Prospective Study on a Fast-Track Training in Psychiatry for Medical Students: The Psychiatric Hat Game

Anthony Clément
Université Paris Descartes https://orcid.org/0000-0002-8152-082X
Raphaël Delage
Hopital Avicenne
Marie Chollier
University of Chester
Laure Josse
Universite Paris 13
Stéphane Gaudry
Hopital Avicenne
Jean-Ralph Zahar
Hopital Avicenne
Thierry Baubet
Hopital Avicenne
Bertrand Degos (bertrand.degos@aphp.fr)

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Abstract

Background: While medical students are losing interest in lectures in favor of other educational materials, many studies suggest the benefit of active learning, combined with gamified educational tools. The authors developed a psychiatric adaptation of the « Hat Game ». It was hypothesised that this game would increase both knowledge and motivation in medical students toward psychiatric semiology.

Methods: This gamified fast-track training consisted of two teams and each team must guess as many psychiatric semiology terms as possible using different techniques (i.e. speech, mime). The study involved a pre- and post-evaluation of knowledge and a satisfaction survey.

Results: Knowledge scores were significantly higher after the game than before. Improvement was maintained three months after the game. Satisfaction survey items highlighted that students enjoyed and would recommend this type of gamified training.

Conclusions: The Psychiatric Hat Game improved knowledge of psychiatric semiology in medical students. Results suggest that it is a promising efficient tool to teach playfully medical semiology, with transferable features, utility and acceptability from one medical field to another. This study contributes to the growing body of knowledge advocating for serious games and gamified training in medical education.

Background

Medical education is challenging as it must emphasise and lead to the acquisition of theoretical knowledge but also practical skills. For medical students from various cultural groups, gaining information is as important as learning to use, remember and understand it [1]. There is nowadays an increasing trend to move from a classical teacher-centered to a student-centered modality of teaching [2]. Indeed, it is now recognized that this kind of active learning is more beneficial for memorization and improves the performance of the students [3].

Repetition is also thought to increase learning when it occurs incidentally. Some studies showed that intentionally massed repetition might be detrimental to memory whereas incidental repetition might be beneficial [4]. Gamified training appears to be a good way to incidentally generate repetition and to provide medical knowledge, especially if several of the four well-known sensory types of inputs (oral/hearing, reading/writing, visual and kinesthetic) are involved [5, 6].

In some medical specialties, such as Neurology, clinical symptoms and signs can easily be orally described and mimed. This property enables the development of active learning methods through play [7]. In a recent study, Garcin et al. proposed a neurological version of the traditional Hat Game as an interesting tool to learn neurological semiology [8]. They showed that the Neurological Hat Game (NHG), which is performed in an intrinsically pleasant context, was a playful method to overview and teach a

wide range of neurological signs and symptoms. Moreover, the students who participated significantly increased their knowledge scores compared to students who did not take part in the sessions.

Psychiatry is another medical specialty for which an accurate knowledge of semiology is essential in order to establish a diagnosis and ensure adequate treatment. Psychiatric semiology is complex and consists of both old and modern terminologies. Understanding subtle differences in symptomatology is a useful skill to develop for clinical evaluation, differential diagnosis, diagnosis and treatment. Yet few studies explored methods for learning the psychiatric semiology, gamified training appears a promising field [9–13]. The Hat Game would be an innovative, playful and interesting way to overview psychiatric main symptoms and signs.

For this purpose, we developed a psychiatric version of the Hat Game and assessed its impact in terms of learning and memorization of psychiatric semiology in third-year medical students. Hence, based on the NHG, we demonstrated that the Hat Game is replicable to another medical specialty and in another University.

Methods

Design

This observational prospective study was conducted between November 2018 and March 2019 in the Faculty of Medicine Sorbonne Paris Nord. The study was approved by the internal review board of the Faculty of Medicine Sorbonne Paris Nord, authorising this gamified teaching to be included in the medical curriculum for third-year students. Moreover, this work was in accordance with the declaration of Helsinki and all participants gave their oral informed consent to participate.

Students

The « Psychiatric Hat Game » (PHG) has been integrated into third-year* medical students' curriculum for Psychiatry (Faculty of Medicine Sorbonne Paris Nord), concomitantly to their first internship in a Psychiatry department. PHG could therefore intervene as a complementary tool to clinical supervising. All the 166 third-year students were included.

