Table-top role playing game and creativity

Tsui-shan Chung

A B S T R A C T

The current study aims to observe whether individuals who engaged in table-top role play-ing game (TRPG) were more creative. Participants total 170 (52 TRPG players, 54 electronic role playing game (ERPG) players and 64 Non-players) aged from 19 to 63. In the current study, an online questionnaire is used, adopting the verbal subtests of Wallach–Kogan Cre-ativity Tests and the McCrae and Costa Big Five Personality Inventory. It is found that TRPG players score higher in divergent thinking tests. Priming and instruction giving methods lower the performance of all participants, in particular, when the instruction is memory provoking. ERPG players score lowest among the three groups. TRPG could be regarded as a form of improvisation. It could also be a preferable activity for the promotion of creativity. It is low cost and no formal setting is required to play. Many ERPGs are originated from TRPGs, therefore, with the popularity of ERPG, there should be advantages in promoting TRPG.

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1. Introduction

As pointed out by Plucker and Runco (1999), despite the discussion about the influence of nature and nurture on creativity, creativity can be enhanced because everyone has his or her inborn potential and such potential can be fully realized.

Training is one of the methods used to enhance creativity (Scott, Leritz, & Mumford, 2004). Inspired by table-top role playing game (TRPG), Karwowski and Soszynski (2008) developed a training method called "Role Play Training in Creativity" which aimed to enhance creative imagination. According to them, their method "proved to be one of quite a high overall effectiveness" (p.168).

TRPGs are not board games, card games nor board wargames. They are fantasy role-playing games, a kind of leisure activity. According to Williams, Hendricks, and Winkler (2006), a basic TRPG require players to "create fictional personas. . .within the rules and genre specified by the game, and then collectively engage in protracted storytelling" (p.3). Although the gamemaster will provide some information according to a rulebook, TRPGs are imagination demanding activities as the players are to create and experience an imaginative adventure together.

TRPG is getting psychologists' attention. Kaufman (2009) expressed his interest in seeing "how imagination is used in creating role-playing game characters" (p.171). In view of the nature of TRPG and the method developed by Karwowski and Soszynski (2008), it is wondered whether TPRG players would score higher in creativity tests: would people without the TRPG training developed by Karwowski and Soszynski but with actual experience in playing TRPG on their own be more creative than people without the exposure to TRPG? Karwowski and Soszynski indicated that "it would be worth to make sure whether the effectiveness of the training session does not bear just a short-term influence on its participants" (p.168). Would being a more experienced TRPG player (i.e. a player with many years of playing practice) relate to the score obtained?

Electronic role playing game (ERPG) is certainly the most well-known form of role playing game. In the study of Yee (2006) about motivations of playing massively multiplayer online role-playing games, with a sample of 3000 participants,

E-mail address: rivachung@gmail.com

Yee found that one of the subcomponents found in the factor analysis is "Role-Playing – creating a persona with a background story and interacting with other players to create an improvised story" (p.773). Yee's definition of Role-Playing points out a common feature of TRPG and ERPG.

The relationship between creativity and ERPG is unclear. Hamlen (2009) found that for upper elementary school students, playing video games had no influence on their creativity. Another study found that for university students who are media multitaskers, the length they were exposed to media had no influence on their creativity (Ophir, Nass, & Wagner, 2009). Would these findings apply to ERPG players?

In relation to priming manipulation in creativity tests, Zabelina and Robinson (2010) found that undergraduate participants scored higher in creativity tests when being asked to imagine themselves as 7-year-olds. Can such priming manipulation be regarded as an analogue of role playing that requires the retrieval of participants' memory? Because both tactics require participants to lower their self-consciousness, and arguably, in a light-hearted manner, it would be interesting to find out if TRPG players would score differently under such priming manipulation.

The current study aims to explore the areas in the above questions by studying whether differences can be found in creativity level between TRPG players, ERPG players and Non-players under three different treatments, namely without priming (Control Treatment), with age-related memory-provoking priming (Treatment One) and with age-related imagination-enhancement role-playing priming (Treatment Two).

"Affect" is another component of creativity considered by Plucker and Runco (1999). The current study also collects data in relation to mood of participants at the time of answering the online-questionnaire and demographic data, such as age and nationality for further analysis. In the current study, data in relation to personality have been collected.

2. Literature review

2.1. Play

Runco (2007) stated that to define "play" is not easy and pointed out that play is related to intrinsic motivation. Dansky (1999) viewed that the meaning of the word "play" has too many aspects, which makes defining it difficult. Therefore, he chose the term "playful behaviour" when talking about the links between play and creativity. He defined "playfulness" as "more to the quality of an activity" (p.393), in contrast, activities are playful if they are self-directed by intrinsic motivation as well as restricted less by external constraints. He also pointed out that playful activities are more likely to bring about positive moods like pleasure, joy, excitement or fun to people.

2.1.1. Role playing game

As a hobby, role playing game (RPG) has many forms such as table-top (or pen-and-paper), live action, video or computer, online (from one to several, and even masses of players playing in real-time). Puchalska-Wasyl, Chmielnicka-Kuter, and Oleś (2008) used the definition of Hughes (1988) and defined RPG as "shared fantasy" that "engage individual imagination that is guided by the rules of the game".

2.1.2. Table-top role playing game

In fact, in every table-top role playing game (TRPG), there is a game rulebook for the use of the gamemaster. The gamemaster acts like the director of a film. The gamemaster informs the players about information regarding the scenes, settings and scenarios. The gamemaster also needs to play all other untaken characters that appear in the shared fantasy world, such as a pedestrian. Player "adopts the role of character and then guides that character through an adventure. The player makes decisions, interacts with other characters and players, and, essentially, "pretends" to be his character during the course of the game" (Cook, 1989, as cited in Mackay, 2001, p.4). They usually design their own characters and speak in character while playing the game. Facial expressions and small gestures are often used during the game.

2.1.3. Length of TRPG varies

It can be a few hours, or continuous episodes spread out over several months. Pen and paper are needed to serve the purposes for character record sheets and notes that need to pass between players. Dice of different sizes and colours are needed to determine results, such as fights (Mackay, 2001). An important nature of TRPG is that players and the gamemaster gather together for the game face-to-face.

