unthink

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CORONET

First published in Great Britain in 2014 by Coronet
An imprint of Hodder & Stoughton
An Hachette UK company

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A CIP catalogue record for this title is available from the British Library

Hardback ISBN 9781444779714
Ebook ISBN 9781444779721

Typeset by Palimpsest Book Production Limited, Falkirk, Stirlingshire
Printed and bound by CPI Group (UK) Ltd, Croydon CR0 4YY

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Hodder & Stoughton Ltd
338 Euston Road
London NW1 3BH
www.hodder.co.uk

NOTES

1. Some of the control variables might seem a bit far-fetched. This is a further sign that introspection is poor at working out what influences our thoughts and behaviour. We will see that holding a warm cup of coffee changes the way people perceive other people. Language impacts the McGurk effect – and perhaps some of the metaphors that we rely on. Crossing a scary bridge makes people more likely to fall in love. If we infer our own minds from the outside, as we will argue, our clothing could change our personality.

   You might be tempted to offer yourself as a sacrificial experimental subject. Unfortunately, if you finish this book you may be a poor subject. If you are leaving a psychology experiment and somebody accidentally knocks over a jar of pencils, you might guess that somebody else will count how many you pick up. There is a bit of an issue that many experiments are performed on undergraduate psychology students who are encouraged (compelled) to volunteer for experiments in return for course credit. Either the subjects are aware of the types of tricks that social psychologists use or they're not particularly interested in the field and one wonders why they're spending years of their life sitting exams in it.
2. (33). See also (102).
3. (79)
4. (157)
5. (11)
6. George Lakoff and Mark Johnson wrote an interesting book on this: (103)

7. (176)
8. (170)
9. (2)
10. The red/romance link affects both men's attraction to women (56) and women's attraction to men (55)
11. (30), (86)
12. (153), (20), (154)
13. The results couldn't be explained by the lonely students just being upset by the feedback or even grumpy with the experimenters for being unpleasant to them, because the researchers included a third condition in which the results apparently showed that the students were clumsy and likely to suffer severe accidents later in life. These students were just as upset by their news, but they were still generous and helpful.

    Believing that you are rejected, or will be in the future, seems to be self-fulfilling, leading to less pleasant behaviour to others, which presumably in turn leads to more rejection and ultimately a forlorn death bed. The one advantage that I can see to this unpleasant cycle is that it leaves you with more time to yourself, to read and ponder over paradoxes such as this one. Unfortunately, your pondering may also be of a lower quality.

    Students took the personality test and the experimenters gave them false feedback about their futures. The students then took mental reasoning tests. Those who'd been told that they were going to have a lonely old age did much worse on these and a series of difficult exams than those who'd been told that they would have a happy marriage.
14. (99)
15. (7). See also (152).
16. (108)
17. (113)
18. (109), (164), (27)
19. See (41) for discussion and experiments implanting (further) false memories in people who believe they've been abducted by aliens.

20. (174)
21. See (85) for an early review. The octagon experiment was published after this review and is in (101).
22. (39), (134). In another experiment (38), they showed a similar result. People are more likely to litter when the area is already littered (they gave unwitting participants the chance to litter by putting a handbill on their car windshields). This effect is even stronger when they see somebody else littering.

    In yet another experiment (74), Professor Cialdini and others designed towel-rack signs to encourage guests at a hotel to re-use their towels. One of their signs just asked customers to help the environment by reusing their towels. The other asked customers to join their fellow guests in helping to save the environment, telling them that 75% of other customers re-used their towels. Again, the most impactful sign was the one that mentioned what other people did. This time the message was helpful, increasing re-use rates by a quarter.

    In spite of all this evidence that telling people that others are doing something increases the likelihood they will do it themselves, it is still common for well-meaning groups, frustrated at the size of a problem, to tell everyone about it. (39) lists many examples including eating disorder programs, suicide prevention campaigns and high-school binge-drinking education efforts. They all had an adverse effect. While I was at university, the pro-life group distributed fliers telling students that one in three pregnancies ended in abortion. A shocking statistic, but I wonder whether the information increased or decreased the number of abortions. The research suggests that the message: 'Most women keep their babies: we can help you as we've helped others' would have been more effective.
23. (83)
24. (98)
25. (146)
26. Most large charities are aware of these effects, and target their

campaigns at our emotions rather than bombarding our reason with statistics. Some offer us the chance to sponsor or 'adopt' a poor child and show us photos of her, tell us the sports she likes to play, and print copies of drawings she's made, before telling us how hungry the little girl is, and how much she wants to go to school.

