

Can playing Dungeons and Dragons be good for you? A pre-registered pilot program using Tabletop Role-Playing Games (TTRPGs) to mitigate social anxiety and reduce problematic involvement in Massively Multiplayer Role Playing Games (MMORPGs)

This study aims to assess the initial feasibility and efficacy of a tabletop role-playing game in reducing symptom severity of possible gaming disorder, social anxiety and loneliness and increasing self-concept in 20 participants. It is a proof of principle study which will inform a larger confirmatory study of this intervention. An experimental, multi-case study design is used with outcomes assessed over a 10-week period and analysed using a variety of effect sizes, across a series of complementary analysis steps. The Stage 1 report is well detailed and clear, and I have assessed it in accordance with the PCI RR guidelines as follows below.

I want to make it clear here that I am no expert in multi-case designs, so the Recommender may want to include another reviewer for this specific design element. It does not seem that confirmatory analyses relating to NHST/p-values will be used, and it also seems that no power analysis is required because of the pilot nature of the study. The figures are fantastic, aiding understanding and clarity of the design and various elements.

1A. The scientific validity of the research question(s).

The research questions are informed by an existing evidence base and there is a clear need and rationale for this research. Ethical approval has been granted. One minor point is that without looking at the image in Figure 1, it was not clear to me that this was an offline game (despite you using the term 'offline/real world setting'). Perhaps I am being old school here, but could you refer to this as an offline boardgame? In my mind I was envisaging an online videogame with offline elements, which confused me.

1B. The logic, rationale, and plausibility of the proposed hypotheses, as applicable.

This is a pilot study to assess the initial feasibility and efficacy of an intervention based on MMORPGS.

Hypotheses are proposed that are plausible given the background literature. It would be good to know exactly *how* these hypotheses would be supported, or not, by the data. The analytic plan uses a range of effect size estimates and complementary steps – what will be the precise criteria for stating that the intervention is indeed feasible and efficacious? In what instances may the data be inconclusive?

In addition to this, can your study get at the 'underlying mechanism' for why this treatment may work? Specifically, is it able to assess which component(s) of the game may impact the outcome variables? (the components being: character creation, advancement system, teamwork, heroic fantasy-based world). It seems as though the data is analysed at different stages, as the players progress through the different 'modules' of the game – are these game-specific elements going to be specifically assessed, or are you looking at the overall impact of the intervention (i.e., the full game)?

1C. The soundness and feasibility of the methodology and analysis pipeline (including statistical power analysis or alternative sampling plans where applicable).

I am not an expert in "Experimental multiple single-case design" so the Recommender may want to recruit another reviewer who can comment on this specific part. However, I

commend the authors for Figure 2 which clarified this for me. This seems like a rigorous step-wedged design.

Page 10 – for lay readers, can you briefly describe what multiple single-case design' is before outlining its advantages?

What mitigation is in place if you cannot recruit participants meeting inclusion criterion 6: “endorsing at least one criterion on the Internet Gaming Disorder Test (IGDT-10; Király et al., 2017) assessing gaming disorder symptoms; and (7) having a score ≥ 56 (threshold for sub-clinical social anxiety) but ≤ 96 (threshold for clinical social anxiety) on the Liebowitz Social Anxiety Scale (LSAS; Liebowitz, 1987) assessing social anxiety symptoms”.

What do the four different groups refer to exactly? I think these might refer to the different timepoints at which the participants enrol into each module/stage of the intervention? But it would be good to explicitly state this to avoid confusion.

I do not think a power analysis is necessary given that confirmatory analyses are not being conducted but would appreciate a response to this to make sure (see my above point regarding my expertise on multiple single-case designs).

What happens if participants drop out of the study at different stages? Will you recruit additional participants to make the final target sample size of 20 across the four groups? Can the same analyses be conducted if the groups are unequal?

It would be good to know the explicit rationale for 20 participants across 4 groups.

1D. Whether the clarity and degree of methodological detail is sufficient to closely replicate the proposed study procedures and analysis pipeline and to prevent undisclosed flexibility in the procedures and analyses.

Yes, the methodology is detailed and sufficient. There is an explicit link to the code and data on the OSF. Diagrams are included to aid the reader's understanding.

1E. Whether the authors have considered sufficient outcome-neutral conditions (e.g. absence of floor or ceiling effects; positive controls; other quality checks) for ensuring that the obtained results are able to test the stated hypotheses or answer the stated research question(s). T

This is the greatest thing, in my opinion – although participants undergo this intervention at different stages in the four groups, is a control group required who play a different/neutral game where the game elements expected to drive effects (e.g., teamwork etc.) are not present. Perhaps the design mitigates against this need?

It may be worth including a question on engagement or enjoyment as an attention check.

It would be good to add an attention check within one of the questionnaires, e.g., within the loneliness questionnaire an additional question could be added which simply states “for this question, select the option X” (with X being one of the response options used in the questionnaire).

Minor additional comments

I would omit the specific name of the hospital from the Introduction; it doesn't add anything but may provide too much detail.

Is 'race' a common terminology used for the defined categories ("race (e.g., human, elf, orc"))?

Overall, this is a fantastic Stage 1 submission with rigour and detail. I recommend minor revisions to aid further clarity on design and analysis elements.