AS and A LEVEL

Teacher Guide

H167/H567

PSYCHOLOGY

Guide to Core Studies 1

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MILGRAM, S. (1963) Behavioural study of obedience

Journal of Abnormal and Social Psychology, 67, (4), 371-378.

1. Theory/ies on which the study is based

- Obedience is the psychological mechanism that links individual action to political purpose. It is the dispositional feature that binds people to systems of authority. It is an active or deliberate form of social influence.
- According to Milgram (1992) obedience involves the 'abdication of individual judgement in the face of some external social pressure'.
- Obedience involves (a) being ordered or instructed to do something, (b) being influenced by an authority figure of superior status, (c) the maintenance of social power and status of the authority figure in a hierarchical society.
- A person commanded by a legitimate authority usually obeys – it is a ubiquitous and indispensable feature of social life.
- Obedience serves a number of productive functions with the very survival of society depending on its existence.

2. Background to the study

- From 1933-45, millions of innocent people were systematically slaughtered on command. Such inhumane actions may have originated in the mind of one person, but they could only have been carried out on such a massive scale because large numbers of people obeyed.
- History and observation suggest that for many people obedience is such an ingrained behavioural tendency that it will override training in ethics, empathy and moral values. This is because, when given extreme commands by legitimate authority figures, subordinates adopt an agentic state where they become the instrument for carrying out another person's wishes.
- The adoption of the agentic state can account for horrific acts committed in the name of obedience eg the atrocities of WWII, the Balkans conflicts, the atrocities in Rwanda.
- The aim of this study was to investigate the process of obedience by testing how far an individual will go in obeying an authority figure, even when the command breaches the moral code that an individual should not hurt another person against his will.

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3. Research Method

- Although Milgram refers to this study as an experiment, it is generally considered a controlled observation as there was, in fact, no independent variable.
- The study took place in a laboratory at Yale University so conditions could be controlled eg who was teacher / learner, the learner's recorded and thus standardised responses, the experimenter's 'prods'.
- Data was gathered through observations made by both the experimenter who was in the same room as the participant and others who observed the process through one-way mirrors. Most sessions were recorded on magnetic tape, occasional photographs were taken through the one-way mirrors and notes were made on unusual behaviours.
- Prior to the study, 14 Yale Seniors, all psychology majors, estimated the percentage of participants who would administer the highest level of shock. Estimates ranged from 1-3 (mean 1.2).

4. Sample

- 40 male participants aged between 20 and 50 years, from the New Haven area were obtained by a newspaper advertisement and direct mail solicitation which asked for volunteers to participate in a study of memory and learning at Yale University. There was a wide range of occupations in the sample. Participants were paid $4.50 for simply presenting themselves at the laboratory.

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5. Outline of the procedure/study

- The study took place in a laboratory at Yale University.
- Prior to the study, the 14 Yale Seniors were provided with a detailed description of the experimental situation. They were asked to reflect carefully on it, and to predict the behaviour of 100 hypothetical subjects. More specifically, they were instructed to plot the distribution of obedience of "100 Americans of diverse occupations and ranging in age from 20 to 50 years" who were placed in the experimental condition.
- The 40 participants in the experimental group were always given the role of teacher (through a fixed lottery) and saw the learner (a confederate) strapped into a chair with (non-active) electrodes attached to his arms. They were given a trial shock of 40 volts to simulate genuineness.
- The 'teacher' then sat in front of an electric shock generator in an adjacent room. He had to conduct a paired word test on the learner and give him an electric shock of increasing intensity for every wrong answer. The machine had 30 switches ranging from 15-450 volts, in 15 volt increments.
- The 'learner' produced (via a tape recording) a set of predetermined responses, giving approximately 3 wrong answers to every correct one. At 300 volts he pounded on the wall and thereafter made no further replies.
- If the 'teacher' turned to the experimenter for advice on whether to proceed, the experimenter responded with a series of standardised prods eg'"Please continue / Please go on."
- The study finished when either the 'teacher' refused to continue (was disobedient) or reached 450 volts (was obedient).
- The participant was then fully debriefed.
- Data was gathered through observations made by both the experimenter who was in the same room as the participant and others who observed the process through one-way mirrors. Most sessions were recorded on magnetic tape, occasional photographs were taken through the one-way mirrors and notes were made on unusual behaviours.

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6. Key findings

- There was considerable agreement between the 14 Yale Seniors on the expected behaviour of hypothetic subjects. All respondents predicted that only an insignificant minority would go through to the end of the shock series (estimates ranged from 0 to 3%, class mean was 1.2%).
- All participants ($^{40}/_{40}$) / 100% continued to 300 volts.
- $^{26}/_{40}$ / 65% of participants continued to the full 450 volts.

Distribution of break-off points (/40 participants)

No. of participants	Voltage / shock level
26	450
1	375
1	360
1	345
2	330
4	315
5	300

- 26 participants were obedient, 14 disobedient.
- Many participants showed signs of extreme stress whilst administering the shocks eg sweating, trembling, stuttering, laughing nervously. 3 had full-blown uncontrollable seizures.
- On completion of the test many obedient participants heaved sighs of relief, mopped their brows, or nervously fumbled cigarettes. Some shook their head, apparently in regret; some remained calm throughout.
- Milgram offered 13 possible explanations for the high levels of obedience shown by participants eg The fact that the study was carried out in the prestigious university of Yale influenced participants as to the worthiness of the study and the competence of the researcher; the participants were told the shocks were not harmful; the situation was completely new for the participant so he had no past experience to guide his behaviour.

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7. Possible conclusions
• Inhumane acts can be done by ordinary people. • People, will obey others whom they consider legitimate authority figures even if what they are asked to do goes against their moral beliefs. • People obey because certain situational features lead them to suspend their sense of autonomy and become an agent of an authority figure. • Individual differences, such as personality, influence the extent to which people will be obedient.

BOCCHIARO, P., ZIMBARDO, P. G. and VAN LANGE , P. A. M. (2012)
To defy or not to defy: An experimental study of the dynamics of disobedience and whistleblowing.
Social Influence, 7, (1), 35-50.

1. Theory/ies on which the study is based

- Social power refers to the influence an individual has to change another's thoughts, feelings or behaviours. Individuals in authority, be it legitimate or illegitimate, have social power to influence those with lower social status within their social hierarchy.
- People have strong inclinations to obey legitimate authority, irrespective of their beliefs, feelings or intentions.
- Independent behaviour/defiance involves the rejection of social influence/power to behave in accordance with one's own internal attitudes, morals and beliefs.
- Disobedience/defiance to unjust authority is a precondition for social progress.
- A whistleblower is a person who exposes/informs on a person or organisation regarded as engaging in unlawful or immoral activity.
- In most situations, with defiant behaviours one would anticipate a relatively lower level of whistle-blowing than disobedience because it involves a potential direct confrontation of the defiant person and the authority.
- One might expect obedient individuals to be considerably different from defiants, the latter being, for example, more honest and prosocial. However it is impossible not to consider that certain behavioural contexts, because of their unusual nature, are likely to reduce the power of individual factors in predicting behaviour (see Blass, 1991). Therefore one might expect personality variables to influence an individual's decision to obey, disobey and openly defy an authority demanding them to act in unethical ways.

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2. Background to the study

- Milgram found that people have strong inclinations to obey legitimate authority, irrespective of their beliefs, feelings or intentions.
- Previous research has allowed us to gain important knowledge of the mechanisms of obedience. However there is little understanding about the nature of disobedience to unjust authority. Little is known about the following:

  (a) Who are the people that disobey or blow the whistle?

  (b) Why do they choose the challenging moral path?

  (c) Do they have personal characteristics that differentiate them from those who obey?
- This study took the first step towards stimulating research on these topics. It used the generic Milgram paradigm as a starting point – authority requesting immoral actions of participants – but aimed to go well beyond it in providing participants the option to take personal action against an unjust system (here an unethical experiment) by giving them the chance to obey, disobey or blow the whistle against authorities who encouraged immoral behaviours.
- The study also aimed to replicate Milgram's findings of a wide gap between people's predictions of their own and others' degree of (dis) obedience when contrasted with the actual behavioural outcomes in his experiment (Milgram, 1974).
- The researchers' interest in understanding the personal (individual) as well as the social (situational) nature of variations in (dis)obedience led them to collect a variety of personality and values information from their participants.