2.1.4. Electronic role playing game

For the purpose of the current study, electronic role playing game (ERPG) includes all kinds of role playing games, as long as they are in electronic forms, and not played face to face by players. Electronic forms may cover video (via console or other electronic devices such as smartphones), computer and online. With reference to the definition for massively multiplayer on-line games (MMOG) by Bainbridge (2010), the definition of such electronic role playing games include the following elements: (a) the games are set in a computer-generated world; (b) each player can choose to play a character; (c) players may or may not interact with other characters played by other players; (d) the games are under certain rule constraints; (e) there are goals for the players to achieve; and (f) players, even situated in the same room, when they play, they focus on the screen not on their fellow players' face.

Within different kinds of ERPG, many research studies have been done on MMOG. As summarized by Barnett and Coulson (2010) in a study about MMOG: (a) video games are played by over 60% of households in the United States (Entertainment Software Association, 2009 as cited in Barnett & Coulson); (b) the age of players range from 12 to 83 (Barnett, Coulson, & Foreman, 2009 as cited in Barnett & Coulson, 2010); (c) about 80% of players are male.

Ophir et al. (2009) compared two groups of participants: those who spent more than 5.9 hours per week and those who spent less than 2.86 hours per week on 12 different forms of media (including playing video or computer games and using a computer for different purposes). They found that such patterns of time allocation would have implications on one's ability to focus on tasks but would not affect one's creativity performance.

2.2. Creativity

A generally agreed definition of creativity is that "creativity involves the development of a novel product, idea, or problem solution that is of value to the individual and/or the larger social group" (Hennessey & Amabile, 2010, p.572).

Although it cannot represent creativity, divergent thinking is a major aspect most studied by psychologists when assessing creativity. Divergent thinking is a predictor of potential for creativity. When one needs to discuss divergent thinking, one must mention Guilford (1967) as divergent thinking was an element in his Structure of Intellect model. Later, Torrance (1974) developed tests that were based on Guilford's suggestion. His tests score on four main units or abilities in divergent thinking: (a) fluency (e.g. number of ideas produced); (b) flexibility (e.g. types of ideas produced); (c) originality (e.g. number of rare ideas produced); and (d) elaboration (e.g. the development of ideas with more details) (Kaufman, 2009; Sternberg, Lubart, Kaufman, and Pretz, 2005). This version of Torrance Tests of Creative Thinking (TTCT) can be referred to as pre-1984 TTCT because a newer edition of TTCT was created in 1984. However, the pre-1984 TTCT is the most recognized edition. It is common that in divergent thinking tests such as the one developed by Wallach and Kogan (1965), subtests are divided into verbal (e.g. open-ended questions) and figural (e.g. finishing a drawing with only a few lines/curves in).

In the study of Karwowski and Soszynski (2008), using a test created by Polish Kujawski, as cited in Karwowski (2008) and a test by Urban and Jellen (1989), both fluency and originality of the participants increased after the Role Play Training in Creativity.

2.2.1. Priming and creativity

According to Bargh and Chartrand (2000), when using priming technique, in contrast with automaticity, one is interested to see the effects that are brought out by the primed context received by a person, i.e. how one reacts, feels or thinks differently. For example, in a research study done by Mumford, Feldman, Hein and Nagao (2001), priming manipulation was used to provide participants "with wider range of alternative solutions" for a creative problem solving task by way of a survey that was compiled beforehand. The target of the priming manipulation in that study was the unconscious mind.

On the other hand, it is noted that the priming manipulation in the study of Zabelina and Robinson (2010), that is, directly requesting the participants to imagine themselves as a 7-year-old, targeted the conscious mind of the participants. Zabelina and Robinson used the abbreviated Torrance test for adults by Goff and Torrance (2002) to test originality and fluency. Their result was that their priming manipulation increased participants' originality but did not influence fluency.

2.2.2. Memory and creativity

The fMRI study by Fink et al. (2010) revealed that in terms of brain activity, usual verbal divergent thinking tasks require participants "to generate ideas in a completely free-associative manner and, thus, to strongly suppress bottom-up attention to external stimulation and automatically activated knowledge" (p.1694). But for verbal divergent thinking tasks with "direction" (in their study, Fink et al. exposed participants with external ideas as a way to stimulate creativity), they found that participants "had to focus on other people's ideas, thus allowing for external stimulation and bottom-up attention" (p.1694). They are of the opinion that it is possible that the "direction" "interacted with participants' memory in a way that they elicited the (automatic) retrieval of novel associations to the stimulus objects" (p.1694). With "direction" given, originality was improved in their study.

2.2.3. Instructions given in creativity tests

In a study conducted in China, Niu and Liu (2009) found that if more details are given in the task instructions, compared with the no additional instruction condition, creativity is higher in the former condition.

2.2.4. Creativity training

Because it has been proven that creativity can be enhanced, people have been trying to achieve this by way of training. According to the meta-analyses conducted by Scott et al. (2004), creativity training was generally effective. As summarized by Hennessey and Amabile (2010), effective creativity training "focus on development of cognitive skills and heuristics for the application of those skills" (p.577). In the study of Karwowski and Soszynski (2008), participants were trained for a total of eight hours. The one-day training group performed better in terms of originality. The 4-week training group performed better in fluency.

2.2.5. Creativity and personality

The relationship between personality and creativity has been well researched. It is well-known that under the Big Five model of personality devised by McCrae and Costa (1997), openness to experience (imagination, curiosity and intellectualism) has been found to be positively related to creativity. Conscientiousness (impulse control, planning and organization), on the other hand, was found to be negatively related. The other three factors, namely extraversion, agreeableness and neuroticism, did not share the strong relationship with creativity as openness to experience and conscientiousness (James & Taylor, 2010).

2.3. Variables

There are three variables in the current study: the dependent variable is divergent thinking test performance; the independent variables are (a) type of participants (TRPG player, ERPG player or Non-player) and (b) treatment type, Control Treatment (without priming), Treatment One (with age-related memory-provoking priming) and Treatment Two (with age-related imagination-enhancement role-playing priming).

One criterion is set for the participants: participants must be 18 years old or above.

2.4. Hypotheses

In the current study, it was hypothesized that TRPG players who have ever played TRPG for more than eight hours have been solidly "trained" and would perform better across different treatments.

Under Treatment One (with age-related memory-provoking priming) of the current study, the same priming manipulation used in the study of Zabelina and Robinson (2010) is copied. Based on the findings of Fink et al. (2010), it was hypothesized that the priming manipulation used by Zabelina and Robinson functions as a "direction" of role playing that requires the participants to focus on the idea of mentally travelling back to one's childhood.

