additionally, evidence from emotional activation and cognitive integration supports the positive relationship between media multitasking and creative behavioral performance. Future research should further validate these underlying mechanisms and explore effective approaches for media multitasking to stimulate creativity, building upon a clarified understanding of their relationship.

Full Text

The Relationship Between Media Multitasking and Creativity: Explanations From Multiple Perspectives

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Abstract: Research findings on the relationship between media multitasking and creativity show discrepancies. This paper reviews the relationship from two aspects—creative thinking and creative behavior performance—and explains

it from multiple perspectives. From the executive function perspective, the positive relationship between media multitasking and divergent thinking is examined, revealing that enhanced cognitive flexibility required for media multitasking is associated with improved divergent thinking. From the attention style perspective, the relationship between media multitasking and convergent thinking is explained, showing that the greater attention breadth required for media multitasking promotes convergent thinking, though weakened cognitive persistence complicates this relationship. Evidence from emotional activation and cognitive integration also supports the positive relationship between media multitasking and creative behavior performance. Future research could further investigate the underlying mechanisms and explore effective ways to use media multitasking to stimulate creativity.

Keywords: media multitasking, creativity, executive function, attentional style

1 Introduction

The 50th Statistical Report on China' s Internet Development shows that as of June 2022, China' s internet user base reached 1.051 billion, with an internet penetration rate of 74.4%. As the internet continues to evolve, media activities (such as using mobile phones or computers) are no longer independent of one another. Increasingly, people choose to handle multiple media tasks simultaneously, a phenomenon known as media multitasking (Voorveld, 2011; Srivastava, 2013; Lin et al., 2019). Statistics indicate that young Americans spend an average of about 5.4 hours per day simultaneously processing different media (Rideout & Inc, 2015), while a survey of 1,140 Chinese adolescents found that 60.3% of participants engaged in media multitasking in their daily lives (Luo et al., 2018).

Kirsh (2000) argued that human cognitive resources are limited, making true simultaneous task processing difficult. Therefore, multitasking can also be understood as "frequent switching between multiple tasks." It is now widely accepted that both simultaneous use and rapid alternation between different media fall within the scope of media multitasking (Foehr, 2006; Lui & Wong, 2012; Judd, 2013). The proliferation of portable electronic devices has further expanded the concept of media multitasking, as people often engage in non-media tasks while performing media tasks—for example, listening to music while studying. This combination of media and non-media tasks also constitutes a form of media multitasking (Lang & Chrzan, 2016; Wiradhany & Baumgartner, 2019). Wallis (2010) categorized media multitasking into three types: (1) media-media: engaging in multiple media activities simultaneously, such as watching TV while browsing Weibo on a mobile phone; (2) media-nonmedia: combining media behavior with daily life activities, such as watching TV while doing housework; and (3) within-media: performing multiple activities on the same media device, such as replying to emails during a video conference.

Therefore, considering both "simultaneity of execution" and "types of multitask-

ing,"media multitasking can be defined as "simultaneously or rapidly alternating between multiple tasks, at least one of which involves media use."

In recent years, the relationship between media multitasking and individual cognitive abilities has attracted considerable scholarly attention. Some studies have found that media multitasking is associated with decreased inhibitory control (Murphy & Creux, 2021), attention deficits (Baumgartner et al., 2017), and increased forgetfulness (Madore et al., 2020). Other research indicates that media multitasking correlates with larger working memory capacity (Shin et al., 2020), faster reaction times in letter-tone tasks (Shin et al., 2019), and better performance in multisensory integration tasks (Lui & Wong, 2012; 林慧谊, 2020). A recent study using four experiments also found that multitasking behavior promotes creativity in subsequent tasks (Kapadia & Melwani, 2021), sparking researchers' interest. However, current research on the relationship between media multitasking and creativity still yields controversial results (Ophir et al., 2009; Gorman & Green, 2016; Loh & Lim, 2020).