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3. Research method

- Bocchiaro et al consider this study as a laboratory experiment. However, like Milgram, there was in fact no independent variable so the study may be best viewed as a laboratory study, or as Bocchiaro et al say a 'scenario study'.
- The study took place in a laboratory at the VU University in Amsterdam, so conditions could be controlled eg the procedure was standardised so the experimenter-authority behaviour and cover story were consistent throughout the experimental period. Two specially prepared rooms were used. Timings for when the experimenter left the room were kept the same for all participants.
- Data was gathered on the number of participants who obeyed by writing a statement in support of the sensory deprivation study; those who disobeyed by refusing to write the requested statement and those who became whistle blowers by reporting the experimenter's questionable conduct to the Research Committee, and through the scores on the two personality inventories (the Dutch version of the 60-item HEXACO-PI-R – tgis measured the six major dimensions of personality, and a nine-item Decomposed Games measure – this measured Social Value Orientation - SVO).
- 138 comparison students from The VU University were provided with a detailed description of the experimental setting. They were then asked "What would you do?" and "What would the average student at your university do?"

4. Sample

- 149 undergraduate students (96 women, 53 men, mean age = 20.8, SD = 2.65) took part in the research in exchange for either €7 or course credit.
- NB. A total of 11 participants were removed from the initial sample of 160 because of their suspiciousness about the nature of the study.

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5. Outline of the procedure/study

- 8 pilot tests, involving 92 undergraduates from the VU University in Amsterdam, were conducted to ensure the procedure was credible and morally acceptable. These tests also served to standardise the experimenter-authority behaviour throughout the experimental period.
- The comparison group was provided with a detailed description of the experimental setting. They were then asked "What would you do?" and "What would the average student at your university do?"
- Participants were informed about what their task was, about the potential benefits/risks of participation, and about their right to withdraw at any time with no penalty. They were also assured of the confidentiality of the information collected.
- Each participant was greeted in the laboratory by a male, Dutch experimenter who was formally dressed and had a stern demeanour.
- The experimenter proceeded with a (seemingly unjustified) request for each participant to provide a few names of fellow students and then presented the cover story.
- The gist of the cover story:
  - The experimenter and an Italian colleague were investigating the effects of sensory deprivation on brain function.
  - A recently conducted experiment on 6 participants in Rome who spent some time completely isolated, unable to see or hear anything, had disastrous effects – all panicked, their cognitive abilities were temporarily impaired, some experienced visual and auditory hallucinations. 2 participants asked to stop because of their strong symptoms but were not allowed to do so because invalid data may then have been collected. The majority said it had been a frightening experience.
  - The experimenters wanted to replicate this study at the VU University using a sample of college students as there was currently no data on young people but some scientists thought that their brains may be more sensitive to the negative effects of isolation.
  - Although it was difficult to predict what would happen, the experimenter wanted to proceed with the experiment.
  - A University Research Committee was evaluating whether to approve the study and were collecting feedback from students who knew details about the experiment, to help them make their decision.
  - Participants were told that Research Committee forms were in the next room.
  - Participants were to write a statement to convince the students they had previously indicated to participate in the experiment. Statements would be sent to the identified students by mail.
- The experimenter left the room for 3 minutes to allow participants to reflect on the action-based decisions they were about to make,
- Participants were then moved to a second room where there was a computer for them to use to write their statement, a mailbox and the Research Committee forms.

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5. Outline of the procedure/study

. . . continued

- Participants were told to be enthusiastic when writing their statements and had to use two adjectives among "exciting", "incredible", "great" and "superb". Negative effects of sensory deprivation were not to be mentioned.
- The experimenter told participants to begin and left the room for 7 minutes.
- If a participant believed the proposed research on sensory deprivation violated ethical norms he/she could anonymously challenge it by putting a form in the mailbox.
- After the 7-minute interval the experimenter returned and invited the participant to follow him back to the first room where he/she was administered two personality inventories, probed for suspicion, fully debriefed and asked to sign a second consent form, this time fully informed.
- The entire session lasted approximately 40 minutes.

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6. Key findings

- Of all the respondents in the comparison group:
  - Only 3.6% indicated they would obey the experimenter. Most believed they would be either disobedient (31.9%) or whistleblowers (64.5%).
  - When asked to predict the behaviour of other typical students at their university, only 18.8% thought an average student at VU University would obey, while they believed most other students would either disobey (43.9%) or whistleblow (37.3%).
- Of the 149 participants in the experimental situation:
  - 76.5% obeyed the experimenter ($n = 114$), 14.1% disobeyed ($n = 21$) and 9.4% ($n = 9$) blew the whistle.
  - Among whistleblowers 6.0% ($n = 9$) had written a message (Anonymous whistleblowers) and 3.4% ($n = 5$) had refused to do so (Open whistleblowers).
  - No significant differences were found in any of the groups in relation to gender, religious affiliation (Christian/Islamic), or religious involvement (defined in terms of church attendance). However a significant difference was observed with regard to faith (defined as a confident belief in a transcendent reality), X^2 (2,149) = 6.74, $p = .03$
- Results for individual differences in personality among the three groups showed no statistically significant differences in any of the six personality factors measured by the HEXACO-PI-R.
- Results in terms of SVO showed that "prosocial" and "individualistic" participants were not unequally distributed among the three groups, X^2 (2,118) = 2.25, $p = .32$

7. Possible conclusions

- People tend to obey authority figures, even if the authority is unjust.
- How people think/what people say they and others will do in a given situation often differs from what actually happens. The internal cognitive processes of ordinary people wanting to appear "good" often differ from the outward pervasive power of situational forces that bind behaviour to a range of seemingly innocuous features in any given behavioural context.
- Individuals behave in completely different ways than expected when they find themselves in certain circumstances that are unfamiliar and somewhat extreme.
- Behavioural acts of both disobedience and whistleblowing are psychologically, socially and economically demanding for people, notably whistleblowers.
- Behaving in a moral manner is challenging for people, even when the reaction appears to observers as the simplest path to follow.
- With regard to faith, there appears to be a trend suggesting that whistleblowers have more faith than either obedient or disobedient individuals.

LOFTUS, E. F. and PALMER, J. C. (1974)
Reconstruction of automobile destruction: An example of the interaction between language and memory.
Journal of Verbal Learning and Verbal Behavior, 13, 585-589.

1. Theory/ies on which the study is based

- Schema theory proposes that memory is influenced by what an individual already knows, and that their use of past experience to deal with a new experience is a fundamental feature of the way the human mind works.
- Knowledge is stored in memory as a set of schemas – simplified, generalised mental representations of everything an individual understands by a given type of object or event based on their past experiences.
- The schema forms part of Bartlett's theory of reconstructive memory which forms the basis for Loftus and Palmer's study into EWT.

2. Background to the study

- Memory involves interpreting what is seen or heard, recording bits of it and then reconstructing these bits into memories when required.
- This infers recall can be distorted or biased by certain features of the situation.
- Loftus and Palmer conducted many studies investigating ways in which memory can be distorted, many of which show that EWT is highly unreliable because it can be influenced by such things as subtle differences in the wording of questions.
- This study focuses on the effects of 'leading questions' on an individual's ability to accurately remember events.
- The expectation was that any information subtly introduced after the event through leading questions – questions phrased in a way suggesting the expected answer – would distort the original memory.

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3. Research method

Experiment 1

- This was a laboratory experiment using an independent measures design.
- The independent variable (IV) was the wording of a critical question hidden in a questionnaire. This question asked, "About how fast were the cars going when they hit / smashed / collided / contacted / bumped each other?"
- The dependent variable (DV) was the estimated speed given by the participant.

Experiment 2

- This was also a laboratory experiment using an independent measures design.
- The independent variable (IV) was the wording on a question in a questionnaire:
  - One group was asked, "About how fast were the cars going when they smashed into each other?"
  - A second group was asked, "About how fast were the cars going when they hit each other?"
  - A third group was not asked about speed.
- One week later, all participants were asked to complete another questionnaire which contained the critical question, "Did you see any broken glass?"
- The dependent variable (DV) was whether the answer to this question was, "Yes/No."

4. Sample

Experiment 1

- 45 students were divided into 5 groups with 9 participants in each group.

Experiment 2

- 150 students were divided into 3 groups with 50 participants in each group.

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5. Outline of the procedure/study

Experiment 1

- All participants were shown the same 7 film clips of different traffic accidents which were originally made as part of a driver safety film.
- After each clip participants were given a questionnaire which asked them firstly to describe the accident and then answer a series of questions about the accident.
- There was one critical question in the questionnaire: "About how fast were the cars going when they hit each other?"
- One group was given this question while the other 4 groups were given the verbs "smashed', 'collided', 'contacted' or 'bumped', instead of 'hit'.