Because no training is received by ERPG players and Non-players, and because there is no evidence for ERPG players to score higher in divergent thinking tests, it was expected that the performance of the two groups would be similar.

In Treatment Two (with age-related imagination-enhancement role-playing priming) of the current study, besides priming manipulation similar to that used by Zabelina and Robinson (2010), an additional role-playing instruction is added. It was expected that additional instruction would enhance creativity.

In view of the previously discussed researches, the following hypotheses are formed:

Hypothesis 1.   Under the Control Treatment, the divergent thinking test performance of TRPG players is higher than that of ERPG players and Non-players.

Hypothesis 2.   Under Treatment One, the divergent thinking test performance of TRPG players is higher than that of ERPG players and Non-players.

Hypothesis 3.   Under Treatment Two, the divergent thinking test performance of TRPG players is higher than that of ERPG players and Non-players.

Hypothesis 4.   The divergent thinking test performance of TRPG players will increase with experience of playing.

Hypothesis 5.   The divergent thinking test performance of all players is higher under Treatment One than Control Treatment.

Hypothesis 6.   There is no difference between the divergent thinking test performance of ERPG players and that of Non-players under Treatment One.

Hypothesis 7.   The divergent thinking test performance of all players is higher under Treatment Two than Treatment One.

Hypothesis 8.   There is no difference between the divergent thinking test performance of ERPG players and that of Non-players under Treatment Two.

Hypothesis 9.   The divergent thinking test performance of ERPG players remains the same regardless of the experience of playing.

3. Methodology

3.1. Design

This study adopts a cross-sectional analytic survey in the form of a Web-based structured questionnaire by using a free online questionnaire service from my3q.com. The 76 items questionnaire in English and Chinese consist of various sections in mixed order. These sections consist of divergent thinking tasks, personality traits items and demographics and other information such as questions about mood, what percentage of imagination and memory is used in answering the divergent thinking tasks. Each divergent thinking task question is separated by demographic questions that sought participants' personal information. These "fillers" are intended to alter the participants' thinking path to an "admin mode". They act as

Table 1
Demographic characteristics of participants ($N = 170$).

Particular	TRPG players ($n = 52$)		ERPG players ($n = 54$)		Non-players ($n = 64$)	
	n	%	n	%	n	%
Gender						
Male	42	80.8	24	44.4	11	17.2
Female	10	19.2	30	55.6	53	82.8
Age						
19–28	25	48.1	22	40.7	20	31.3
29–38	24	46.2	24	44.4	33	51.6
39–48	2	3.8	7	13.0	9	14.1
49–58	0	0	1	1.9	2	3.1
59 or above	1	1.9	0	0	0	0

the "cleaner" between each divergent thinking task and are intended to help give participants a refreshed mind for the next divergent thinking task. The fillers should have no influence on the result of the divergent thinking tasks.

3.2. Participants

The current study attracts 175 participants to voluntarily complete the on-line questionnaire. Five participants who are under 18 years old are excluded in the data analysis, leaving a total of 170 participants in the current study.

Participants who indicate that they had played TRPG for a total of 8 or more hours (ever in their lives) were regarded as TRPG players. Participants who indicate that they played ERPG and who are not TRPG players are regarded as ERPG players. Participants who indicate that they never played ERPG and who are not TRPG players are regarded as Non-players. There are 52 TRPG players (30.6%), 54 ERPG players (31.8%) and 64 Non-players (37.6%) in the current study. Among TRPG players, 47 of them (90.38%) indicate that they also play ERPG.

Age of the participants ranges from 19 to 63 ($M = 30.63$, $SD = 8.38$). There are 93 women (54.7%) and 77 men (45.3%). They come from 12 different nationalities and 122 of them are from Hong Kong (71.8%). Participants with a university degree or above amount to 122 (71.8%). Single participants, total 123 (72.4%). The 170 participants are grouped into 25 different occupations (excluding "unknown"). Only one occupation type (translation/language) amount to more than 10% of the total participants ($n = 20$, % = 11.8). Table 1 shows the demographic characteristics of the three types of players. Fig. 1 shows the gender of the participants. Fig. 2 shows the age of the participants.

3.3. Instruments

The current study adapts the three verbal alternate uses tests in the Wallach–Kogan Creativity Tests (WKCT; Wallach & Kogan, 1965), namely "knife", "newspaper" and "button – the kind that is used in clothing" for the three treatment types, respectively. The three tests are designed to generate three scores: fluency (number of responses), flexibility (number of categories of responses the answers were allocated to), and uniqueness (uncommon responses which amounted to $\leq 1\%$ from the total number of responses). The higher the scores, the better the performance is. The categories of responses are generated by the research of the current study in order to tailor the responses collected. A total of 23 categories are generated for each of the three tests.

The three treatment types in the current study are: Control Treatment (without priming); Treatment One (with age-related memory-provoking priming); and Treatment Two (with age-related imagination-enhancement role-playing priming).
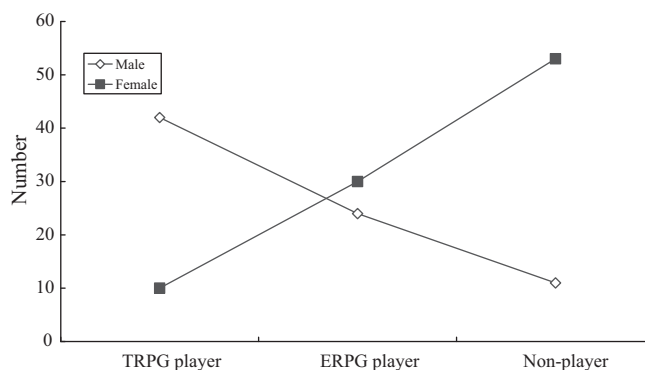
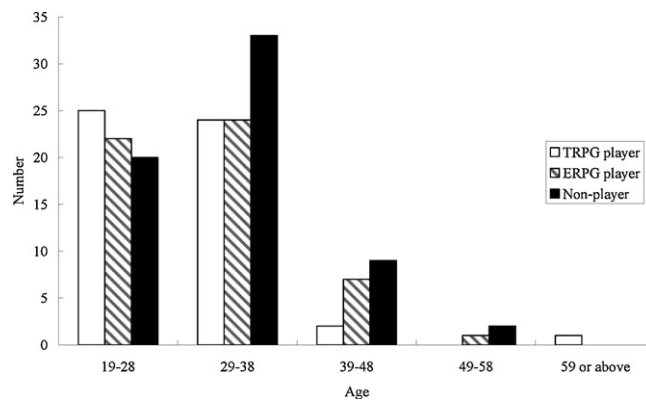

Fig. 1. Gender of participants.

