Creativity, Innovation and Entrepreneurship, Vol. 125, 2024, 86–96
https://doi.org/10.54941/ahfe1004724

Developing College Students' Creative Problem-Solving Ability: The Roles of Empathy, Prosocial Motivation, and Cultural Differences

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ABSTRACT

Nurturing students' creative problem-solving (CPS) skills is key to helping them develop important abilities such as critical thinking and adaptability in order to effectively navigate current society. The study aims to identify college students' capacity to understand empathy, prosocial motivation, and cultural differences, and how these traits relate to CPS. The study recruited 309 college students from three American universities to participate in an online survey. The results confirmed that prosocial motivation was significantly predicted in all dimensions of CPS: fluency, flexibility, originality, and usefulness. Among the four CPS dimensions, usefulness was negatively related to cognitive empathy and positively predicted collectivism. Cognitive empathy was interrelated with both individualism and collectivism, whereas affective empathy was associated with collectivism. Additionally, students with multicultural experiences tended to consider others more often and to generate more useful solutions. These findings help educators better understand the important roles played by empathy, prosocial motivation, and cultural differences in influencing CPS in higher education.

Keywords: Creative problem-solving, Cultural differences, Empathy, Prosocial motivation, Higher education

INTRODUCTION

The teaching of creative problem-solving (CPS) has been required in higher education to teach students to think critically, to use thinking skills, and to apply creative strategies in diverse ways, thus leading students to become creative problem solvers, and hence, to generate useful solutions (Kim et al., 2022). Empathy, prosocial motivation, and cultural differences are particularly necessary to include in the curricula as they promote students' CPS abilities to solve complex social problems.

Both cognitive empathy and affective empathy influence one's perspectives of others (Davis, 1983). Accordingly, individuals with high empathy levels better capture the needs and emotions of those from different backgrounds, as well as become involved in highly productive problem-solving processes

(Yoon et al., 2020). Furthermore, empathy and creativity share similar traits such as personal openness, non-judgmentalism, and avoidance of setting limitations (Demetriou & Nicholl, 2022). Therefore, in order for students to become empathetic, they need to be innovative, creative, and effective problem-solvers when confronted with diverse and complicated problems.

Prosocial motivation–benefitting others by advancing their sense of well-being–can foster individuals' creative idea generation ability as well as offer encouragement to use creative problem-solving strategies (Park et al., 2023). Previous empirical studies have confirmed that prosocially motivated individuals demonstrate the abilities to have keen creative idea generation, useful solution selection, and acceptance of new problem-solving methods (Grant & Berry, 2011). Within higher education, prosocial motivation helps students develop solutions that are empathetic, inclusive, responsive, and creative in order to both meet broader needs and to solve complicated problems (Kim et al., 2022). Moreover, the inclusion of prosocial motivation in learning environments promotes the acceptance of diverse cultural experiences and the shared responsibility of addressing social challenges (Park et al., 2023).

Cultural differences is related to creative problem-solving and has been studied across fields. Specifically, individualism, which focuses on personal autonomy and self-reliance, is associated with unique and independent thinking that can lead to innovative solutions and collectivism, which pursuits collaboration for group binding, adopts problem-solving approaches to prioritize communal well-being (Germani et al., 2020; Tadmor et al., 2012). Cultural differences constitute a significant consideration in higher education since students' cultural backgrounds can affect their CPS skills (McCance & Blanchard, 2024). Students who interact with classmates from different cultural backgrounds demonstrate a greater capacity for creative performance and thinking styles, a better understanding of others' perspectives and emotions, and an advanced ability to solve complex social problems (Tadmor et al., 2012). Accordingly, student diversity and understanding of cultural differences in the classroom can enhance students' thinking processes, problem-posing, and academic achievement (Sulik et al., 2022).

This study aims to advance knowledge about the relationship between empathy, prosocial motivation, and cultural differences to reinforce students' CPS ability in higher education. To answer the question, three American state universities participated in an online survey that included both multiple answers and an open-ended question. The insights gained in this research contribute to the understanding of how academics can develop student empathy, prosocial motivation, and prosocial motivation that, in turn, advances their CPS ability.