Even animal charities use similar techniques. In 2009, the RSPCA received over $100m in voluntary income, and spent over $20m on marketing. One of their mail shots has a kitten's face on the envelope and the question 'can YOU hear my cry for help?' In the enclosed letter, we learn that Stevie was just eight weeks old when his heartless owner threw him out. 'Cold and trembling, with a broken leg, his tiny mewing cries could barely be heard.'

If our charitable choices were reasoned, we'd want more information on the cost per rabbit re-homed so that we could compare it to the number of meals we could send to Ethiopians for the same amount. Some organisations do use such figures in their adverts, and it seems laudable, but any charity swapping their emotional appeal for statistical details doesn't understand human nature very well. And I'd prefer to donate to charities that understand humans.

27. (144)
28. See (76, 75, 82) for this section and the next.
29. (76, 75)
30. (97)
31. (111)
32. (96). See also (4).
33. (133)
34. There are many fascinating experiments on just-world theory. Two of the earliest are (105, 104). (80) is a recent review, including references to the final examples in the section.
35. In *Candide*, Voltaire wrote about an optimist, Pangloss, who contracted syphilis, lost an eye and an ear, and survived an earthquake and a tsunami before being hanged by the

Portuguese Inquisition for his heretical beliefs. Throughout the satire, Pangloss held to his philosophy that all was for the best in a world that must have been created for the best possible ends.

Pangloss's beliefs (actually a parody of those defended by Leibniz) were an attempt to deal with a sticky religious problem: if the world is created by a good god, how can there be evil in it?

36. (117)
37. (176)
38. (32, 139)
39. Some interesting discussion on the related ideas of neural re-use are in (6).
40. In fact, Leon Festinger and colleagues did the next best thing and infiltrated a millennial cult (64). This was perhaps less controversial than creating his own, as at worst they could be accused of failing to prevent harm to members rather than causing it.

    On a similar note, one of my favourite books is by somebody who joined Scientology at an early stage in its development (95). It reads like a gripping thriller, but interested psychologists can play spot-the-technique as they read it.
41. e.g. (23, 24)
42. (84). Psychopaths are classified using a multi-item test. A cut-off is defined such that people with a higher score in the test are classed as psychopaths and those with a lower score are not. It is possible therefore to have many of the tendencies of a psychopath without being caught in the statistics, or indeed to define a cut-off that would classify a greater or smaller proportion of the population as psychopaths.
43. (162)
44. (155)
45. (88)
46. Researchers invent their own languages and teach them to volunteers (137, 138). Here is a list from one experiment. If you want

to play along, spend seven minutes memorising the following strings and then cover them up

XMXRTVTM	XXRVTM	XXRTVTM
VVTRTTVTM	XMMMMXM	VTVTRVTM
VTTTTVM	XMXRTTTVM	XMMMXRTVM
XXRTTTVM	XMMXRTVM	VVTRVM XMMXM
VTTTVTRVM	XMMMXRVTM	

The list might have looked nonsensical, but there were actually rules governing which strings were possible. They had a grammar. The rules are complicated, and it would take me seven minutes to explain them to you. It would take even longer for you to memorise them.

I've not given you those rules, and working back to them from the list you've seen isn't trivial. But it might be that your unconscious brain has extracted some information. On the following page, there's another list of words. Half of the words are grammatically correct, the other half aren't. Put a tick next to the ones you think are right and a cross next to the others.

