DESIGN
2024

The influence of culture on creativity in ideation: a review

Zhengya Gong [1,✉], Milene Gonçalves [2], Vijayakumar Nanjappan [1,3] and
Georgi V. Georgiev [1]

[1] Center for Ubiquitous Computing, University of Oulu, Finland, [2] Department of Design, Organisation and Strategy, Faculty of Industrial Design Engineering, Delft University of Technology, The Netherlands, [3] School of Computer Science and Information Technology, University College Cork, Ireland

✉ zhengya.gong@oulu.fi

Abstract

The relationship between culture and creativity has sparked the interest of researchers for decades. Although researchers have attempted to establish a connection between culture and creativity, the precise relationship between the two remains ambiguous. The current paper examined extant literature on the subject matter and synthesized the relations between culture and creativity in ideation over the past twenty years. The present study expounds upon the utilized samples, measures implemented to assess creativity and culture, and the study results.

Keywords: design creativity, human behaviour, idea generation, culture influence, literature review

1. Introduction

The topic of how culture impacts creativity has captured scholars' interest for decades (Gong et al., 2023; Peng et al., 2021; Xie & Paik, 2019; Zheng et al., 2022). Culture is conceptualised as the transmission and creation of content and patterns of values, ideas and other factors that can shape and mould individuals' cognitive and behavioural tendencies (Gong et al., 2023, p. 2, referring to Kroeber & Parsons, 1958). In our study, we follow the widely recognised definition of creativity found in Rhodes: "The phenomenon in which a person communicates a new concept (which is the product). Mental activity (or mental process) is implicit in the definition, and of course no one could conceive of a person living or operating in a vacuum, so the term press is also implicit" (1961, p. 305). The link between culture and creativity is multifaceted and can be succinctly summarised as follows. The cultural values of individuals are shaped by the environment in which they are raised, and they are influenced by the culture of their nation or society, which ultimately leads to variations in their creativity. Moreover, individuals engage in creative processes to produce objects that may embody their culture and exert an impact on other individuals, thereby influencing their behaviours and responses (Gong et al., 2023).

While empirical evidence has supported the idea that a connection exists between culture and creativity, the precise nature of this relationship remains a topic of debate. Regarding one cultural dimension – individualism versus collectivism – a study was conducted wherein subjects from 17 different nations were enlisted to independently generate ideas. The findings revealed that individualism had a favourable impact on the quantity of novel ideas produced (Wodehouse et al., 2011). However, alternative perspectives exist among the scholars who have examined the beneficial associations between original ideas and individualism versus collectivism. For instance, Ye and Roberts (2017) documented the positive influence of collectivism on creativity. This is just one example of the diverse outcomes and inferences derived from different measurements, tasks and procedures employed in experiments. Our

study aims to understand the literature's heterogeneity and presents an analysis of previous research to explore the links between culture and creativity with an emphasis on the early stage of design (ideation) in the past two decades. We focus on ideation as this stage has garnered significant attention in the realm of design and creativity and plays a crucial role in the subsequent phases of the design process (Gonçalves & Cash, 2021).

2. Research method

A preliminary review of the literature pertaining to the intersection of creativity and culture was conducted. The scope of the review was broad, encompassing several fields rather than a single one. We searched for the words "cultur*" AND "creativity" AND "idea" in the titles, abstracts and keywords of the articles present in various academic databases, including but not limited to the Summon meta-database, Scopus, Web of Science, EBSCO Information Services, Association for Computing Machinery (ACM) Digital Library, JSTOR, Design Society, and Wiley Online Library, from January 2000 to May 2023. The inclusion of the first word was based on the consideration that in such cases, culture was part of the study design or was explicitly measured.
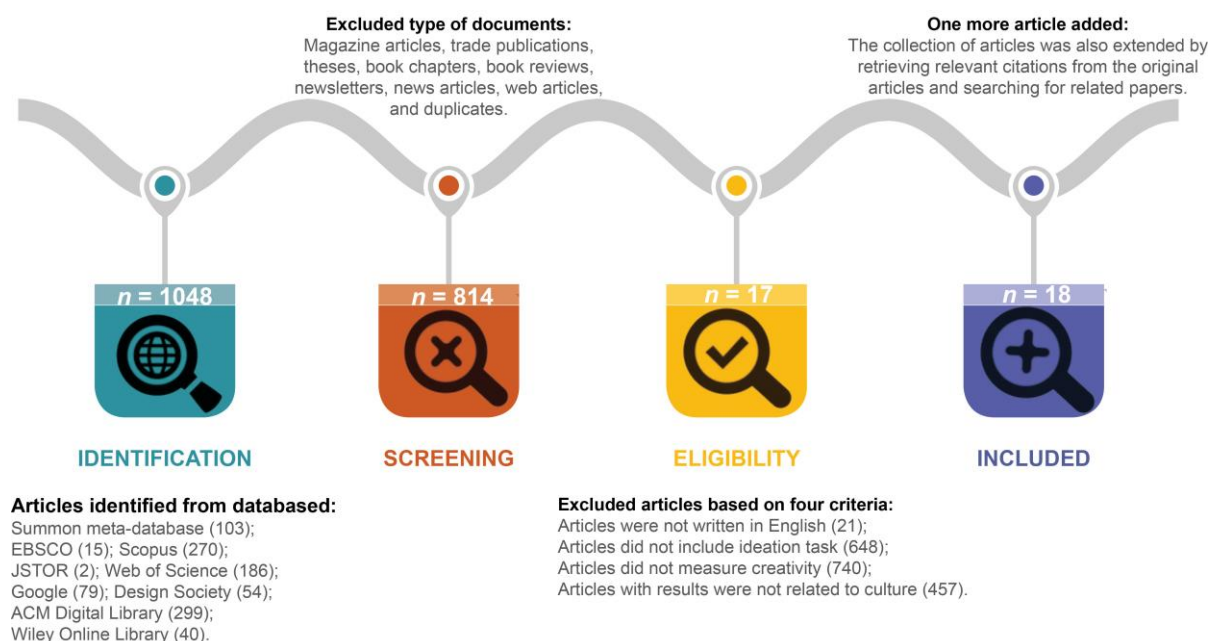

Excluded type of documents:
Magazine articles, trade publications, theses, book chapters, book reviews, newsletters, news articles, web articles, and duplicates.