In collaboration with the Officer for Healthcare Simulation (LJ), the person in charge of the second cycle of the Medical Studies (SB) and the vice-dean in charge of Pedagogy (JRZ), an online interactive board was generated to propose to all third-year medical students to participate in this teaching. This has been integrated into a revision period of the psychiatric semiology in addition to their usual lecture courses.

Groups of 12–15 students were scheduled to form two teams of 6–7 students. Each group was supervised by a psychiatrist (RD).

The Psychiatric Hat Game

We used a deck of 63 cards that are described in ou additional files (Additional File 1). A psychiatric symptom or sign was written on each card. No definition was mentioned on the card. Explanations were given at any time in case of misunderstanding or misinterpretation. This card game was designed by RD and all words were reviewed and validated by one colleague (TB). The task of the game was to guess as many words as possible in a short period (i.e. less than 90 seconds).

There were three rounds:

1. In the first round, a member of one of the two teams (the clue-giver) had to make his team-mates guess the maximum number of words using any and as many descriptive terms as s/he wanted in less than 90 seconds. Once this time was elapsed, a member of the opposing team started trying to make his team guess the remaining cards of the deck for another 90 seconds. Teams alternated until no cards were left or until the end of the dedicated time. The team that won the most cards won the first round.
2. During the second round, the same deck of cards was used and students proceeded in the same way but the clue-giver could give only one word to make his team-mates guess which word was on the card. The team that won the most cards won the second round.
3. The third and final round was similar in principle, but students had to guess the words through a mime. Twenty-two out of the 63 cards were considered too difficult to guess by mime (for instance delusion of filiation or devaluation ideas) and students were allowed to use a small scenario to contextualise the symptom.

At the end of the three rounds, the team that had guessed the most words won. To complete this playful revision of semiology, explanations, exemplifications and supplementary information were provided at any time. Between the first and the second rounds, and at the end of the game, there was an open discussion about symptoms and signs that remained problematic. This debriefing also controlled for potential stereotypes to be formed or expressed, emphasising the complexity of symptoms and experiences.

Assessment

As a first step, the benefit of this teaching was assessed through 20 Multiple Choice Questions (MCQs) about psychiatric semiology. These questionnaires are available in an additional file (Additional File 2). This questionnaire was designed by RD and TB to assess symptoms and diagnosis knowledge. Before the beginning of the game, students had to answer the MCQs. Then, at the end of the day of the game, they were given the same 20 MCQs again, but in a different order. Only fully correct MCQs were counted as valid (1 point per MCQ), and students were given a limited time of 15 minutes to complete the MCQs. Possible knowledge scores ranged from 0 to 20.

A satisfaction survey, which is presented in an additional file (Additional File 3), was completed after the second MCQs session (right after the game). This survey included 8 questions and responses were given according to a 5 choices scale of Likert (1. Strongly agree, 2. Agree, 3. Neutral, 4. Disagree, 5. Strongly

disagree). The whole session including the two MCQs' sessions, the game itself, the teaching period and the satisfaction questionnaire completion lasted about 150 minutes.

Finally, in order to assess the long-term benefit of such teaching, MCQs were proposed to the same students three months later, at the same time as an annual exam.

Statistical analysis

The data are expressed as mean ± standard deviation (SD) and percentage. Wilcoxon test for paired samples was used for statistical analysis, as data did not follow a normal distribution because of a ceiling effect (20 is the maximum score for the MCQs). Analyses were performed on IBM SPSS Statistics 23 software (https://www.ibm.com/fr-fr/analytics/spss-statistics-software).
* in France, the first two years of medical studies are dedicated to the learning of anatomy, physiology and biology. The third year focuses on medical semiology. Students are taught to perform a clinical exam, recognize different symptoms, and organize them into syndromes.

Results

Students

One hundred and sixty-six students were proposed to take part in the study (Fig. 1). Among them, 83 were women (50%). Age ranged from 19 to 35 years old, with a mean at 21.7 ± 2.6. Ten students were absent at game sessions. One hundred and thirty-two students underwent both the first and the second test (MCQs). Three of them did not complete the follow-up at three months.

MCQs results

Post-test mean MCQs scores significantly increased compared to pre-test (11.5 ± 3.2 [3–20] vs 16.1 ± 2.4 [8–20], N = 144, $p < 0.001$, Fig. 2). At three months, among those who participated to the game, the mean score reached 14.3 ± 3.1 [3–20], which was higher than the first scores (11.6 ± 3.2, $p < 0.001$ [3–20], N = 139, Fig. 3). However, we found that scores decreased at three months compared to the score obtained just after the game (14.3 ± 3.1 vs 16.1 ± 2.3, N = 140, $p < 0.001$).