LITERATURE REVIEW

CPS is typically measured with insight problems such as the "Aha!" experience that leads to restructuring a given problem with a new approach (He & Wong, 2021). An individual's CPS ability and creative strength can be assessed using the Torrance Test of Creative Thinking (TTCT; Torrance, 1974) which is based on the divergent thinking concept (Demetriou &

Nicholl, 2022). The TTCT-Verbal (TTCT-V), the focus of the present study, includes four dimensions: fluency, which is the number of solutions identified; flexibility, which assesses the number of different types of solutions identified; originality, which identifies the selected solution's uniqueness compared to the full sample; and usefulness, which considers how useful the selected solution is for the stakeholder (Rubenstein et al., 2020).

The TTCT-V has been used in higher education to examine students' creativity across disciplines. When Liu et al. (2020) used the TTCT-V to identify nursing students' creativity, creative personality, and innovation, a positive correlation between creative innovation and curiosity was discovered. Joy and Breed (2012) also demonstrated that the TTCT-V is an appropriate method to explore the relationship between innovation motivation and creative story writing among psychology students. The finding revealed that college students' divergent thinking and creative product approaches were closely interrelated in the creative thinking process.

Empathy is thought to have two components: *cognitive* which focuses on others' situations, and *affective* which emphasizes others' emotions (Alzayed et al., 2021; Davis, 1983). According to Davis (1983), each component includes two tendencies: the fantasy scale which is the capacity to imagine imaginary characters' emotions and situations from novels, and the perspective taking in which others' perspectives and their situations are processed. Affective empathy involves *empathic concern*–the ability to focus on the emotions of others, particularly warmth and compassion–and *personal distress*, one's negative emotions such as anxiety and nervousness in response to others' negative experiences. In regard to empathy traits, individuals with higher degrees of empathy tend to show better self-reflection, self-critique, consideration of commonalities with others, and feelings with and for others, all of which can affect thinking or taking action in behalf of others (McCurdy et al., 2020).

Accordingly, the nurturing of student empathy increases the student's CPS ability, including potential problem recognition, problem identification, and creative solution generation (Fila & Hess, 2016). Many empirical studies have demonstrated the positive role of empathy in CPS attainment. Kim et al. (2022) found a significant relationship between empathy and problem identification during CPS, and focused on a user-centered approach through design thinking. Furthermore, teamwork and group activity have been shown to promote student empathy during CPS (David Carlson & Dobson, 2020; Kim et al., 2022; Yoon et al., 2020). These empathy traits can also be significantly extended to students' motivation and increase their desire to help others during CPS (Alzayed et al., 2021).

Prosocial motivation that is strongly other-oriented and concerned with their wellness shares several traits with empathy (Grant, 2008). Individuals with high prosocial motivation levels tend to be highly compassionate and generous, traits that significantly impact creativity (Tian et al., 2021). In other words, prosocially motivated individuals tend to think of benefiting others and understanding their perspectives–characteristics that allow them to deeply engage in the CPS process and generate useful ideas help others (Grant & Berry, 2011; Tian et al., 2021). These prosocial motivational traits

are essential to arousing individuals' creativity in the CPS process across disciplines (Forgeard, 2022; Tian et al., 2021). Previous empirical studies have found that prosocial motivation plays an essential role in encouraging student creativity engagement in the classroom. For example, Lorio et al. (2017) reported that prosocial motivation traits can help students engage in their research (Forgeard, 2022). Thus, it allows students to generate useful ideas, both in quantity and quality; and by addressing social issues, they consider others during creative processes to solve end-user problems (Forgeard, 2022).

An understanding of cultural differences is essential to better understand the relationship between students' cultural backgrounds and CPS ability. Individualism and collectivism possess two models, each with a vertical (considering hierarchy) and a horizontal (considering equality) axis. Accordingly, they involve four attributes: (1) Vertical Individualism (VI) that focuses on distinguishing competition with others; (2) Horizontal Individualism (HI) that recognizes uniqueness and distinctness from others, and involves higher levels of self-reliance; (3) Vertical Collectivism (VC) that identifies individuals who consider themselves as members of an in-group, but see themselves as interdependent and different from others; and (4) Horizontal Collectivism (HC) in which individuals can be similar to others and yet pursue common goals without authority present (Germani et al., 2020; Singelis et al., 1995). Integration of these attributes can establish inclusive learning environments for students who wish to foster their academic success and personal development (Kozleski & Waitoller, 2010).