One more article added:
The collection of articles was also extended by retrieving relevant citations from the original articles and searching for related papers.

n = 1048 — **IDENTIFICATION**

n = 814 — **SCREENING**

n = 17 — **ELIGIBILITY**

n = 18 — **INCLUDED**

Articles identified from databased:
Summon meta-database (103);
EBSCO (15); Scopus (270);
JSTOR (2); Web of Science (186);
Google (79); Design Society (54);
ACM Digital Library (299);
Wiley Online Library (40).

Excluded articles based on four criteria:
Articles were not written in English (21);
Articles did not include ideation task (648);
Articles did not measure creativity (740);
Articles with results were not related to culture (457).

Figure 1. Flow diagram of the literature review selection process

A total of 1,048 research articles were identified from the databases. After excluding 234 items (e.g., duplicates and magazine articles), the final number was 814. Then, we established a set of exclusion criteria. We removed papers written in languages other than English (n = 21) and papers that did not contain a case study, empirical study, experimental study or comparative study involving an ideation task (n = 648). Articles that did not measure creativity based on outputs (n = 740) and that presented results unrelated to culture were also excluded (n = 457). Our focus was on empirical evidence that allowed exploring the influence of culture on creativity in ideation, which led us to prioritise papers based on experimental research. The first author employed these four exclusion criteria to select a total of 17 articles for the study. This corpus was expanded by extracting pertinent references from it and by conducting a search for associated articles on the website Connected Papers. As a result, an additional article was included in the sample. Our methodology for conducting the search and screening is illustrated in detail in Figure 1.

3. Results

This section provides a summary of the sample, the creativity- and culture-related measures, and the link between culture and creativity as derived from the literature review. Although creativity and culture

have been extensively studied over the past century, it is essential to comprehensively analyse the current state of these complex concepts. Therefore, we have focused on articles published since the year 2000.

