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Tabletop Role-Playing Games and Social Skills in Young Adults

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Advisor Approval Page

Abstract

This paper explores the relationship between playing tabletop role-playing games (TTRPGs) and the creativity, self-efficacy, and social skills of the players. Eighty-five people ages 18-25 were surveyed on their perceived levels of these three variables, as well as how often they played TTRPGs. Responses of those who did play TTRPGs were compared with results of those who did not play TTRPGs. A statistically significant positive correlation was identified in all participants between creativity and self-efficacy, creativity and social skills, and self-efficacy and social skills. Participants who played TTRPGs scored statistically significantly higher in measures of creativity than participants who did not play TTRPGs. There was no statistically significant difference in the two groups in terms of self-efficacy or social skills. These findings, along with previous studies concentrating on possible benefits of TTRPGs, suggest that there is a strong relationship between creativity and playing TTRPGs, and further investigation into ways TTRPGs could be implemented in the treatment of autistic patients are warranted.

Keywords: tabletop role-playing games, creativity, self-efficacy, social skills, young adults

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Tabletop Role-Playing Games and Social Skills in Young Adults

Expanding on studies that have suggested an educational potential in gaming, investigations have specifically been made into the benefits of tabletop role-playing games (TTRPGs) and possible improvement in interpersonal and intrapersonal abilities of those who played the games. TTRPGs are games in which players assume the roles of characters in a fictional setting and describe their actions through speech. The successes of these actions are determined by a system of rules and guidelines, most commonly involving rolling dice. In this way, players can shape the direction and eventual outcome of the game (Dormans, 2006). For example, if you roll for an attack, the number the dice lands on determines whether the attack hits or not. Dungeons and Dragons is the oldest and perhaps the most well-known game of this particular type (Jahromi, 2017). In addition to tabletop, there are also live-action, computer, and massively multi-player online role-playing games. This study will focus on TTRPGs because of their emphasis on collaborative storytelling and teamwork rather than competition. Role-playing is a therapeutic technique that has often been used in the treatment of autistic patients to teach them about social cues (Fein, 2015; Müller, Schuler, & Yates, 2008). In a similar way, TTRPGs may provide additional benefits by allowing these patients to test out different responses to social situations with no real-world consequences and to explore ways of interacting and working with a group in a setting that may be more engaging than a classroom environment (Betz, 2011; Blackmon, 1994; Daniau, 2016; Rivers, Wickramasekera, Pekala, & Rivers, 2016). These potential benefits are not limited to those with autism. Playing TTRPGs has been shown to affect improvements in creativity and positively correlate with greater self-efficacy in people on and off the autistic spectrum (Chung, 2013; Dyson, Chang, Chen, Hsiung, Tseng, & Chang, 2016; Karwowski & Soszynski, 2008; Smith, 2014).

Literature Review

Creativity

Creativity refers to an individual's ability to come up with new and innovative ideas and solutions to problems (Gerrig & Zimbardo, 2002). The use of role-play training to improve creativity has been studied by Karwowski and Soszynski (2008) in Poland and replicated by Chung (2013) in Hong Kong. The Karwowski study showed significant improvement in creativity, fluency, and originality in the Test of Creative Imagination inventory after going through training inspired by role-playing games (Karwowski & Soszynski, 2008). The study showed no significant difference in creative transformativeness, a quantity defined in the experiment as the ability to mentally represent and transform something.

The replication experiment by Chung (2013) involved both TTRPG players and electronic role-players, whereas the Karwowski study only examined TTRPG players. Chung's experiment showed that the TTRPG players scored higher in divergent thinking tests. Another experimental study was done by Dyson and associates (2016) in Taiwan and showed significant improvement in creative potential but not emotional creativity. These studies suggest that there is a possible causal connection between playing TTRPGs and the level of the participant's creativity, meaning greater levels of creativity could be achieved through the use of TTRPGs.

Self-Efficacy

Self-efficacy refers to the extent to which an individual believes they are able to accomplish a given task (Gerrig & Zimbardo, 2002). While not explicitly discussing self-efficacy, Betz (2011) argues that among the most important beliefs TTRPGs teach is the idea that "you can make a difference; you can change the world." This would contribute to the connection between playing TTRPGs and greater self-efficacy.

Self-efficacy was directly studied in relation to TTRPGs by Smith (2014). A sample of over 400 adult gamers showed a positive correlation between playing TTRPGs and general self-efficacy ($t(413) = 24.90, p < .001$), which refers to one's sense of self-efficacy in a broader sense, not specific to any one situation. The results showed no statistically significant correlation to social self-efficacy, which refers to the belief that one is able to interact with others appropriately in a social situation (Smith, 2014). The study measured self-efficacy by means of the General Self-Efficacy Exam and Perceived Social Self-Efficacy Scale. This study suggests that there is a possible correlational connection between playing TTRPGs and the level of the participant's self-efficacy, meaning greater levels of self-efficacy could present in those who play TTRPGs.

Social Skills

Social skills refer to the ability an individual has to interact with others, including the abilities to perceive and convey emotional expressions. The application of skills used in TTRPGs such as teamwork, relation to others, and understanding of social dynamics to real world interactions has been studied using the idea of transformative role-playing games (Daniau, 2016; Rivers et al., 2016). Daniau (2016) by means of a literature review and data cross-analysis argues that by understanding the role-playing game through the four dimensions of character, player, person, and human being, what is learned can be applied to four dimensions of learning: knowing, doing, being, and relating.

The study by Rivers and associates (2016) found a positive correlation ($r = .43$) between playing TTRPGs and amount of empathy as measured by the Davis Interpersonal Reactivity Index. While tabletop games have not been investigated thoroughly in this area, there is evidence that video games may help foster a sense of social connection through the appeal of

competitiveness. Given that TTRPGs and certain online role-playing games have a similar genesis, it is possible this effect could translate to TTRPGs as well (Vorderer, Hartmann, & Klimmt, 2003). These studies suggest that there is a possible correlational connection between playing TTRPGs and the extent of the participant's social skills, meaning higher levels of social skills may be present in those who play TTRPGs.