Cultural differences can affect empathy and prosocial motivation. According to Duan et al. (2008), students in a collectivist culture tend to have cognitive empathy for their clients and frequently accept others' perspectives and situations. Liao et al. (2022) stated that individuals who are part of a collectivist culture are more prosocially motivated since they desire to generate public goals and consider others' welfare more than those from individualist cultural backgrounds. Associated with individualism and empathy, individuals' empathic ability increases when external support does not conflict with individualism and vice versa (Feldman et al., 2020). However, Heinke and Louis (2009) failed to find significant differences in college students' empathy between collectivism and individualism. Luria et al. (2015) explored the relationships between prosocial motivation and cultural differences in 66 countries and discovered that individualists positively correlated with prosocial behavior when they donated money to charity, as opposed to volunteering or helping others. Lampridis and Papastylianou (2017) demonstrated a positive interrelation between individualism and prosocial motivation when individualists desired other' respect.

Many empirical studies have demonstrated that student's cultural differences are related to creativity. More specifically, individualism, focusing on personal goals and self-expression, has been shown to positively enhance creativity and CPS. Sadd et al. (2015) revealed that individualists positively relate to the quantity of creative ideation in problem-solving, original thinking, and a willingness to explore novel solutions (Gorodnichenko & Roland, 2017). In contrast, Saad et al. (2017) concluded that students from collectivist cultures focus on the quality and originality of ideas rather than merely generating

high quantity ideas. Regarding student's experience with diverse cultures and its effect on their creativity, Maddux and Galinsky (2009) reported that students who possess multicultural learning experiences show a higher level of CPS, creative performance, self-perceived creativity (Leung & Chiu, 2010), and idea fluency and flexibility (Leung & Chiu, 2008). Similarly, Tadmor et al. (2012) revealed that Asians' and Caucasians' multiculturalism significantly impacts students' creative fluency, flexibility, and novelty. However, there are contradictory results related to culture and creativity. Nouri et al. (2013) found that cultural diversity in the classroom decreases team creativity, and that there are no significant creativity differences between students who do and do not live abroad (Maddux et al., 2010). Together, the interplay between empathy, prosocial motivation, and cultural differences should be further studied to identify their effect on college students' CPS ability.

METHODS

The online survey was conducted using the Qualtrics platform, ensuring efficient and accessible participant data collection from diverse regions of the United States from November 8 to December 10, 2023. A total of 309 college students participated at three US universities. Among the 309 respondents, 35.1% were male, 63.2% were female, and 1.7% did not indicate their gender. Of the student groups, 33% were international and 67% were domestic. Among the 309 students, 68.7% were undergraduate students, 30.9% were graduate students; 0.3% of the students did not indicate their academic standing. Approximately 55.7% of the students were 18–21 years old, followed by 17.2% aged 22–25 years, and 14.8% aged over 31 years.

This study utilized several measurements to assess student empathy, prosocial motivation, cultural differences, and CPS ability rated on a 5-point Likert scale (1 is strongly disagree, and 5 is strongly agree). The Interpersonal Reactivity Index (IRI; Davis, 1983) was employed to measure cognitive and affective empathy. The IRI contains 28 items (Fantasy scale: $M = 20.99$, $SD = 2.60$; perspective taking: $M = 19.80$, $SD = 3.23$; empathic concern: $M = 24.19$, $SD = 3.26$; personal distress: $M = 23.80$, $SD = 2.34$) and presented the acceptable internal consistency reliability of empathy was $\alpha = 0.65$ for this study. A prosocial motivation measurement proposed by Grant (2008) was used to assess participants' prosocial motivation ($M = 17.46$, $SD = 2.70$). This section consisted of four statements and showed excellent reliability ($\alpha = 0.90$). Participants' cultural differences were evaluated using a Triandis and Gelfand (1998) instrument focused on 16 items (HI: $M = 15.54$, $SD = 2.79$; VI: $M = 11.75$, $SD = 2.97$; HC: $M = 15.82$, $SD = 2.24$; VC: $M = 14.38$, $SD = 3.07$) that showed acceptable internal consistency ($\alpha = 0.69$). One open-ended question related to the creation of a positive and supportive work environment between younger and old generations and was provided to evaluate participants' CPS ability. Using this scenario, three judges examined their own subjective interpretations of how empathy and prosocial motivation could be engaged to generate creative solutions based on cultural differences. The TTCT-V (Rubenstein et al., 2020) was used to measure participants' CPS ability, including fluency ($M = 2.50$,