Therefore, to clarify the relationship between media multitasking and creativity, this paper reviews the relationship between media multitasking and creative thinking and creative behavior performance from both process and outcome perspectives, explains possible underlying mechanisms from multiple perspectives, and points out future research directions.

2 The Relationship Between Media Multitasking and Creative Thinking

Creative thinking is the core of creativity, including divergent thinking and convergent thinking (Guilford, 1967). Divergent thinking refers to an individual' s ability to generate multiple answers from given information in unconventional ways, primarily assessed using the Torrance Test of Creative Thinking (TTCT; Torrance, 1974) and the Alternative Uses Test (AUT; Guilford, 1967) to evaluate fluency, flexibility, and originality. Convergent thinking refers to using existing experience or conventional methods to analyze given information and obtain a single best answer, primarily measured through tasks such as the Remote Association Test (RAT; Mednick, 1952), insight problem-solving tasks (Insight Problems; Dow & Mayer, 2004), and story generation tasks (Story generation; Howard-Jones et al., 2005) (Shen et al., 2015). In previous research, different researchers have focused on different aspects of creative thinking and used different assessment tools, making research findings unsystematic and controversial. This paper attempts to review the relationship between media multitasking and creative thinking from both divergent and convergent thinking perspectives.

2.1 The Relationship Between Media Multitasking and Divergent Thinking

Currently, most studies in this field support a positive correlation between media multitasking and divergent thinking, suggesting that media multitasking can

enhance individual divergent thinking performance (Madjar & Oldham, 2006; Kapadia & Melwani, 2021; Kapadia, 2017; Ritter & Ferguson, 2017; 王芸颖, 2017). For example, Madjar and Oldham (2006) randomly assigned 224 college students to either a task-switching group (frequently switching between three tasks, working on each for 3 or 6 minutes) or a sequential condition group (completing three tasks in order, 12 minutes each). Participants were asked to complete three creative generation tasks within 36 minutes (for example, designing a new refrigerator with non-repetitive, feasible ideas) and then complete a polychronicity questionnaire. Hierarchical regression analysis showed that although individuals who preferred simultaneous multitasking had lower creativity, they could generate more creative ideas when switching tasks, with higher novelty and practicality. Kapadia (2017) simulated real-life media multitasking scenarios in the laboratory, dividing participants into sequential processing and multitasking groups. Participants were asked to reply to three emails while listening to a conference call, then complete creative generation and logical reasoning tasks. The results showed that participants in the media multitasking condition generated more original ideas in both quantity and category, while no significant differences were found between groups on other analytical tasks. This suggests that media multitasking only affects subsequent divergent thinking task performance. However, the media multitasking paradigms used in these two studies differed slightly: the former included creativity tasks within the media multitasking itself, while the latter performed divergent thinking tasks after completing media multitasking. Whether different operational methods affect research results remains undetermined and warrants further investigation to compare differences between various media multitasking research paradigms and their relationships with creativity.

Some studies have also found no relationship between media multitasking and divergent thinking. Ophir et al. (2009) used the TTCT to measure and compare divergent thinking between heavy and light media multitaskers but found no significant differences between groups, suggesting no significant association between media multitasking and divergent thinking. However, the sample size was only 33, with 16 heavy and 17 light media multitaskers. Gorman and Green (2016) recruited 42 participants in an intervention study, dividing them into heavy and light media multitaskers, and asked them to complete the AUT (listing as many alternative uses as possible for common objects such as bricks, towels, and newspapers). Scores for flexibility, fluency, and elaboration were combined into a total divergent thinking score. The results showed no significant differences between groups. However, in this study, different participants received different AUT items and used "elaboration," an uncommon evaluation metric, which may have reduced the reliability of the findings. Additionally, like Ophir et al. (2009), this study had a small sample size.