Experiment 2

- All participants were shown a one-minute film which contained a 4-second multiple car crash.
- They were then given a questionnaire which asked them to describe the accident and answer a set of questions about the incident.
- There was a critical question about speed:
  - One group was asked, "About how fast were the cars going when they smashed into each other?"
  - Another group was asked, "About how fast were the cars going when they hit each other?"
  - The third group did not have a question about vehicular speed.
- One week later, all participants, without seeing the film again, completed another questionnaire about the accident which contained the further critical question, "Did you see any broken glass – Yes/No?" There had been no broken glass in the original film.

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6. Key findings

Experiment 1

a) Speed estimates for the verbs used in the critical question

Verb	Mean speed estimate (mph)
Smashed	40.5
Collided	39.3
Bumped	38.1
Hit	34.0
Contacted	31.8

- Smashed produced the fastest speed estimates and contacted the slowest.

(b) For the 4 staged films where speeds were accurately measured

- The film of a crash at 20 mph was estimated to be 37.7 mph.
- The film of a crash at 30 mph was estimated to be 36.2 mph.
- The films of crashes at 40 mph were estimated to be 39.7 mph and 36.1 mph.

Experiment 2

a) Speed estimates for the verbs used in the question about speed

Response	Smashed	Hit	Control
Yes	16	7	6
No	34	43	44

- More participants in the 'smashed' condition than either the 'hit' or control groups reported seeing broken glass.
- The majority of participants in each group correctly recalled that they hed not seen any broken glass.

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7. Possible conclusions

- The verb used in a question influences a participant's response ie the way a question is phrased influences the answer given.
- People are not very good at judging vehicular speed.
- Misleading post event information can distort an individual's memory.
- It is proposed that two kinds of information go into our memory for a 'complex occurrence' such as this. Firstly, the information gleaned during the perception of the original event. Secondly, the post-event information that is gained after the fact. Information from the two sources will integrate over time and we will be unable to decipher which source the information comes from. We are therefore unable to tell whether our memory is accurate.

GRANT, H. M., BREDAHL, L. C., CLAY, J., FERRIE, J., GROVES, J. E., McDORMAN, T. A. and DARK, V. J. (1998)
Context-Dependent Memory for Meaningful Material: Information for students.
Applied Cognitive Psychology, 12, (6), 617-623.

1. Theory/ies on which the study is based

- Context-dependent memory refers to improved recall of specific episodes or information when the context present at encoding and retrieval are the same.
- Context-dependency effects for memory recall are typically interpreted as showing that the characteristics of the environment are encoded as part of the memory trace and can be used to enhance retrieval of other information in the trace (Eich, 1980; Smith, 1988).
- A number of factors are thought to affect how contextual information interacts with memory recall. An analysis of the literature on environmental context-dependency memory by Smith and Vela (2001) suggests that in cases where contextual information is not particularly salient, context-dependent effects on memory are reduced.
- Johnson et al's (1993) Source Monitoring Framework proposes that the ability of an individual to remember the source of an episode will affect the likelihood of that memory being recalled. Hence, in the case of context-dependent memory, this framework suggests that the effects of context on memory may also be limited by cognitive factors such as the ability of individuals to differentiate between individual contexts.
- Context effects differ when it comes to what sort of task is being performed. Research by Godden and Baddeley (1975, 1980) showed the effects of context change on memory retrieval are much greater in recall tests than in recognition tests, suggesting there are differences in the retrieval process involved in the two types of tests.

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2. Background to the story

- Research has shown that context-dependence may play an important role in numerous situations, such as memory for studied material.
- Grant et al were interested in determining whether environmental context-dependency effects would be found with the type of material and the type of tests typically encountered in school.
- Their focus is more on study conditions than on differences in classroom testing conditions because they hold that students have more control over their study environments than over their test environments.
- Observations had shown them that many high school and college students study material in environments very different from those in which they are tested: study environments often include background noise from either family, friends or television, while test environments are typically quieter. Therefore, if context-dependency occurs with meaningful course material, students' study habits could be harming their test performance.
- Grant et al therefore aimed to show that environmental context can have a more positive effect on performance in a meaningful memory test when the test takes place in the same environment in which the to-be-remembered material was originally studied (the matching condition) than when the test occurs in a different environment (mismatching condition).

3. Research method

- This was a laboratory experiment using an independent measures design.
- The independent variables (IVs) were:

  (i) whether the participant read the two page article under silent or noisy conditions

  (ii) whether the participant was tested under matching or mismatching conditions

  - The first IV – study context (silent versus noisy) and the second IV – test context (silent versus noisy) were manipulated in a between-subjects factorial design, producing four conditions.
- The dependent variable (DV) was the participant's performance on (a) a short-answer recall test and (b) a multiple-choice recall test.

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4. Sample

- Eight members of a psychology laboratory class served as experimenters. Each experimenter recruited five acquaintances to serve as participants.
- There were 39 participants, ranging in age from 17 to 56 years (M = 23.4, SD = 5.9), 17 were female, 23 were male. (1 participant's results were omitted from the analyses.)

5. Outline of the procedure/study

- Each experimenter ran one participant for each of the four conditions and an additional participant for one of the conditions as assigned by the instructor. Experimenters randomly assigned their participants to their five conditions.
- Stimuli

  (a) Each experimenter provided his/her own cassette player and headphones. The eight cassettes were exact copies made from a master tape of background noise recorded during lunchtime in a university cafeteria. The background noise consisted of occasional distinct words/phrases embedded within a general conversational hum that was intermixed with the sounds produced by movement of chairs and dishes. The tape was played at a moderately loud level.

  (b) A two-page, three-columned article on psychoimmunology (Hales,1984) was selected as the to-be-studied material.

  (c) 16 multiple-choice questions, each consisting of a stem and four alternatives were generated, all of which tested memory for points stated in the text. 10 short-answer questions were derived from those multiple-choice stems that could easily be restated to produce a question that could be answered unambiguously by a single word or phrase. The order of the questions on each test followed the order in which the tested points were made in the text. The short-answer test was always administered first to ensure that recall of information from the article was being tested and not recall of information from the multiple- choice test.

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5. Outline of the procedure/study

. . . continued

- Procedure
  - Instructions, describing the experiment as a class project and stating that participation was voluntary, were read aloud.
  - Participants were asked to read the given article once, as if they were reading it for a class assignment. They were allowed to highlight and underline as they read.
  - Participants were informed that their comprehension would be tested with both a short-answer test and a multiple-choice test.
  - All participants wore headphones while they read. Those in the silent condition were told they would not hear anything over the headphones whilst those in the noisy condition were told they would hear moderately loud background noise, but that they should ignore it.
  - Reading times were recorded by the experimenters.
  - A break of approximately 2 minutes between the end of the study phase and the beginning of the test phase was incorporated to minimise recall from short-term memory.
  - The short-answer test was given, followed by the multiple-choice test.
  - Participants were tested in either silent or noisy conditions and were informed of the condition before testing. Regardless of testing condition, all participants wore headphones.
  - At the end of the testing phase participants were debriefed concerning the purpose of the experiment.
  - The entire procedure lasted about 30 minutes.

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6. Key findings

NB The data from one participant in the silent study/silent test condition were omitted from the analysis because his performance was over 2.5 standard deviation below the combined group mean on each test. Therefore although 40 people took part, only 39 results were analysed.

Mean reading time (in minutes) and mean number correct on the two tests as a function of study condition and test condition

	Study condition			
	Silent		Noisy	
Test condition	*M*	SD	*M*	SD
Reading time				
Silent	15.0	7.08	13.8	6.78
Noisy	11.8	3.07	14.0	8.24
Short-answer test (out of 10)				
Silent	6.7	1.22	5.4	1.90
Noisy	4.6	1.17	6.2	2.20
Multiple-choice test (out of 16)				
Silent	14.3	1.58	12.7	1.64
Noisy	12.7	1.64	14.3	1.77

- Results suggest participants in all groups spent roughly equal amounts of time studying the material. Therefore reading time was used as a co-variable in the analysis of test performance.
- There was a reliable Study Condition *x* Test Condition interaction for both the short-answer test and the multiple-choice test. A planned contrast comparing performance in the matching conditions (silent study/silent test and noisy study/noisy test) to performance in the mismatching conditions (silent study/noisy test and noisy study/silent test) was reliable
- (F (1,34) = 6.79) showing that studying and testing in the same environment produced better results.
- There was no overall effect of noise on performance.

