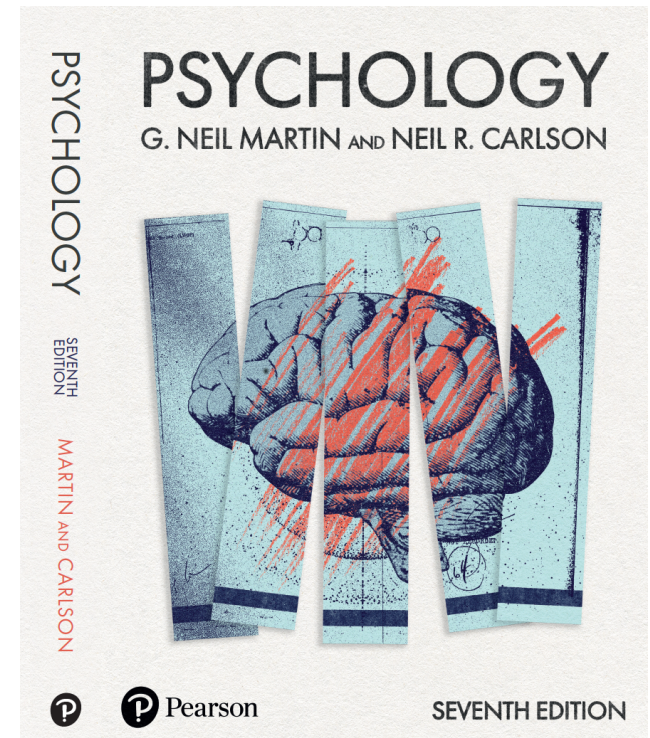


**Practical ideas for introducing
new & controversial research
to the introductory psychology
programme**

Professor G. Neil Martin, FRSA



How much of a psychologist are you?



True or False?

- A person with schizophrenia has a split personality
- Women are more likely to conform than men
- People who threaten to commit suicide rarely do
- We only use 10% of our brain
- Astrology is a good predictor of personality
- “Opposites attract” (in romantic relationships)
- Neuroscience has concluded that people are left-brained or right-brained
- People exposed to words about old people leave a laboratory walking more like an old person
- People who suffer from amnesia typically cannot recall their own name or identity
- Human memory works like a video camera, accurately recording events
- Once you have experienced an event and formed a memory of it, that memory does not change.

They are all...

FALSE



MAKING INTRO PSYCH (EVEN MORE) INTERESTING

- Replication (and well-known psychological phenomena)
- Questionable research practices
- Deception
- Face recognition
- Knowledge of memory
- Sense of smell (and taste)
- Cognitive psychology and classroom learning
- Some highlights of the 7th edition of psychology



PSYCHOLOGY & REPLICATION/REPLICABILITY

“the integrity of research, especially medical and social science research, is at risk from what is known as the ‘reproducibility crisis’ (i.e. it being very difficult or impossible to replicate a scientific study).” (<https://committees.parliament.uk/committee/135/science-and-technology-committee/news/156859/reproducibility-of-research-inquiry-launched/>)

UK Parliament’s Science and Technology Committee, 2021



6th edition- 2018

Controversies in psychological science: Replication

The issue

What a time to be alive. If you read certain journals, news media and websites and listen to certain researchers, you might be vaguely aware that some psychologists think the discipline is undergoing a crisis. But why? And what is the cause of the crisis? At the heart of the problem is this: replication failure.