References	Subjects	Comparison	Procedure		Measures	
			Steps	Tasks	Creativity-related measures	Culture-related variables
Goncalo and Staw (2006)	204 students from an American university	● Individualistic in creative instruction ● Individualistic in practical instruction ● Collectivistic in creative instruction ● Collectivistic in practical instruction	● Manipulation of cultural orientation ● Group idea generation ● Group idea selection	The University restaurant has finally gone bankrupt and is being shut down. The school administration is trying to decide what new business should go into that space. You have fifteen minutes to come up with as many (practical/creative) solutions to their problem as possible.	● The total number of ideas each group ● The flexibility of the ideas each group ● The novelty of each idea ● Creativity of selected ideas	There were nine or more statements on individualism–collectivism measured for each person. Two blind coders evaluated each participant's statements on the degree to which they reacted the values of individualism or collectivism.
Wodehouse et al. (2011)	32 Masters students from 17 countries	Correlation	● To individually generate as many ideas as possible ● As a team to decide on the five strongest	To design a product to assist urban supermarket shoppers in the transportation of a weekly shopping load without the aid of a car.	● The number of distinct ideas ● The number of sketches ● Word count ● Weighted idea selection score	Adopted Hofstede's national cultural dimensions' values
Wang et al. (2011)	54 participants recruited from a large U.S. university and surrounding community	● Intercultural groups (one American and one Chinese) ● Intracultural groups (two Americans) ● Intracultural groups (two Chinese)	Groups engaged in free conversations to brainstorm via a chatroom	● Participants brainstorm about the benefits and difficulties for people having a hypothetical extra thumb or an extra eye at the back of their heads. ● The "having wings" task is a newly designed task that asked participants to brainstorm about the benefits and difficulties for people having a pair of wings.	● Productivity of ideas ● Breadth of ideas	Based on nationality
Bechtoldt et al. (2012)	174 students from a Korean university	● Individualistic self-construal in individualistic value orientation ● Individualistic self-construal in collectivistic value orientation ● Collectivistic self-construal in individualistic value orientation ● Collectivistic self-construal in collectivistic value orientation	● Manipulation of individualistic or collectivistic value orientation ● Manipulation of individualistic or collectivistic self-construal ● Groups brainstorming	How to improve teaching at their university – a topic that was used before with this subject population	● Fluency of ideas ● Originality of ideas	Several statements with a 5-point Likert scale were used to measure the manipulation of value orientation and self-construal.
Goncalo and Duguid (2012)	496 undergraduate students at a university in the United States	● Individualism in high conformity pressure ● Individualism in low conformity pressure ● Collectivism in high conformity pressure ● Collectivism in low conformity pressure	● Norm content manipulation ● Conformity pressure manipulation ● Groups brainstorming	The campus restaurant has finally gone bankrupt and is being shut down. The school administration is trying to decide what new business should go into that space. You have 15 min to come up with as many creative solutions to their problem as possible.	● Number of ideas generated ● Idea creativity	Several statements with a 7-point Likert scale were used to check the manipulation of conformity pressure and individualism–collectivism.
Haines (2013)	54 undergraduate and graduate students from five different countries	Correlation	● GlobeSmart Assessment Profile ● Idea generation ● Creation of presentation and a series of questions ● Idea presentation, a group interview and an individual questionnaire	To develop an idea for a novel and useful invention for students in 30 minutes.	● Novelty of ideas ● Originality of ideas ● Feasibility of ideas ● Usefulness of ideas ● Practicality of ideas ● Contribution of ideas ● Detail of ideas	GlobeSmart Assessment Profile to assess cultural differences and degrees of diversity along five dimensions.
Yi et al. (2013)	45 German Students and 61 Chinese Students from Chinese and German universities.	● Caucasian Germans ● Asian Germans ● Chinese studying abroad ● Domestic Chinese	A collage design and a drawing of an extraterrestrial alien	● Making a collage design ● Drawing an extraterrestrial alien	● Creativity ● Likeability ● Appropriateness ● Technical quality ● Imagination ● Artistic level ● Elaboration ● General impression	Based on nationality
Wodehouse and Maclachlan (2014)	32 Masters students from 17 countries	Correlation	● To individually generate as many ideas as possible ● As a team to decide on the five strongest	To design a product to assist urban supermarket shoppers in the transportation of a weekly shopping load without the aid of a car.	● Number of sketches ● Scores of idea raking	Adopted Hofstede's national cultural dimensions' values
Nouri et al. (2015)	79 undergraduate students in the United States and 83 undergraduate students in China	● Americans working under a supervisor ● Americans working with peers ● Americans working alone ● Chinese working under a supervisor ● Chinese working with peers ● Chinese working alone	● Questionnaires ● Manipulation ● Idea generation	To generate creative ideas for redesigning a refrigerator under the following conditions.	● Originality of ideas ● Fluency of ideas ● Elaboration of ideas	Based on nationality focusing on power distance and individualism–collectivism
Saad et al. (2015)	256 students from two urban universities, in China and Canada	● Chinese working independently ● Chinese working interdependently ● Canadian working independently ● Canadian working interdependently	● Idea generation independently ● Idea generation interdependently	● To generate ideas about the practical benefits that would arise if everyone had an extra thumb on each hand as of next year, from which they then chose the idea that would provide the greatest benefit(s) ● To generate ideas on how to attract tourists to an imaginary underwater city	● The number of non-redundant, task-appropriate ideas ● The originality of ideas ● Quantity of negative verbal cues ● Valence of negative verbal cues	Based on nationality focusing on individualism–collectivism
Ye and Robert (2017)	107 students from a public university in the United States	● Collective self-priming ● Private self-priming	● Training on how to use the chat room on Skype ● Priming collective self and private self ● Idea generation ● A survey	To generate as many creative ideas as possible to reduce pollution	● The number of unique ideas ● Originality of ideas ● Applicability of ideas ● Effectiveness of ideas	The self-construal scale was used to measure the collective self and the private self to ensure the effectiveness of priming
Liou and Lan (2018)	216 students from university in China and the United States	● Americans working alone ● Americans working in group ● Chinese working alone ● Chinese working in group	● Idea generation ● Idea selection	To generate and select slogans for promoting a newly designed 3D hologram.	● Originality of ideas ● Usefulness of the ideas	Based on nationality
Koronis et al. (2019)	65 Singaporean and 56 Portuguese student designers	● A baseline design brief ● A baseline design brief + Video of a manual orange squeezer ● A baseline design brief + Video of a manual orange squeezer + Detailed quantitative requirements	Group idea generation	To design a device to extract juice from fresh oranges at home	● Novelty of ideas ● Appropriateness of ideas	Based on nationality
Choi et al. (2019)	216 undergraduates at a large private university in Korea	● Independent self-representation in individualistic value orientation ● Independent self-representation in collectivistic value orientation ● Interdependent self-representation in individualistic value orientation ● Interdependent self-representation in collectivistic value orientation	● Manipulation of individualistic or collectivistic value orientation ● Manipulation of self-representation ● Groups brainstorming	To develop advertisement slogans targeted toward prospective students of their university	● Fluency ● Adjacency dissimilarity ● Flexibility ● Consensual originality ● Novelty	Several statements were used to check the manipulation of value orientation.
Ge et al. (2021)	158 Japanese engineering students and 209 American engineering students	● Change the situations ● Preserve the situations	● To come up with a new idea to solve a problem and write down their ideas using between 300 to 800 characters (150 to 400 Japanese words)	To design solutions to change or preserve a local park, local transportation, career path, how to do exercises, how New Year is celebrated, the way you interact with a good friend living in a different city and how recycling is done in your neighborhood.	● Motivation for idea generation ● Self-appraisal of the novelty ● Self-appraisal of the usefulness ● Self-appraisal of creativity ● Self-appraisal of liking	A series of measures to explore individual difference including individualism, belief of the source of change, the level of societal change, holistic attention, value of tradition, and openness to experience.
Zheng et al. (2022)	144 university students, 72 from the United States and 72 from China	● American in originality-focused instruction ● American in appropriateness-focused instruction ● Chinese in originality-focused instruction ● Chinese in appropriateness-focused instruction	● Idea generation individually ● Group discussion ● Idea generation and improvement individually	● To generate ideas to help a college student to improve her mental health status during a lockdown period ● To generate ideas to creatively help a campus club use their leftover funds to promote multiculturalism during the pandemic	● Everyday creativity measure (originality and appropriateness) ● Unusual uses test (fluency and originality) ● Creative self-efficacy	Based on nationality
Peng et al. (2022)	40 students master's and PhD students from Morocco and the United States	● Students from the United States ● Students from Morocco	● Idea generation individually ● Group discussion ● Idea selection individually	To develop concepts for a new, innovative product that can froth milk in a short amount of time with minimal instruction	● Idea fluency ● Idea goodness. ● Goodness—self-generated ideas ● Percent of ideas selected ● Goodness-selected ideas ● Idea ownership	Based on nationality
Lee and Choi (2022)	192 Korean undergraduates	● Independent self-representation in individualistic value orientation ● Independent self-representation in collectivistic value orientation ● Interdependent self-representation in individualistic value orientation ● Interdependent self-representation in collectivistic value orientation	● Manipulation of individualistic or collectivistic value orientation ● Manipulation of self-representation ● Groups idea generation	To develop as a team one best possible idea about how to make the university campus eco-friendly	● Idea creativity ● Novelty (maximum) ● Novelty (average)	The effectiveness of the self-concept manipulation by examining the number of participants who responded to the questions as instructed by the experimenter in each priming condition. The manipulation of individualistic versus collectivistic orientation was checked on a 5-point scale.