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Fig. 2. Age of participants.

Under the Control Treatment (without priming), the original form of the verbal subtest is used. Treatment One includes an age-related memory-provoking priming instruction to the verbal subtest. Treatment Two includes an age-related imagination-enhancement role-playing priming instruction to the verbal subtest.

The Chinese version of the tests is translated/edited with reference to other Chinese versions available to the researcher of the current study.

Lau and Cheung (2010) reported moderate internal consistency (Cronbach's alpha) of the electronic format of WKCT: fluency was .78, flexibility was .71 and uniqueness was .61 (p.104).

The personality traits items in the current study are adopted from the Big Five Personality Inventory (BFI, John & Srivastava, 1999). The BFI contains 44 items in a 5-point Likert scale (1 = *Disagree Strongly* and 5 = *Agree Strongly*). Scores range from 44 to 220. The Chinese version of the BFI is translated/edited with reference to other Chinese versions available to the researcher of the current study. According to John and Srivastava (1999), the mean reliability of the BFI was .83 (p.62).

The mood question was answered with a 7-point Likert scale ranging from 1 (bad bad bad) to 7 (good good good). (The details of how gender, occupation, nationality and education are scored are available from the electronic version of this article.)

3.4. Procedures

After the questionnaire was formulated, invitations were sent to potential participants, such as targeted hobbies groups, friends, classmates, and colleagues. The background and the objective of the study were stated and the embedded hyperlink to the online questionnaire was also available for convenient access.

The online questionnaire was available for three months between 12 November 2010 and 11 February 2011. No time limit was set to any of the items or the whole questionnaire. Generally, it would take about 30 minutes for participants to complete the questionnaires and they needed to answer all the questions before submitting their forms.

The Control Treatment (without priming) question is: "List out the different ways you could use a "*knife*". Please write as many as possible."

The priming question for Treatment One (with age-related memory-provoking priming) is: "Now, imagine that you were 7 years old. What would you like to do now?" A list of child activities and an option to/one's own answer are given for selection.

The Treatment One (with age-related memory-provoking priming) question is: "As a 7-year-old, list out the different ways you could use a "*newspaper*". Please write as many as possible."

The priming question for Treatment Two (with age-related imagination-enhancement role-playing priming) is: "Now, imagine that you were a 7-year-old alien in outer space. What would you like to do now?" No suggested answer is given for this question.

The Treatment Two (with age-related imagination-enhancement role-playing priming) question is: "As a 7-year-old alien in outer space, list out the different ways you could use a "*button-the kind that is used on clothing*". Please write as many as possible."

3.5. Data analysis

The data collected from the three verbal alternate uses tests is rated by two independent raters before the divergent thinking scores of fluency, flexibility, and uniqueness are computed. The raters express their agreement or disagreement about which category the responses should belong to. In this regard, an inter-rater reliability for flexibility is calculated. In terms of uniqueness, the current study adopts the ≤1% threshold in forming the uniqueness scores, i.e. 1 mark is given to a

Table 2

Descriptive statistics under the three treatments (N = 170).

Particular	Fluency	Flexibility	Uniqueness
Control Treatment			
M	6.53	3.94	3.45
SD	5.86	2.65	5.09
Minimum	1	1	0
Maximum	46	20	40
Treatment One			
M	4.46	3.37	1.98
SD	3.82	2.14	2.80
Minimum	0	0	0
Maximum	34	15	28
Treatment Two			
M	2.56	2.11	1.69
SD	2.06	1.46	1.79
Minimum	0	0	0
Maximum	11	7	10

response which appears in only 1% or less of the total responses. This scoring mechanism is partially adopted from Runco and Albert (1985).

All the statistical computations are carried out by the use of SPSS for Windows version 17.0. After pre-processing the raw data, correlation analysis and one-way analysis of variance (ANOVA) are conducted to test the hypotheses. Hierarchical multiple regression is also conducted to examine the relative contribution of different factors in producing variations in divergent thinking tests performance.

## 4. Results

4.1. Descriptive statistics

The participants' mean verbal alternate uses tests score (9 items: 3 scores from 3 treatments) is 30.08 (SD = 20.50) ranging from 4 to 115 (Cronbach's alpha = .85); higher value indicated higher divergent thinking test scores. The inter-rater reliability for the flexibility scores over the three treatments is 98.28%. The mean scores, standard deviations, minimum and maximum scores of each of fluency, flexibility and uniqueness for the three conditions are presented in Table 2. Fig. 3 shows the mean score under different treatments of all participants.

All the mean scores in fluency, flexibility and uniqueness are highest in Control Treatment (without priming). They all drop in Treatment One (with age-related memory-provoking priming) and drop further in Treatment Two (with age-related imagination-enhancement role-playing priming).

In relation to the BFI, in the current study, the Cronbach's alpha of (a) extraversion is .81; (b) agreeableness is .63; (c) conscientiousness is .83; (d) neuroticism is .83; and (e) openness is .85.

4.2. Relationship between the variables

The intercorrelations and coefficient alphas for the WKCT scores, BFI scores, years of experience (the time one spent on playing over the years, i.e. experience of playing) in TRPG and ERPG, mood of participants, and other demographic data such as gender and age are shown in Table 3.
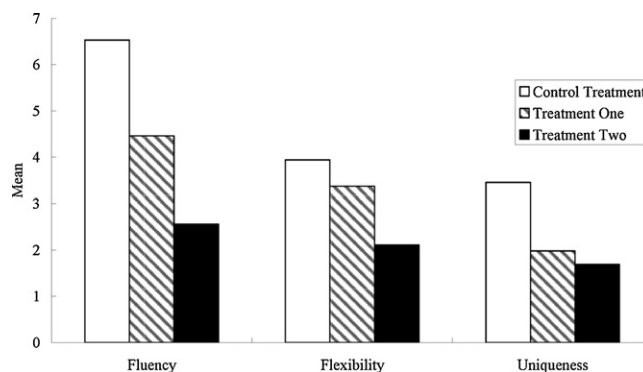
Fig. 3. Mean score under different treatments of all participants.