GRANT, H. M., BREDAHL, L. C., CLAY, J., FERRIE, J., GROVES, J. E., McDORMAN, T. A. and DARK, V. J. (1998)
Context-Dependent Memory for Meaningful Material: Information for students.
Applied Cognitive Psychology, 12, (6), 617-623.

7. Possible conclusions

- There are context-dependency effects for newly learned meaningful material regardless of whether a short-answer test or a multiple-choice test is used to assess learning.
- Studying and testing in the same environment leads to enhanced performance.
- Students are likely to perform better in exams if they study for them with a minimum of background noise because, although there was no overall effect of noise on performance, the fact that there was evidence for context-dependency suggests they are better off studying without background noise as it will not be present during actual testing.

BANDURA, A., ROSS, D. and ROSS, S. A. (1961)
Transmission of aggression through imitation of aggressive models.
Journal of Abnormal and Social Psychology, 63, (3), 575-582.

1. Theory/ies on which the study is based

Social Learning Theory (SLT)

- SLT explains human behaviour in terms of a continuous interaction between cognitive, behavioural and environmental influences.
- According to SLT, aggressive behaviours are learned through reinforcement and the imitation of aggressive 'models' (Bandura, 1965, 1973, 1974).
- Imitation is the reproduction of learning through observation (observational learning), and involves observing other people who serve as models for behaviour.
- Bandura et al (1961, 1963) showed how a child's aggressive tendencies can be strengthened through vicarious reinforcement (seeing others being rewarded for behaving aggressively ie not punished) .

2. Background to the study

- Previous research has shown that children will readily imitate behaviour demonstrated by an adult model if the model remains present (Bandura & Hudson, 1961).
- However, although such research has provided convincing evidence for the influence and control exerted by role models on the behaviour of others, until this study, little was known about how the behaviour displayed by a model might affect an individual in novel settings when the model is absent.
- This study therefore firstly exposed children to aggressive and non-aggressive adult models and then tested the amount of imitative learning demonstrated by the children in a new situation in the absence of the model.
- The aim was to demonstrate that learning can occur through mere observation of a model and that imitation of learned behaviour can occur in the absence of that model.
- There were four hypotheses:
  (i) Children shown aggressive models will show significantly more imitative aggressive acts resembling those of their models than those shown non-aggressive or no models.
  (ii) Children shown non-aggressive, subdued models will show significantly less aggressive behaviour than those shown aggressive or no models.
  (iii) Boys will show significantly more imitative aggression than girls.
  (iv) Children will imitate same-sex model behaviour to a greater degree than opposite-sex behaviour.

BANDURA, A., ROSS, D. and ROSS, S. A. (1961)
Transmission of aggression through imitation of aggressive models.
Journal of Abnormal and Social Psychology, 63, (3), 575-582.

3. Research method

- This was a laboratory experiment which used an independent measures, matched participants design.
- The independent variables (IVs) were:
  (i) Whether the child witnessed an aggressive or a non-aggressive adult model in the first phase of the experiment (a control group was not exposed to an adult model).
  (ii) The sex of the model (male or female).
  (iii) The sex of the child (boy or girl).
- The dependent variable (DV) was the amount of imitative behaviour and aggression shown by the child in phase three, measured by the male model and, at times, a second researcher observing each child through a one-way mirror and noting down at 5-second intervals: displays of imitative aggressive responses, partially imitative responses and/or non-aggressive imitative aggressive responses.
- The 72 children (36 boys, 36 girls), aged 37-69 months (mean 52 months), from Stanford University Nursery School.
- Participants were matched through a procedure which pre-rated them for aggressiveness. They were rated on four five-point rating scales by the experimenter and a nursery school teacher, both of whom were well acquainted with the children. These scales measured the extent to which participants displayed physical aggression, verbal aggression towards inanimate objects, and aggressive inhibition. On the basis of these scores, participants were arranged in triplets and randomly assigned to one of the two experimental groups or to the control group.
- Each child only participated in either one of the experimental conditions ie boy + male aggressive/non-aggressive model; girl + male aggressive/non-aggressive model; boy + female aggressive/non-aggressive model; girl + female aggressive/non-aggressive model; control group (no model) or the control group (no model).

4. Sample

- 72 children (36 boys, 36 girls), aged 37-69 months (mean 52 months), from Stanford University Nursery School.

BANDURA, A., ROSS, D. and ROSS, S. A. (1961)
Transmission of aggression through imitation of aggressive models.
Journal of Abnormal and Social Psychology, 63, (3), 575-582.

5. Outline of the procedure/study

Phase 1

- Children in the experimental conditions were individually taken into a room and sat at a table to play with potato prints and picture stickers for 10 minutes whilst:
  - The aggressive model began by assembling a tinker toy set but after about a minute turned to a Bobo doll and spent the remainder of the period physically and verbally aggressing it using a standardised procedure.
  - The non-aggressive model assembled the tinker toys in a quiet subdued manner, totally ignoring the Bobo doll.
  - The control group did not participate in Phase 1.

Phase 2

- All the children were then taken individually to an anteroom and subjected to mild aggression arousal. Initially they were allowed to play with some very attractive toys but after about two minutes the experimenter took the toys away saying they were reserved for other children. However they could play with any of the toys in the next room.

Phase 3

- Children were then taken individually into a third room which contained both aggressive and non-aggressive toys eg 3ft high Bobo doll, a mallet, dart guns and non-aggressive toys eg tea set, cars, dolls. They were observed through a one-way mirror for 20 minutes whilst observers recorded behaviour (with inter-scorer reliabilities of .90 product-moment coefficients) in the following categories:
  (i) Imitative aggression (physical, verbal and non-aggressive speech).
  (ii) Partially imitative aggression.
  (iii) Non-imitative physical and verbal aggression.
  (iv) Non-aggressive behaviour.

BANDURA, A., ROSS, D. and ROSS, S. A. (1961)
Transmission of aggression through imitation of aggressive models.
Journal of Abnormal and Social Psychology, 63, (3), 575-582.

6. Key findings

- Children in the aggressive condition showed significantly more imitation of physical and verbal aggressive behaviour and non-aggressive verbal responses than children in the non-aggressive or control conditions.
- Children in the aggressive condition showed more partial imitation and non-imitative physical and verbal aggression than those in the non-aggressive or control conditions. Results here were however not always significant.
- Children in the non-aggressive condition showed very little aggression, although results were not always significantly less than the control group.
- Children who saw the same sex model imitated the model's behaviour significantly more in the following categories:
  (i) Boys imitated male models more than girls for physical and verbal aggression, non-imitative aggression and gun play.
  (ii) Girls imitated female models more than boys for verbal imitative aggression and non-imitative aggression. However results were not significant.
- The behaviour of the male model exerted greater influence than the female model.
- Overall boys produced more imitative physical aggression than girls.

7. Possible conclusions

- Children will imitate aggressive/non-aggressive behaviours displayed by adult models, even if the model is not present.
- Children can learn behaviour though observation and imitation.
- Behaviour modelled by male adults has a greater influence on children's behaviour than behaviour modelled by a female adult.
- Both boys and girls are more likely to learn highly masculine-typed behaviour such as physical aggression from a male adult rather than a female.
- Boys and girls are likely to learn verbal aggression from a same-sex adult.

CHANEY, G., CLEMENTS, B., LANDAU, L., BULSARA, M. and WATT, P. (2004)
A new asthma spacer device to improve compliance in children: a pilot study.
Respirology, 9, (4) 499-506.

1. Theory/ies on which the study is based

Operant conditioning

- Operant conditioning is a form of associative learning, whereby associations and connections are formed between stimuli and responses that didn't exist before learning occurs.
- Operant conditioning involves learning through the consequences of behavioural responses. The principles of operant conditioning were first investigated by Thorndike who found that any response that led to desirable consequences was more likely to be repeated, whereas any response that led to undesirable consequences was less likely to be repeated – a principle which became known as the Law of Effect.
- The principles of operant conditioning were further developed by Skinner who applied them to explain how many aspects of human behaviour are acquired.