$SD = 2.00$), flexibility ($M = 1.90$, $SD = 1.82$), originality ($M = 1.49$, $SD = 1.75$), and usefulness ($M = 3.93$, $SD = 3.37$). It showed good reliability, $\alpha = 0.84$ using a 2 and 3-point scale ranging from 0 to 2, but not good fluency using a 2-point scale ranging from 0 (no ideas or duplicated ideas) to 1 (including ideas). Three judges trained to use the TTCT-V evaluated the written solutions independently and subsequently engaged in several discussions to cross-check their scores. Lastly, students were asked to provide their demographic information.

Participants were recruited via three state universities' recruitment emails. Survey participation was voluntary, and a digital version of the informed consent form constituted the first page of the survey. After participants agreed to participate and confirmed they were at least 18 years of age, they moved on to the main questionnaire. Participants were asked to provide their email address if they wanted to be included in a $50 Amazon e-gift card drawing in which 20 participants would be awarded. They were made aware that their email address would be deleted following the e-gift cards drawing. All statistical analyses were performed using IBM SPSS version 29. The present study conducted a descriptive analysis, an independent sample *t*-test, and a Pearson Correlation Coefficient analysis to identify participant's level of empathy, prosocial motivation, cultural differences, CPS ability, and to compare international and domestic student differences.

RESULTS

The *t*-test results showed student group differences in CPS skills, empathy, motivation, and cultural background. Among variables, fluency ($t = 1.963$, $p = 0.052$), perspective taking ($t = 1.718$, $p = 0.088$), personal distress ($t = -4.312$, $p = 0.075$), and vertical collectivism ($t = -3.549$, $p = <0.001$) indicated statistically significant international and domestic student differences. The international student group had higher levels of fluency ($M = 2.87$, $SD = 2.45$), perspective taking ($M = 3.49$, $SD = 0.68$), and vertical collectivism ($M = 15.38$, $SD = 3.35$) than the domestic student group (fluency: $M = 2.32$, $SD = 1.71$; perspective taking: $M = 19.55$, $SD = 2.83$; vertical collectivism: $M = 13.88$, $SD = 2.80$). However, the domestic student group exhibited higher levels of personal distress ($M = 23.98$, $SD = 2.11$) than the international student group ($M = 23.43$, $SD = 2.72$).

A Pearson Correlation Coefficient was performed to examine relationships among study variables. All four CPS variables positively correlated with prosocial motivation. In particular, fluency showed the highest relationship ($r = 0.199$, $p <0.001$), while originality ($r = 0.139$, $p = 0.02$) presented the lowest. Among the four CPS variables, only usefulness was shown to be significant, but it was negatively related to the fantasy scale of empathy ($r = -0.125$, $p = 0.036$) and positively related to horizontal collectivism ($r = 0.157$, $p = 0.009$). Cognitive empathy was not related to prosocial motivation, whereas perspective taking was positively interrelated to individualism (horizontal individualism: $r = 0.125$, $p = 0.028$; vertical individualism: $r = 0.117$, $p = 0.04$) and vertical collectivism ($r = 0.173$,

$p = 0.002$). Affective empathy significantly correlated with prosocial motivation (empathic concern: $r = 0.375$, $p < 0.001$; personal distress: $r = 0.238$, $p < 0.001$) and horizontal collectivism ($r = 0.209$, $p = 0.008$). Empathic concern was negatively related to vertical individualism ($r = -0.150$, $p < 0.001$), indicating that individuals with a high degree of empathic concern would likely be less engaged in individualism.

DISCUSSION AND CONCLUSION

This study aimed to examine whether empathy, prosocial motivation, and cultural differences contribute to students' CPS ability. Through an empirical analysis of 309 college students' data, relationships among three variables associated with CPS were examined. Several key findings were extracted from the data and helped describe key components of college students' CPS development.