The research presented shows a lack of correlational research in the relationship between TTRPGs and creativity, and creativity studies in general in a United States population. There is a significant lack of studies on any sort of relationship between TTRPGs and self-efficacy and social skills, specifically in regards to a college-aged population. This study aims to investigate if any correlation exists between TTRPGs and the amount of creativity, self-efficacy, and social skills in college-aged individuals.

Statement of Problem

Research studies addressing the question of whether TTRPGs have any therapeutic benefits are minimal. To date, the studies on creativity have been entirely experimental, not correlational, largely focusing on a change on a creativity scale over a time period of playing a TTRPG as compared to the control group that did not play a TTRPG. This means that the study is limited to possible effects of that one sort of TTRPG, and the sample size is also limited to the few who participated in the experiment. These studies on creativity were also not done on populations in the United States. As a result, cultural differences may account for any differences found in creativity with or without the influence of the TTRPG.

Studies on the relationship between self-efficacy and playing TTRPGs are few. The Smith study found a correlation between these two variables, and while the sample size was large, the population did not focus on young adults. No correlation was found with playing

TTRPGs and social self-efficacy, so this study will focus on general self-efficacy and examine social skills as a separate variable. This one study is lacking in that its findings have not been replicated, and thus the findings have not been assessed for validity; however, the correlation found between playing TTRPGs and general self-efficacy has provided a new avenue of research to explore in specific benefits of playing TTRPGs.

There is a lack of studies examining the relationship between social skills and playing TTRPGs. From the literature review, we see ways that skills learned by playing TTRPGs can be applied to real life, and a relationship between empathy and playing TTRPGs has been suggested. However, neither of these studies focused on the larger variable of social skills, which is what role-playing is largely utilized for in teaching autistic children. There is an additional complication in that such programs operate under the assumption that autistic children are able to generalize from one setting to another.

The correlational study was also not focused on a specific population in terms of age, and the participants were mostly male, so the results could include confounding variables such as age and gender. The purpose of the studies mentioned was not to compare the relationships between variables, solely to examine a single variable.

This study intends to expand on the studies in the field of psychology in relation to TTRPGs. It will focus on the areas of creativity, self-efficacy, and social skills in players of these games as compared to people who do not play these games. The three previously mentioned variables will be examined in a young adult or college-aged population (18-25 years) in the United States.

Purpose

The purpose of this study is to investigate the relationship between creativity, self-efficacy, and social skills, and the playing of TTRPGs. These variables will be examined in the context of the differences between two groups: those who play TTRPGs and those who do not. To gather this information, a survey will be distributed to a population of young adults, and in-depth interviews will be conducted with participants of Pace University NYC's Ongoing Academic and Social Instructional Support (OASIS) program for autistic students where an original tabletop role-playing game called "Myriad" was created. The intention of this research is to survey a community of online and in-person participants in tabletop role-playing games using non-playing young adults as the control.

Significance

This study will provide a larger sample of how TTRPGs may affect each of the three aforementioned areas of performance. If there are significant results, the implications would suggest a possible correlation between participation in gaming and an increase in these skills. It has been debated whether creativity can be taught or acquired or if it is something inherent (Karwowski & Soszynski, 2008).

One area of focus that has been explored in attempts to expand creative thinking is the ability to problem solve (Chung 2013). TTRPGs often reward players for creative solutions to problems and may even include puzzles that require creative thinking to solve. Following this line of thinking, previous studies have shown improvement in creativity through TTRPG-inspired training (Dyson et al., 2016; Karwowski & Soszynski, 2008).

The importance of self-efficacy, defined by Smith as "the internal belief that one is capable of appropriately addressing a given situation," has been highlighted in multiple fields including academics, personal health, and endeavours in the workplace (Smith, 2014). Closely

related to confidence, self-efficacy specifically can be built through experience in multiple different situations. Playing TTRPGs allows players to experience problem solving without experiencing embarrassment or failure in a real world setting.

The little evidence there is about the relationship between self-efficacy and playing TTRPGs suggests some correlation with general self-efficacy, and there has been no statistically significant correlation found when it comes to social self-efficacy (Smith, 2014). More inquiry in this area of study could help give insight into the extent to which self-efficacy is related to playing TTRPGs. This may also prompt future research into therapeutic techniques to see if self-efficacy can be improved upon through the use of TTRPGs.

Given that TTRPGs, with the structured social setting and small group focus, are likely to attract a more introverted crowd, the possibility that the very game they feel comfortable socializing in could help expand their skills in a real world setting could open up investigation into techniques that may be more enjoyable and well-received by patients looking to better their social skills (Daniau, 2016). The fact that many who play TTRPGs say playing the game has helped them find friends and find a place to feel comfortable socializing coupled with the lack of research in this specific relationship indicates an area of practice that could be valuable in training social skills that is currently being overlooked (Ashley, 2016; Blackmon, 1994; Gilsdorf, 2017; Jahromi, 2017; Michaud, 2017). That is, assuming social skills displayed while playing TTRPGs can be generalized to other forms of socialization.

If the “Myriad” program specifically can be shown to have benefited students in the areas examined, it implies that similar programs could be produced with similar results in other educational support programs or in therapeutic practices in general. Examining the effectiveness of such a unique program will also be helpful in determining any other benefits not specifically

investigated in this study that deserve future research. Recognizing the possible areas that need to be improved in the Myriad program would also be valuable in making sure that the intended purpose of this program corresponds to its current outcomes.

Role-play has been shown to be an effective method in teaching those with autism about socializing and letting them explore different techniques with little consequence to themselves personally, although usually these methods have been used for younger children (Fein, 2015; Müller, Schuler, & Yates, 2008). Adding the game element to this method could produce more engaging programs that could be helpful for young adults as well. With the growing popularity of fan conventions and tabletop gaming in general, a possible implication of this study is to see if this element of popular culture can be beneficially integrated into a therapeutic environment.

The results of this study may prompt further investigation in ways play can assist in skill development past the young age when games typically stop being a teaching opportunity. Additionally, the idea that something that appeals to a large age group could be implemented in a clinical setting has the possibility of increasing patient receptiveness and engagement. Patients may be more motivated to continue their treatment if it involves something that they enjoy. Given that TTRPGs have provided ways for those with autism to engage with others in a social setting, the introduction of playing these games in treatment has the possibility of engaging the patients in a way other programs may not.