Artificial grammar strings

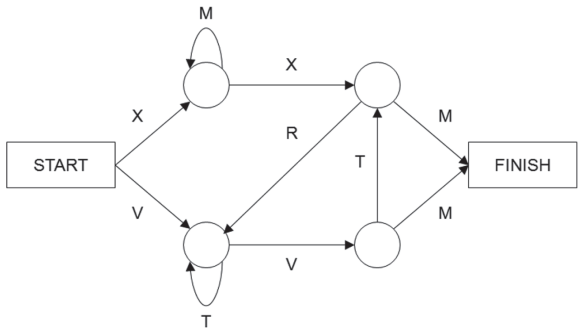
1. XMXRVM	11. VTTVTM	21. VVTTRMTM
2. VTTTVM	12. XMVRMVRXM	22. XMVRXM
3. XMVRXRM	13. VVTRVTM	23. VVRMVTRXM
4. VVTRXRRRM	14. XMMXRVM	24. XXRTTVM
5. XMTRRM	15. MXRTTVTM	25. VVRMVRXM
6. VVRXRRM	16. VVTRTTVTM	26. XMVRXRRM
7. XMMMXRVM	17. XMVTRXRM	27. VTVTM
8. XXRTTVTM	18. VTVTRTVM	28. XMMXRTTVM
9. VTRRM	19. XMMMXM	29. XMVRXRRRM
10. XMVTTRXM	20. VTTTVTRVM	30. XMTRRRM

How confident are you that you did better than chance at this? Do you know what any of the rules are? Most people who take this test can't articulate any of them. They're confident on just a few of the strings. But on average, they get about two-thirds right. The answers, along with a discussion of the artificial grammar used, are below.

Our unconscious learns very fast. No French teacher could impart much grammar to me in seven minutes (they didn't manage much in five years), but without even knowing what we are supposed to be learning, we can grasp the rudiments of a difficult alien language.

Yet because we can't say what we've learned we don't have a lot of confidence. When researchers allow volunteers to gamble on which strings they know have the right grammar, betting either a high sum or a low sum, they don't do any better than chance at picking their winners. This seems to be a general characteristic of unconscious knowledge. When my dad took the stabilisers off my bike I was very unhappy. I had no idea how to stay upright. But he could see that I did.

The artificial grammar is defined by the following flow diagram.



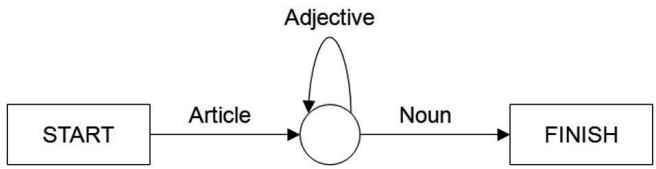
To use the diagram to create a string, start at the left-hand side. Now follow the arrows in the direction that they point.

Whenever you pass along an arrow, write down the letter next to the arrow. For example, begin by following the arrow marked X. Now go along the arrow at the top marked M. This arrow takes you back to where you started, so we can go along it again. M. Now let's follow the second X arrow. From here, take the R arrow, then the V arrow and finally the M arrow until we reach the end. Our string is XMMXRVM. If we can create a string with this diagram it's grammatically correct, if not then it isn't.

The correct strings are: 1, 2, 7, 8, 11, 13, 14, 15, 16, 18, 19, 20, 24, 27 and 28. Incidentally, the fifteen grammatically incorrect strings were all created using another grammar diagram. You might try working back from those strings to the diagram that created them. I predict you won't get very far in seven minutes.

Comparison with English grammar

This artificial grammar might seem very artificial, but in structure it's a simplified version of real languages. The letters are equivalent to words and the strings are sentences. We could compose a simple flow diagram for constructing English.



Article	Adjective	Noun
The	Dirty	Dog
A	Hard	House
	Shiny	Table

Using this, you can make sentences such as 'The Table', 'A Dirty House', and 'The Hard, Shiny Dog'. Some of them make more sense than others, but they're grammatically fine. But if you disobey the rules, you get something unacceptable. 'Hard A House' and 'Shiny Dog The' don't work.

English grammar is of course more complicated. Our diagram ignores subtleties even with the components that it includes. Take a simple sentence of the form article-adjective-adjective-noun. 'The big blue house' is okay. But there's something awkward about the sentence 'The blue big house'. You've probably never been taught that an adjective denoting size should come before one giving colour, but you use the rule anyway. Your unconscious brain knows it.

47. (106)
48. But whether verbalisation helps or hinders depends on the type of problem. Problems 1–2 required insight. The following problems are logical problems which you can crunch through.
    3. The police were convinced that either A, B, C or D had committed a crime.

       Each of the suspects, in turn, made a statement, but only one of the four statements was true. A said, 'I didn't do it.' B said, 'A is lying.' C said, 'B is lying.' D said, 'B did it.' Who is telling the truth, and who committed the crime?
    4. Three cards from an ordinary deck are lying on a table, face down. The following information (for some peculiar reason) is known about those three cards (all the following information refers to the same three cards). (i) To the left of the queen there is a jack. (ii) To the right of a spade there is a diamond. (iii) To the right of a heart there is a king. (iv) To the right of a king there is a spade. Can you assign the proper suit to each picture card?