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Table 3
Intercorrelations and coefficient alphas for major variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Fluency	–																	
2. Flexibility	.92**	–																
3. Uniqueness	.95**	.83**	–															
4. Total creativity	.99**	.93**	.97**	–														
5. Years of experience in TRPG	.29**	.30**	.28**	.30**	–													
6. Years of experience in ERPG	−.14	−.12	−.16	−.15	−.36**	–												
7. Extraversion	.19*	.18*	.16*	.19*	.07	−.02	–											
8. Agreeableness	.02	−.02	.02	.01	.02	.03	.24**	–										
9. Conscientiousness	−.09	−.13	−.05	−.09	.02	−.04	.19*	.17*	–									
10. Neuroticism	−.05	.03	−.06	−.04	−.07	−.08	−.31**	−.28**	−.45**	–								
11. Openness	.22**	.27**	.17*	.22**	.18*	.02	.36**	.20**	.14	−.12	–							
12. Mood	.16*	.14	.18*	.17*	.17*	−.10	.21**	.19*	.35**	−.19*	.24**	–						
13. Gender	.09	.08	.11	.10	.47**	.02	−.14	.04	−.03	−.19*	.18*	.04	–					
14. Age	−.07	−.10	−.06	−.08	−.09	.04	.06	.06	.34**	−.28**	−.03	.10	.13	–				
15. Education	.11	.12	.09	.11	.01	.11	.06	.03	.09	−.09	.23**	.12	.07	.13	–			
16. Marital status	−.03	−.01	−.04	−.03	−.04	.10	.06	.02	.29**	−.31**	.05	.13	.09	.42**	.18*	–		
17. Nationality	.27**	.27**	.21**	.26**	.23**	−.11	.11	.13	−.11	−.03	.23**	.11	.08	−.03	.04	−.13	–	
18. Occupation	.02	.02	.03	.03	.13	−.02	.00	−.05	−.15*	.12	−.06	−.11	.07	−.15	−.16*	−.15*	−.06	–

* $p \le .05$.
** $p \le .01$.

Table 4
Total divergent thinking test scores under the three treatments ($N = 170$).

Particular	TRPG players ($n = 52$)	ERPG players ($n = 54$)	Non-players ($n = 64$)
Control Treatment			
M	6.84	3.49	3.81
SD	6.31	2.47	2.99
Treatment One			
M	3.65	3.00	3.19
SD	2.76	2.09	3.32
Treatment Two			
M	2.69	1.72	1.99
SD	1.99	1.36	1.45

The WKCT scores are highly correlated among themselves which show a high internal consistency although variations from the original form are made in two of the tasks. Years of experience in TRPG are highly correlated with all the WKCT scores. Years of experience in ERPG are not correlated with any of the WKCT scores except flexibility. In terms of personality, openness and extraversion are correlated with all the WKCT scores. Negative correlation between conscientiousness and WKCT scores is found but it is not significant. Also, openness is correlated with years of experience in TRPG. In relation to mood, it is correlated with all the WKCT scores except flexibility, and all the BFI scores and years of experience in TRPG. Regarding demographic information, only nationality is found to be highly correlated with all the WKCT scores.

4.3. Hypotheses testing

Table 4 shows the mean and the standard deviations of the three types of players under the three different treatments. In all three treatments, TRPG players score highest, Non-players score lower and ERPG players score lowest. Fig. 4 shows the total divergent thinking test scores of different types of players under different treatments.

H1. Under the Control Treatment, the divergent thinking test performance of TRPG players is higher than that of ERPG players and Non-players. ANOVA shows over all significant effects for the type of players: fluency score, $F(2, 167) = 9.06$, $p < .001$, $\eta_p^2 = .10$; flexibility score, $F(2, 167) = 13.25$, $p < .001$, $\eta_p^2 = .14$; uniqueness score, $F(2, 167) = 9.17$, $p < .001$, $\eta_p^2 = .10$; and total score in the free-association test, $F(2, 167) = 10.49$, $p < .001$, $\eta_p^2 = .11$.

For fluency score, Scheffé's range tests find that TRPG players differ from Non-players ($p = .002$) and ERPG players ($p = .001$). For flexibility score, Scheffé's range tests find that TRPG players differ from Non-players ($p < .001$) and ERPG players ($p < .001$). For uniqueness score, Scheffé's range tests find that TRPG players differ from Non-players ($p = .002$) and ERPG players ($p = .001$). For total score in the free-association test, Scheffé's range tests find that TRPG players differ from Non-players ($p = .001$) and ERPG players ($p < .001$). No other significant differences are found by the Scheffé's range test. These confirm H1 that TRPG players score highest among the three groups under Control Treatment (without priming).

H2. Under Treatment One, the divergent thinking test performance of TRPG players is higher than that of ERPG players and Non-players. ANOVA does not show overall significant effects for the type of players.

Fluency score, flexibility score, uniqueness score and total score in Treatment One (with age-related memory-provoking priming), as well as Scheffé's range tests find that TRPG players do not differ from Non-players and ERPG players. No significant differences are found by the Scheffé's range test in other aspects. These results do not support H2 that TRPG players score highest among the three groups under Treatment One (with age-related memory-provoking priming).

H3. Under Treatment Two, the divergent thinking test performance of TRPG players is higher than that of ERPG players and Non-players. ANOVA shows significant effects for the type of players in Treatment Two (with age-related imagination-enhancement role-playing priming) except for flexibility score: fluency score, $F(2, 167) = 5.12$, $p = .007$, $\eta_p^2 = .06$; uniqueness
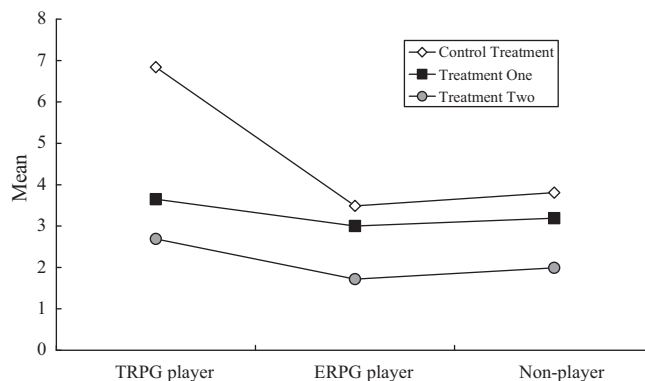

Fig. 4. Total divergent thinking test scores of different types of players under different treatments.

Table 5
Mean, standard deviations, and intercorrelations for total divergent thinking score (standardized) and predictor variables.