This study has the potential to benefit the field of counseling, specifically programs benefiting young adults with autism as well as patients with some form of social anxiety. It will provide evidence as to whether further study into the relationship between TTRPGs and the variables discussed is worthwhile. Experimental studies may be warranted to solidify the cause and effect relationship. This study will also fill the gaps in previous research, including the

viability of using TTRPGs in the treatment of young adults. It is especially important to evaluate effects of treatment in this population because it is during this point of emerging adulthood that the brain and the frontal lobe finish fully developing (Johnson, Blum, & Geidd, 2009).

The assessment of the Myriad program already in place will determine if the program has benefited the student participants and if similar programs would provide these same benefits in other universities. Investigation into possible benefits of an increasingly popular hobby will provide important implications for both the companies that produce these games and the consumers who play the games. Positive effects of playing TTRPGs would also help combat the negative connotations often associated with these games and people who play them (Haberman, 2016; Riggs, 2016).

Methods

The study will use a quasi-experimental design, with variables examined including whether or not the participant plays TTRPGs, and measures of the subject's creativity, self-efficacy, and social skills. The levels of skills in each group will be compared, and the correlation between the amount of each variable and the TTRPG-playing status of the participants will be examined. One-on-one interviews will be used to corroborate the survey results and add qualitative aspects.

Research Design

The primary method for data collection will be an electronically-distributed survey. The survey will divide participants into two categories: those who play TTRPGs and those who do not. Simply having played once or twice will not be enough to put a participant in the quasi-

experimental category. The survey will include four sections: demographics, creativity questionnaire, self-efficacy questionnaire, and social skills questionnaire.

The results of the survey will compare the scores of the control group who does not play TTRPGs to the quasi-experimental group that does. The results will also compare the three measures for any correlations present. The survey will be supplemented with an interview of students playing a TTRPG at Pace University's OASIS program, which will ask the same questions but allow for open-ended responses.

OASIS and Myriad

OASIS is Pace University NYC's support program for undergraduate students with autism and learning differences. The program offers qualified students academic coaching, internship and educational coordination, social workers, housing and social assistance, social coaches, and additional accommodations for academic testing and assignments. Course material is not actually modified for these students, and for the past five years, OASIS students have achieved an average GPA of 3.0 or higher. There are on average 38-42 students involved in OASIS programming at a time. The only requirement to join the program, in addition to meeting all admissions requirements for Pace University, is to complete a neuropsychological evaluation for assessment of individual needs.

Myriad as a program was created in 2015. The game itself was created by an OASIS student who was becoming so engrossed in the game that he was neglecting his academics. The OASIS faculty worked with the student to restrict gameplay, and by only allowing the game to be played at certain times and therefore only in the OASIS office, other OASIS students became involved. Myriad as a game is played in a combination of in-person role-playing, and online text-based role-play. As the program has now expanded to over 20 participants, some in OASIS and

some not, the players themselves have taken over regulating gameplay and the game in general. The faculty no longer has to step in to apply restrictions, and are not involved in any aspect of playing the game itself or developing rules for the game.

Sampling

The survey will be distributed through convenience sampling, including the university's psychology students, and snowball sampling, beginning with people in the gaming community to whom the researcher has easy and direct access, and expanding through these participants passing the survey along to others they know. Snowball sampling may also be employed to gather responses from those who do not play TTRPGs. The population will be all college-aged (18-25 years) adults in the United States.

Instrumentation

The scales that will be used in the survey are all public domain, and have minimal information provided on statistical norms. As such, the control group, or the group of participants that do not play TTRPGs, will serve as the "norm." These results will be compared with the quasi-experimental results, or the results of the group that does play TTRPGs. All the scales were retrieved from the PsycTESTS online database.

Creativity Scale

The scale for creativity will be the Creativity Scale, which includes 13 items on a scale ranging from 1 (strongly disagree) to 7 (strongly agree) (Tsai, Horng, Liu, & Hu, 2015). This measure was used in a study published in the peer-reviewed *International Journal of Hospitality Management*. Creativity will be defined as the ability to generate ideas or products that are both novel and appropriate to the circumstances (Gerrig & Zimbardo, 2002). This scale was selected

both because it was easily accessible and the questions focus on task-oriented ways of expressing creativity, which will be more relevant to a young adult population.

General Self-Efficacy Scale

The scale for self-efficacy will be the General Self-Efficacy Scale, which includes 12 items on a 4-point Likert scale (Not at all true, Barely true, Moderately true, Exactly true) (Bosscher & Smit, 1998). This measure was reviewed in an article published in the peer-reviewed journal *Behaviour Research and Therapy*. Self-efficacy will be defined as the set of beliefs that one can perform adequately in a particular situation (Gerrig & Zimbardo, 2002). This scale was selected both because it was easily accessible and the questions examine self-efficacy in a generalized fashion, not any one specific area, such as emotional or social self-efficacy.

The questionnaire includes measures divided into three categories: initiative, effort, and persistence. Initiative questions have to do with one's desire to act independently, an example being "if something looks too complicated, I will not even bother to try it." Effort questions have to do with the level of one's level of vigor put into a task, an example being "failure just makes me try harder." Persistence questions have to do with one's ability to stick with something despite obstacles, an example being "when I set important goals for myself, I rarely achieve them."

Abridged Social Skills Inventory

The scale for social skills will be the Abridged Social Skills Inventory, which includes 24 items on a scale ranging from 1 (not at all like me) to 5 (exactly like me) (Oldmeadow, Quinn, & Kowert, 2013). This measure was used in a study published in the peer-reviewed journal *Computers in Human Behavior*. Social skills will be defined as an individual's ability to successfully facilitate communication and interaction with others, involving the understanding

and proper use of both verbal and nonverbal cues. This scale was selected both because it was easily accessible and the questions provide a variety of applications of social skills while still being brief.