2.2 The Relationship Between Media Multitasking and Convergent Thinking

Compared with divergent thinking, the relationship between media multitasking and convergent thinking appears more complex. Most studies have found no significant correlation between media multitasking and convergent thinking (Morgan et al., 2013; Kapadia, 2017; Ritter & Ferguson, 2017; 王芸颖, 2017). For instance, Ritter and Ferguson (2017) measured both divergent and convergent thinking in 155 college students using the Remote Association Test, Creative Selection Task, and insight problem-solving tasks, combining the three test scores as an overall convergent thinking indicator. Their findings showed no significant differences between participants who completed tests with happy background music and those in quiet conditions. Chinese scholar 王芸颖 (2017) also conducted a detailed study on the relationship between media multitasking and creative thinking. Regarding the relationship with convergent thinking, she invited 32 college students to complete a picture-based story generation task in the laboratory while collecting eye movement data. No significant differences were found between high and low media multitaskers in story novelty or average fixation duration and count.

Some studies have reached different conclusions, finding a positive correlation between media multitasking and convergent thinking. Loh and Lim (2020) invited 104 college students to complete a computerized RAT and a media multitasking questionnaire individually, then used median split to find that heavy media multitaskers performed better on the RAT. Mehta et al. (2012) also found that college students scored higher on the RAT when completed on a computer in moderate noise compared to no-noise environments. However, it should be noted that in the first study, regression analysis and extreme group analysis did not reveal this relationship, while in the second study, the difference between high-noise and no-noise conditions was not significant. This suggests that the degree of media multitasking may affect its relationship with convergent thinking, and future research should explore whether more complex relationships exist.

Additionally, both studies used the RAT for convergent thinking assessment, whereas Ritter and Ferguson (2017) used three tests to represent overall convergent thinking, and 王芸颖 (2017) used story generation novelty. Could the differences in research findings on the relationship between media multitasking and convergent thinking be related to the selection of measurement tools and indicators across studies? Minear et al. (2013) attempted to replicate Ophir et al.' s (2009) findings using the same media multitasking index to distinguish heavy and light media multitaskers but employed different tasks to measure participants' ability to inhibit distractions in working memory. They found no deficits in heavy media multitaskers' processing of irrelevant information, possibly because the different tasks involved different cognitive processes and loads. Therefore, future research should clarify and verify how different tests and indicators may lead to result variations.

2.3 Explaining the Relationship Between Media Multitasking and Creative Thinking

Based on previous research, two distinct patterns emerge in the relationship between media multitasking and creative thinking: (1) media multitasking is positively correlated with divergent thinking but not with convergent thinking; (2) media multitasking is positively correlated with both divergent and convergent thinking.

The first pattern may be explained from the executive function perspective. The dual-pathway model of creativity posits that creative thinking is a function of persistence and flexibility, with situational variables influencing creativity through these mechanisms. On one hand, divergent thinking tests such as the AUT require sufficient cognitive flexibility (Davidson et al., 2006; Dreu et al., 2011; Zabelina & Robinson, 2010) to generate as many novel and unique ideas as possible. Individuals who frequently engage in media multitasking must adapt to constantly changing task environments and adjust their thinking patterns to meet current demands, thus being better able to shift spatial perspectives on problems and break out of mental sets. That is, enhanced cognitive flexibility influences the relationship between media multitasking and divergent thinking. Research has confirmed this: Seddon et al. (2021) found that better media multitasking ability is associated with better performance on cognitive flexibility tasks (Wisconsin Card Sorting Task, phonemic fluency task, and semantic fluency task). Additionally, media multitasking has been shown to promote divergent thinking by reducing cognitive fixation (Lu et al., 2017) and enhancing cognitive flexibility (Kapadia & Melwani, 2021). On the other hand, convergent thinking tests such as the RAT rely less on flexibility and more on finding a single correct answer, requiring greater persistence. However, high media multitaskers show decreased inhibitory control (Loh & Ryota, 2014), with individuals uncontrollably attending to irrelevant environmental information during perceptual processing (Lopez et al., 2018), making it difficult to focus attention on structured exploration of limited cognitive information. Therefore, they do not show superior performance on convergent thinking tasks.

