

Can humour make students love statistics?

Andy Field, winner of the Society's Book Award, on how he makes use of eels, quails and lap dancers in his teaching

Many psychology students find themselves riddled with fear, boredom and often both at the prospect of learning statistics. Statistics anxiety and a lack of motivation are often cited as major obstacles to learning statistics, but what can be done to overcome these difficulties? This article looks at some of the problems we face when teaching statistics to psychologists, and asks whether humour is a useful tool to engage students and reduce their anxiety. It turns out that there is little evidence for humour as an effective tool to assist learning at all, and that using humour can be a double-edged sword!

I've just finished reading Chris Frith's brilliant *Making Up the Mind*, the most recent winner of the British Psychological Society's Book Award. In this book, Professor Frith distils a diverse collection of research from every corner of psychology into a coherent theory of the mind. It's a book full of wonders for both the layman and the experienced psychologist and is everything an award-winning book should be. In comparison, the previous year's winner – my 800 page re-description of the *t*-test (*Discovering Statistics Using SPSS*) – seems, well, a little undeserving to say the least.

To add insult to injury, no sooner had I won the award with a book that simply describes how to do statistics rather than distil all of science into a beautiful and elegant new theory, it was time to write a new edition. I spent most of last year writing this and, as with the previous two editions, I have simply done what comes naturally and hoped for the best. However, my bemusement at winning the award has made me question why the book has been so successful. Although I probably should have done this before embarking on a new edition, I recently decided that it was about time that I read some of the literature on good teaching practice to see whether I'm doing it right.

So this article is my attempt to summarise what I have discovered about the use of humour in teaching. There is rather more written about sociology students, so I have unashamedly drawn upon the sociology teaching literature. However, there are similarities between sociology and psychology students: both

have similar interests (although psychology majors tend to have higher school grades, Lunneborg & Lunneborg, 1991) and have comparable views of the scientific model (Caffrey & Lile, 1976).

Numbers are the beast

Psychology students are enrolled on courses that, to the layperson, shouldn't obviously involve a detailed knowledge of statistics. Teaching them poses a unique set of difficulties. Ask anyone who teaches statistics to undergraduate psychologists and they will regale you with tales of students who are anxious, bored, unmotivated and constantly wondering why they are being tortured with statistics when they hoped to spend three years analysing their friends on a leather couch. Conners et al. (1998) identified four main problems in teaching statistics to undergraduate psychologists: motivation, statistics anxiety, performance extremes (students tend to be either brilliant or hopeless at statistics so at what level do you pitch the material?), and making learning last. Arguably the latter two of these problems will be eased by addressing motivation and anxiety.

Maths anxiety and motivation are frequently cited as major obstacles in teaching statistics to social scientists. Bessant (1992) wrote that anxiety was 'one of the most significant barriers that instructors encounter while teaching statistics' (p.143). Similarly, Blalock (1987) assumed that students arrive with a 'considerable fear of anything with the slightest quantitative flavor to it' (p.164) and proposed that overcoming fears should be a primary goal in teaching statistics.

Remarkably though, data supporting this assumption about anxiety is hard to unearth. One recent study, suggests that 25.1 per cent of sociology students reported being 'very anxious' and 32.8 per cent 'anxious' about taking a statistics course (DeCesare, 2007). Another cites values of two thirds to four fifths of graduate students experiencing uncomfortable levels of statistics anxiety

questions

What are the main obstacles in teaching statistics to psychologists?

What effect does statistics anxiety have on course performance?

What forms of humour work best in the classroom, and is this true for all tutors?

resources

Field, A.P. (2009). *Discovering statistics using SPSS* (3rd edn). London: Sage. www.statisticshell.com www.sagepub.co.uk/field3e/

references

- Benson, J. (1989). Structural components of statistical test anxiety in adults: An exploratory model. *Journal of Experimental Education*, 57, 247–261.
- Bessant, K.C. (1992). Instructional design and the development of statistical literacy. *Teaching Sociology*, 20, 143–149.
- Blalock, H.M. (1987). Some general goals in teaching statistics. *Teaching Sociology*, 15(2), 164–172.
- Bryant, J., Crane, J.S., Comisky, P.W. & Zillmann, D. (1980). Relationship between college-teachers use of humor in the classroom and students evaluations of their teachers. *Journal of Educational Psychology*, 72(4), 511–519.
- Caffrey, B. & Lile, S. (1976). Similarity of attitudes toward science on the part of psychology and physics students. *Teaching of Psychology*, 3(1), 24–26.
- Conners, F.A., McCown, S.M. & Roskos-Ewoldson, B. (1998). Unique challenges in teaching undergraduates statistics. *Teaching of Psychology*, 25(1), 40–42.
- DeCesare, M. (2007). 'Statistics anxiety' among sociology majors. *Teaching Sociology*, 35(4), 360–367.
- Elmore, P.B. & Vasu, E.S. (1980). Relationship between selected variables and statistics achievement. *Journal of Educational Psychology*, 72(4), 457–467.
- Epting, L.K., Zinn, T.E., Buskist, C. & Buskist, W. (2004). Student perspectives on the distinction between ideal and typical teachers. *Teaching of Psychology*, 31(3), 181–183.
- Gruner, C.R. (1967). Effect of humor on speaker ethos and audience information gain. *Journal of*