The current study confirmed that among individuals with relatively high levels of prosocial motivation, fluency, flexibility and originality employed in their CPS are significantly enhanced, as well as their solutions' usefulness. These results are supported by previous studies. According to Grant and Berry (2011), prosocial motivation helps individuals understand others' problems and needs, and they gather information that generates useful and realistic solutions (Park et al., 2023). Building on that finding, the present study demonstrated that prosocial motivation can positively impact students' ability to generate a greater number of different solution types, and to determine their solutions uniqueness and usefulness when applied to others' needs. Therefore, since prosocial motivation is an important predictor of CPS ability with diverse perspectives, strategies such as watching documentaries and sharing students' stories with their classroom peers (Oxford & Gkonou, 2018), should be included in the college curricula to promote prosocial motivation.

Among the four dimensions of CPS, usefulness was the only indicator related to cognitive empathy and collectivism. Importantly, usefulness was negatively correlated with the fantasy scale in cognitive empathy, indicating that individuals who score high on the fantasy scale will generate fewer useful solutions. This result contradicts those found in previous studies. Weibel et al. (2018) stated that fantasy is referred to as goal-oriented, and it promotes helpful decisions that can generate alternative solutions related to future empathetic behavior during the problem-solving stage of the creative process (Ganiev & Tashev, 2021). The present study assumes that since most participants were young adults aged 18–21 and in the process of developing empathy and CPS ability, the results might show a negative relationship. Since empathy and creative ability can be nurtured through education (David Carlson & Dobson, 2020; Çubukcu & Dündar, 2007), upper-level students (seniors and graduates) may show a positive correlation between empathy and CPS. Usefulness was positively associated with HC in the present study. That finding can be interpreted to mean that students with HC are more likely to be concerned with other-focused and non-hierarchical cultures, thus driving them to be prosocially motivated and to focus on finding solutions

that help others (Tian et al., 2021; Triandis & Gelfand, 1998). Therefore, the current study presumes that students with a higher degree of HC tend to generate more high-quality and useful solutions focused on helping others.

Additionally, while addressing the relationship between empathy and cultural differences, the current study found that perspective taking was significantly related to individualism and VC, while affective empathy correlated with HC. Perhaps those possessing individualist and vertical collectivist traits consider themselves independent with high self-focus, and therefore tend to be less motivated to take on others' perspectives (Yang & Hung, 2021). Since affective empathy is related to the ability to feel others' emotions, it can be linked to the HC trait–they consider themselves similar to others (Davis, 1983; Germani et al., 2020).

When studying the differences between international and domestic students, it became clear that the two groups exhibited significant differences in fluency, cognitive and affective empathy, and vertical collectivism while engaged in creative problem-solving. The international student group reported higher values of fluency, perspective taking, and vertical collectivism than the domestic student group, a result that can be added to the body of knowledge provided by previous investigators. Students who have had multicultural experiences appear better able to identify with others and their perspectives, generating a greater number of creative solutions which benefit others (Leung & Chiu, 2008, 2010; Maddux et al., 2010). Domestic students displayed a higher level of personal distress. The current study assumes that since the personal distress trait is related to self-oriented emotions from others rather than other-oriented ones, it is likely to be related to the individualism of domestic students who have a Western cultural background (Sharif, 2019). Overall, these results shed light on how to implement college students' CPS ability based on empathy, prosocial motivation, and cultural differences in higher education.

Although the current study reported meaningful findings, there were several limitations that deserve acknowledgment. Firstly, the study had a small number of international student participants compared to domestic students, and this imbalance may have affected the results. Secondly, when the three judges evaluated participants' written answers for a CPS task, several responses suggested that ChatGPT had been used to complete the task. Accordingly, the answers provided by participants suspected of using AI were removed; however, they might have been included in the analysis. Therefore, it must be emphasized that participants cannot use AI-generated answers for written tasks in future studies. Lastly, the present study used a quantitative method that used a single-time online survey. In future studies, a mixed method should be considered to discover a deeper understanding of the relationships among empathy, prosocial motivation, and cultural differences in CPS.

REFERENCES

Alzayed, M. A., McComb, C., Menold, J., Huff, J., & Miller, S. R. (2021). Are You Feeling Me? An Exploration of Empathy Development in Engineering Design Education Journal of Mechanical Design, 143(11).

Çubukcu, E., & Dündar, Ş. G. (2007). Can creativity be taught? An empirical study on benefits of visual analogy in basic design education. Al Z ITU Journal of the Faculty of Architecture, 4(02), 67–80.

David Carlson, J., & Dobson, T. (2020). Fostering Empathy through an Inclusive Pedagogy for Career Creatives. International Journal of Art & Design Education, 39(2), 430–444.