The questionnaire includes measures divided into six categories: emotional expressivity, emotional sensitivity, emotional control, social expressivity, social sensitivity, and social control. Expressivity questions have to do with the ability to effectively communicate feelings and receptivity to social environments, an example being “I rarely show my feelings or emotions.” Sensitivity questions have to do with the awareness to others’ emotions and one’s capacity to be easily hurt, an example being “I always seem to know what people's’ true feelings are no matter how hard they try to conceal them.” Control questions have to do with the power to direct one’s own feelings, an example being “I am rarely able to hide a strong emotion.”

One-on-One Interviews

In addition to a survey, in order to receive quantitative results, students who are a part of Pace University’s Myriad group will also be interviewed using key questions from the survey but allowing for more open-ended responses. Additionally, it will be documented if these students have perceived any change in their creativity, self-efficacy, or social skills during their experience playing Myriad. This will give the research more nuance and help prove whether or not experimental studies are warranted in this area.

Data Collection and Analysis Procedures

The data will be collected through Qualtrics, with the letter of consent preceding the questionnaire itself. Demographic information will be open-ended, and each instrument will have its own measure of possible answers. The only possible incentives participants would have for answering the questionnaire is a portion of the sample will include students in an Introduction to

Psychology class in which participating in undergraduate research studies is an option to fulfill part of the class credit. The data will be analyzed using the Pearson Correlation Coefficient to determine the strength of the correlation of the three variables within each group, and a one-way ANOVA to determine the difference among the three variables between the two groups, both in SPSS Version 23.

Protection of Human Rights

In order to protect human subjects, participation in both the survey and interview portion of the study is voluntary and participants can choose to withdraw from the study at any time. Subjects' confidentiality will be protected as there will be no section in the survey requesting a name and the questions included in the demographics section will be broad and not be specific enough to identify subjects given the information. Subjects will be informed in the letter of consent that they may receive a copy of the study when it is finished via the undergraduate researcher's academic email.

Results

There were 85 total participants in this study. Forty-nine participants reported they played TTRPGs yearly or less often, and 36 reported they played monthly or more often. Twenty-seven participants identified as male, 52 identified as female, and 6 identified as nonbinary. There were 120 total responses to the Qualtrics survey; however, 35 of these responses were incomplete and so were not included in the statistical analysis.

A Pearson correlation was calculated examining the relationships among each of the three measures, first for the participants that played TTRPGs and second for participants that did not. Those who classified as TTRPG players were participants who reported they played monthly or

more often, and those who did not play TTRPGs were participants who reported they played yearly or less often. A one-way multivariate ANOVA was then computed comparing the three measures of creativity, self-efficacy, and social skills of participants who either did or did not play TTRPGs.

A Pearson correlation was calculated examining the relationship between creativity and self-efficacy. A strong correlation that was significant between creativity and self-efficacy was found for TTRPG players ($r(2) = .44, p < .01$) and for non TTRPG players ($r(2) = .336, p < .05$). Creativity is positively correlated with self-efficacy. These results are presented as a scatterplot in Figure 1.

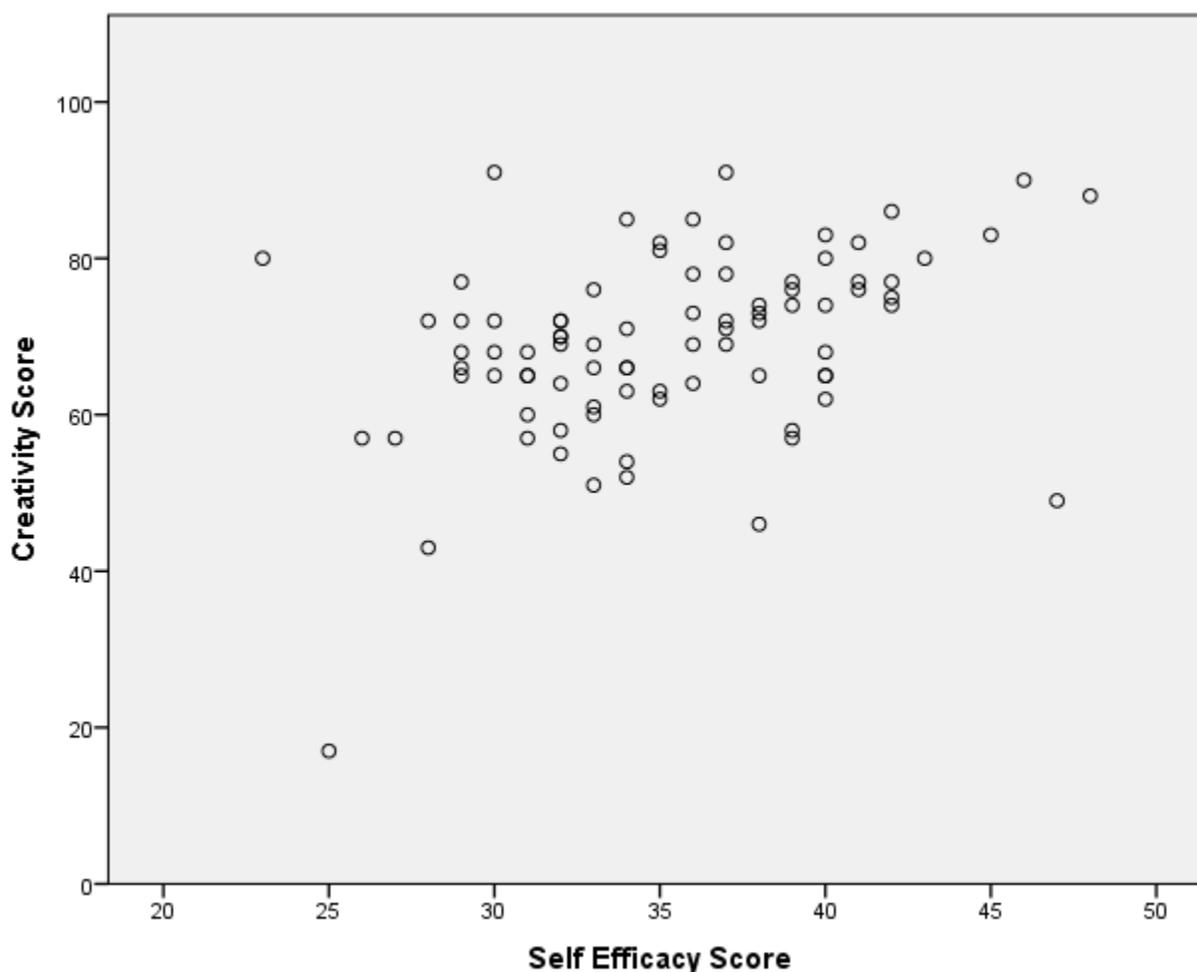


Figure 1: correlation between creativity and self-efficacy

A Pearson correlation was calculated examining the relationship between creativity and social skills. A strong correlation between creativity and social skills that was significant was found for TTRPG players ($r(2) = .606, p < .01$) and for non TTRPG players ($r(2) = .428, p < .01$). Creativity is positively correlated with social skills. These results are presented as a scatterplot in Figure 2.