(Onwuegbuzie & Wilson, 2003). Significantly more women than men report being anxious, and lower expected course grades predicted higher levels of reported anxiety (DeCesare, 2007). Although this shows that the majority of students are anxious about statistics, it is not the case that they all are.

The effects of statistics anxiety on course performance are clear. A positive attitude to statistics has been found to enhance performance on introductory statistics courses (Elmore & Vasu, 1980), whereas statistics anxiety causally decreases performance (Benson, 1989; Onwuegbuzie & Wilson, 2003). Statistics anxiety affects a student's ability to understand research articles, and to analyse and interpret statistical data, and it reduces memory efficiency when trying to understand and learn new statistical material (Onwuegbuzie & Wilson, 2003).

Motivation for learning statistics can be low because students perceive the topic as unconnected to their chosen degree, which leads them to believe it is unimportant (Paxton, 2006). This perception could be exacerbated if the link to research methods is not directly made in core psychology courses. Statistics anxiety is also intrinsically linked to motivation: It is likely to reduce students' self-efficacy, which reduces their achievement expectancies, and make them likely to give up when confronted with challenging material (Paxton, 2006). In the wider context this anxiety and reduced motivation might prevent some very gifted students from pursuing careers in psychology because they feel that a lack of confidence with statistics might prevent them from doing their job effectively or lead colleagues to perceive them as 'stupid'. Although the obvious examples are research or academic posts, a great many psychology careers make use of the fundamental research skills that are the backbone of the British Psychological Society's core undergraduate curriculum.

Although I have no desire to be a harbinger of despair, the problems we face with student motivation and anxiety are

likely to be getting worse. Undergraduate psychology students' core mathematical skills are on the decline: a 1992 cohort outperformed a 2002 cohort on measures of calculation, algebraic reasoning, graphical interpretation, proportionality and ratio, probability and sampling, and estimation (Mulhern & Wylie, 2004). In the same study there was evidence that the 1992 cohort underperformed compared with a 1984 cohort on a subset of these measures. If students have any insight into their abilities then they will be less confident and, consequently, more anxious about statistics courses than in the past. It is increasingly important, therefore, to strive to engage students in statistical material in a way that decreases anxiety and increases motivation.

Why was Spearman embarrassed?

In winning the award, my book *Discovering Statistics Using SPSS* was praised for its refreshing style that engages students in statistics. If you believe the publisher's blurb for the new edition then its success is attributable to 'Andy's humorous and self-deprecating style and the book's host of characters' which apparently 'make the journey entertaining as well as educational'. So the main cannons in my armoury appear to be humour and self-loathing. Certainly, humour was the hare that I pursued like a hungry greyhound in this new edition. In the past I have invented datasets around bizarre examples from my imagination, but always feared that this might sidetrack students from the research process. This time I tried to find real research that would entertain (some might say offend) as well as inform. I found myself accelerating uncontrollably down an icy slope of ejaculating quails, oriental men with eels up their anus,

ovulating lap dancers (see box) and fake vaginas filled with fake sperm. Much as this passion for the bizarre keeps me motivated and calm when writing the book, does humour keep students motivated and calm about statistics?

There is a remarkably small literature about using humour in teaching and textbooks. It is, to be fair, difficult to study. Apart from anything else, one person's hilarious joke is another person's tumbleweed rolling across the lecture theatre (or worse still, complaint to the vice chancellor



about levels of decency). There is a long-held belief that humour in public speaking is a good thing, and that the information gained by an audience is

enhanced by humour. The assumption is that humour increases attention and, therefore, learning. However, when comparing humorous and non-humorous speeches there is conflicting evidence about whether humour improves information retention (Gruner, 1967). There seems little doubt that students want humour: 96.6 per cent of students reported that they would want an 'ideal' teacher to use humour often or occasionally (Epting et al., 2004) and student evaluations of teachers' effectiveness and appeal are positively related to their use of humour (Bryant et al., 1980). But does humour actually work, as an educational tool for reducing anxiety and improving learning?