Satisfaction survey

The post-test phase included a satisfaction survey, completed by 144 students (Table 1). All eight questions obtained a median response of 1. All students found the game playful (129 strongly agreed, 14 agreed, 1 neutral). They also answered that it could help to better understand (121 strongly agreed, 22 agreed, 1 neutral), remember (108 strongly agreed, 32 agreed, 4 neutral) and that it helped for their annual exam (83 strongly agreed, 50 agreed, 11 neutral). Only two students did not find the modalities appropriate (2 disagreed). Finally, a majority of students answered that the game increased their motivation to learn psychiatric semiology (95 strongly agreed, 29 agreed, 19 neutral and 1 disagreed).

These results indicate that the PHG is perceived as an acceptable and useful educational tool for students.

Table 1
– Assessment of students' satisfaction regarding the Psychiatric Hat Game.

Satisfaction survey items	Mean ± SD
It is playful	1.1 ± 0.3
Helped to better understand	1.2 ± 0.4
Helped to better remember	1.3 ± 0.5
Was helpful for reviewing your upcoming exam	1.5 ± 0.6
Increased your motivation to learn psychiatric semiology	1.5 ± 0.8
Terms are appropriate	1.5 ± 0.6
Should be repeated in the future	1.2 ± 0.6
Should be extended to other medical specialties	1.4 ± 0.8
Abbreviations: SD: standard deviation. Responses ranged from 1. Strongly agree, to 5. Strongly disagree (Likert scale).	

Discussion

The present study demonstrated the transferability and replicability of the Hat Game to another medical discipline (Neurology but also Psychiatry) and another institution (Sorbonne University but also Sorbonne Paris Nord) [8]. As expected, the successful application of the Hat Game to psychiatric semiology confirms that the Hat Game is an effective setting for gamified training and that it is easy to create and implement in a teaching or working day. There is no constraint except a sufficient number of student-players.

Here, we applied the Hat Game to teach the psychiatric semiology at the Faculty of Medicine of Sorbonne Paris Nord. The PHG is associated with increased knowledge just after and 3-months after completion. As for the neurological semiology, a satisfaction survey demonstrated that medical students found that the Hat Game is an appreciated tool for teaching semiology such as psychiatric semiology. Compared to the Neurological Hat Game (NHG), almost all the group of the third-year medical students participated in this teaching game. The high participation rate (77.7% completed the whole program) in third year student cohort does not allow for a comparison group. Furthermore, high scores at pre-test may also relate to the university teaching. A further research could involve several universities cohort with control groups and assess both academic performance in psychiatry exam and PHG scores. Further studies could also assess the efficiency of the PHG, indeed, three or four sessions of a 2 h gamified training could be a cost-efficient fast-track training, integrated into university curricula and medical staff routine. Team

work is also documented as a way to facilitate competitiveness and protect those who perform less under pressure.

As shown for the NHG, gamified teaching is a facilitative method for learning that probably involves mesocorticolimbic circuits [14, 15]. Teaching and learning in a nice and not stressful environment appear to improve learning and memorization [8, 16–19]. In addition to short-term memory benefits, our results suggest that this playful method could facilitate long-term retention, regarding the MCQs results at 3 months. Yet the benefit persists compared to pre-PHG, the slow MCQs score decrease observed at 3-months follow up indicates the potential need for booster session or regular PHG to maintain knowledge acquisition. Similar enthusiastic teaching was already applied by Roze et al., demonstrating its efficiency in facilitating long term memory [20].

Despite positive results, our open-labeled study presented limitations. A randomised controlled study should be carried out with two arms, some of the students benefiting from this method and the other not. However, this kind of study is difficult to achieve because it implies that one of the arms will be penalised in its university curriculum if a difference occurs. An interesting point would also be to apply again at 3 months the satisfaction survey to verify the students found this educational approach is really useful. Booster sessions could also help enhance the benefit of the game. It would be interesting to perform a multicenter study to confirm the external validity of our findings but differences in the organization of the medical studies between faculties could be a problem. Finally, further studies are needed to confirm the effects on short-term and long-term memory retention. An other way to validate this training could be to show that this increase in knowledge translate in other assessments, such as Objective Structured Clinical Exams (OSCE).