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11	12
Total divergent thinking score (standardized)	–	–	.10	−.08	.11	−.03	.03	.31***	.18*	.01	−.09	−.04	.22**	.17*
Predictor variable														
1. Gender	–	–	–	.13*	.07	.08	.06	.47***	−.14*	.04	−.03	−.19**	.18**	.04
2. Age	31	8		–	.13*	.42***	−.15*	−.13*	.06	.06	.34***	−.28***	−.03	.10
3. Education	–	–			–	.18*	−.16*	.04	.06	.03	.09	−.09	.23***	.12*
4. Marital status	–	–				–	−.15*	−.04	.06	.02	.29***	−.31***	.05	.13*
5. Occupation	–	–					–	.16	.00	−.05	−.15*	.12	−.05	−.11
6. TRPG player	–	–						–	.01	−.03	−.05	−.01	.16*	.12
7. Extraversion	3.14	.70							–	.24***	.19**	−.31***	.36***	.21**
8. Agreeableness	3.50	.50								–	.17	−.28***	.20**	.19**
9. Conscientiousness	3.10	.66									–	−.45***	.14*	.35***
10. Neuroticism	3.08	.69										–	−.12	−.19**
11. Openness	3.41	.69											–	.24***
12. Mood	4.55	1.17												–

* $p \le .05$.
** $p \le .01$.
*** $p \le .001$.

score, $F(2, 167) = 5.94$, $p = .003$, $\eta_p^2 = .07$; and total score in Treatment Two (with age-related imagination-enhancement role-playing priming), $F(2, 167) = 5.08$, $p = .007$, $\eta_p^2 = .06$.

For fluency score, Scheffé's range tests find that TRPG players marginally differ from Non-players ($p = .055$) yet differ from ERPG players ($p = .011$). For flexibility score, Scheffé's range tests find that TRPG players do not differ from Non-players nor ERPG players. For uniqueness score, Scheffé's range tests find that TRPG players differ from Non-players ($p = .031$) and ERPG players ($p = .006$). For total score in Treatment Two (with age-related imagination-enhancement role-playing priming), Scheffé's range tests find that TRPG players do not really differ from Non-players ($p = .073$) yet they differ from ERPG players ($p = .01$). H3 is confirmed only in terms of the uniqueness score of the divergent thinking tests under Treatment Two (with age-related imagination-enhancement role-playing priming).

H4. The divergent thinking test performance of TRPG players will increase with experience of playing. However, Pearson correlation analysis shows that such relation does not exist among the 52 TRPG players in the current study. Further one-way unrelated analysis of variance (ANOVA) confirms this result. Hence, H4 is not supported.

H5. The divergent thinking test performance of all players is higher under Treatment One than Control Treatment. However, it is not the case. All the participants actually score highest under Control Treatment (without priming). Furthermore, ANOVA shows significant effect that all the participants score higher in Control Treatment (without priming) when compared with their performance under Treatment One (with age-related memory-provoking priming), $F(2, 167) = 7.01$, $p = .001$, $\eta_p^2 = .08$. Hence, H5 is not supported.

H6. There is no difference between the divergent thinking test performance of ERPG players and that of Non-players under Treatment One. The performance of Non-players ($M = 3.19$, $SD = 3.32$) is only slightly better than ERPG players ($M = 3.00$, $SD = 2.09$). ANOVA confirms that there is no significant difference between the performances of the two groups under Treatment One (with age-related memory-provoking priming). Hence, H6 is confirmed.

H7. The divergent thinking test performance of all players is higher under Treatment Two than Treatment One. It is found that the mean scores of all players are higher under Treatment One (with age-related memory-provoking priming) than Treatment Two (with age-related imagination-enhancement role-playing priming). In addition, ANOVA shows no significant difference between the scores. Hence, H7 is not supported.

H8. There is no difference between the divergent thinking test performance of ERPG players and that of Non-players under Treatment Two. The performance of Non-players ($M = 1.99$, $SD = 1.45$) is only slightly better than ERPG players ($M = 1.72$, $SD = 1.36$). ANOVA confirms that there is no significant difference between the performances of the two groups under Treatment Two (with age-related imagination-enhancement role-playing priming). Hence, H8 is confirmed.

H9. The divergent thinking test performance of ERPG players remains the same regardless of the experience of playing. Pearson correlation analysis shows that there is no relation between the performance of ERPG players and their experience of playing among the 54 ERPG players in the current study. Hence, H9 is confirmed.

4.4. Regression analysis

Table 5 shows the mean, standard deviations, and intercorrelations for total divergent thinking score (standardized) and all the predictor variables used in the hierarchical multiple regression conducted in the current study. The correlations between total divergent thinking score (standardized) and TRPG player is statistically significant: TRPG player ($r = .31$, $p \leq .001$). The correlations between total divergent thinking score (standardized) and extraversion, openness and mood are also significant: extraversion ($r = .18$, $p \leq .05$); openness ($r = .22$, $p \leq .01$); and mood ($r = .17$, $p \leq .05$).

Table 6

Hierarchical regression analysis summary for predicting divergent thinking test scores.

Step and predictor variable	B	SE B	β	R^2	ΔR^2	Adjusted R^2
Step 1				.031		.001
Gender	.20	.16	.10			
Age	−.01	.01	−.10			
Education	.08	.06	.12			
Marital status	−.02	.13	−.02			
Occupation	.00	.01	.02			
Step 2				.109[***]	.079	.077
TRPG player	.71	.19	.33			
Step 3				.166	.056	.108
Extraversion	.19	.12	.14			
Agreeableness	−.06	.16	−.03			
Conscientiousness	−.22	.13	−.14			
Neuroticism	−.09	.13	−.06			
Openness	.20	.12	.14			
Step 4				.180	.014	.117
Mood	.11	.07	.13			

[***] $p \leq .001$.

In a hierarchical multiple regression, potential predictors of total divergent thinking score (standardized) are entered subsequently in blocks. Demographic variables, namely occupation, gender, education, age and marital status, are entered first as controlling variables. The total variance explained by this model is 3.1% but this figure is not significant. None of the variables are statistically significant in the first model. The variable of TRPG player is added in the second block. The total variance explained by this model is 10.9%. This figure is significant at the $\leq .001$ level. The only variable that is statistically significant in the second model is TRPG player ($p \leq .001$). Then, personality variables are added in the third block. The total variance explained by this model is 16.6% but this figure is not significant. None of the variables are statistically significant in the third model except TRPG player ($p \leq .001$). Lastly, the variable "mood" is added in the fourth block. The total variance explained by this model is 18% but this figure is again not significant. There are two variables that are statistically significant in the fourth model: TRPG player ($p = .001$) and conscientiousness ($p \leq .05$). The summary of the results in the hierarchical multiple regression is shown in Table 6.