Schacht and Stewart (1990) evaluated a statistics course that used humorous cartoons as a means to reduce statistics anxiety. They found that not only did students perceive the cartoons as having reduced their anxiety, but scores on the maths anxiety rating scale significantly diminished from pre- to post-course. However, there was no control course that did not use cartoons, so it is unclear whether the use of cartoons was the causal agent in reducing anxiety. Astonishingly,

Kaplan, R.M. & Pascoe, G.C. (1977). Humorous lectures and humorous examples. *Journal of Educational Psychology*, 69(1), 61-65.

Klein, D.M., Bryant, J. & Zillmann, D. (1982). Relationship between humor in introductory textbooks and students evaluations of the texts appeal and effectiveness. *Psychological Reports*, 50(1), 235-241.

Lunneborg, C.E. & Lunneborg, P.W. (1991). Who majors in psychology? *Teaching of Psychology* 18(3), 144-148.

Miller, G., Tybur, J.M. & Jordan, B.D. (2007). Ovulatory cycle effects on tip earnings by lap dancers: Economic evidence for human estrus? *Evolution and Human Behavior*, 28, 375-381.

Mulhern, G. & Wylie, J. (2004). Changing levels of numeracy and other core mathematical skills among

psychology undergraduates between 1992 and 2002. *British Journal of Psychology*, 95, 355-370.

Onwuegbuzie, A.J. & Wilson, V.A. (2003). Statistics anxiety: Nature, etiology, antecedents, effects, and treatments. *Teaching in Higher Education*, 8(2), 195-209.

Paxton, P. (2006). Dollars and sense: Convincing students that they can learn and want to learn statistics.

Teaching Sociology, 34(1), 65-70.

Schacht, S. & Stewart, B.J. (1990). What's funny about statistics - A technique for reducing student anxiety. *Teaching Sociology*, 18, 52-56.

Zillmann, D., Williams, B.R., Bryant, J. et al. (1980). Acquisition of information from educational-television programs as a function of differently paced humorous inserts. *Journal of Educational Psychology*, 72, 170-180.

this was the only study I managed to find that looked at the use of humour to reduce statistics anxiety.

In terms of assisting learning, there are some studies (although not specific to statistics teaching) suggesting that humour can be a useful tool in facilitating learning. A study on children manipulated televised educational programmes so that they contained clips of humorous programmes (such as *The Muppet Show*) or non-humorous inserts placed such that they didn't interrupt an educational point. Results showed that children learnt more from educational films containing humorous inserts compared to films containing non-humorous inserts or no inserts (Zillmann et al., 1980). The authors concluded that the humorous inserts increased learning by improving attention. These humorous inserts were fairly randomly interspersed within the educational content and were unrelated to the material to be learned. Kaplan and Pascoe (1977) systematically manipulated whether humour in a lecture was related to the topic being taught, was un-related, or was a mix of the two. Compared to lectures with no humour, concepts presented humorously were not better remembered immediately after the lecture, but were at six-week follow up. This suggests that humour can be a useful tool

in making learning last (one of the four obstacles mentioned earlier). However, the effect that humour had was concept-specific; unlike in Zillmann et al.'s study, humour did not improve overall learning, only recall of the specific concepts that were described using humour. One strategic approach to teaching statistics might, therefore, be to use humour selectively when explaining particularly difficult constructs.

By the way, in case you're wondering: Spearman's mum caught him ranking.

The sad clown

If we assume, based on the limited evidence available, that humour can be a useful way to reduce statistics anxiety and improve learning then we need to also consider the pitfalls. The research so far conducted on the use of humour has, by necessity, been fairly limited. There are numerous styles of humour, and the extent to which humour can be a useful tool probably depends on the extent to which the teacher's personality lends itself to being funny.

There is very little research that has tried to pick apart the effects of different styles of humour. One exception is Bryant et al.'s (1980) study, in which humour characteristics of lecturers were

categorised. They found very interesting gender differences. For male tutors:

- | humour was overall associated with effectiveness;
- | funny stories were better than jokes, riddles or puns;
- | spontaneous humour was more effective than prepared humour;
- | humour related to the topic being taught was better than unrelated humour;
- | hostile/aggressive humour and nonsense humour correlated with effectiveness but sexual humour did not; and
- | effectiveness was correlated with humour that involved characters other than the tutor or students.

For female tutors, however, the picture was very different. Overall, the use of humour was not associated with effectiveness, and the use of puns had a detrimental relationship with effectiveness. No other humour characteristics correlated with effectiveness for female tutors. The authors suggest that these gender differences may stem from students' gender stereotypes of appropriate behaviour in the classroom; however, nearly 30 years on from the study this explanation probably has less credibility.