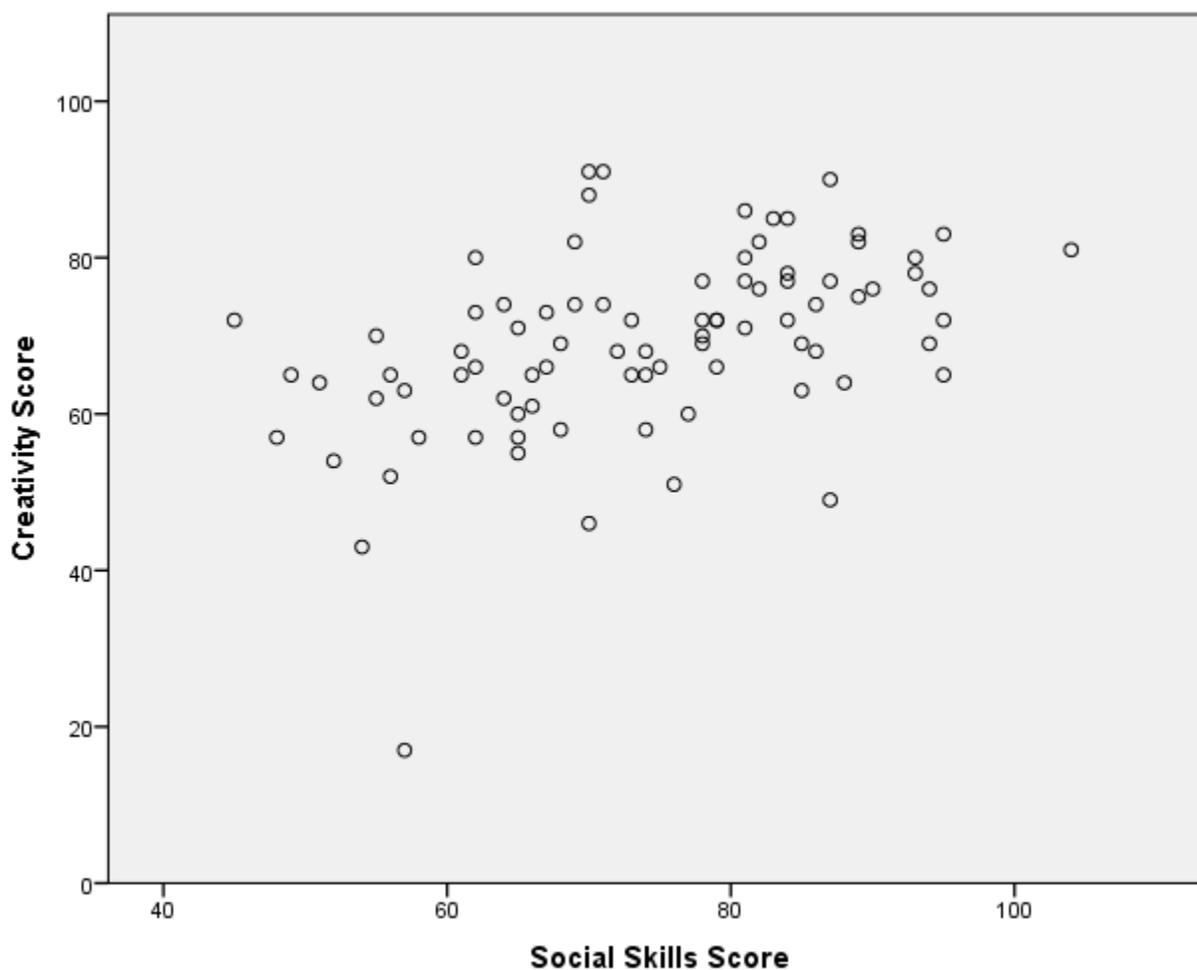


Figure 2: correlation between creativity and social skills

A Pearson correlation was calculated examining the relationship between self-efficacy and social skills. A strong correlation that was significant was found between self-efficacy and

social skills for TTRPG players ($r(2) = .441, p < .01$) and for non TTRPG players ($r(2) = .384, p < .01$). Self-efficacy is positively correlated with social skills. These results are presented as a scatterplot in Figure 3.