Replication refers to the process whereby a study is repeated in a way that is as close to the original as possible with the prediction that the same results will be produced as those found in the original study. A direct replication will match the original study almost identically (but the participants will differ, the building will differ, the experimenter will differ, etc. - but these are sources of variance which should be negligible if an effect is strong). A 'conceptual' replication will reproduce the conditions of the original experiment only loosely - various parts of the methodology might differ, for example, or there may be the addition of different types of group. What has made news in Psychology recently is that psychologists have been unable to replicate some well-known effects and findings in the discipline. That is, they have not been able to find the same results as early studies and these findings were thought to be robust and reliable (Pashler and

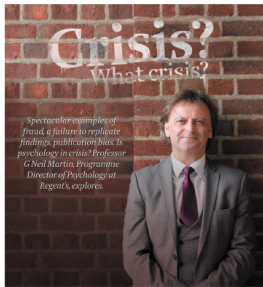
Harris, 2012; Pashler and Wagenmakers, 2012; Laws, 2013; APS, 2015). Many of them led to theories and many citations and became classic in the field being widely cited in textbooks, including this one. Some of the more notable replication failures are summarised in Table 1.2.

The problem is not specific to psychology - only 11 per cent of 53 landmark preclinical cancer trials have been found to replicate (Begley and Ellis, 2012) with 35 per cent of pharmacology studies replicating (Prinz et al., 2011). Of the 49 most widely cited papers in medicine, only 44 per cent were replicated (Ionnidis, 2005). Sixty per cent of 5p studies failed to replicate in finance (Hubbard and Vetter, 1991), 40 per cent in advertising (Reid et al., 1981) and 46 per cent in accounting, management, finance, economics and marketing (Hubbard and Vetter, 1996). The situation is somewhat better in education (Makel and Plucker, 2014), human factors (Jones et al., 2010) and forecasting (Evanschitzky and Armstrong, 2010).

In psychology, priming research involving social factors has been particularly susceptible to non-replication (Earp and Trafimow, 2015). In priming research, participants' behaviour is influenced by exposure to stimuli of which they are not consciously aware or which influences them in a way in which they were not aware. For example, presenting someone with words related to being a professor might lead to participants performing well on a later IQ test (because their schema of a professor has been activated).

Klein et al. (2014) found that in 13 replication attempts of classic and contemporary findings using 36 samples comprising 6,344 participants, 10 were successful, one was weakly replicated and two sets of findings were not. Both failures to replicate involved social priming. The latest last set of replication attempts, however, found that of 100 experiments published in journals from the year 2008, fewer than half were successfully replicated (Open Science Collaboration, 2015), as you can see in Figure 1.1.

These, and similar results, suggest that some research may be susceptible to Questionable Research Practice (QRP) which leads to positive findings that may ultimately be nothing more than well-camouflaged Type 1 errors (Simmons et al., 2011; John et al., 2012; Makel, 2014). In statistics and psychology a Type 1 error is one where your statistical analysis yields a result - say, a difference between two groups - that has an extremely low probability of being found by chance but is actually false (the opposite is a Type 2 error where a statistical test suggests that there is no difference between two groups or conditions when there actually is).



Controversies in psychological science: Continued

Table 1.2 Some recent failures to replicate well-known findings in psychology

Finding	Author/s	Author/s of failed replication
Exposure to high achievement words leads to better cognitive task performance	Bargh et al (2001)	Harris et al (2013)
Exposure to honesty-related words makes people disclose alcohol-related behaviour	Rasinski et al (2005)	Pashler et al (2013)
People who wrote about secrets estimated hills to be steeper	Slepian et al (2012)	LeBel & Wilbur (2013)
Using imagery to reduce prejudice	Birtel & Crisp (2014)	McDonald et al (2014)
Priming with religion affects hand grip endurance	Hone & McCullough (2015)	Hone & McCullough (2015)
Priming with 'elderly'-related words makes people walk like old people	Bargh et al (1986)	Shanks et al (2013)
Priming with words about professors makes people work harder	Dijksterhuis & Van Knippenberg (1998)	Doyen et al (2012)
Evidence of precognition	Bem (2011)	Ritche et al (2012)
We feel psychologically closer to people physically close to us	Bash & Shalev (2012)	Nosek & Lakens (2014)
Hoarding a pen lengthways in the mouth increases happiness	Strack et al (1998)	Wagenmakers et al (2016)
Priming moral purity leads to cleaning-related thoughts/behaviours	Zhong & Liljenquist (2006)	Earp et al (2014)
Stereotype threat during maths tests in women	Spencer et al (1999)	Ganley et al (2013)
Power posing	Carney et al (2010)	Ranehill et al (2015)
Reminders of money alter people's political views	Vohs et al (2010)	Rohrer et al (2015)
Avoidant individuals will respond to social warmth with intimacy	MacDonald & Borsook (2010)	Philipp-Muller & MacDonald (2016)