The second pattern also has explanations from the attention style perspective. First, media multitasking can enhance creativity by transforming individuals' attention styles, primarily manifested as a preference for defocused attention and expanded attention scope. Yap and Lim (2013) found that compared to low media multitaskers who prefer focused attention, individuals who frequently engage in media multitasking are more inclined to use defocused attention in visual search patterns. The attention flexibility underlying this attention style is related to divergent thinking, with Zabelina and Ganis (2018) providing cognitive neuroscience evidence. Martindale (1989) argued that different attention styles also lead to differences in conceptual associations: focused attention is associated with activation of target concepts (concepts closest to semantic network nodes), reducing the generation of associative ideas and potentially inhibiting convergent thinking, whereas defocused attention is associated with activation

of numerous low-level mental representations, promoting new combinations between concepts and thereby improving convergent thinking task performance. Additionally, previous research has shown that high media multitaskers have broader attention spans (Lin, 2009), enabling them to access a wider range of stimuli and better integrate multisensory information (Lui & Wong, 2012), increasing the likelihood of forming connections between different ideas (Mendelsohn, 1976). As early as 1995, Eysenck proposed that a broader associative horizon and divided attention were related to trait creativity, and subsequent research has indicated that larger attention scope has a positive impact on individual creativity (Kasof, 1997; Zmigrod et al., 2015).

As can be seen, compared with the relationship between media multitasking and divergent thinking, its relationship with convergent thinking is more subtle. This may be related to the complexity of how media multitasking affects attention functions. As mentioned above, media multitasking on one hand leads to excessive attention to irrelevant information and decreased cognitive persistence, while on the other hand, the defocused attention mode expands attention scope, making it easier to generate highly creative answers. This results in a mixed pattern in the relationship between media multitasking and convergent thinking. Future research could further examine the different mechanisms of attention function in the relationship between media multitasking and creativity. Of course, this may also be related to the nature of convergent thinking tests such as the RAT, which require both broad attention scope to generate associations between distant concepts and high cognitive persistence to complete focused searches for target information. These different task demands on cognitive abilities may explain the current controversial findings, and future research should improve measurement tools or use meta-analysis to further clarify the relationship.

2.4 Summary

Summarizing the relationship between media multitasking and creative thinking from both divergent and convergent thinking perspectives, we find that the relationship mainly appears as positive or non-significant. We have explained these patterns from multiple perspectives. However, creative thinking is a comprehensive manifestation of various thinking processes, and using only divergent and convergent thinking as indicators may not be comprehensive enough. Future research should also consider other aspects of creative thinking. Additionally, critical thinking, like creative thinking, is an important 21st-century skill (Abdulla & Cramond, 2017; Trilling & Fadel, 2009) and plays a significant role in forming creative ideas and products (Lin & Shih, 2022; Shubina & Kulakli, 2019). Future research could examine the relationship between media multitasking and critical thinking or explore the role of critical thinking in the relationship between media multitasking and creativity.

3 The Relationship Between Media Multitasking and Creative Behavior Performance

Although divergent and convergent thinking are core components of creativity, they do not represent the entirety of creativity nor necessarily indicate higher creativity (Runco & Jaeger, 2012). To more comprehensively understand the relationship between media multitasking and creativity, we must also consider the output dimension of creativity—that is, creative behavior performance.

Most studies support a positive correlation between media multitasking and individuals' creative behavior performance (Carson et al., 2003; Lottridge et al., 2015; Kühnel et al., 2017; Kapadia & Melwani, 2021; 王芸颖, 2017). Lottridge et al. (2015) found that heavy media multitaskers could quickly integrate relevant information streams from multiple tasks, adopting more complex prose writing styles and producing higher-quality articles. 王芸颖 (2017) also found that college students who engaged in long-term media multitasking exhibited more daily creative behaviors. Moreover, evidence comes not only from academic settings but also from workplace contexts: Carson et al. (2003) found that using social media at work could promote individuals' task-oriented productive behaviors, generating new ideas and finding creative solutions with others; Kühnel et al. (2017) also found that media multitasking at work had a marginally positive predictive effect on employees' creativity in the subsequent hour (β = .01, SE = .01, t = 1.66, p = .09). However, Loh and Lim (2020) found no relationship between media multitasking and creative achievement, possibly due to their homogeneous sample of undergraduates from a single department while the scale measured creative achievement across 10 different domains (e.g., visual arts, music, dance).