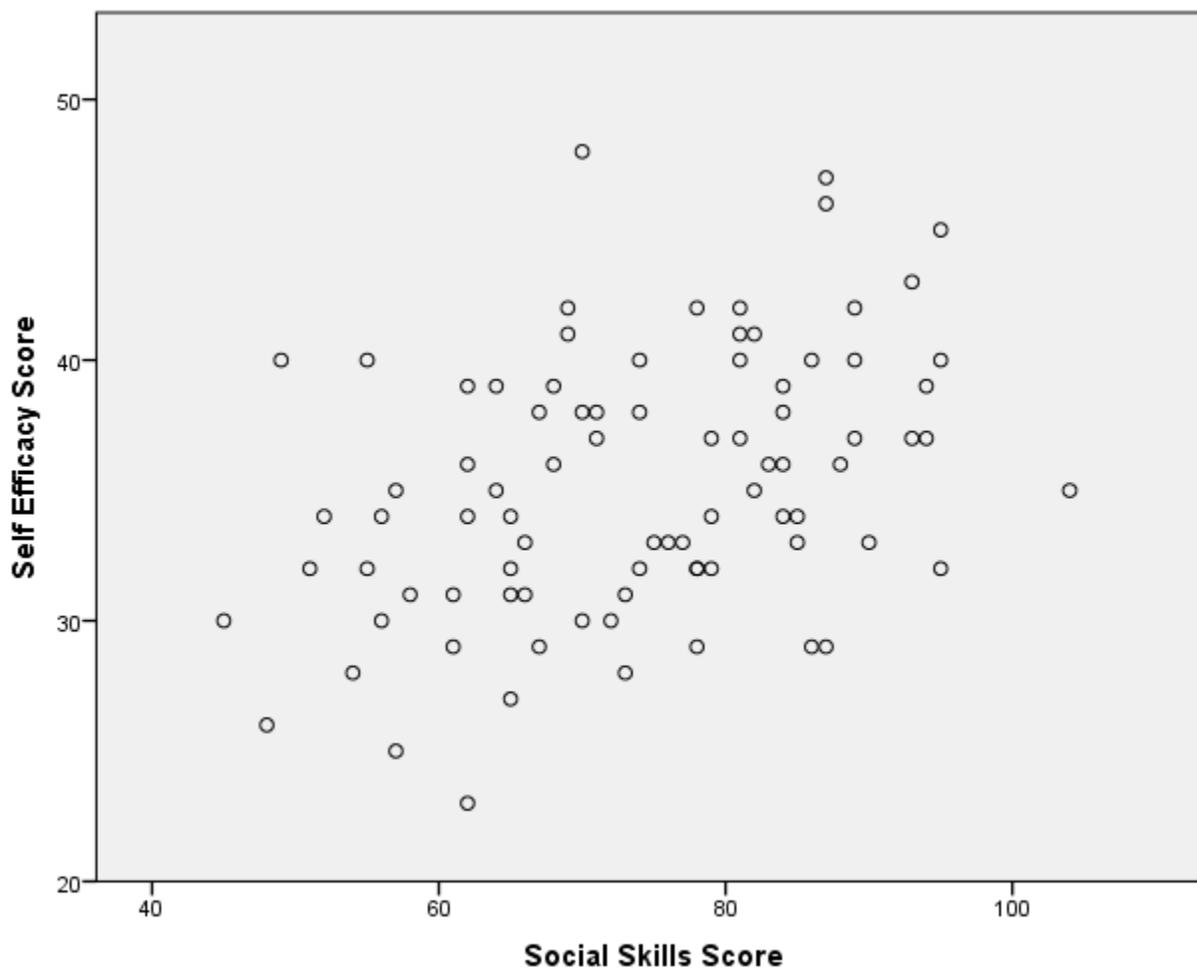


Figure 3: correlation between self-efficacy and social skills

Creativity

A one-way multivariate ANOVA was calculated comparing the creativity scores of participants who either did or did not play TTRPGs. A significant difference was found between the groups ($F(2, 82) = 6.972, p < .05, \text{partial } \eta^2 = .106$). Tukey's HSD was used to determine the nature of the differences between the groups. This analysis revealed that participants who did not

play TTRPGs had significantly lower creativity scores ($m = 66.41$, $sd = 12.403$) than participants who did play TTRPGs ($m = 72.97$, $sd = 9.652$). Gender was calculated as a covariate and did not significantly affect the results for creativity scores.

Self-Efficacy

A one-way multivariate ANOVA was calculated comparing the self-efficacy scores of participants who either did or did not play TTRPGs. No significant difference was found ($F(2, 82) = 1.175$, $p > .05$, $\text{partial } \eta^2 = .094$). The two groups did not differ significantly in terms of self-efficacy. Participants who played TTRPGs had a mean self-efficacy score of 35.94 ($sd = 4.478$). Participants who did not play TTRPGs had a mean self-efficacy score of 34.73 ($sd = 12.403$).

After controlling for gender as a covariate, a significant difference was found in self-efficacy scores in the tests of between-subjects effects ($F(2,82) = 4.268$, $p < .05$). Tukey's HSD was used to determine the nature of the differences between the groups. This analysis revealed that male participants ($m = 37.07$, $sd = 4.787$) had significantly greater scores than nonbinary participants ($m = 31.0$, $sd = 4.648$), (6.074 (95% CI, .8 to 11.35), $p < .05$) but no other group differences were statistically significant.

Social Skills

A one-way multivariate ANOVA was calculated comparing the social skills scores of participants who either did or did not play TTRPGs. No significant difference was found ($F(3, 82) = .054$, $p > .05$, $\text{partial } \eta^2 = .002$). The two groups did not differ significantly in terms of social skills. Participants who played TTRPGs had a mean social skills score of 74.14 ($sd = 12.062$). Participants who did not play TTRPGs had a mean social skills score of 73.47 ($sd =$

14.628). Gender was calculated as a covariate and did not significantly affect the results for social skills scores.

Overall, one of the three measures used in the present study (creativity) demonstrated statistically significant differences between the participants that did play TTRPGs and the participants that did not. All three of the measures were positively correlated with each other. While the correlation between creativity and playing TTRPGs does not necessarily mean there is a direct connection between the two variables, the statistical significance supports further investigation into the exact nature of the relationship between the variables.

Discussion

In all participants, regardless of whether or not they played TTRPGs, creativity was positively correlated with self-efficacy and social skills, and self-efficacy was positively correlated with social skills. Participants who played TTRPGs had statistically significantly higher creativity scores than participants who did not play TTRPGs, but these two groups did not display statistically significant differences in either self-efficacy scores or social skills scores. Given previous research, the results of the present study are surprising in terms of the lack of statistical significance between playing TTRPGs and either self-efficacy or social skills. These results support various studies previously done in the area, and indicate possible areas for future related studies.

The strong correlations found among all three variables studied for both participants who played TTRPGs and those who did not implies a connection, either cognitively, emotionally, or some combination, between the skills involved in the variables. This connection may not be direct, and the correlational component does not mean that one leads to the other. The correlation found in the present study does support further study into the relationships among the three

variables, and not necessarily only in terms of those who play TTRPGs. The correlations also suggest there may be similarities in the skills needed to have higher scores in the three measured variables, which also warrants further investigation into other skills that could affect creativity, self-efficacy, and social skills. If a causal relationship can be found, it could be effective in helping to modify programs working to improve skills in any of these three areas.