John et al. (2012) found that more than 50 per cent of the 2,000 psychologists they asked wished to extend their study until a sufficient sample was recruited which produced a statistically significant result. Forty per cent had reported selectively publishing studies that produced significant results. Both are examples of p-hacking, the publication of a statistically significant finding or set of findings which are, to all intents and purposes, Type 1 errors. Type 1 errors in psychology and statistics are findings that are spurious - a study may show a statistically significant difference between two groups, for example, but this difference is spurious because it is based on problems with data collection, the method or data analysis.

P-hacked publications arise from studies with small samples and power, which are selective in the sample they recruit and retain, which engage in post-hoc data analysis selection, and which may exclude negative results, conditions, experiments and even participants. Simmons et al. (2011), for example, have demonstrated how easily a surprising and logically derived finding or phenomenon can turn out to be utterly bogus because of the methodological and statistical design and analysis decisions made by the experimenter. In their study they were able to demonstrate that people who listened to a song about getting older made people feel younger. In the following table, they report (in bold) what was included in the

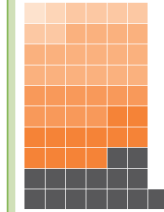
Controversies in psychological science: Continued

RELIABILITY TEST

An effort to reproduce 100 psychology findings found that only 39 held up.* But some of the 61 non-replications reported similar findings to those of their original papers.

Did replicate match original's results?

NO: 61



YES: 39

Replicator's opinion: How closely did findings resemble the original study?

- Virtually identical
- Extremely similar
- Very similar
- Moderately similar
- Somewhat similar
- Slightly similar
- Not at all similar

* based on criteria set at the start of each study

Figure 1.1 Replication graph <http://www.nature.com/news/first-results-from-psychology-s-largest-reproducibility-test-1.17433>

original report and what was excluded from the written-up report (in grey).

It shows how excluding data and being flexible with your data analysis can lead to false positives. For example, they included a number of factors in their study but did not include others - the greater the number of factors (or variables) in your study, the easier it will be to find a significant result. You have an approximately 1 in 20 chance of finding a significant result regardless of whether that result is genuine. It is unacceptably easy, they conclude, 'to publish statistically significant' evidence consistent with any hypothesis. And reporting dramatic single effects like these reflects another problem: publication bias. This refers to journals' tendency to publish only results which are positive and statistically significant and a reluctance to publish negative results.

Why has some research in psychology been so difficult to replicate? One reason might be that the original result is not robust or valid in the first place. In statistics, this is called a false positive - claiming a result or finding exists when it doesn't. Journals have been criticised for publishing and prioritising novel, creative, significant results and for not publishing negative results or direct replications. This is called a publication bias - publishing only positive results. The result of this is that non-supporting research does not get published and that positive, but spurious, results are embedded in the literature in perpetuity. Martin and Clarke found that of 1,551 psychology journals, only 3 per cent accepted replications. Many journals emphasised the importance of new and original research.

Table 3. Study 2: Original Report (In Bolded Text) and the Requirement-Compliant Report (With Addition of Gray Text)

Using the same method as in Study 1, we asked 34 University of Pennsylvania undergraduates to listen only to either "When I'm Sixty-Four" by The Beatles or "Kalimba" or "Hot Potato" by the Wiggles. We conducted our analyses after every session of approximately 10 participants; we did not decide in advance when to terminate data collection. **Then, in an ostensibly unrelated task, they indicated only their birth date (mm/dd/yyyy) and how old they felt, how much they would enjoy eating at a diner, the square root of 100, their agreement with 'computers are complicated machines', their father's age, their mother's age, whether they would take advantage of an early-bird special, their political orientation, which of four Canadian quarterbacks they believed won an award, how often they refer to the past as "the good old days," and their gender. We used father's age to control for variation in baseline age across participants.**