2. Background to the study

- Behaviour therapy and behaviour modification (based on classical and operant conditioning) have been major approaches used by both clinical psychologists and health practitioners to improve adherence to prescribed medical regimes.
- Poor adherence to prescribed frequency and technique remains a major problem for paediatric asthmatics on inhaled medication (Chaney et al, 2004).
- Rates of compliance for offering medication regularly to asthmatic children range from 30% to 70%, while paediatric compliance rates for the correct pressurised metered dose inhaler (pMDI) technique range from 39% to 67%. Adherence does not necessarily improve with rising severity of illness (Chaney et al, 2004).
- Although reasons for poor adherence are varied, Watt et al proposed that a positive interplay of adherence considerations with aerosol output factors would improve medication adherence in young asthmatics.
- The aim of this study was therefore to show that the use of a novel asthma spacer device, the "Funhaler", which incorporates incentive toys isolated from the main inspiratory circuit by a valve, whilst not compromising drug delivery, can provide positive reinforcement which leads to improved adherence in young asthmatics.

CHANEY, G., CLEMENTS, B., LANDAU, L., BULSARA, M. and WATT, P. (2004)
A new asthma spacer device to improve compliance in children: a pilot study.
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3. Research method

- This was a field experiment, conducted in the participants' home settings in Australia, which used a repeated measures design.
- The independent variables (IVs) were:
  (i) whether the child used a standard/small volume spacer device – the Breath-a-Tech (Scott-Dibben, Australia)
  (ii) whether the child used a Funhaler (InfMed Ltd, Australia).
- The dependent variable (DV) was the amount of adherence to the prescribed medical regime.

4. Sample

- 32 children (22 male, 10 female; age range 1.5 - 6 years, mean age 3.2 years; average duration of asthma 2.2 years) prescribed drugs delivered by pMDI and spacer were recruited.
- The children's parents provided informed consent and also participated in the study through completing questionnaires and taking part in a phone interview. They also helped (where necessary) in the use of the inhalers.

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A new asthma spacer device to improve compliance in children: a pilot study.
Respirology, 9, (4) 499-506.

5. Outline of the procedure/study

- Firstly, a comparison was made between the aerosol output of the standard/small volume spacer device (235ml Breath-a-Tech) and the 225ml Funhaler. Overall no significant differences were observed. The comparison was therefore complementary, indicating that the use of a Funhaler rather than a standard inhaler does not compromise drug delivery.
- Participants were then asked to use a Funhaler instead of their normal pMDI and spacer inhaler to administer their medication.
- Matched questionnaires were competed (by parents) after sequential use of the Breath-a-Tech inhaler and the Funhaler.
- The first questionnaire was completed at the beginning of the research before the Funhaler had been used. After 2 weeks of using the Funhaler a second questionnaire was done.
- Data collected from the self-report related to how easy each device was to use, compliance of parents and children, and treatment attitudes. Furthermore, during the course of the study each parent was called at random to find out whether they had attempted to medicate their child the day before.
- The Funhaler incorporates a number of features to distract the attention of children from the drug delivery event itself and to provide a means of self reinforcing the use of effective technique. The Funhaler makes spacers appealing to children in the following ways:

  (i) It isolates incentive toys (eg spinner and whistle) in a separate branch to the standard inhalation circuit, placing them outside the expiratory valve of the spacer to avoid problems of contamination and interference of drug delivery.

  (ii) The design of the toys themselves ensures sufficient inspiratory resistance to minimise entrainment of inspired air through the toy circuit.

  (iii) The design attempts to link the optimal function of the toys to deep breathing pattern conducive to effective medication.

  (iv) The design anticipates the potential for boredom of children with particular incentive toys in its modular arrangement which would allow the replacement of the incentive toy module with a range of different toys.

6. Key findings

- The use of the Funhaler was associated with improved parental and child compliance.
- When surveyed at random, 38% more parents were found to have medicated their children the previous day when using the Funhaler, compared to their existing small volume spacer device (22/27 versus 16/27 respectively; $p = 0.016$).
- 60% more children took the recommended four or more cycles per aerosol delivery (24/30 versus 15/30; $p = 0.02$) when using the Funhaler compared with the standard/small volume spacer.
- Significantly more parents reported they were 'always' successful in medicating their child using the Funhaler (22/30), compared to their existing device (3/30).

CHANEY, G., CLEMENTS, B., LANDAU, L., BULSARA, M. and WATT, P. (2004)
A new asthma spacer device to improve compliance in children: a pilot study.
Respirology, 9, (4) 499-506.

7. Possible conclusions

- Improved adherence, combined with satisfactory delivery characteristics, suggest that the Funhaler may be useful for management of young asthmatics.
- The use of the Funaler could possibly be translated to improved measures of clinical outcome.
- The use of functional incentive devices such as the Funhaler may improve the health of children.
- More research is recommended in the long-term efficacy of this treatment.

SPERRY, R. W. (1968)
Hemisphere deconnection and unity in conscious awareness.
American Psychologist, 23, 723-733.

1. Theory/ies on which the study is based

- Although the right and left hemispheres are in many ways mirror images of each other, there are distinct areas dealing with speech production and comprehension (Broca's area and Wernike's area, respectively) showing their functional localisation. Functional lateralisation also exists because Broca's and Wernike's areas are only found in the left hemisphere.
- The primary motor cortex is situated in the frontal lobe and areas in the right hemisphere receive information from and are concerned with the activities of the left side of the body and vice versa.
- Sperry believes that studies involving split-brain patients reveal the 'true' nature of the two hemispheres because a commissurotomy which deconnects the two hemispheres means they can only work independently.

2. Background to the study

- Previous research using split-brain animals showed numerous behavioural effects (Myers, 1961; Sperry, 1967a, 1976b).
- Other research by Sperry on both humans and monkeys who had undergone surgical section of the corpus callosum suggested the behavioural effects of this surgery may be less severe than other forms of cerebral surgery eg frontal lobotomy.
- Research by Akelaitis (1944) also showed no important behavioural effects of surgical section of the corpus callosum in humans, provided other brain damage was excluded.
- More recent research by Sperry et al using appropriate tests has actually shown a large number of behavioural effects that correlate directly with the loss of the neocortical commissures in man as well as animals.
- Sperry therefore set out in this study, using split-brain patients, to show that each hemisphere:
- (i) Possesses an independent stream of conscious awareness.
- (ii) Has its own separate chain of memories that are inaccessible to the other.

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American Psychologist, 23, 723-733.

3. Research method

- This is usually considered a quasi/natural experiment because the independent variable (IV) – having a split brain or not – was not directly manipulated by the researchers. Participants with split-brains had already undergone hemisphere deconnection to reduce severe epilepsy. No actual control group was necessary for comparison in the study because the functions and abilities of the visual fields and hemispheres in non split-brain individuals was already known.
- The dependent variable (DV) was the participant's ability to perform a variety of visual and tactile tests.
- It has, however, been argued that because such extensive tests were carried out on a very small sample (11 split-brain patients in total), this study can be considered a collection of case studies.

4. Sample

- 11 patients who had undergone 'an extensive midline section of the cerebral commissures in an effort to control severe epileptic convulsions not controlled by medication'.
- The first patient (a man) had his surgery over 5½ years before the study was conducted.
- The second patient, a housewife and mother in her 30s had her surgery more than 4 years before the study was conducted.
- The other 9 patients had their surgery at varying times but not long before the study was conducted.

SPERRY, R. W. (1968)
Hemisphere deconnection and unity in conscious awareness.
American Psychologist, 23, 723-733.

5. Outline of the procedure/study

Key tests

- Presenting visual information
  The participant, with one eye covered, centred his gaze on a fixed point in the centre of an upright translucent screen. Visual stimuli on 35-millimetre transparencies were arranged in a standard projector and were then back-projected at 1/10 of a second or less – too fast for eye movements to get the information into the wrong visual field. Everything projected to the left of the central meridian of the screen is passed via the left visual field (LVF) to the right hemisphere and vice versa (regardless of which eye is used).
- Presenting tactile information
  Below the translucent screen there was a gap so that participants could reach objects but not see their hands. Objects were then placed in either the participant's right / left hand or both hands. Information about objects placed in the left hand is processed by the right hemisphere and vice versa.
- Participants undertook a variety of both visual and tactile tests.

This apparatus is called a tachistoscope.

- Sperry also conducted a variety of other tests which highlighted the lateralisation of brain function. These can be found in the original study.

SPERRY, R. W. (1968)
Hemisphere deconnection and unity in conscious awareness.
American Psychologist, 23, 723-733.

6. Some key findings

Visual tests

- Information shown and responded to in one visual field could only be recognised again if shown to the same visual field.
- Information presented to the RVF (LH system of a typical right-handed patient) could be described in speech and writing (with the right hand). If the same information is presented to the LVF (RH), the participant insisted he either did not see anything or that there was only a flash of light on the left side ie the information could not be described in speech or writing. However the participant could point with his left hand (RH) to a matching picture / object presented among a collection of pictures / objects.
- If different figures were presented simultaneously to different visual fields eg $ sign to the LVF and ? to the RVF, the participant could draw the $ sign with his left hand but reported that he had seen a ?