These results are consistent with the literature data suggesting that serious games are useful when associated with standard lecturing [18]. Other playful methods have been proven efficient to increase students’ knowledge in psychosis or dementia [9, 12]. Techniques, such as simulation, could enable students to be more confident in diagnosing and managing psychiatric disorders [22,23]. Developing such educational materials seem all the more important as learning Psychiatry plays an important role in destigmatising this discipline with future health professionals. Moreover, it would encourage "person-centered" approaches to medical practice [24–26].

A further challenge with the PHG relies on stereotypes formation and the development of mental health stigma in young medical students [27–29]. Service users, researchers and health professionals have highlighted the deleterious impact of stigma and caricatured portrayal might contribute to erroneous and stigmatizing representations [30, 31]. To address these concerns, two strategies have been considered: including mental health stigma questionnaire in the pre/post evaluation design [32, 33] and adapting and piloting efficient interventions retrieved from the stigma-reducing literature. The PHG could be co-facilitated with a person living with a mental health difficulty or complemented with a testimony as direct (in-person) and indirect contact (video) have been documented and proven to be efficient in medical students [34, 35]; include perspective-taking exercises and/or debriefs and anti-stigma training in the

medical curriculum [36, 37]; include reflexive exercises to encourage medical students to identify self-stigma and seek help when appropriate, as medical students are vulnerable to mental health difficulties and related stigma [38, 39]. Since mental health stigma in medical professions is under-researched in France, both medical students and service users would benefit from further research about integrative training addressing stigma, participants' concerns and ensuring knowledge acquisition.

In conclusion, the Hat Game seems to be a very interesting educational tool which could be developed worldwide. An international study would be of interest to test the transferability of this easy, playful and promising method of teaching.

List Of Abbreviations

NHG – Neurological Hat Game

PHG – Psychiatric Hat Game

MCQ – Multiple Choice Question

OSCE – Objective Structured Clinical Exam

Declarations

Ethics approval and consent to participate

The study was approved by the internal review board of the Faculty of Medicine Sorbonne Paris Nord,authorising this gamified teaching to be included in the medical curriculum for third-year students. Moreover, this work was in accordance with the declaration of Helsinki and al participants gave their oral informed consent to participate.

Consent for publication

Not applicable

Availability of data and materials

The datasets used and analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests

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None

Authors' contributions

BD designed and supervised the study. The card game and MCQs were designed by RD and reviewed by TB. Game sessions were supervised by RD. LJ, SB and JRZ generated the online interactive board and included the gamified training in the students' curriculum. Data were analyzed by AC and BD. AC, BD and MC reviewed the literature and wrote the paper. All authors were involved in reviewing and approval of the final version.