An ANCOVA revealed the predicted effect: According to their birth dates, people were nearly a year-and-a-half younger after listening to "When I'm Sixty-Four" (adjusted $M = 20.1$ years) rather than to "Kalimba" (adjusted $M = 21.5$ years), $F(1, 17) = 4.92, p = .040$. Without controlling for father's age, the age difference was smaller and did not reach significance ($M = 20.3$ and 21.2, respectively), $F(1, 16) = 1.01, p = .33$.

ORIGINAL RESEARCH article

Front. Psychol., 11 April 2017

Sec. Quantitative Psychology and Measurement

Volume 8 - 2017 | <https://doi.org/10.3389/fpsyg.2017.00523>

Are Psychology Journals Anti-replication? A Snapshot of Editorial Practices



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Recent research in psychology has highlighted a number of replication problems in the discipline, with publication bias – the preference for publishing original and positive results, and a resistance to publishing negative results and replications-identified as one reason for replication failure. However, little empirical research exists to demonstrate that journals explicitly refuse to publish replications. We reviewed the instructions to authors and the published aims of 1151 psychology journals and examined whether they indicated that replications were permitted and accepted. We also examined whether journal practices differed across branches of the discipline, and whether editorial practices differed between low and high impact journals. Thirty three journals (3%) stated in their aims or instructions to authors that they accepted replications. There was no difference between high and low impact journals. The implications of these findings for psychology are discussed.

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CONVERTING THIS INTO A CLASS ACTIVITY

What is replication?

Why is it important?

What are the Open Science Framework and Many Labs and how have these contributed to our understanding of how psychology research has been conducted and published?

What is the difference between a direct and conceptual replication?



SEMINAR/CLASS ACTIVITY: STATE/CONTEXT DEPENDENT MEMORY

Compare and contrast Godden & Baddley's (1975) scuba diving study with a "replication" by Murre (2021; 2022)

1. Ask the students to describe what Godden and Baddeley did
2. Then, ask them to compare that study's method with those of the Murre study.
3. How do they differ?
4. In what way is the latter study not a direct nor a conceptual replication?
5. What are the issues with describing this study as a replication?



SEMINAR/CLASS ACTIVITY: STRACK ET AL (1988)- FACIAL FEEDBACK HYPOTHESIS



Figure 13.13 Examples of the facial expressions created in Strack et al's experiments when people held a pen between the lips or the teeth- note the position of the muscles.

Source: Strack, F., Stepper, S. and Martin, L. L., Inhibiting and facilitating conditions of the human smile. *Journal of Personality and Social Psychology*, 1988, 54, 768-777.
© Fritz Strack. Reproduced with permission.



<https://psycnet.apa.org/record/1988-25514-001>

You can repeat this study in the session using a selection of cartoons and rating scales

A failure to replicate the result of Strack et al directly in 17 laboratories can be found here: <https://journals.sagepub.com/doi/full/10.1177/1745691616674458>

Discussion of the controversy here which suggests that variations in procedure can affect whether the finding is replicated -<https://psycnet.apa.org/record/2018-16714-001>



CLASS ACTIVITY: QUESTIONABLE RESEARCH PRACTICES

- Match the term with the definition
- The exercise provides opportunity to discuss the nature of QRPs, why they are committed and the consequences of committing them.
- You could refer to case studies in psychology, such as Diederik Stapel and Brian Wansink- and, possibly, Eysenck & Grossarth-Maticek work on cancer-prone personality.
- cf Gino, Ariely.
- Fabrication in a study about honesty
- <https://www.informahealthcare.com/doi/metrics/10.1080/08989621.2024.2329265>