Figure 2. Summary of the samples, procedures, and measures

3.1. A descriptive summary of the studies included in the review

Regarding the publication channels, six articles (Ge et al., 2021; Haines, 2013; Koronis et al., 2019; Wang et al., 2011; Wodehouse et al., 2011; Ye & Robert, 2017) were published in conference proceedings, such as those of the International Conference on Engineering Design and the ACM Conference on Creativity & Cognition. The remaining articles (n = 12) were published in journals, such as The Design Journal and the Creativity Research Journal. The conferences and publications with the most papers (n = 2) were the ACM Conference on Computer Supported Cooperative Work and Social

Computing, the International Conference on Engineering Design, and Organizational Behavior and Human Decision Processes. Scholars from various countries, including Canada, China, Germany, Greece, South Korea, the United Kingdom and the United States, examined the impact of culture on creativity in ideation. The vast majority of them were based at academic institutions, with the exception of a representative from Google, who was affiliated with a corporate entity. These researchers possessed a diverse range of specialisations, including psychology, organisational behaviour, human–computer interaction, modern pedagogical technology and human-centred design.

3.2. Experimental samples, procedures and tasks

All 18 studies recruited participants from universities, and their samples ranged from 32 to 496 persons (Figure 2). They all included idea-generation tasks to be carried out individually or in a group. Approximately two-thirds of the studies enlisted subjects from different countries in order to use cultural indexes or nationalities as independent variables in their analyses. This allowed the authors to assess differences among groups and verify the connection between culture and creativity (Ge et al., 2021; Haines, 2013; Koronis et al., 2019; Liou & Lan, 2018; Nouri et al., 2015; Peng et al., 2021; Saad et al., 2015; Wodehouse et al., 2011; Wodehouse & Maclachlan, 2014; Yi et al., 2013; Zheng et al., 2022). Seven studies conducted in a single country recruited participants and manipulated their cultural values before ideation (Bechtoldt et al., 2012; Choi et al., 2019; Goncalo & Duguid, 2012; Goncalo & Staw, 2006; Lee & Choi, 2022; Wang et al., 2011; Ye & Robert, 2017). The participants were divided into different conditions (e.g., individualistic and collectivistic value orientations) based on manipulations before an ideation task to measure differences among groups and demonstrate the influence of culture on creativity (Goncalo & Staw, 2006). Some studies included an idea-selection task after the idea-generation task. However, our focus is not on this aspect; therefore, we will not delve into the topic of idea selection (Figure 2).

In the reviewed articles, the ideation tasks depended on the participants' backgrounds. The tasks varied considerably – from designing a tool to extract juice from fresh oranges for family use to devising a product to help urban supermarket shoppers transport their weekly shopping without using their cars (Koronis et al., 2019; Wodehouse & Maclachlan, 2014). In cases where the participants came from different disciplines or where information about their backgrounds was not specified in the studies, the chosen tasks were familiar to students. For instance, one task involved generating creative ideas to mitigate pollution (Ye & Robert, 2017). Figure 2 presents a comprehensive list of the ideation tasks used in our sample.

3.3. Measures to evaluate creativity and culture

It should be noted that the terminology used in the current investigation is derived from the literature; we will not discuss the accuracy or suitability of the concepts and metrics employed to assess creativity and culture. The articles in our sample come from diverse disciplines, whose emphases on culture and creativity might not necessarily overlap. All the terms used here were drawn from the reviewed papers.

3.3.1. Measures to evaluate creativity

Many of the studies in our sample enlisted evaluators (between 2 and 21) to assess the ideas generated during the ideation exercises. Some of the studies neglected to account for the raters' backgrounds comprehensively, and only one provided a detailed explanation of such backgrounds (Koronis et al., 2019). Furthermore, one study asked the participants to evaluate their own ideas. Finally, in three studies, the authors judged creativity-related content (e.g., by counting the number of ideas).

The metrics of creativity evaluation were varied, and they included flexibility (Choi et al., 2019), fluency (Bechtoldt et al., 2012), novelty (Choi et al., 2019; Lee & Choi, 2022), productivity (Wang et al., 2011), originality (Bechtoldt et al., 2012) and creativity (Goncalo & Duguid, 2012; Lee & Choi, 2022) (see Figure 2). For each metric, the authors employed different assessment methods. For example, to measure fluency, some researchers counted ideas per group (Goncalo & Staw, 2006), while others simply counted sketches (Wodehouse et al., 2011) or noted the selection of non-redundant and unique ideas that were task appropriate (Saad et al., 2015; Ye & Robert, 2017). The choice of creativity metrics was probably influenced by the scholars' backgrounds and the conventions of their disciplines.

3.3.2. Measures to evaluate culture

The reviewed studies used three approaches to the quantification of culture-related content. The first one was based on nationality, and it compared the creativity of participants from different countries and with diverse experiences. This approach employed countries as a variable to demonstrate the specific cultural background or experience positively correlated to creativity (Ge et al., 2021; Koronis et al., 2019; Liou & Lan, 2018; Nouri et al., 2015; Peng et al., 2021; Saad et al., 2015; Wang et al., 2011; Yi et al., 2013; Zheng et al., 2022). The researchers using the second approach recruited participants from different countries and employed cultural-dimension indexes to analyse the connections between culture and creativity (Haines, 2013; Wodehouse et al., 2011; Wodehouse & Maclachlan, 2014). For example, compared to several previously mentioned studies, which evaluated the differences between participants from various nations, Wodehouse and Maclachlan (2014) adopted Hofstede's national-culture index as an independent variable to measure the correlation between culture and design creativity. The third approach involved the manipulation of participants' cultural values (e.g., individualistic vs collectivistic value orientations) before the ideation tasks. This was done to analyse the differences among the groups and verify culture's positive or negative influence on creativity (Bechtoldt et al., 2012; Choi et al., 2019; Goncalo & Duguid, 2012; Goncalo & Staw, 2006; Lee & Choi, 2022; Ye & Robert, 2017).