Tactile tests

- Objects placed in the right hand (LH) could be described in speech or writing (with the right hand). If the same objects were placed in the left hand (RH) participants could only make wild guesses and often seemed unaware they were holding anything.
- Objects felt by one hand were only recognised again by the same hand eg objects first sensed by the right hand could not be retrieved by the left.
- When two objects were placed simultaneously in each hand and then hidden in a pile of objects, both hands selected their own object and ignored the other hand's object.

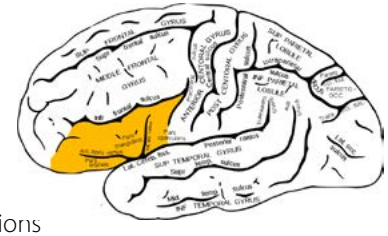
7. Possible conclusions

- People with split brains have two separate visual inner worlds, each with its own train of visual images.
- Split-brain patients have a lack of cross-integration where the second hemisphere does not know what the first hemisphere has been doing.
- Split-brain patients seem to have two independent streams of consciousness, each with its own memories, perceptions and impulses ie two minds in one body.

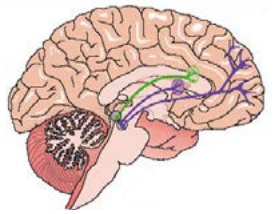
CASEY, B. J., SOMERVILLE, L. H., GOTLIB, I. H., AYDUK, O., FRANKLIN, N. T., ASKREN, M. K., JONIDES, J., BERMAN, M., WILSON, N., TESLOVICH, T., GLOVER, G., ZAYAS, V., MISCHEL, W. and SHODA, Y. (2011)
Behavioural and neural correlates of delay of gratification 40 years later.
Proceedings of the National Academy of Sciences, 108, (36), 14998-15003.

1. Theory/ies on which the study is based

The inferior frontal gyrus (shown in yellow)



The ventral striatum



- The ability to resist temptation in favour of long-term goals is an essential component of individual, societal and economic success.
- Alluring situations can diminish control. What serves as an alluring situation that requires a capacity to control impulses, changes as a function of age.
- Delay of gratification depends importantly on cognitive control. Individuals use different cognitive strategies to delay gratification and there appear to be naturally existing differences in the spontaneous use of these strategies.
- A study by Jabbi and Keysers (2008) demonstrated the role of the inferior frontal gyrus in our interpretations of facial expressions and a corresponding emotional response appropriate to the expression. A correlation has also been found between an avoidance of risky behaviour and greater excitation in the right inferior frontal gyrus.
- It has been found that functionally, the ventral striatum facilitates and balances motivation with both higher-level and lower-level functions, such as inhibiting one's behaviour in a complex social interaction. This region has been found to be the region in the basal ganglia neural circuit most closely associated with reward.
- Brain imaging studies have provided evidence for dissociable brain systems related to immediate over long-term choice behaviour. Imaging has shown that a region of the prefrontal cortex, the inferior frontal gyrus, is critically involved in resolving interference among competing actions (eg to go or not to go) ie cognitive control during delay of rewards whereas limbic or emotional brain regions, including the ventral striatum have been shown to be associated with more immediate choices and rewards.

CASEY, B. J., SOMERVILLE, L. H., GOTLIB, I. H., AYDUK, O., FRANKLIN, N. T., ASKREN, M. K., JONIDES, J., BERMAN, M., WILSON, N., TESLOVICH, T., GLOVER, G., ZAYAS, V., MISCHEL, W. and SHODA, Y. (2011)
Behavioural and neural correlates of delay of gratification 40 years later.
Proceedings of the National Academy of Sciences, 108, (36), 14998-15003.

2. Background to the study

- Previous research (Eigsti, 2006) showed performance on a delay-of-gratification task in childhood predicted the efficiency with which the same individuals performed a cognitive control task (go/nogo task) as adolescents and young adults. Those who as preschoolers directed their attention toward rewarding aspects of the classic delay-of-gratification situation, such as focusing on cookies (high-temptation-focus group) had more difficulty suppressing inappropriate actions than did their low-temptation-focus counterparts. The findings suggested that performance in preschool delay of gratification may predict the capacity, in adulthood, to control thoughts and actions, as reflected in performance on cognitive control tasks, and that the ability to control one's thoughts and actions can vary by the potency of interfering information (Shoda et al, 1990). Likewise, alluring or social contexts can diminish self control (eg Hare et al, 2005).
- The aim of this study was to build on previous research to assess whether delay of gratification in childhood predicts impulse control abilities and sensitivity to alluring or social cues (happy faces) at the behavioural and neural level when participants were in their 40s ie adults.
- The alluring qualities of targets in an impulse control task were manipulated to examine behavioural and neural correlates of delay of gratification using functional magnetic resonance imaging (fMRI).

3. Research method

- This can be considered a quasi/natural experiment.
- The independent variable (IV) - whether the participant was a high delayer or a low delayer was naturally occurring and so could not be manipulated or controlled by the researchers.
- The dependent variable (DV) was the performance on the impulse control task (in terms of reaction times and accuracy) in Experiment 1 and the performance on the impulse control task (in terms of reaction times and accuracy) and imaging results using fMRI.
- The fact that some participants completed self-control scales when in their 20s and 30s and that those participating in Experiment 1 did both the "hot" and "cool" go/nogo tasks means the study had, in parts, a repeated measures design.
- This was a longitudinal study which followed some of the original participants from the age of 4 years until they were in their 40s.

CASEY, B. J., SOMERVILLE, L. H., GOTLIB, I. H., AYDUK, O., FRANKLIN, N. T., ASKREN, M. K., JONIDES, J., BERMAN, M., WILSON, N., TESLOVICH, T., GLOVER, G., ZAYAS, V., MISCHEL, W. and SHODA, Y. (2011)
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4. Sample

- 562, 4-year-old pupils from Stanford's Bing Nursery School completed a delay-of-gratification task during the late 1960s and early 1970s.
- 155 of these completed self-control scales when in their 20s (1993) and then 135 of these when in their 30s (2003).
- 117 of the 135 individuals who were above average or below average in their original delay-of-gratification performance as well as in the self-report measures of self control were contacted in relation to participating in this study.
- 59 (23 males, 36 females) of the 117 agreed to participate in this longitudinal behavioural study (Experiment 1). Participants were classified as low or high delayers from the results of (a) their delay-of-gratification performance and (b) the self-control measures. In Experiment 1 there were 32 high delayers (12 male, 20 female) and 27 low delayers (11 male, 16 female).
- 27 (13 males, 14 females) of the 59 who participated in Experiment 1 agreed to be part of a functional neuroimaging study (Experiment 2). In Experiment 2 there were 15 high delayers (5 male, 10 female) and 11 low delayers (7 male, 4 female)
- NB: One 41-year-old man was excluded from all analyses because of poor performance so results for Experiment 2 were based on the performance of 26 participants.

CASEY, B. J., SOMERVILLE, L. H., GOTLIB, I. H., AYDUK, O., FRANKLIN, N. T., ASKREN, M. K., JONIDES, J., BERMAN, M., WILSON, N., TESLOVICH, T., GLOVER, G., ZAYAS, V., MISCHEL, W. and SHODA, Y. (2011)
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5. Outline of the procedure/study

Experiment 1

- This tested whether individuals who were less able to delay gratification as children and young adults (low delayers) would, as adults in their 40s, show less impulse control in suppression of a response to "hot" relative to "cool" cues.
- The 59 participants, already classified as high or low delayers, consented to take part in a behavioural version of a "hot" and "cool" impulse control task.
- Participants completed two versions of the go/no-go task. The "cool" version of the task consisted of male and female stimuli which were presented, one sex as a "go" (ie target) stimulus to which participants were instructed to press a button, and the other sex as a "no-go" (ie nontarget) stimulus to which participants were instructed to withhold a button press.
- Before the onset of each run, a screen appeared indicating which stimulus category served as the target.
- Participants were instructed to respond as quickly and accurately as possible.
- Each face appeared for 500ms, followed by a 1-s interstimulus interval.
- A total of 160 trials were presented per run in pseudorandomised order (120 go, 40 no-go).
- The task was therefore a 2 (trial type: go, no-go) x 2 (stimulus sex: male, female) factorial design.
- Accuracy and response latency data (reaction times) were acquired in four runs representing each combination of stimulus sex (male, female) and trial type (go, no-go).
- The "hot" version of the go/no-go task was identical to the "cool" version except that fearful and happy facial expressions served as stimuli.
- The tasks were presented using programmed laptop computers sent to participants' homes.