Davis, M. H. (1983). Measuring individual differences in empathy: Evidence for a multidimensional approach. Journal of Personality and Social Psychology, 44(1), 113–126.

Demetriou, H., & Nicholl, B. (2022). Empathy is the mother of invention: Emotion and cognition for creativity in the classroom. Improving Schools, 25(1), 4–21.

Duan, C., Wei, M., & Wang, L. (2008). The role of individualism-collectivism in empathy: An exploratory study. Asian Journal of Counselling, 15(1), 57–81.

Nouri, R., Erez, M., Rockstuhl, T., Ang, S., Lee, L.-C., & Rafaeli, A. (2013). Taking the bite out of culture: The impact of task structure and task type on overcoming impediments to cross-cultural team performance. Journal of Organizational Behavior, 34(6), 739–763.

Feldman, S., Huddy, L., Wronski, J., & Lown, P. (2020). The Interplay of Empathy and Individualism in Support for Social Welfare Policies. Political Psychology, 41(2), 343–362.

Fila, N. D., & Hess, J. L. (2016). In their shoes: Student perspectives on the connection between empathy and engineering, proceeding of 2016 ASEE Annual Conference & Exposition.

Forgeard, M. (2022). Prosocial Motivation and Creativity in the Arts and Sciences: Qualitative and Quantitative Evidence. Psychology of Aesthetics, Creativity, and the Arts. Advance online publication.

Ganiev, A. G., & Tashev, S. N. (2021). The Role of "Imagination" in the Process of "Creative Thinking" Developing Students' "Imagination" and "Creative Thinking" Skills in Teaching Physics. Annals of the Romanian Society for Cell Biology, 633–642.

Germani, A., Delvecchio, E., Li, J. B., & Mazzeschi, C. (2020). The Horizontal and Vertical Individualism and Collectivism Scale: Early Evidence on Validation in an Italian Sample. Journal of Child and Family Studies, 29(3), 904–91.

Gorodnichenko, Y., & Roland, G. (2017). Culture, institutions, and the wealth of nations. Review of Economics and Statistics, 99(3), 402–416.

Grant, A. M. (2008). Does intrinsic motivation fuel the prosocial fire? Motivational synergy in predicting persistence, performance, and productivity. Journal of Applied Psychology, 93, 48–58.

Grant, A. M., & Berry, J. W. (2011). The Necessity of Others is The Mother of Invention: Intrinsic and Prosocial Motivations, Perspective Taking, and Creativity. Academy of Management Journal, 54(1), 73–96.

He, W., & Wong, W. (2021). Gender Differences in the Distribution of Creativity Scores: Domain-Specific Patterns in Divergent Thinking and Creative Problem Solving. Frontiers in Psychology, 12.

Heinke, M. S., & Louis, W. R. (2009). Cultural Background and Individualistic–Collectivistic Values in Relation to Similarity, Perspective Taking, and Empathy. Journal of Applied Social Psychology, 39(11), 2570–2590.

Joy, S. P., & Breed, K. (2012). Innovation Motivation, Divergent Thinking, and Creative Story Writing: Convergence and Divergence across the Torrance Tests and Tat. Imagination, Cognition and Personality, 32(2), 179–195.

Kim, H. J., Yi, P., & Ko, B. W. (2022). Deepening students' experiences with problem identification and definition in an empathetic approach: Lessons from a university design-thinking program. Journal of Applied Research in Higher Education, 15(3), 852–865.

Lampridis, E., & Papastylianou, D. (2017). Prosocial behavioural tendencies and orientation towards individualism–collectivism of Greek young adults. International Journal of Adolescence and Youth, 22(3), 268–282.

Leung, A. K., & Chiu, C. (2008). Interactive Effects of Multicultural Experiences and Openness to Experience on Creative Potential. Creativity Research Journal, 20(4), 376–382.

Leung, A. K., & Chiu, C. (2010). Multicultural Experience, Idea Receptiveness, and Creativity. Journal of Cross-Cultural Psychology, 41(5–6), 723–741.

Liao, H., Su, R., Ptashnik, T., & Nielsen, J. (2022). Feeling good, doing good, and getting ahead: A meta-analytic investigation of the outcomes of prosocial motivation at work. Psychological Bulletin, 148, 158–198.