SEMINAR/CLASS ACTIVITY: QUESTIONABLE RESEARCH PRACTICES

- A. p-hacking
- B. Omitting data
- C. Additional recruitment
- D. HARKing or H (ypothesising) A (fter) the R (esults) are K (nown)
- E. Publication bias
- F. Reporting “trends”
- G. Small samples



1. The tendency for journals to publish research reporting only statistically significant results; this can lead to a failure to published similar studies which do not find significant results, i.e., where null findings are reported
2. Analysing data sets until a significant result is found (multiple testing); (also known as data-dredging); removal of data to ensure $p < .05$; conducting unplanned statistical tests until a significant p value is found; Removal of conditions/groups from analysis in order to achieve a significant p value; changing analysis strategy after the data have been ~~collected/analysed~~
3. Insufficiently powered studies leading to inappropriately applied statistical tests
4. Leaving out null findings from the study
5. Recruiting more participants until a significant result is found
6. Data are reinterpreted according to what was found rather than what was predicted in the hypotheses; post-hoc interpretation of results
7. Probability values above .05 reported as "marginally significant"



How might psychologists prevent questionable research practices and improve replicability?

What is the nature and purpose of a registered report?

How they differ from other types of report?


Why have psychologists chosen to adopt this as one model of publishing their data?

How might students **adopt** registered reports in their own study?

Would this be practical? What would be the obstacles to adopting this approach?

What is open science and open data? Do students believe there are negative aspects to open data, as well as positive, and if so what are they and how might these be addressed or mitigated?

You can refer to national research concordats here, which stipulate that institutions such as Universities adopt open science and open data practices (such as making data and code freely available)



KRISHNA & PETER (2018): QRPS

Practice

Selectively reporting studies

Deciding whether to exclude data after looking at the results

Changing or formulating new hypotheses after analyzing the data

Rounding off p values

Claiming to have predicted an unexpected result

Failing to report all relevant conditions

Failing to report all relevant dependent measures

Falsifying data

Falsely claiming that results are unaffected by demographics

Collecting more data in order to achieve significance

Stopping data collection after achieving the desired result

Reporting effect sizes

Conducting a power analysis

Using Bayesian analysis

Utilizing sequential analysis

- Ask students to respond on a five point scale whether they think these practices are acceptable (where 1 = unacceptable).
- You could also ask students how they think their tutor/supervisor might respond, using the same scale.



SEMINAR/CLASS ACTIVITY: DECEPTION!

- A test of students' knowledge about deception and the behavioural cues to deception
- Ask the students to indicate what verbal and non-verbal behaviour they think would identify a liar.
- Are there any consistent cues, according to them, that liars use/exhibit when they lie?
- Are there any verbal and non-verbal cues that signify truth-telling? Ask them why they think these cues are indicative of deception (and truth-telling)?



ARE THESE INDICATIVE OF PEOPLE NOT TELLING THE TRUTH & LYING?

Cues

Vocal

Hesitations (use of speech fillers, e.g. 'ah', 'um', 'er', and 'hmm')

Speech errors (grammatical errors, word or sentence repetition, false starts, sentence change, sentence incompletions, slips of the tongue, etc.

High-pitched voice

Speech rate (number of spoken words in a certain period of time)

Latency period (period of silence between question and answer)

Pauses (silent, filled or mixed)

Visual

Gaze aversion (looking away from the conversation partner)

Smiles (smiling and laughing)

Facial fidgeting (face touching or rubbing hair)

Self-fidgeting (touching, rubbing, or scratching body or face)

Fidgeting (undifferentiated)

Illustrators (hand and arm movements designed to modify or supplement what is being said verbally)

Leg and foot movements

Posture shifts (movements made to change seating position)

Head movements (head nods and head shakes)

Eye blinks (blinking of the eyes)