Bringing lap dancers to the lecture theatre

One way to bring some humour into the lecture theatre is to find examples of real research that address important theoretical questions, but that are tested in an unusual way and can feed into lively discussions about methods and research design. A particular favourite of mine is a study by Miller et al. (2007) that used lap dancers as an ingenious method of testing an important evolutionary theory. Most female mammals experience a phase of 'estrus' during which they are more sexually receptive and attractive, the evolutionary benefit of which is believed to be to attract mates of superior genetic stock. Some people have argued that this important phase became uniquely lost in human females. Miller and his colleagues reasoned that if the 'hidden-estrus' theory is incorrect then men should find women most

attractive during the fertile phase of their menstrual cycle compared to the pre-fertile (menstrual) and post-fertile (luteal) phase. To measure how attractive men found women in an ecologically valid way, they came up with the ingenious idea of collecting data from women working at lap-dancing clubs. There is a link between how much money a dancer earns and their attractiveness to patrons because men pay for dances: the more men a dancer attracts, the bigger her tips. If women do have an estrus phase then they will be more attractive during this phase and therefore earn more money. To gather this information, the researchers got the dancers to keep diaries

recording their menstrual cycle and tips.

The example is naturally attention-grabbing, memorable, and is easy to present in a light-hearted way; however, it addresses an important research question, was well conducted, and enables you to make several educational points. First, the data are quite representative of naturally collected data in that different dancers provided different amounts of data because of the varying nature of their shifts. There are a lot of missing values. The data are therefore a very useful way to explore the problems of 'real' data sets (in this case, I use it to show how multilevel models can be used to overcome the problem of missing data in repeated measures designs). It is also a

fabulous example of how diary methods can be used to collect data (Why might the researchers have used a diary method rather than visiting lap-dance clubs?). It can be used to prompt discussion about cause and effect in time series research (Can we conclude that the extra tips were caused by the estrus phase?). You can also discuss generalisation (Are men who attend lap-dancing clubs and give tips representative of the population of men as a whole?). Finally, it is a great example of how to address an important research question using a naturally occurring phenomenon. Students can consider whether it would be possible to test this theory experimentally, and they invariably have some entertaining speculations about the motives for using lap dancers – but then can they think of alternative ways to test the same theory?

"the more men a dancer attracts, the bigger her tips"

It would be interesting to see whether these gender differences hold up in a more contemporary setting.

Moving away from face-to-face teaching, it is also important to ascertain whether humour is a useful tool in teaching materials and textbooks (and, of course, this is a pertinent personal issue on the eve of the release of my new tome). I was delighted to discover that chapters from humorous textbooks are rated by students as more enjoyable (Klein et al., 1982). This delight waned upon glancing at the table showing data that humorous book chapters did not significantly improve learning, interest, persuasiveness, and the desire to read more. The delight swung to horror as the article revealed that the credibility of the author was inversely related to the amount of humour used. Oh dear, I probably won the 2007 book award because the judges enjoyed it and not because they learnt anything from it.

Conclusions

I have tried to summarise what little evidence there is that humour can be a

useful teaching tool for reducing statistics anxiety and improving learning. The most glaring conclusion that stems from this review is that a lot more research is needed, and within contemporary settings. There is little research on the use of humour in teaching, and what little there is now relatively dated and does not fully explore the influences of different forms of humour, the placement of humour and how well the humour aligns to the concepts being taught.



There is also a massive lacuna in research on the use of humour to reduce statistics anxiety, and whether reductions in statistics anxiety moderate improvements in performance that arise from the use of humour.

Finally, we need to know more about how humour interacts with the personality of the lecturer. It seems naive to assume that humour is universally a good thing – it will work for some people and not for others. A prescription of how to deliver humorous examples can probably never be found and there is no substitute for

teachers and writers finding their own voice.

There are also potential pitfalls in using humour. Two that we know of are that using humour doesn't always improve your effectiveness or appeal (it seems to depend upon your gender), and that it reduces student perceptions of your genius. However, there is tentative evidence that humour might be a useful way to reduce statistics anxiety, and concept-related humour can probably be a useful way to enhance learning. If you're going to try humour in your teaching, it is better to tell anecdotes about people other than you or your students, and avoid sexual themes (like ejaculating quails, ovulating lap dancers and eels).

Finally, ignore me, because, apparently, I have no academic credibility.



Andy Field
is in the Department of Psychology, University of Sussex
andyf@sussex.ac.uk