The positive relationship between media multitasking and creative behavior performance can be explained from several perspectives. First, evidence from working memory: Working memory involves holding information in mind and mentally processing it (Diamond, 2013). Media multitasking environments require individuals to respond to instant messages while storing and retrieving different information from multiple media, which helps us discover connections between seemingly unrelated things and integrate new information into ideas or action plans (Seddon et al., 2021). High working memory capacity has been shown to be associated with both media multitasking and high creativity. Pollard and Courage (2017) found that frequent media multitaskers have larger working memory capacity, and individuals with high working memory capacity show better creative performance (Takeuchi et al., 2020).

Second, evidence from emotional activation: Uses and gratifications theory (Rubin, 2002) focuses on satisfaction obtained from media activities. Wang and Tchernev (2012) showed that although cognitive needs initially drive individuals to engage in media multitasking, emotional needs are ultimately satisfied —that is, positive emotions are generated during media multitasking. Positive affective states have been shown to promote cognitive flexibility, reduce

persistence, increase attention breadth and dispersion, and facilitate creative problem-solving (Ashby et al., 2002). However, some studies have found different results: the more time people spend on media multitasking, the more negative emotions they experience (Hatchel et al., 2018). Nevertheless, negative emotions do not always harm creativity. Cognitive tuning theory (Schwarz, 1990) suggests that individuals in negative emotional states tend to use deeper, more rigorous thinking for introspection, which enhances cognitive persistence and improves creative performance (Yin et al., 2021). Additionally, researchers have found that emotional ambivalence can also promote creative performance —simultaneously experiencing positive and negative emotions increases sensitivity to unusual associations, helping individuals identify unusual relationships between concepts and positively affecting creativity (Fong, 2006).

Third, evidence from cognitive integration: Not only emotional but also cognitive and behavioral contradictions can enhance creative performance. Miron-Spektor et al. (2011) used different methods to activate individuals' paradoxical frames—encouraging them to recognize and accept contradictory mental templates—while measuring their creative task performance across four experiments. Results showed that participants who adopted paradoxical frames were more creative than those who did not. Research conclusions that bicultural individuals are more creative because they possess multiple cognitive perspectives (Tadmor & Galinsky, 2012; Gaither et al., 2015; Huang et al., 2018) also support this point. Furthermore, Gino and Wiltermuth (2014) found that individuals who engaged in dishonest behavior showed greater creativity on subsequent tasks than those who did not cheat, and this result remained significant even after controlling for individual creativity differences. These studies support Bledow et al.' s (2009) view that creativity benefits from the coexistence of contradictory traits—in other words, simultaneously processing contradictions promotes individuals' creative performance (Smith, 2009). Notably, whether integrating contradictions at the cognitive, emotional, or behavioral level, the underlying process involves handling multiple cognitive elements. Media multitasking has been shown to be closely related to cognitive resource allocation and multichannel information processing (Ralph & Smilek, 2017; Wammes et al., 2019; Hall et al., 2020). That is, media multitasking also involves the contradictory coexistence of cognitive elements and their integration, thus showing a positive correlation with individuals' creative behavior performance.