3.4. The influences of culture on creativity in ideation

We divided the reviewed studies into two categories. The first one comprised those that used nationality or the participants' backgrounds (e.g., studying abroad or residing domestically) to evaluate the impact of culture on creativity. The second one included those that employed or manipulated the participants' cultural values for such evaluation.

3.4.1. The cultural influence of participants' backgrounds on creativity

The first category contains nine studies. In these, the participants were recruited from diverse countries, and their nationalities or backgrounds were used as variables to compare the differences in creativity among the groups (Figure 2, second column, cells with a purple background). Of these nine studies, four recruited participants from the United States and China (Liou & Lan, 2018; Nouri et al., 2015; Wang et al., 2011; Zheng et al., 2022). The rest included individuals from the United States and Morocco (Peng et al., 2021), the United States and Japan (Ge et al., 2021), Singapore and Portugal (Koronis et al., 2019), China and Canada (Saad et al., 2015), and China and Germany (Yi et al., 2013).

The findings concerning culture and creativity have been summarised as follows: 1) Chinese participants working in intercultural groups scored higher on the breadth of ideas (the average semantic distance between any two ideas) than those working in intracultural groups. This resulted from a condition where the participants were shown pictures selected from the relevant set with the highest utility score, in which no difference was observed in the American participants (Wang et al., 2011). 2) There were no significant disparities in artistic-creativity performance when comparing Asian German individuals with Caucasian German individuals. Furthermore, no differences were found between Chinese studying abroad and Chinese residing domestically (Yi et al., 2013). 3) The originality level of Chinese individuals who worked under a supervisor was significantly lower than that of those who worked independently. The idea fluency of American individuals was lower when working in the presence of peers as opposed to when working independently or under a superior. The degree of elaboration exhibited by American individuals was slightly reduced when operating in the presence of peers as opposed to when working under a supervisor (Nouri et al., 2015). 4) Individualists tended to outperform collectivists in generating ideas when working independently. Collectivists tended to exhibit higher idea quality, specifically in terms of originality, when compared to individualists. Individualists tended to produce a greater number of distinct ideas compared to collectivists when working collaboratively. A discernible discrepancy was found in the quality of ideas between collectivistic groups and their individualistic counterparts, with the former exhibiting superior performance (Saad et al., 2015). 5) Regarding group ideation, Americans obtained higher scores in originality than Chinese, and Chinese scored better in usefulness than Americans (Liou & Lan, 2018). 6) Singaporean students exhibited superior performance on the novelty metric, while Portuguese students demonstrated better results on the appropriateness metric (Koronis et al., 2019). 7) Engineering students from the United States showed

a tendency to achieve higher scores in creativity, novelty, usefulness and liking of their own ideas than their Japanese counterparts (Ge et al., 2021). 8) When working independently, American students demonstrated higher levels of originality than their Chinese counterparts. In the context of group work, Chinese students exhibited superior performance in terms of originality when compared to their American counterparts (Zheng et al., 2022). 9) American students exhibited higher levels of idea fluency than their Moroccan counterparts. The perceived quality – the goodness of the ideas – was found to be equivalent (Peng et al., 2021).

3.4.2. The influence of participants' cultural values on creativity

Six experimental studies from our sample manipulated participants' individualistic and collectivistic values in order to examine intergroup differences in creativity (Figure 2, second column, cells with a yellow background) (Bechtoldt et al., 2012; Choi et al., 2019; Goncalo & Duguid, 2012; Goncalo & Staw, 2006; Lee & Choi, 2022; Ye & Robert, 2017). The remaining three studies explored the relationship between other cultural dimensions and creativity (Haines, 2013; Wodehouse et al., 2011; Wodehouse & Maclachlan, 2014), as shown in Figure 2, second column, cells with a yellow background. The findings related to culture and creativity have been summarised as follows: 1) Individualistic groups instructed to be creative generated significantly more ideas compared to collectivistic groups that received the same instruction. Collectivistic groups that were instructed to be practical generated a slightly higher number of ideas than individualistic groups. When instructed to be creative, individualistic groups produced a significantly higher number of ideas than those generated by individualistic groups instructed to be practical and more creative ideas than those produced by collectivistic groups. Conversely, collectivistic groups exhibited a significantly higher number of ideas when instructed to be practical rather than creative (Goncalo & Staw, 2006). 2) Individualism had the largest effect on the number of ideas generated, with uncertainty avoidance also forming a significant relationship (Wodehouse et al., 2011). 3) The average number of ideas was greater in collectivism-oriented groups compared to those with individualistic values. Originality was found to be greater among participants who held collectivistic values but adopted an individualistic self-construal as opposed to those who maintained a collectivistic self-construal (Bechtoldt et al., 2012). 4) Groups produced more ideas and creative ideas overall when they were manipulated to be individualistic rather than collectivistic. Manipulation to be individualistic promoted the expression of more ideas and more creative ideas in groups composed of less creative personalities when conformity pressure was high rather than low. In comparison, manipulation to be individualistic promoted the expression of more ideas and more creative ideas in groups composed of highly creative personalities when conformity pressure was low rather than high (Goncalo & Duguid, 2012). 5) One study employed the GlobeSmart Assessment Profile to evaluate cultural differences and degrees of diversity along five continuums: independent/interdependent, egalitarianism/status, risk/restraint, direct/indirect and task/relationship. The results showed that the greater the dispersion of group members along the risk/restraint cultural continuum, the lower the scores for feasibility, usefulness and overall creativity. In addition, there was a negative correlation between the overall creativity of ideas and the task/relationship dimension as well as overall diversity (five dimensions) in the groups (Haines, 2013). 6) The dimensions of individualism versus collectivism and uncertainty avoidance have been found to impact persons who tend to be creative in idea generation (Wodehouse & Maclachlan, 2014). 7) When participants were primed towards collectivism and perceived high diversity in their group members, the number of unique ideas and the quality of ideas were higher than in other conditions, such as collectivistic priming with perceived low diversity and individualistic priming with perceived low and high diversity (Ye & Robert, 2017). 8) The groups that exhibited a combination of a collectivistic value orientation with independent self-representation demonstrated a greater degree of flexibility and novelty as well as a higher quantity of original ideas compared to those that combined a collectivistic value orientation with interdependent self-representation. Furthermore, the former groups exhibited a decrease in idea fixation compared to the latter (Choi et al., 2019). 9) In conditions where an independent self-concept was emphasised, the level of creativity in ideas was greater in the collectivistic norm condition compared to the individualistic norm condition. The collectivistic norm condition yielded higher maximum and average novelty scores than the individualistic norm condition. The study in question found that groups that integrated an