. . . continues

CASEY, B. J., SOMERVILLE, L. H., GOTLIB, I. H., AYDUK, O., FRANKLIN, N. T., ASKREN, M. K., JONIDES, J., BERMAN, M., WILSON, N., TESLOVICH, T., GLOVER, G., ZAYAS, V., MISCHEL, W. and SHODA, Y. (2011)
Behavioural and neural correlates of delay of gratification 40 years later.
Proceedings of the National Academy of Sciences, 108, (36), 14998-15003.

5. Outline of the procedure/study

. . . continued

Experiment 2

- fMRI was used to examine neural correlates of delay of gratification. It was anticipated that low delayers would show diminished activity in the right prefrontal cortex and amplified activity in the ventral striatum compared to high delayers.
- 27 participants from Experiment 1 agreed (consented) to complete the imaging study.
- Participants completed a "hot" version of the go/no-go task similar to that used in Experiment 1. Differences were in timing, number of trials and apparatus.
- Each face stimulus was presented for 500ms, followed by a jittered intertrial interval ranging from 2 to 14.5s in duration (mean 5.2s).
- A total of 48 trials were presented per run in pseudorandomised order (35 go, 13 no-go).
- In total, imaging data were acquired for 26 no-go trials and 70 go trials for each expression.
- The task was viewable by a rear projection screen and a Neuroscreen five-button response pad recorded button responses and reaction times.
- One participant was excluded for excessively poor behavioural performance on the fMRI version of the task leaving 26 participants for group analysis.
- A 2 x 2 x 2 group linear mixed-effects model was conducted with factors of trial type (within subjects: go, no-go), emotion (within subjects: happy, fearful) and group (between subjects: high delayer, low delayer).

CASEY, B. J., SOMERVILLE, L. H., GOTLIB, I. H., AYDUK, O., FRANKLIN, N. T., ASKREN, M. K., JONIDES, J., BERMAN, M., WILSON, N., TESLOVICH, T., GLOVER, G., ZAYAS, V., MISCHEL, W. and SHODA, Y. (2011)
Behavioural and neural correlates of delay of gratification 40 years later.
Proceedings of the National Academy of Sciences, 108, (36), 14998-15003.

6. Some key findings

Experiment 1

- Reaction times (outside the scanner)
  - There were no effects of delay group on reaction time measures to correct "go" trials [main effect of group, F (1,57) = 2.23, P ≥ 0.1; group x task interaction, F = (1,57) = 0.002, P ≥ 0.9].
- Accuracy (outside the scanner)
  - Participants performed with a high level of accuracy for correctly responding to "go" trials during both the "cool" (99.8% correct) and "hot" tasks (99.5% correct).
  - Low and high delayers performed with comparable accuracy on "go" trials. Accuracy for "no-go" trials was more variable, with low delayers committing more false alarms than high delayers.
  - Low and high delayers performed comparably on the "cool" task but the low delayers trended toward performing more poorly on the "hot" task than the high delayers; only the low delay group showed a significant decrement in performance for the "hot" trials relative to the "cool" trials.
  - Overall therefore the go/no-go task produced differences between the delay groups only in the presence of emotional "hot" cues ie individuals, who as a group, had more difficulty delaying gratification at 4 years of age (low delayers) showed more difficulty as adults in suppressing responses to happy faces than the high delayers.

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CASEY, B. J., SOMERVILLE, L. H., GOTLIB, I. H., AYDUK, O., FRANKLIN, N. T., ASKREN, M. K., JONIDES, J., BERMAN, M., WILSON, N., TESLOVICH, T., GLOVER, G., ZAYAS, V., MISCHEL, W. and SHODA, Y. (2011)
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6. Some key findings

. . . continued

Experiment 2

- Reaction times (inside the scanner)
  - The two delay groups did not differ significantly in reaction times in correct "go" trials: [t (24) = 0.81, P ≥ 0.4].
- Accuracy (inside the scanner)
  - Overall accuracy rates for the "hot" go/no-go task were uniformly high for "go" trials (mean 98.2% correct hits) with more variable performance to "no-go" trials (12.4% false alarm rate).
  - Differences between the two delay groups in "no-go" accuracy were consistent with the observed differences in the "hot" task performance in Experiment 1, with low delayers committing more false alarms than high delayers.
- Imaging results
  - The "no-go" vs. "go" trials identified candidate regions of the brain differentially engaged as a function of cognitive control tasks.
  - The right inferior frontal gyrus was involved in accurately withholding a response.
  - Compared with high delayers, low delayers had diminished recruitment of the inferior frontal gyrus for correct "no-go" relative to "go" trials.
  - The ventral striatum demonstrated significant difference in recruitment between high and low delayers. This reward-related region of the brain showed a three-way interaction of group x trial x emotion, with elevated activity to happy "no-go" trials for low delayers relative to high delayers.
  - These results showed that the prefrontal cortex differentiated between "no-go" and "go" trials to a greater extent in high delayers. The ventral striatum showed exaggerated recruitment in low delayers.

CASEY, B. J., SOMERVILLE, L. H., GOTLIB, I. H., AYDUK, O., FRANKLIN, N. T., ASKREN, M. K., JONIDES, J., BERMAN, M., WILSON, N., TESLOVICH, T., GLOVER, G., ZAYAS, V., MISCHEL, W. and SHODA, Y. (2011)
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7. Possible conclusions

- Sensitivity to environmental hot cues plays a significant role in an individual's ability to suppress actions toward alluring cues.
- Resistance to temptation as measured originally by a delay-of-gratification task is a relatively stable individual difference that predicts reliable biases in frontostriatal circuitries that integrate motivational and control processes.
- The capacity to resist temptation varies by context, the more tempting the choice for the individual, the more predictive are the individual differences in peoples' ability to regulate their behaviour.
- Behavioural correlates of delay ability are a function not only of cognitive control but also of the compelling nature of the stimuli that must be suppressed.
- Individuals who, at the age of 4 years, have difficulty delaying gratification and who continue to show reduced self-control abilities, have more difficulty as adults in suppressing responses to positive social cues than those who don't.

FREUD, S. (1909)
Analysis of a phobia of a five-year old boy.
The Pelican Library, Vol. 8, Case Histories, p. 169-306.

1. Theory/ies on which the study is based

Theory of Infantile Sexuality/Theory of Psychosexual Development

- According to Freud's theory, sexuality isn't confined to physically mature adults, but is evident from birth. However different parts of the body are particularly sensitive at different times during childhood.
- The sequence of the psychosexual stages are determined by maturation (nature) and how the child is treated by others (nurture).
- Freud's stages of psychosexual development are: (1) oral stage: 0 – 1 year, anal stage: 1 – 3 years, phallic stage: 3 – 5/6 years, latency stage: 5/6 years –puberty, genital stage: puberty - maturity.
- The Oedipus complex for boys and the Electra complex for girls forms part of the phallic stage.

2. Background to the study

- Hans was described as a cheerful and straightforward child, but when he became 'ill' (developed his phobia) it was obvious that there was a difference between what he said and what he thought. Freud thought this was because things were going on in Hans' unconscious mind of which he was unaware.
- Little Hans was referred to Freud by his father, a keen supporter of Freud's work. Freud therefore decided to help Hans by interpreting his behaviour and telling him why he was thinking and behaving as he was. This is a process known as psychoanalysis.
- Freud therefore documented the case of Little Hans to show how his fears, dreams and fantasies were symbolic of his unconscious passing through the phallic stage of psychosexual development.
- Freud used this study to support his ideas about the origins of phobias, his theory of infantile sexuality and the Oedipus complex, and his belief in the effectiveness of psychoanalytic therapy.

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3. Research method

- This was a longitudinal case study.
- A case study gathers detailed data of either a single individual or a very small group of individuals, an institution or an event. Here, in-depth, detailed data was gathered on one individual – Little Hans – in relation to his fantasies, fears and phobias.
- The study is considered longitudinal as it documents developments in Hans' fears from when he was three years old until he was five. This allowed Freud to link the evidence gathered to his developmental theory of sexuality.
- Data was gathered by Little Han's father (a firm believer of Freud's ideas) regularly observing and questioning Hans. He then sent records of the events and conversations to Freud who interpreted the information and replied to Little Hans' father with advice on how to proceed.