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Figures

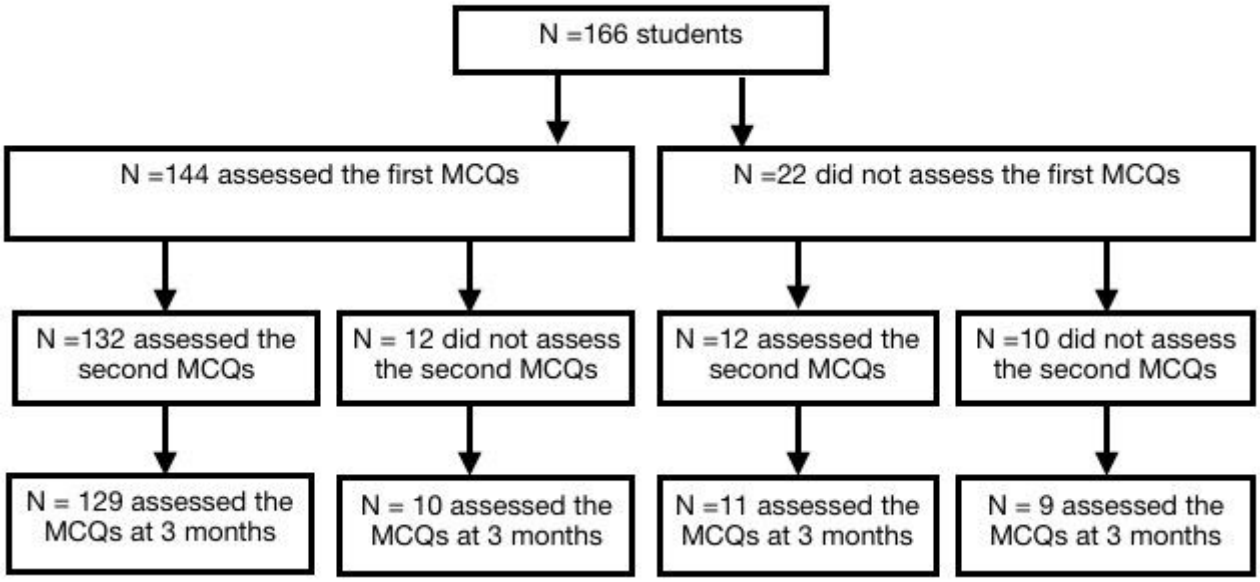

Figure 1

Flowchart. One hundred and sixty-six students participated in the study. One hundred and twenty-nine of them completed all the sessions. MCQs : Multiple Choice Questions.

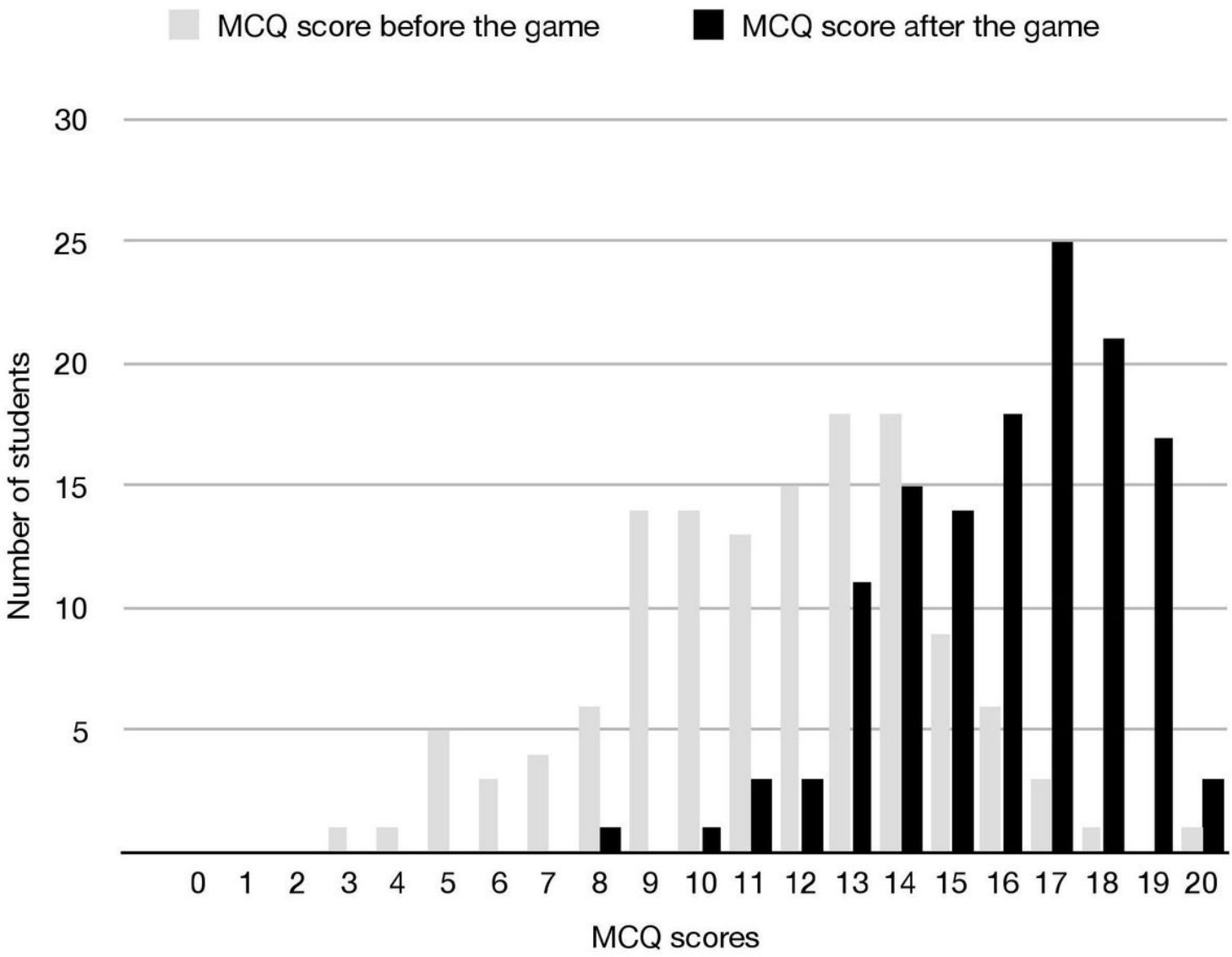

Figure 2

Distribution of students' knowledge score before (light grey) and after (black) the Psychiatric Hat Game (PHG). There was a significant improvement in performances after the PHG. X axis: scores obtained in MCQs; Y axis: absolute number of students within each subset.