Cues	Actual relationship	Assumed relationship
Vocal		
Hesitations (use of speech fillers, e.g. 'ah', 'um', 'er', and 'hmmm')	0.04	Associated with lying
Speech errors (grammatical errors, word or sentence repetition, false starts, sentence change, sentence incompletions, slips of the tongue, etc.)	0.00	Associated with lying
High-pitched voice	0.21	Associated with lying
Speech rate (number of spoken words in a certain period of time)	0.07	No assumed relationship
Latency period (period of silence between question and answer)	0.02	No assumed relationship
Pauses (silent, filled or mixed)	0.02	Associated with lying
Visual		
Gaze aversion (looking away from the conversation partner)	0.03	Associated with lying
Smiles (smiling and laughing)	0.00	No assumed relationship
Facial fidgeting (face touching or rubbing hair)	.08	Associated with lying
Self-fidgeting (touching, rubbing, or scratching body or face)	-0.01	Associated with lying
Fidgeting (undifferentiated)	0.16	Associated with lying
Illustrators (hand and arm movements designed to modify or supplement what is being said verbally)	-0.14	No assumed relationship
Leg and foot movements	-0.09	Associated with lying
Posture shifts (movements made to change seating position)	0.05	Associated with lying
Head movements (head nods and head shakes)	-0.02	Associated with lying
Eye blinks (blinking of the eyes)	0.07	Associated with lying

Note. Data on actual relationships between cues and lying is taken from DePaulo et al (2003). Data on assumed relationships is taken from Vrij (2008). Positive scores indicate increase in liars; negative-scores indicate decrease in liars; significant relationships are indicated in bold.



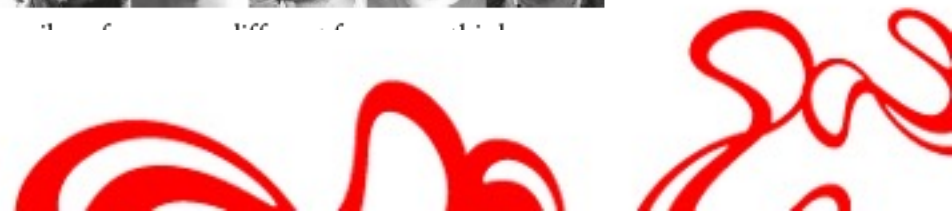
SEMINAR/CLASS ACTIVITY: FACE RECOGNITION

HOW MANY DIFFERENT FACES CAN YOU SEE?

(JENKINS ET AL, 2011)



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40



QUESTIONS

- Why were they unable to identify the correct number?
- What does this say about our ability to identify faces accurately?
- Do they think that facial recognition software would perform better?



FACE RECOGNITION: SOME SIMPLE EXPERIMENTS

- Present students with images of facial features (eyes, noses, mouths, chins) cut out from magazines and newspapers; ask them to identify the famous faces from which they were cut. Which features provide the best clues to the identification of the individual?
- Present an unfamiliar face briefly as a target and ask students to spot this target face from within a collection of other unfamiliar faces presented serially. How many people are able to identify the face correctly? How did they remember the face? What features did they look for as they searched through the distracter faces?
- Present unfamiliar faces (preferably without the hair, which would provide an additional clue) very briefly and ask students to identify the sex/age of each one. How accurate are they? Are students better able to identify the sex/age of faces of their own ethnic origin than of faces of different ethnic origins?
- Present famous faces briefly, some in the correct orientation and some upside down. Is identification as accurate when the faces are inverted as when they are the right way up? Why is this?



SEMINAR/CLASS ACTIVITY: BELIEFS ABOUT MEMORY

Table 8.4 Percentage of respondents agreeing with each memory statement, along with the average rate of agreement across items.

Item	MTurk (%)	SurveyUSA (%)
Amnesia: People suffering from amnesia typically cannot recall their own name or identity.	81.4	69.6
Confident testimony: In my opinion, the testimony of one confident eyewitness should be enough evidence to convict a defendant of a crime.	22.1	32.9
Video memory: Human memory works like a video camera, accurately recording the events we see and hear so that we can review and inspect them later.	46.9	52.7
Unexpected events: People generally notice when something unexpected enters their field of view, even when they are paying attention to something else.	77.4	65.0
Permanent memory: Once you have experienced an event and formed a memory of it, that memory does not change.	28.0	39.9
Hypnosis: Hypnosis is useful in helping witnesses accurately recall details of crimes.	46.4	44.6
Average agreement rate (out of 6 items).	50.33 (3.02)	50.83 (3.05)

Table 8.5 The mean ~~number of~~ endorsements for metaphors of memory used in Brewin et al's (2019) study (7 = strongly agree).