independent self-concept with a collectivistic norm exhibited higher levels of maximum and average novelty than those that integrated an independent self-concept with an individualistic norm (Lee & Choi, 2022).

4. Discussion

The reviewed studies investigated the relationships between culture and creativity in ideation. To facilitate the understanding of the phenomena in question, we categorised their results into three sections, which deal with the influences of cultural diversity, cultural backgrounds and cultural values on creativity (Figure 2; last column; pink, blue and green backgrounds, respectively).

4.1. The influence of cultural diversity on creativity

Perceiving that one's group is very diverse in how they deal with risk (risk versus restraint) seems to lead to less useful and feasible ideas (Haines, 2013). This means that having groups where some members are risk averse while others are risk seekers is not beneficial to creative outcomes. Regarding the task-relationship dimension, a task orientation is characterised by quick transitions to relevant issues, a focus on meeting goals within deadlines and direct disagreement. In contrast, a relationship orientation involves building trust, understanding the importance of relationships for goal achievement and communicating disagreement indirectly. The greater the focus of the group on task completion, the greater its efficacy and overall-productivity rating. The more divided the group along this continuum, with some members more relationship oriented while others more task oriented, the lower the usefulness score (Haines, 2013). Haines's (2013) findings contradict prior research that suggested the potential benefits of diversity in enhancing group creativity (Bouncken, 2009; Kurtzberg, 2005). Furthermore, another study demonstrated that there was no difference between intercultural groups (one Chinese and one American) and intracultural groups (two Chinese or two Americans) in terms of the quantity and originality of the ideas generated (Wang et al., 2011). In general, cultural diversity among group members has not been shown to enhance creativity, and it may have a detrimental impact, particularly with regard to usefulness and feasibility. A definitive conclusion in this domain is not possible due to the limited number of reviewed articles. Therefore, more research is necessary to explore the relationship between cultural diversity and creativity in ideation.

4.2. The influence of cultural backgrounds on creativity

Several scholars found no significant differences among participants who were from different countries or had diverse experiences (Koronis et al., 2019; Peng et al., 2021; Yi et al., 2013). Concerning originality, they verified that Chinese exhibited higher originality than Americans (Nouri et al., 2015) and Canadians (Saad et al., 2015). However, other researchers demonstrated that Chinese students had lower originality scores than American students (Liou & Lan, 2018). Scholars also have different opinions about different working conditions. Nouri et al. (2015) found that Chinese students working alone outperformed in terms of originality other Chinese students who worked collaboratively with peers or under a supervisor. By contrast, other researchers noted that Chinese students derived benefits from collaborative work regarding originality (Zheng et al., 2022). Concerning the level of fluency, American and Canadian students performed better than Chinese ones (Nouri et al., 2015; Saad et al., 2015), and Americans exhibited higher levels of idea fluency compared to Moroccans (Peng et al., 2021). In terms of appropriateness and usefulness, only one study found a significant difference between Americans and Chinese, with the latter's ideas showing a higher level of usefulness than that of the Americans' ideas (Liou & Lan, 2018). The rest of the studies did not focus on this metric or did not uncover significant differences among the countries, such as Zheng et al. (2022). Additionally, a study using self-evaluation verified that students from the United States obtained higher scores in creativity, novelty, usefulness and liking of their own ideas compared to students from Japan (Ge et al., 2021).

Further research is required to establish a definitive link between the cultural backgrounds of participants and their creativity, given the inconsistent findings regarding originality in previous studies (Liou & Lan, 2018; Nouri et al., 2015; Saad et al., 2015; Zheng et al., 2022). Several factors have to be considered when recruiting participants from different countries, such as their academic fields,

education levels and the curricular systems under which they are studying. For example, consider a scenario where an experiment enlists design students from several universities across different nations. In this case, the education systems involved will vary. Consequently, the students' abilities and subject-specific knowledge will be different, which will potentially impact their capacity to generate creative ideas. When the findings indicate that individuals from a certain country exhibit a greater degree of creativity, it is not possible to definitively ascertain if their creativity is impacted by their culture, educational system or curricular system.

4.3. The influence of cultural values on creativity

Among Hofstede's cultural dimensions (Hofstede, 2001), the individualism versus collectivism dimension has garnered greater attention compared to the other dimensions proposed by the author, such as uncertainty avoidance (Bechtoldt et al., 2012; Choi et al., 2019; Goncalo & Duguid, 2012; Goncalo & Staw, 2006; Lee & Choi, 2022; Ye & Robert, 2017). The reviewed studies found that groups generated more ideas and creative ideas overall when they were manipulated to be individualistic rather than collectivistic (Goncalo & Duguid, 2012). Individualism versus collectivism was positively correlated to the quality of unique ideas (Ye & Robert, 2017). Moreover, individuals who held collectivistic values exhibited a higher ideation output compared to those who held individualistic values (Bechtoldt et al., 2012). Also, there was a higher level of novelty in groups primed to be collectivistic than in those primed to be individualistic (Lee & Choi, 2022). It was observed that the ideas of participants who held collectivistic values and were primed to have an individualistic self-construal (Bechtoldt et al., 2012) or an independent self-representation (Choi et al., 2019) exhibited greater originality compared to the ideas of those who were primed to have a collectivistic self-construal (Bechtoldt et al., 2012) or an interdependent self-representation (Choi et al., 2019). Furthermore, groups produced more creative and novel ideas when they combined an independent self-concept with a collectivistic group norm rather than with an individualistic group norm (Lee & Choi, 2022).

