

MATHS, STATS AND RESEARCH METHODS FOR THE NEW SPECIFICATIONS

Number 2: Dreaming of failing works!

Arnulf et al (2014) sent 2324 students entered for a medical school entrance exam an email after the exam inviting them to participate in a study about the exam. Responding was taken as consenting to the study and the students provided their student number. Any dream content described was coded using a Dream Threat Scale in categories including nature (eg failing, being chased), target (self, important character) and severity (minor to life-threatening). Each participant's exam result, was also identified by their student number.

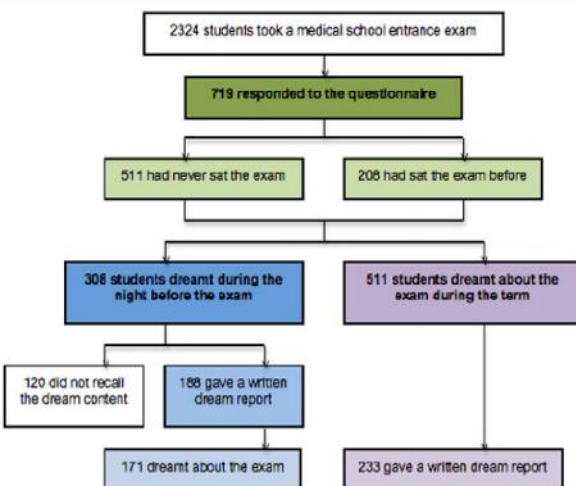
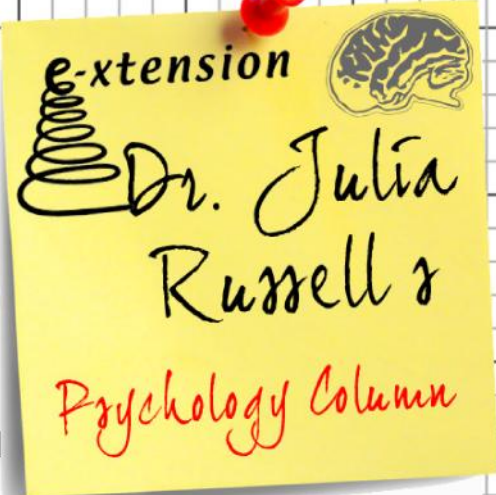


Figure 1

They found that students often dreamt about problems with the exam. Having a dream about the exam on the pre-exam night was associated with better performance on the exam ($p \leq 0.01$) and the frequency of exam-related dreams during the first term was proportional to exam grade ($r = 0.1$, $p \leq 0.01$). The best students' dream included being delayed on the train to the exam, not waking on time on the morning of the exam, forgetting to complete a question, ticking boxes with an erasable paper pen, and running out of time in the exam.

1. Figure 1 gives, the number of participants in different categories. Work out:
 - a. the percentage of the total who responded to the questionnaire. Give your answer to one significant figure. [1]
 - b. the percentage of those who responded who gave any dream report. Give your answer to one decimal place. [1]
 - c. which of these ratios is closer to 3:4 and which to 2:5:
 - i. students who had sat the exam before : those who had not. [1]
 - ii. students who did : did not dream the night before the exam. [1]

2. Think about the **ethical issues** raised in this study.

- a. How did the researchers ensure **confidentiality** in their study? [1]
- b. It was a tough exam, only 37% usually pass, and it is crucial for career progression of medical students. To what extent was there a risk of **psychological harm** arising from participation this study? [2]
- c. Define one other ethical guideline and outline how it was followed. [2]

3. The questionnaire included written answers (eg about dream content) and other items such as 'During the night preceding the exam, did you dream? Yes/No' and 'How high do you rate your usual level of anxiety, form 1 (not at all anxious) to 10 (extremely anxious)?'. Describe the different **types of questions** and explain why some of the data collected would have been **qualitative** and some **quantitative**. [5]

Extension:

1. Students' general anxiety level and their exam anxiety **correlated** ($r=0.52$, $p \leq 0.0001$). Comment on this finding.

2. How would you **code** these two dream descriptions? "I arrived in the exam room and looked for my place. The room was divided into different spaces with various colors and atmospheres. Each section corresponded to a block of numbers. Mine was 1941. At the end of my section, there was a number 1940 but no 1941. I panicked, ran from section to section, asking the supervisors, who gave me wrong information or did not help, seeming indifferent". "I had no paper for writing. I asked for a piece of paper and someone instead gave me some bread and said that I should write inside the bread, which everybody was doing and found normal and easy except me". "I shifted the numbers of my answers on the form. As I realized my mistake 5 min before the end of the session, I could not copy the right answers to a new form, and I received a grade of 0/20". "The physics and chemistry formulae were impossible to solve".

3. Try keeping two diaries, remembering to date each entry carefully. In one, describe your dreams each morning. Each evening, use a separate diary to rate the previous day for potential stressors. After a month, read the dream entries and rate each one for threat level (you can add more categories). Plot threat level against stress level on a scatter diagram. Can you see any relationship?

Reference

Arnulf I, Grosliere L Le Corvec T, Golmard J-L, Lascols O & Duguet A (2014) *Will students pass a competitive exam that they failed in their dreams? Consciousness and Cognition* 29: 36–47.
<http://www.ncbi.nlm.nih.gov/pubmed/25108280> PLOSone, 4(1):e4215.



Suggested Answers

1. Calculations:

- a. $719/2324 = .30687 \times 100 = 30\%$ to one SF. [1]
b. $177+233=410$, $410/719 = 57.0236 = 57.0$ to one DP. [1]
c. had sat: hadn't sat = $208:511$, /100 gives 2.08:5.11, approximately 2:5 [1]
d. did dream on exam night: did dream on exam night = $308:(719-308) = 308:411$, /100 gives 3.08:4.11, approximately 3:4. [1]

2.

- a. Used student numbers (for exam results and self reports). [1]
b. Risk of harm because: it was tough and important, candidates could have been stressed and felt pressured into participating when they didn't want to. Doing the questionnaire, and writing about their dreams and anxieties might have worsened their fears about their performance, or their preparation. It might also have caused them to have worried about the exams, or their dreams, more afterwards. Little risk of harm because: it was after they had sat the exam anyway, they could easily withdraw by not completing or submitting the questionnaire online, they have been doing the exam anyway, they weren't deliberately stressed for the study. [2]
c. Right to withdraw: being able to leave the study at any time: possible because they could not complete or not submit the questionnaire. Consent: they were told it was a questionnaire about the exam. [2]

3. The written answers (eg about dream content) were open questions asking for descriptive data, ie gave qualitative answers, the other items, which were closed questions, such as 'During the night preceding the exam, did you dream? Yes/No' and 'How high do you rate your usual level of anxiety, from 1 (not at all anxious) to 10 (extremely anxious)?' produced quantitative data because the answers were numerical. The first is a forced choice question because the participants could not, for example, say 'sometimes', they had to select one of two extremes. The latter is a rating scale, because it asked for a figure between 1 and 10. [5]

Some other useful links:

<http://digest.bps.org.uk/2014/11/does-dreaming-of-exam-failure-make-it.html> BPS Research Digest page

<http://www.hypersomnia.info/hsf-conference-announced-keynote-speaker-dr-isabelle-arnulf/> links to other interesting research by Isabelle Arnulf.