Liu, H. Y., Chang, C. C., Wang, I. T., & Chao, S. Y. (2020). The association between creativity, creative components of personality, and innovation among Taiwanese nursing students. Thinking Skills and Creativity, 35, 100629.

Lorio, R., Labory, S., & Rentocchini, F. (2017) 'The Importance of Pro-social Behaviour for the Breadth and Depth of Knowledge Transfer Activities: An Analysis of Italian Academic Scientists', Research Policy, 46: 497–509.

Luria, G., Cnaan, R. A., & Boehm, A. (2015). National Culture and Prosocial Behaviors: Results From 66 Countries. Nonprofit and Voluntary Sector Quarterly, 44(5), 1041–1065.

Maddux, W. W., & Galinsky, A. D. (2009). Cultural borders and mental barriers: The relationship between living abroad and creativity. Journal of Personality and Social Psychology, 96(5), 1047–1061.

Maddux, W. W., Adam, H., & Galinsky, A. D. (2010). When in Rome... Learn Why the Romans Do What They Do: How Multicultural Learning Experiences Facilitate Creativity. Personality and Social Psychology Bulletin, 36(6), 731–741.

McCance, K. R., & Blanchard, M. (2024). Measuring the Interdisciplinarity and Collaboration Perceptions of US Scientists, Engineers, and Educators. AERA Open, 10, 23328584231218952.

McCurdy, R. P., Nickels, M. L., & Bush, S. B. (2020). Problem-Based Design Thinking Tasks: Engaging Student Empathy in STEM. The Electronic Journal for Research in Science & Mathematics Education, 24(2), 22–55.

Oxford, R. L. and Gkonou, C. (2018) "Interwoven: Culture, language, and learning strategies," Studies in Second Language Learning and Teaching, 8(2), 403–426.

Park, H. J., Lim, H., & Cho, Y. (2023). Understanding Students' Diversity in Inclusive Design: A Review of Literature on Students' Empathy and Prosocial Motivation from Cultural Differences. Design for Inclusion, 75(75).

Rubenstein, L. D., Callan, G. L., Speirs Neumeister, K., Ridgley, L. M., & Hernández Finch, M. (2020). How problem identification strategies influence creativity outcomes. Contemporary Educational Psychology, 60, 101840.

Sharif, R. (2019). The relations between acculturation and creativity and innovation in higher education: A systematic literature review. Educational Research Review, 28, 100287.

Singelis, T. M., Triandis, H. C., Bhawuk, D. P. S., & Gelfand, M. J. (1995). Horizontal and Vertical Dimensions of Individualism and Collectivism: A Theoretical and Measurement Refinement. Cross-Cultural Research, 29(3), 240–275.

Sulik, J., Bahrami, B., & Deroy, O. (2022). The diversity gap: when diversity matters for knowledge. Perspectives on Psychological Science, 17(3), 752–767.

Tadmor, C. T., Galinsky, A. D., & Maddux, W. W. (2012). Getting the most out of living abroad: Biculturalism and integrative complexity as key drivers of creative and professional success. Journal of Personality and Social Psychology, 103(3), 520–542.

Tian, X., Peng, X., & Peng, X. (2021). Influence of Prosocial Motivation on Employee Creativity: The Moderating Role of Regulatory Focus and the Mediating Role of Knowledge Sharing. Frontiers in Psychology, 12.

Torrance, E. P. (1974). The Torrance Tests of Creative Thinking: Norms-Technical Manual. Princeton, NJ: Personal Press.

Triandis, H. C., & Gelfand, M. J. (1998). Converging measurement of horizontal and vertical individualism and collectivism. Journal of Personality and Social Psychology, 74(1), 118–128.

Weibel, D., Martarelli, C. S., Häberli, D., & Mast, F. W. (2018). The Fantasy Questionnaire: A Measure to Assess Creative and Imaginative Fantasy. Journal of Personality Assessment, 100(4), 431–443.

Yang, Z., & Hung, I. W. (2021). Creative thinking facilitates perspective taking. Journal of Personality and Social Psychology, 120(2), 278–299.

Yoon, J., Jo, T. J., & Kang, S. J. (2020). A study on the possibility of the relationship among group creativity, empathy, and scientific inquiry ability of elementary school students. International Journal of Science Education, 42(13), 2113–2125.