There are disagreements in the sampled literature in relation to the individualism versus collectivism, which might result from several reasons. The terminology employed (individualism versus collectivism, individualistic/collectivistic self-construal, and independent/interdependent self-representation) exhibits a high degree of similarity, albeit with diverse applications across different disciplines (Hofstede, 2001; Lechuga, 2012). For instance, collectivism refers "to the need to fit in, [and it] is also known as interdependence" (Lechuga, 2012, p. 452). Therefore, we suspect a low efficacy of dual manipulation and the distinction between two groups (e.g., independent self-representation in collectivistic value orientation and interdependent self-representation in individualistic value orientation). Two studies attempted to reach a more comprehensive understanding of cultural influences on creativity by using national-culture indexes based on Hofstede's (2001) research (Wodehouse et al., 2011; Wodehouse & Maclachlan, 2014). They revealed that power distance, individualism versus collectivism, and uncertainty avoidance negatively correlated with the number of ideas and sketches. However, they also mentioned the limitation of adopting such indexes to measure individuals' cultural values, and they did not provide statistically significant analyses based on p values. We found other articles that provided clues to explore further this topic (these works were excluded from our literature review because they did not measure creativity based on outputs). One study evaluated participants' cultural values with a questionnaire that had acceptable reliability and variety (Gong et al., 2023). It found statistically significant connections between individuals' cultural values and their experiences of creativity. This study also conducted a pre-investigation to select rarely used creative methods, which were employed in the idea-generation experiment to avoid unexpected influences in ideation, such as domain-relevant skills and creative processes.

5. Conclusions, limitations and future research

The present review analysed the findings of 18 articles dealing with the influence of culture on creativity. By synthesising the diverse and fragmented literature on this topic published between 2000 and 2023, this review elucidated three areas of research: 1) the influence of cultural diversity, 2) the influence of cultural backgrounds and 3) the influence of cultural dimensions. Still, the correlation between culture and creativity remains uncertain due to contradictory results.

HUMAN BEHAVIOUR AND DESIGN CREATIVITY

The scope of this review is limited to idea generation; however, future studies could look at idea selection to better understand the influence of culture on ideation. In addition, for keyword searching (i.e., creativity), which are popular and commonly used terms. Some researchers might utilise terms such as creative performance or innovation, depending on their academic fields. This might have led to the exclusion of possibly relevant publications in the present review. Still, we used forward and backward referencing, along with keyword searches, to find relevant articles and remove search bias.

More studies are needed to explore the connection between culture and creativity in ideation due to the limited number of articles reviewed here and their contradictory results. Furthermore, it is important to examine strategies for dealing with the influence of culture. If it is determined that a particular cultural feature or national origin exerts a detrimental impact on people's creativity, what actions might be taken to address this issue? Scholars have proposed methods to prime cultural values through digital technologies in order to mitigate the impacts of culture, and they have conducted experiments in cultural priming with video and virtual-reality stimuli (Gong et al., 2022; Gong, Gonçalves, Latif, & Georgiev, 2023; Gong, Gonçalves, Nanjappan, & Georgiev, 2023). These studies have confirmed that individuals' cultural values can be modified, which can affect their performance in ideation (Gong, Gonçalves, Latif, & Georgiev, 2023). Regrettably, to the best of our knowledge, there is a lack of further evidence on this aspect.

Acknowledgement

References

Bechtoldt, M. N., Choi, H.-S., & Nijstad, B. A. (2012). Individuals in mind, mates by heart: Individualistic self-construal and collective value orientation as predictors of group creativity. *Journal of Experimental Social Psychology*, *48*(4), 838–844. https://doi.org/10.1016/j.jesp.2012.02.014

Bouncken, R. (2009). Creativity in Cross-Cultural Innovation Teams: Diversity and Its Implications for Leadership. In P. Meusburger, J. Funke, & E. Wunder (Eds.), *Milieus of Creativity: An Interdisciplinary Approach to Spatiality of Creativity* (pp. 189–200). Springer Netherlands. https://doi.org/10.1007/978-1-4020-9877-2_10

Choi, H.-S., Seo, J.-G., Hyun, J., & Bechtoldt, M. (2019). Collectivistic Independence Promotes Group Creativity by Reducing Idea Fixation. *Small Group Research*, *50*(3), 381–407. https://doi.org/10.1177/1046496419827990

Ge, X., Misaki, D., Furue, N., & Xu, C. (2021). Culturally Responsive Engineering Education: Creativity Through "Empowered to Change" in the U.S. and "Admonished to Preserve" in Japan. 2021 *ASEE Virtual Annual Conference Content Access Proceedings*, 36887. https://doi.org/10.18260/1-2--36887

Goncalo, J. A., & Duguid, M. M. (2012). Follow the crowd in a new direction: When conformity pressure facilitates group creativity (and when it does not). *Organizational Behavior and Human Decision Processes*, *118*(1), 14–23. https://doi.org/10.1016/j.obhdp.2011.12.004

Goncalo, J. A., & Staw, B. M. (2006). Individualism–collectivism and group creativity. *Organizational Behavior and Human Decision Processes*, *100*(1), 96–109. https://doi.org/10.1016/j.obhdp.2005.11.003

Gonçalves, M., & Cash, P. (2021). The life cycle of creative ideas: Towards a dual-process theory of ideation. *Design Studies*, *72*, 100988. https://doi.org/10.1016/j.destud.2020.100988

Gong, Z., Gonçalves, M., Latif, U., & Georgiev, G. V. (2023). Priming Culture Differences in a Creative Design Course: The Influence of Digital Stimuli. *Proceedings of the Design Society: International Conference on Engineering Design (E&PDE 2023)*.