Diary entry	5.31
Video camera	5.12
Library	5.06
Rooms in a house	4.89
Storehouse	4.88
Computer storage	4.75
Painting	4.74
Collage	4.70
Made-up story	4.67
Perfume	4.58
Artist's impression	4.55
Jigsaw puzzle	4.55
Melodies on a piano	4.50
Filing cabinet	4.31
Muscle	4.29
Lock and key	4.11
Subway map	3.99
Conveyor belt	3.63
Aviary	3.16
Compost heap	3.16
Bottle	2.63

Note: SurveyUSA data are from Simons and Chabris (2011).
doi: 10.1371/journal.pone.0051876.t003

BUT! WORDING

- When participants presented with:

‘Human memory works partly like a video camera, accurately recording some of the events we see and hear so that we can review a simplified version later’ and ‘ Human memory is not like a video camera because we cannot play back events exactly as happened’

they were less likely to accept the video camera metaphor (Brewin et al, 2019)

Importance of wording in influencing people’s beliefs- discussion of validity



SEMINAR/CLASS ACTIVITY: THE JELLY BEAN TEST



SEMINAR/CLASS ACTIVITY: THE JELLY BEAN TEST

A good way of showing students the difference between retronasal and orthonasal smelling -and the importance of olfaction to flavour- is the Jelly Bean test.

For this you will need some physical items: a packet of differently flavoured jelly beans (with a map on the back identifying which colour is which flavour- this is very important), a blind-fold (option) and nose clip (optional). You can also run this exercise remotely by asking students to prepare in advance and obtain the jelly beans. The instructions below are the same.

1. Ask the student to put on a blind-fold (or to close their eyes)
2. Ask them to pinch their nose (or apply the nose clip)
3. Ask them to open their mouth and place a jelly bean on their tongue (the student must not be able to see the colour nor to breathe through the nose)
4. Ask them to chew the bean and try to identify the flavour
5. Note the flavour
6. Remove the nose clip or ask them to release their fingers and ask them to identify again
7. Note any differences between the two.
8. Repeat for as many flavours as you want

How good or poor were they when their nose was pinched? Discuss with the students why they identified in the way that they did, using the exercise to illustrate the function of retronasal smelling. You could bring in real-life examples, such as having a cold- which impairs olfaction but leaves gustation relatively intact (you can taste food but not its odour)





Journal of Applied Research in
Memory and Cognition

Volume 1, Issue 4, December 2012, Pages 242-248



Target Article

Inexpensive techniques to improve education: Applying cognitive psychology to enhance educational practice


[Henry L. Roediger III](#)  , [Mary A. Pyc](#)

Optimizing Learning in College: Tips From Cognitive Psychology

**Adam L. Putnam¹, Victor W. Sungkhasettee², and
Henry L. Roediger, III²**

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 - nudging and its problems
 - conspiracy theories
 - face recognition technology and its use and effectiveness
 - the use of phonics to teach reading
 - sex differences and the brain
 - machine learning
 - screen and social media use in teenagers
 - predicting your personality from your digital footprint
 - how behaviour and sensation changed during COVID-19 and lockdown.



A close-up photograph of a person's hand holding a large, textured, brown object, possibly a piece of wood or bark. The object has a rough, cracked surface with a mottled brown and tan color. A white speech bubble with a black outline is positioned in the upper left quadrant, containing the text "Thank you for listening!". The background is dark and out of focus.

Thank you for listening!

Practical ideas for introducing new & controversial research to the introductory psychology programme

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