4. Sample

- Little Hans (Herbert Graf) was five years old at the time of this study.
- Historical evidence starting from when Little Hans was three years old is used by Freud to support his theory of psychosexual development and the Oedipus complex.

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5. Outline of the procedure/study

- Just before he was three, Hans started to show a lively interest in his 'widdler' and the presence/absence of this organ in others – human and non-human.
- At this time he had a tendency to masturbate, bringing threats from his mother to send for Dr A. to cut it off.
- When he was three and a half, Hans gained a baby sister, Hanna, whom he resented and subsequently, subconsciously, wished his mother would drop in the bath so she would drown.
- Later Hans developed a fear of being bitten by white horses. This seemed to be linked to two incidents:
  (i) Overhearing a father say to a child, "Don't put your finger to the white horse or it will bite you."
  (ii) Seeing a horse that was pulling a carriage fall down and kick about with its legs.
- His fear was then generalised to carts and buses.
- Both before and after the development of the phobias (of the bath and horses), Hans was both anxious his mother would go away and prone to fantasies and daydreams. These included:
  - The giraffe fantasy.
  - 2 plumber fantasies.
  - The parenting fantasy.
- Having received 'help' from his father and Freud, after the parenting fantasy, both the 'illness' and analysis came to an end.

6. Key findings

- Little Hans' fear of horses was considered by Freud as a subconscious fear of his father. This because the dark around the mouth of a horse + the blinkers resembled the moustache and glasses worn by his father. He was fearful of his father because he was experiencing the Oedipus complex.
- Hans' fascination with his 'widdler' was because he was experiencing the Oedipus complex.
- Hans' daydream about giraffes was a representation of him trying to take his mother away from his father so he could have her to himself – another feature of the Oedipus complex.
- Hans' fantasy of becoming a father again linked to his experiencing the Oedipus complex.
- Hans' fantasy about the plumber was interpreted as him now identifying with his father and having passed through the Oedipus complex.

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7. Possible conclusions

- Freud concluded that his study of Hans provided support for:
  (i) His theory of psychosexual development / infant sexuality.
  (ii) His suggestion that boys in the phallic stage of psychosexual development experience the Oedipus complex.
  (iii) The nature of phobias and his theory that they are the product of unconscious anxiety displaced onto harmless external objects.
  (iv) His concept of unconscious determinism which holds that people are not consciously aware of the causes of their behaviour.
  (v) His use of psychoanalytic therapy to treat disturbed thoughts, feelings and behaviours by firstly identifying the unconscious cause(s) of the disturbance and them bringing them into the conscious so they can be discussed and resolved.

BARON-COHEN, S., JOLLIFFE, T., MORTIMORE, C. and ROBERTSON, M. (1997)
Another advanced test of theory of mind: evidence from very high functioning adults with autism or Asperger Syndrome.
Journal of Child Psychology and Psychiatry, 38, 813-822.

1. Theory/ies on which the study is based

- The most influential theory of autism in recent years maintains that what all autistic people have in common (the core deficit) is mind-blindness (Baron-Cohen,1990), a severe impairment in their understanding of mental states and in their appreciation of how mental states govern behaviour. They lack a 'theory of mind' (TOM).
- Because autistic individuals fail to develop the ability to attribute mental states to other people, fundamental implications arise for communication, where making sense of other's intentions enables the listener to understand what is being said (inferred/intended). (Baron-Cohen, 1995a).
- Individuals diagnosed with autism show a tremendous variation in the degree to which they are affected. To address this issue a 'spectrum of autism' was devised. Difficulties experienced by children, judged in relation to set criteria, allow them to be placed within the spectrum eg

Classic autism ——— ***Asperger's syndrome*** - - - - - ***Normality*** →

(Those with Asperger Syndrome show the same characteristics as autism but are of average or above average intelligence and appear to have good communication skills, though this may not actually be the case.)

2. Background to the study

- Some evidence suggests that a TOM deficit is not a core cognitive deficit in autism. However no conclusive evidence has yet shown that individuals such as adults with 'high-functioning autism' or Asperger Syndrome (AS) have an intact TOM. This is because usual tests to assess TOM have a ceiling in developmental terms corresponding to a mental age of about 6 years. Therefore, although existing TOM tests are challenging for 6-year-olds, they are far too easy for adults who all pass even though they may not have a fully functioning TOM.
- Happé (1994) tested adults with autism or Asperger Syndrome on an 'advanced' TOM task and found her participants had more difficulty with her mental state stories (Happé's Strange Stories) than matched controls.
- Baron-Cohen et al built on Happé's research by using an adult test to assess theory of mind competence in high-functioning adults with autism or AS.

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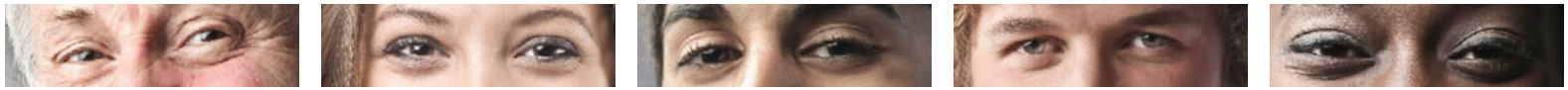
3. Research method

- This was a quasi/natural experiment because the independent variable (IV) – the type of person likely to have TOM deficits (adults with high-functioning autism/AS, normal adults and adults with Tourette Syndrome) – was naturally occurring so could not be manipulated or controlled by the researchers. The dependent variable (DV) was the performance – score out of 25 – on the Eyes Task; measured by showing each participant 25, black and white, standardised photographs of the eye region of faces (male and female) and asking them to make a forced choice between two mental state words (target and foil) to best describe what the person in the photograph was feeling or thinking.

Photographs of eyes similar to those used in The Eyes Task



- The study used a matched participants design because the group of normal adults and the group with TS were age-matched with the group of adults with autism/AS.All participants were considered to be of normal intelligence.

4. Sample

- Three groups of participants were tested:
  - Group 1: 16 individuals with high-functioning autism or Asperger Syndrome (HFA = 4, AS = 12). The sex ratio was 13:3(m:f). All were of normal intelligence and were recruited through an advert in the National Autistic magazine and a variety of clinical sources.
  - Group 2: 50 normal age-matched adults (25m:25f), drawn from the general population of Cambridge.
  - Group 3: 10 adults with Tourette Syndrome also age-matched with groups 1 and 2. The sex ratio was 8:2 (m:f). All were of normal intelligence and were recruited from a tertiary referral centre in London.

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5. Outline of the precedure/study

- The Eyes task, the Strange Stories and the two control tasks (Gender Recognition of Eyes Task, Basic Recognition Task) were presented in random order to all participants.
- The Gender Recognition Task involved identifying the gender of the eyes used in the Eyes Task. The task controlled for face perception, perceptual discrimination and social perception. The Basic Emotion Recognition Task involved judging photographs of whole faces displaying basic emotions identified by Ekman (1992). The task was done to check whether difficulties on the Eyes Task were due to difficulties with basic emotional recognition. The Strange Stories Task was used to validate the results from the Eyes Task.
- Participants were tested individually in a quiet room either in their own home, in the researchers' clinic or in the researchers' laboratory at Cambridge University.

6. Key findings

- The mean score for adults with TS (20.4) was not significantly different from normal adults (20.3) but both were significantly higher than the autism/AS mean score (16.3).
- Normal females performed significantly better than normal males on the Eyes Task (mean 21.8 versus 18.8) but the normal males were significantly better than the autism/AS group (mean 18.8 versus 16.3).
- The autism/AS group made significantly more errors on the Strange Stories task than either of the other groups.
- On the Gender and Emotion control tasks, there were no differences between the groups.
- Within the autism/AS group there was no significant correlation between IQ and performance on the Eyes Task.
- On Happé's Strange Stories, no participants with TS made any errors but those with autism/AS were significantly impaired, making many errors.

Results of the Eyes Task (out of 25)		
	Mean score	**Range**
Autistic/AS	16.3	13-23
Normal	20.3	16-25
TS	20.4	16-25

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7. Possible conclusions

- Contrary to previous research with adults, these results seem to provide evidence that adults with autism/AS do possess an impaired theory of mind.
- As some of the autism/AS group hold university degrees and were all of normal intelligence, it is reasonable to suggest that TOM deficits are independent of general intelligence.


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