Gong, Z., Gonçalves, M., Nanjappan, V., & Georgiev, G. V. (2023). VR storytelling to prime uncertainty avoidance. *In International Conference on Interactive Digital Storytelling*, 103–116.

Gong, Z., Nanjappan, V., & Georgiev, G. V. (2023). Experience of creativity and individual cultural values in ideation. *Proceedings of the Design Society: Design Conference*.

Gong, Z., Nanjappan, V., Lee, L.-H., Soomro, S. A., & Georgiev, G. V. (2023). The Relationship Between Culture and Design Creativity at the Individual Level: A Case Study Based on Design Tasks. *International Journal of Design Creativity and Innovation*. https://doi.org/10.1080/21650349.2022.2157889

Gong, Z., Wang, M., Nanjappan, V., & Georgiev, G. V. (2022). Instrumenting Virtual Reality for Priming Cultural Differences in Design Creativity. *Creativity and Cognition*, 510–514. https://doi.org/10.1145/3527927.3535205

Haines, J. K. (2013). Cultivating creativity in diverse teams. *Proceedings of the 9th ACM Conference on Creativity & Cognition*, 32–41. https://doi.org/10.1145/2466627.2466651

Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions and organizations across nations: Vol. Sage publications*. sage.

Koronis, G., Meurzec, R. W., Silva, A., Leite, M., Henriques, E., & Yogiaman, C. (2019). Cross-Cultural Differences in Creative Ideation: A Comparison between Singaporean and Portuguese Students. *Proceedings of the Design Society: International Conference on Engineering Design (E&PDE 2019)*, *1*(1), 89–98. https://doi.org/10.1017/dsi.2019.12

Kroeber, A. L., & Parsons, T. (1958). The Concepts of Culture and Social System. *The American Sociological Review*, *23*, 582–583.

Kurtzberg, T. R. (2005). Feeling Creative, Being Creative: An Empirical Study of Diversity and Creativity in Teams. *Creativity Research Journal*, *17*(1), 51–65. https://doi.org/10.1207/s15326934crj1701_5

Lechuga, J. (2012). Collectivism. In S. Loue & M. Sajatovic (Eds.), *Encyclopedia of Immigrant Health* (pp. 452–453). Springer. https://doi.org/10.1007/978-1-4419-5659-0_155

Lee, H., & Choi, H.-S. (2022). Independent self-concept promotes group creativity in a collectivistic cultural context only when the group norm supports collectivism. *Group Dynamics: Theory, Research, and Practice*, *26*(1), 71–84. https://doi.org/10.1037/gdn0000129

Liou, S., & Lan, X. (2018). Situational Salience of Norms Moderates Cultural Differences in the Originality and Usefulness of Creative Ideas Generated or Selected by Teams. *Journal of Cross-Cultural Psychology*, *49*(2), 290–302. https://doi.org/10.1177/0022022116640897

Nouri, R., Erez, M., Lee, C., Liang, J., Bannister, B. D., & Chiu, W. (2015). Social context: Key to understanding culture's effects on creativity. *Journal of Organizational Behavior*, *36*(7), 899–918.

Peng, A., Menold, J., & Miller, S. (2021). Crossing cultural borders: A case study of conceptual design outcomes of U.S. and Moroccan student samples. *Journal of Mechanical Design*, 1–42. https://doi.org/10.1115/1.4052659

Rhodes, M. (1961). An Analysis of Creativity. *The Phi Delta Kappan*, *42*(7), 305–310.

Saad, G., Cleveland, M., & Ho, L. (2015). Individualism–collectivism and the quantity versus quality dimensions of individual and group creative performance. *Journal of Business Research*, *68*(3), 578–586. https://doi.org/10.1016/j.jbusres.2014.09.004

Wang, H.-C., Fussell, S. R., & Cosley, D. (2011). From diversity to creativity: Stimulating group brainstorming with cultural differences and conversationally-retrieved pictures. *Proceedings of the ACM 2011 Conference on Computer Supported Cooperative Work*, 265–274. https://doi.org/10.1145/1958824.1958864

Wodehouse, A., & Maclachlan, R. (2014). An Exploratory Model for Understanding Culture in Student Design Team Idea Generation. *The Design Journal*, *17*(4), 488–514. https://doi.org/10.2752/175630614X14056185479980

Wodehouse, A., Maclachlan, R., Grierson, H. J., & Strong, D. (2011). Culture and concept design: A study of international teams. *In DS 68-7: Proceedings of the 18th International Conference on Engineering Design (ICED 11)*, *7*, 12–21.

Xie, G., & Paik, Y. (2019). Cultural differences in creativity and innovation: Are Asian employees truly less creative than western employees? *Asia Pacific Business Review*, *25*(1), 123–147. https://doi.org/10.1080/13602381.2018.1535380

Ye, T., & Robert, L. P. (2017). Does Collectivism Inhibit Individual Creativity?: The Effects of Collectivism and Perceived Diversity on Individual Creativity and Satisfaction in Virtual Ideation Teams. *Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing*, 2344–2358. https://doi.org/10.1145/2998181.2998261

Yi, X., Hu, W., Scheithauer, H., & Niu, W. (2013). Cultural and Bilingual Influences on Artistic Creativity Performances: Comparison of German and Chinese Students. *Creativity Research Journal*, *25*(1), 97–108. https://doi.org/10.1080/10400419.2013.752260

Zheng, M., Niu, W., Wang, W., Cheng, L., Ma, T., & Park, J. H. (2022). Originality vs. Appropriateness: The Moderating Role of Culture on the Effect of Instructional Focus on Individual and Team Creativities. *The Journal of Creative Behavior*, jocb.575. https://doi.org/10.1002/jocb.575