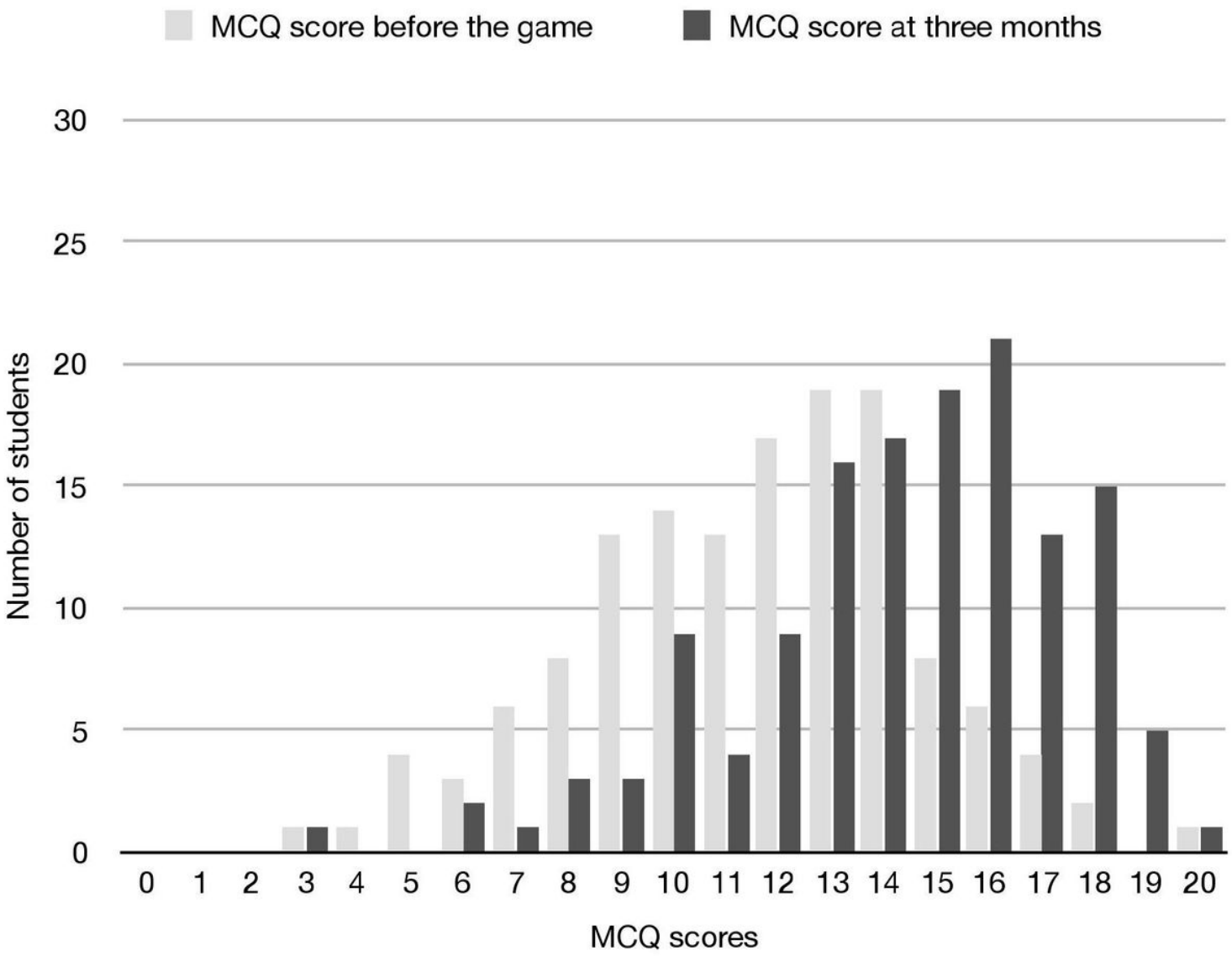

Figure 3

Distribution of students' knowledge score before (light grey) and three months after (dark grey) the Psychiatric Hat Game (PHG). X axis: scores obtained in MCQs; Y axis: absolute number of students within each subset.

Supplementary Files

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