The statistically significant difference found in creativity between those who play TTRPGs and those who do not support the experimental evidence for a causal relationship between playing TTRPGs and creativity. These studies, done by Karwowski & Soszynski (2008), Chung (2013), and Dyson (2016), reported increased creativity scores of varying types after either playing TTRPGs or going through training inspired by TTRPGs. While the present study does not provide support for such a relationship, it builds on the described results by offering a possible correlational component. This replication gives strength to the hypothesis that the variables of creativity and playing TTRPGs are related.

The lack of a statistically significant difference in self-efficacy between those who play TTRPGs and those who do not does not support the results of the study done by Smith (2014), which reported a strong correlation between playing TTRPGs and self-efficacy. The Smith study was done on a different population from the present study in that it included adults. The focus of this study on a young adult population therefore may display a lack of a correlational relationship between playing TTRPGs and self-efficacy if, for example, there is a connection between increased self-efficacy and increased age, or some other confounding variable not considered in either study.

The fact that there was a statistically significant difference in self-efficacy between males who took the survey and nonbinary people who took the survey may not be indicative of a

similar difference in the larger population, as there were 27 men who participated in the survey as opposed to 6 nonbinary people. 4 of the 6 nonbinary participants reported playing TTRPGs either monthly or more often, and the remaining 2 reported playing yearly or less often, therefore the difference in self-efficacy scores cannot be connected to whether the participants played TTRPGs or not. Since the controlling of gender as a covariate did not significantly affect the differences between the two groups of participants, these results do not support any further investigation into the difference in self-efficacy between males and nonbinary people.

In order for future studies using either creativity or self-efficacy to have external validity, definitions of these variables need to be solidified. For example, if creativity is considered the ability to be able to try new things and explore novel ideas, and self-efficacy is considered one's confidence they can complete tasks, then having self-efficacy would not be conducive to participating in creative endeavors. This possible connection between creativity and self-efficacy would bring the positive correlation found in the present study into question, as one would expect the two to have an inverse relationship. Consequently, questionnaires that measure creativity and self-efficacy that are directly related may need to be established.

The lack of a statistically significant difference in social skills between participants who played TTRPGs and those who did not does not directly support the study by Rivers and associates (2016), in which a positive correlation between playing TTRPGs and empathy was found. This difference in results may be due to the fact that the present study only had four questions out of the 24 included in the Abridge Social Skills Inventory related to social sensitivity, which while similar, does not explicitly measure empathy. This lack of a statistically significant difference in social skills additionally refutes the popular stereotype that people who

play TTRPGs and role-playing games in general are reclusive and purposefully avoidant of social interaction.

The results of the one-on-one surveys yielded information about the participants' perspective on how the Myriad program benefited them. The participants were under the impression that, rather than benefiting them in terms of creativity, self-efficacy, or social skills, they learned time management and self control abilities through playing the TTRPG Myriad. This perception may be influenced by how often autistic patients are told these are the abilities they need to improve on, while creativity and imagination may be taken for granted. While the interviews did not explicitly reveal any information about the three variables the present study focused on, executive function skills could contribute to increases in self-efficacy and even social skills. This feedback may support further study into ways TTRPGs can improve executive function, specifically in those who have autism.

Limitations

Possible weaknesses in this study begin with the lack of statistical norms for the scales being used, and therefore the reliance on a control group to determine these norms. While two of the three scales described have been created within the last five years, the General Self-Efficacy Scale was written two decades ago, and could possibly have lost validity during this time due to outdated questions and methods. Given that these scales were all written by different researchers and have not been used in a combination prior to this study, the different scales may have affected participants' responses.

Given the nature of the convenience sample, there is no random selection, so differences in scores could be attributed to many other variables. The present study attempted to remedy this with the use of the demographics section of the survey so possible such variables could be

examined. This section revealed that the majority of the responders were white ($n = 63$, 74.12% of total respondents) and living in the northeast part of the United States ($n = 53$, 62.35% of total respondents).

The very nature of a self-report survey means that results are not necessarily accurate, but rather reflective of participants' perceptions of themselves, or even the participants' ideal selves rather than their actual selves. Given the researcher had the means to distribute the survey throughout the online TTRPG-playing community and to a large portion of students at Pace University, the external validity exceeded the original goal of 70 respondents, but these results are not generalizable to the entire population of all people in the United States ages 18-25. The results may be more generalizable to the population most represented in the study, which are young adults who are white and living in the northeast part of the United States.

The only indicated gender differences in scores between males and nonbinary participants in terms of self-efficacy scores highlights another limitation in the study. There were significantly more male participants than nonbinary participants, meaning no conclusion based on statistics from the present study. The small number of nonbinary participants may be the reason for the statistically significant difference identified, or could be indicative of a larger difference in a more general population; however, further investigation is not directly supported by the results of the present study.

With the assistance of feedback from survey participants, given voluntarily and not recorded with names by the researcher, other limitations in the demographics section were found. The question about where in the United States the participant lived did not include an option for Alaska, Hawaii, or United States territories due to oversight on the researcher's part. Additionally, there was no option in the ethnicity question for Hispanic, Latinx, or mixed

participants, again due to oversight on the researcher's part. This lack of comprehensive ethnicity options was somewhat remedied by the fact that the participants had the opportunity to input their own text to describe their ethnicity rather than choose one of the given options.

As the study is correlational, it does not provide a determination of the causal relationship between the three variables described and the playing of TTRPGs. Therefore, the internal validity is low; however, the relationships identified among the variables discussed will help determine where future research and possible experimental studies should focus their efforts. Various causal relationships have also been identified by previous studies in similar areas, and so the presence of a significant correlation in this research strongly supports the results of such studies. The results indicate such future research should focus on creativity as it relates to TTRPGs, and further solidifying the relationships among creativity, self-efficacy, and social skills.