The above summarizes existing research on the relationship between media multitasking and creative behavior performance and discusses it from three different perspectives. We can see that research findings on both media multitasking and creative thinking and creative behavior performance show predominantly non-negative relationships. No study has explicitly identified a negative relationship between media multitasking and creativity. However, media multitasking has been shown to have significant negative effects on individuals' cognitive functions and task performance, which are closely related to creativity. This raises the question: could media multitasking also negatively affect individual creativity under certain circumstances? Yang et al. (2022) found that the in-

teraction between multitasking and achievement orientation affects employee creativity through different cognitive appraisals—specifically, individuals with high achievement orientation tend to view multitasking as a challenge, enhancing their creativity, while those with low achievement orientation engage in more threat appraisals, thereby inhibiting creativity. Could the relationship between media multitasking and creativity vary depending on certain individual or situational factors? Future research should explore this question more deeply.

4 Summary and Outlook

This study focused on both the cognitive process and output outcomes of creativity, systematically reviewing the relationship between media multitasking and creativity from the perspectives of creative thinking and creative behavior performance, and explaining it from multiple perspectives including executive function, attention style, emotional information, and contradiction integration. Executive function and attention style examine the roles of basic cognitive abilities and attention processing modes in the relationship between media multitasking and creativity at the cognitive level; emotional activation analyzes how different emotions are influenced by media multitasking and how they affect creativity from the affective level; finally, contradiction integration provides an explanation at the volitional level, pointing out the relationship between media multitasking' s demands for cognitive integration and creativity.

These multi-perspective explanations help deepen understanding, but several unresolved issues remain in this field. Future research could expand in the following directions:

4.1 Clarifying the Relationship Between Media Multitasking and Creativity

First, improve the authenticity of media multitasking scenarios simulated in laboratories. Moisala et al. (2016) found that everyday media multitasking did not translate to performance benefits in laboratory multitasking environments, suggesting differences between laboratory and real-life media multitasking. Compared with laboratory operations, real-life media multitasking is more complex. People may both process multiple tasks in parallel and switch between them within the same time period—for example, listening to music while checking email and replying to social messages on a computer. Kononova et al. (2018) distinguished between non-media multitasking, dual media multitasking, and triple media multitasking in their study (requiring participants to watch TV and text research assistants while reading articles online or shopping online). Future research could adopt similar experimental paradigms to reproduce authentic media multitasking scenarios as much as possible to further explore the relationship with creativity.

Second, use more ecologically valid methods to simultaneously measure media multitasking and creativity. Previous studies often used questionnaires to

measure media multitasking, but Williams et al. (2011) found that individuals tend to overestimate their multitasking abilities, and retrospective self-report methods rely on participants' accurate assessment and memory of media use, resulting in low internal consistency. Future research should choose more ecologically valid measurement methods, such as real-time self-reporting through experience sampling methods. This approach can be used not only to monitor media multitasking but also for ecological measurement of creativity (Cotter & Silvia, 2019). However, no study has yet used this method to simultaneously measure both media multitasking and creativity, representing a potential direction for improvement that would enhance ecological validity while remaining economical and convenient.

Third, adopt more comprehensive approaches to assess media multitasking and creativity. In measuring media multitasking, future research could consider comprehensive assessments. For example, Brand et al. (2021) not only recorded participants' media multitasking performance experimentally but also collected their everyday media multitasking data, improving internal validity. In measuring creativity, different studies have used different creativity tests with overlapping components, reducing comparability between findings. Future research should select more representative and distinctive creativity tasks, covering multiple levels including creative cognition, personality, and output, using more diverse measurement methods such as combining creativity tasks with creative drawing tests to comprehensively analyze the relationship between media multitasking and different aspects of creativity. Meta-analytic methods could also strengthen the systematic nature of findings. Additionally, in Loh and Lim' s (2020) study, extreme group and regression analyses did not yield consistent conclusions with median split methods. Could this indicate a non-linear relationship between media multitasking and creativity? Future research should investigate the true nature of this relationship with larger samples to determine appropriate statistical methods.