5. Discussion and conclusion

The objective of the current study is to find out whether TRPG players would score higher in WKCT verbal alternate uses tests (i.e. the verbal subtests) than non-TRPG players. It is also interesting to see if (1) the performance of ERPG players differs from Non-players and (2) different forms of priming manipulations would affect the performance of TRPG players.

5.1. The three types of players

It is found that in the original form of the verbal subtest, TRPG players perform better than non-TRPG players in all aspects. This finding is in line with the findings of Karwowski and Soszynski (2008) as they found that after Role Play Training in Creativity, their participants scored higher in fluency and originality.

TRPG players also do better in terms of uniqueness in Treatment Two (with age-related imagination-enhancement role-playing priming). This result shows that when the priming manipulation worked, it is showed by the uniqueness or originality score, but not the fluency score or the flexibility score. This result is in line with the study of Zabelina and Robinson (2010).

It is found that years of experience in TRPG are not related to verbal subtest performance. However, whether the effect of having played TRPG for over eight hours could affect divergent thinking test performance in the long run is still unknown as the following possibility cannot be ruled out in the current study: those who engaged in playing TRPG area special group of people who tend to be more creative (see Section 5.6 below for more discussion).

For ERPG players and Non-players, after some further analyses, it is found that under the three tests, there is no significant difference between their performances although the mean scores of ERPG players are all lower than Non-players across the three treatments. It is also found that years of experience in ERPG are not related to verbal subtest performance. The fact that in the current study, ERPG players score lowest among the three groups may give rise for future research studies.

5.2. The issue with Treatment One: scoring method

In the current study, the performances of all participants under Treatment One (with age-related memory-provoking priming) are significantly worse than Control Treatment (without priming) and no difference is found between Treatment One (with age-related memory-provoking priming) and Treatment Two (with age-related imagination-enhancement role-playing priming).

It is suspected that this is due to the scoring method of uniqueness, therefore, a further hypothesis is made: all players score higher in uniqueness when the scoring method of abbreviated Torrance test for adults by Goff and Torrance (2002) is used.

The relevant data is scored again using the method adopted in the study of Zabelina and Robinson (2010), i.e. giving one mark to answers that appeared once in the whole set of data, and the method used in the abbreviated Torrance test for adults by Goff and Torrance (2002). However, the results remain the same.

5.3. The issue with Treatment One: mood and personality

Most studies have shown that positive mood enhances creativity, in contrast, some studies found that positive mood (a) does not always boost divergent thinking and (b) creativity could be enhanced while both positive and negative moods were high (Hennessey & Amabile, 2010). In the current study, one question taps participants' mood. It is noted that this one question could not be sufficient to obtain detailed information about participants' mood since the environment the participants are engaged in when filling in the questionnaire would be uncontrollable in the current study. Participants in the current study report an average of neutral to slightly better than neutral mood. Therefore, other reasons should be considered in order to explain the results found under Treatment One (with age-related memory-provoking priming).

Personality does not seem to be a factor in the current study. Among the five personality traits, only openness is found to be significantly correlated with the total divergent thinking test score (as shown in Table 2). At the same time, in the hierarchical multiple regression, the relation between conscientiousness and mood is only revealed in the last step and the

last step is not even a statistically significant step in the hierarchical multiple regression. The patterns related to openness and conscientiousness are in line with previous research findings, as discussed earlier.

5.4. The issue with Treatment One: fatigue

Next, it is logical to consider that the participants probably experience fatigue or get bored after the first verbal subtest. It is evidenced by the reduced number of responses in the second verbal subtest and further reduction in the third verbal subtest. It should be noted that a limitation of the current study is that due to limited resources, an online questionnaire is selected as the method for data collection. With this limitation, it is considered that avoiding carryover effect is a more important issue when the questionnaire is designed. Therefore, randomization of the order of the questions is not applied in the current study.

Despite possible fatigue effect, it is found that under Treatment Two (with age-related imagination-enhancement role-playing priming), TRPG players could still perform better and score higher (in terms of uniqueness) than the other two groups. Therefore, it seems that the way the question is phrased in Treatment Two (with age-related imagination-enhancement role-playing priming) stimulated TRPG players to "overcome" order effect, i.e. only the priming manipulation under Treatment Two (with age-related imagination-enhancement role-playing priming) works, and it only works for TRPG players.

5.5. The issue with Treatment One: priming and instruction

As discussed earlier, asking the participants to imagine themselves as 7-year-olds is regarded as requiring the participants to retrieve their memory in answering the question. In the current study, there are questions in the questionnaire asking the participants if they used memory in each of the three verbal subtests. Under Treatment One (with age-related memory-provoking priming), only 12 participants report that they did not use memory in answering the question. On the other hand, under Treatment Two (with age-related imagination-enhancement role-playing priming), 49 participants report that they did not use memory in answering the question.

In fact, Gilhooly, Fioratou, Anthony, and Wynn (2007) had identified that memory was one of the four main strategies used by participants in divergent thinking tests. They reported that "initial responses are based on a memory strategy of retrieval from long-term memory of pre-known uses" (p.623). They found that when using a memory strategy, participants used less executive capacity and for participants who were less able to utilize executive capacity, it was more difficult for them to "switch to other strategies and to resist intrusions of previous uses" (p.623). Therefore, it is possible that under Treatment One (with age-related memory-provoking priming), when being stimulated to use a memory strategy while under the influence of fatigue, all participants are also less capable to utilize executive capacity.

The study of Nusbaum and Silvia (2011) found that fluid intelligence can be enhanced by the way instructions were given: they referred their instruction as giving "effective strategy" to participants as they asked the participants to imagine "disassembling the object and using parts or recombining parts" in unusual uses tasks. In their study, fluid intelligence was measured by latent fluid reasoning, verbal fluency and strategy generation variables. They expressed their view that a memory strategy "did not foster creative responses for the simple reason that uses in memory are things that people have seen before". They also provided an executive approach to explain why responses given at later stages are more creative than earlier responses: "people are seeking and adopting better strategies" (p.43).