Conclusions and Further Study

The results of this study lead to the conclusion that TTRPG players score higher than non-TTRPG players in terms of creativity, but not self-efficacy or social skills. Additionally, regardless of TTRPG-playing status, creativity is positively correlated with self-efficacy, social skills are positively correlated with creativity, and self-efficacy is positively correlated with social skills. The qualitative results of this study reveal time management and executive functioning as a possible additional avenue to explore with regards to benefits of playing TTRPGs. The focus of this study would support such an inquiry with a specific concentration in a practical application to the treatment of autistic young adults.

Previous investigations into possible positive effects of TTRPGs, while sparse, focused primarily on the three measures examined by this study. The results of the present study add to

this field in that it provides an expansion on the mentioned previous studies, and fills the gaps in certain areas not previously explored. One such area is the correlational component in the relationship between creativity and playing TTRPGs, as previous studies have established a possible causal relationship (Karwowski & Soszynski, 2008; Chung, 2013; Dyson, 2016). The presence of a positive correlation in this study provides additional evidence for the fact that the increase in creativity in previous studies was due to the playing of TTRPGs and not a confounding variable.

The one study that could be identified examining the relationship between playing TTRPGs and self-efficacy determined there was a positive correlation in a population that was primarily adults (Smith, 2014). The lack of a correlation found in this study does not invalidate these previous results; however, it may indicate a significant difference in the research methods. This could include either the responsiveness of participants to the different questionnaires used, age as a possible confounding variable, or something else not considered. Replications of either the present study or the Smith study could also help identify more reasons for the differences in results.

This study attempted to expand upon a previous study which measured empathy, an essential ability for one to succeed in terms of social abilities (Rivers et al., 2016). The Rivers study found a positive correlation between empathy and playing TTRPGs, while the present study did not find a statistically significant correlation between social skills in general and playing TTRPGs. As the present study used a different questionnaire that measured a variety of social abilities, and while empathy was not explicitly one of them, a fraction of the questions measured social sensitivity. The difference in results may warrant further investigation into the

other social skills evaluated by the present study and the relationship of those variables to playing TTRPGs to determine which ones specifically produce statistically significant results.

The implications of this research offer possibilities for new or modified programs for improving creativity, and suggest the establishment of programs for autistic people similar to Myriad may have concrete, statistically-supported benefits. The lack of a correlation found between self-efficacy and playing TTRPGs, other than warranting further investigation, provides evidence against assumptions that playing TTRPGs is harmful. The lack of a correlation found between social skills and playing TTRPGs serves a similar purpose, and more specifically provides a contradiction to stereotypes of TTRPG players as antisocial or otherwise not socially competent.

The presence of a correlation among all the three variables regardless of TTRPG-playing status also suggests, if playing TTRPGs can improve performance in one area, there may be some sort of improvement in the other two as well, even if that improvement is not as direct. Further implications are that benefits of playing TTRPGs are not limited to those with unusually low levels of either creativity, self-efficacy, or social skills, but to a larger, more general population. Additional research is needed to determine the validity of these assumptions; however, the presence of strong correlations in this study provide statistical justification for such research. The results of this study also serve as justification into further investigation of TTRPG programs as part of autism treatment plans.

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Appendix

Creativity Scale

1. I will suggest new ways to achieve goals or objectives.
2. I will come up with new and practical ideas to improve performance.
3. I will search out new technologies, processes, techniques, and/or product ideas.
4. I will suggest new ways to increase quality.
5. I am a good source of creative ideas.
6. I am not afraid to take risks.
7. I will promote and champion ideas to others.
8. I will exhibit creativity on the job when given the opportunity.
9. I will develop adequate plans and schedules for the implementation of new ideas.
10. I often have new and innovative ideas.
11. I will come up with creative solutions to problems.
12. I often have a fresh approach to problems.
13. I will suggest new ways of performing tasks.

Responses are on a seven-point Likert scale ranging from: 1 (strongly disagree) to 7 (strongly agree).

General Self-Efficacy Scale**Initiative**

1. If something looks too complicated, I will not even bother to try it.
2. I avoid trying to learn new things when they look too difficult.
3. When trying to learn something new, I soon give up if I am not initially successful

Effort

1. When I make plans, I am certain I can make them work
2. If I can't do a job the first time, I keep trying until I can.
3. When I have something unpleasant to do, I stick to it until I finish it.
4. When I decide to do something, I go right to work on it.
5. Failure just makes me try harder.

Persistence

1. When I set important goals for myself, I rarely achieve them.
2. I do not seem capable of dealing with most problems that come up in my life.
3. When unexpected problems occur, I don't handle them very well.
4. I feel insecure about my ability to do things.

Results are on a 4-point Likert scale ranging from: Not at all true, Barely true, Moderately true, to Exactly true.

Abridged Social Skills Inventory**Emotional Expressivity**

1. I usually feel uncomfortable touching other people.
2. Sometimes I have trouble making my friends and family realize how angry or upset I am with them.
3. I often touch my friends when talking to them.
4. I rarely show my feelings or emotions.

Emotional Sensitivity

1. I can easily tell what a person's character is by watching his or her interactions with others.
2. I always seem to know what people's' true feelings are no matter how hard they try to conceal them.
3. I can accurately tell what a person's character is upon first meeting him or her.
4. I can instantly spot a "phony" the minute I meet him or her.

Emotional Control

1. I am not very skilled in controlling my emotions.
2. It is very hard for me to control my emotions.
3. I am very good at maintaining a calm exterior even if I am upset.
4. I am rarely able to hide a strong emotion.

Social Expressivity

1. I love to socialize.
2. I always mingle at parties.
3. At parties I enjoy talking to a lot of different people.

4. I enjoy going to large parties and meeting new people.

Social Sensitivity

1. I am very sensitive of criticism.
2. It is very important that other people like me.
3. I am generally concerned about the impression I am making on others.
4. I am often concerned what others are thinking of me.

Social Control

1. When I am with a group of friends I am often the spokesperson for the group.
2. I find it very difficult to speak in front of a large group of people.
3. I am usually very good at leading group discussions.
4. I am often chosen to be the leader of a group.

Responses are on a 5-point Likert scale ranging from: 1 (not at all like me) to 5 (exactly like me).