Fourth, clarify the directionality of the relationship between media multitasking and creativity. Duff et al. (2014) explored predictive factors of media multitasking using the Big Five personality inventory to measure creative personality and found that creativity is an important predictor of media multitasking. This finding complicates the relationship: does media multitasking stimulate higher creativity, or are highly creative individuals more inclined to engage in media multitasking? Previous correlational studies have mostly been cross-sectional, lacking longitudinal designs, and the causal relationship remains unclear. Future research could use reverse experimental designs to examine media multitasking performance in the laboratory among participants with different creativity levels, which may help answer this question. Additionally, transactional media effects theory suggests reciprocal causality between media use and its outcomes (Bandura, 2001; Valkenburg et al., 2016). van der Schuur et al. (2018) used cross-lagged panel design based on this theory to explore causality between media multitasking and sleep problems, and Luo et al. (2020) used the same method to clarify relationships among media multitasking, academic performance, and

self-esteem. Future research could adopt similar methods to further clarify the causal relationship between media multitasking and creativity.

4.2 Verifying Theoretical Mechanisms of Media Multitasking' s Effect on Creativity

First, conduct empirical testing and theoretical integration of internal mechanisms. This paper summarized current academic explanations of the relationship between media multitasking and creativity from four perspectives: executive function, attention style, emotional information, and contradiction integration. However, in real life, factors affecting this relationship are often not independent, and examining the relationship from a single perspective in isolation has limitations. Future research could design more sophisticated experiments to distinguish the independent effects of different factors or their interactions, and integrate the four existing perspectives for a more comprehensive view of the issue. Moreover, few studies have specifically conducted empirical tests. Future research could explore the mechanisms of specific factors. For example, Kapadia (2017) examined the role of cognitive flexibility between media multitasking and creativity, but future studies could expand to other aspects of executive function. Kononova et al. (2018) compared pleasant and unpleasant media multitasking with healthy food choices; future research could examine the relationship between media multitasking and creativity under different emotional states from the emotional information perspective. Based on internal mechanism verification, existing explanations from the four perspectives could be integrated and refined.

Second, further explore other factors influencing the relationship between media multitasking and creativity. Jeong and Hwang (2016) found through meta-analysis that media multitasking effects on cognitive outcomes vary depending on user control, task relevance, and task continuity, but no study has directly tested how these factors affect media multitasking' s impact on creativity. Additionally, research shows that media multitasking affects creativity through activation, and individuals low in polychronicity have been shown to have higher activation levels (Kapadia & Melwani, 2021). Could polychronicity moderate the relationship between media multitasking and creativity? Research also shows that polychronic media multitaskers perceive lower time pressure and thus have better creativity performance (Madjar & Oldham, 2006). What role does the match between situational conditions and personal characteristics play in the relationship between media multitasking and creativity? This may be an important direction for future exploration.

4.3 Exploring Effective Ways to Use Media Multitasking to Stimulate Creativity

First, investigate the delayed effects of media multitasking on creativity. Researchers have found that mind wandering during creative generation reduces creativity (Hao et al., 2015), but mind wandering during incubation periods

helps solve problems creatively later (Baird et al., 2012). Kapadia and Melwani (2021) used archival research to analyze a chef competition TV show and found that multitasking behavior during appetizer preparation did not affect appetizer creativity but influenced creativity in subsequent main courses. This suggests that multitasking may have delayed effects on creativity. Future research could explore this further to identify the optimal time 临界点 for media multitasking to stimulate creativity.

Second, explore forms of media multitasking that stimulate creativity. Currently, measurement indicators for media multitasking are mostly limited to frequency of use. Future research could compare whether different types of media multitasking (such as simultaneous work and non-work tasks, social media multitasking vs. non-social media multitasking) or different forms of media multitasking operations (such as simultaneous processing vs. frequent switching) have different relationships with creativity. Further investigation could identify which media combinations are most conducive to creativity stimulation and which patterns may impair task performance, exploring the practical application value of media multitasking for creativity. Currently, China is in a special period of normalized pandemic prevention and control, with increased needs for online teaching and remote work also increasing media multitasking trends. A comprehensive and objective understanding of the relationship between media multitasking and creativity and its internal mechanisms will help develop corresponding teaching and office software to maximize positive effects and help people better adapt to the media multitasking trend.

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