In the current study, it seems that such phenomenon is observed. In Treatment One (with age-related memory-provoking priming), the responses given by the participants show a tendency to focus too much on using a memory strategy. But then in Treatment Two (with age-related imagination-enhancement role-playing priming), they are (to a certain extent) inhibited from using a memory strategy because they cannot: they are asked to imagine themselves as a 7-year-old alien. This might explain why despite fatigue, TRPG players score significantly higher (in terms of uniqueness score only) in Treatment Two (with age-related imagination-enhancement role-playing priming). It seems that TRPG players are more able to see the instruction under Treatment Two (with age-related imagination-enhancement role-playing priming) as providing them with an "effective strategy" in answering the question and such instruction has stimulated their executive capacity, i.e. it is like they are asked to play the role of a 7-year-old alien, as in any TRPG, they play the role of a second person/living thing.

5.6. Playfulness

To explain the possibility that those who engaged in playing TRPG could be a special group of people who tend to be more creative, one might look at playfulness in adults. Guitard, Ferland, and Dutil (2005) found that the components of playfulness in adults and children are actually similar. They identified five components: creativity, curiosity, sense of humour, pleasure, and spontaneity. They also found that compared with young children, "adults seldom use their imagination for fantasizing", and that "imagination serves as an inspiration for artistic or intellectual creativity" (p.19). They concluded that playfulness in children "appears to have an important role in the child's quality life" (p.12).

Since TRPG players in the current study are a group of adults who like to play a game which requires a heavy use of imagination for fantasizing, it is reasonable to speculate that these TRPG players are also people high in playfulness. Further research in this area should be helpful to clarify this point.

5.7. The nature of TRPG, improvisation and creative leisure

As summarized by Costikyan (2007), in TRPG, although the gamemaster holds a rulebook, they are expected to create the story with the players in accordance to the rules in the rulebook and "unlike digital RPGs, there is no pre-established story line" (p.9). Therefore, people involved in TRPG are actually creating a story together. The players are growing and evolving as the story progresses and TRPGs are "social affairs".

Costikyan (1993) described the experience of explaining what TRPG is to novices as difficult because people who used to play chess or Monopoly or other traditional games "are unsettled to find a game in which there is no winner and no set end, no strategy, no board nor pieces" (p.349). He further described that actors, on the other hand, could instantly get the idea as they associate this form with "improv". He also pointed out that for long-term TRPG players, the stories created and experienced by them in the course of playing TRPG can be "emotionally powerful" and "personally meaningful".

According to Sawyer (1999), improvisation in theatre performance could be an "elaboration or variation of an existing framework" (p.31). It also could be the creation of a piece of work on or off stage "without any advance framework" (p.31). Obviously, the products of theatre improvisation are to be performed, sooner or later, in front of audiences. If TRPG is to be regarded as a form of improvisation, then the products of such improvisation would probably be the experience and the process during the game. TRPG players could be regarded as actors, and the gamemaster as the director, for a story that would not be performed or repeated.

Hegarty (2009) proposed that acts such as improvisation by a mother during bedtime story telling could be regarded as creative leisure. He suggested that "these experiences are perhaps those in which creativity is most meaningful in our everyday lives" (p.10). It should be noted that this is similar to the "everyday" creativity or "little-c" creativity of Runco and Bahleda (1986). When Hegarty discussed freedom and constraints in creative leisure, such as financial and health-related freedom and constraints, he emphasized that creativity should not be "limited to the chosen few" and researchers should promote creative leisure.

It seems that TRPG does not only fit into the definition of creative leisure proposed by Hegarty (2009), TRPGs are also low budget activities, and can be enjoyed by people of different ages (the eldest TRPG player in the current study was 63), and people of various health conditions.

5.8. Other limitations

5.8.1. Experimental control

All the current research data is based on participants' self report through an easy to use and effective online questionnaire however, it is difficult to impose better experimental control. Although using an online questionnaire can probably avoid the experimenter effect, data manipulation may occur, in particular, participants may have been using the internet while answering the three divergent thinking questions and there is no way to stop them if they search for answers on the web.

Furthermore, among the 52 TRPG players, only 10 of them are women. In contrast, among the 64 Non-players, only 11 of them are men. Due to the uneven numbers of the participants in the current study, gender difference could not be compared. Future studies should try to get a better balance in the number of male and female participants and address this issue.

It should also be noted that among the 52 TRPG players, only 10 of them are "pure" TRPG players who have not played ERPG. Despite the studies of Hamlen (2009) and Ophir et al. (2009) as discussed in the Introduction section, that playing video games or being exposed to media had no influence on creativity, one may wonder if the better performance of TRPG players has any relationship with playing both TRPG and ERPG. However, owing to the uneven numbers of pure and non-pure TRPG players and the small group of pure TRPG players, further analysis, such as the interaction between creativity and the two types of TRPG players, cannot be done. Future study may attempt to answer this question.

5.9. Conclusions and significance of the current study

In the current study, no training is given to the participants; yet, it is found that TRPG players do better in divergent thinking tests. It appears that TRPG, a cheap leisure time hobby that requires only pen and paper, maybe related to this finding. TRPG could be preferable activities for the promotion of creativity. It is low cost and no formal setting is required to play. Many ERPGs are originated from TRPGs, therefore, with the popularity of ERPG, there should be advantages in promoting TRPG, as TRPG is unpopular in Hong Kong (Yeung, 2010) and likely unpopular around the world. It is believed that TRPG deserves the attention of educators and researchers.

5.10. Future research

The number of research studies done about the relationship between TRPG and creativity has been very limited. The current study explores this area. However, unlike the study of Karwowski and Soszynski (2008), the current study does not collect base line data of the participants as the basis for comparison owing to limited resources. The current research only analyses data from self-reports by way of an online questionnaire. Since that, the TRPG training used in the study of Karwowski and Soszynski may not be the same as actually playing TRPG and it is not known whether some of the more creative people in the population like to play TRPG or that playing TRPG makes the players more creative.

For further investigations, improvement could be made on methodology and data quality to provide data from base line, from experiments or under controlled conditions so as to avoid order effect as well as to clarify the effect of different priming and instruction giving techniques. Also, due to the small sample size, it is unknown if the effect of TRPG is related to years of experience, frequency of play and length of play or other characteristics of the TRPG players. For future study, the easiest way would be to invite Non-players to play TRPG and test them at different times.

Future studies may also explore the reasons for low scores of ERPG players; it is suspected that the fact that no matter how large the scale of an ERPG is, the avatar played by the player can only act within the scope of the programme. This may have an impact on one's creativity after a long period of playing. Another potential future study could be whether TRPG playing improves one's performance when playing ERPG.

Acknowledgements

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.tsc.2012.06.002.

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