    Volunteers who tried these and similar problems didn't do any worse when thinking aloud, though they didn't do any better either. But something interesting happened when the experimenters gave the volunteers a hint. They told participants that

sometimes people got stuck in a particular mindset, and that if they were having trouble it might be worth trying another approach.

On problems requiring insight (e.g. 1–2), or when volunteers worked quietly, the hint had no discernible effect. But when subjects worked on the problems that (i) could be crunched through and (ii) voiced their thought process, the hint dramatically harmed their success rate. The conscious mind confused itself and gave up too quickly on effective strategies. Thinking too hard and allowing your conscious mind to try too many lines of attack can be a bad thing.

Scientists found a similar result in a very different type of problem. Moderately able golfers practised putting up a gradual incline until they could get three balls in the hole in a row. Half of them then spent five minutes writing a detailed description of how they performed the task. The other half spoke about something unrelated.

Afterwards, they tried again to putt three balls in a row. Those who'd spoken about something unrelated achieved this in an average of eleven shots. The golfers who'd tried to explain what they were doing took twenty-one shots, which was just as many as when they first tried. Conscious reflection completely ruined all the benefits of practice.

It seems that there is an overhead to the unconscious problem-solver communicating with the conscious mind. In some problems this overhead slows the process down dramatically.

49. (50). This is a controversial experiment. Later in the book we'll see some similar experiments which scientists have used to claim that we need conscious attention to solve e.g. logical problems. However, the experiments of Dijksterhuis and colleagues are compelling. If we distract conscious attention and we are able to weigh information then we must be able to do this without conscious input. The converse isn't necessarily true. As all conscious processes are accompanied by unconscious processes (49), the distraction of conscious processes may also be distracting

unconscious processes, and it may be those which are needed to solve the test problem.

It may ultimately turn out that we need consciousness for some sorts of problems (indeed in this book I'll argue that this is so). However, the fact that we can solve some problems without conscious effort that we wrongly imagine we solve better with conscious effort is a dramatic result.

50. See e.g. (129) for a discussion of popular perceptions of subliminal advertising and the difficulties of using subliminal techniques in advertising. However, it is worth noting that advertising techniques where it is possible for targets to see the message, but where most of them don't and are still influenced, are widely used. The product placement experiments described in this book are one example. Banner adverts often go unnoticed, but still affect our choices when we don't recall seeing them (59).
51. (1)
52. (131)
53. (61)
54. Similar results came from Duke University, where Dasani was already market leader. With no exposures, 31% wanted Dasani as a gift. With twelve unnoticed exposures, 62% thought that nothing but Dasani could quench their thirst.

    The unconscious can also do more than count the number of exposures we've had to a brand: it can also assess the relevance of these exposures. When the people in the pictures were outgroup members (i.e. wearing kit from a different university) no increase in preference for Dasani was found.

    Other experiments (59) have shown that banner adverts on Internet pages often go unnoticed, but still influence our preferences. The effect seems to rely on an increased fluency leading to a positive experience, which we misattribute as a preference for the brand. So noticing the adverts / product placement and understanding why we have the fluency may actually damage their effectiveness. This presents a problem for sophisticated

advertisers explaining their strategy to management. Who wants to hear they've spent millions on a campaign and nobody even noticed the ads? Perhaps the disbelieving managers might offer to subliminally prime the ad-men with images of money instead of paying them so that they have the impression of being rich.

55. The following exercise is based on one given by John Bargh and colleagues(12).

From each set of five words below, make a grammatically-correct four-word sentence.

For example, from the list:

good cat she very was

you could form the sentence:

she was very good

If you are able to, time yourself on the task and see how quickly you can complete the exercise.

1. father sat TV likes my
2. apple the please rules respect
3. the was optimistic flat patient
4. flock sensitively granddad her told
5. tomorrow usually her they see
6. I ready discreetly was not
7. exercised bald dog Sally her
8. cautiously will golf play I
9. grass green the off keep
10. weight hair brown I have
11. here yield in it lives
12. optimistically this have finished I

Given the topic of this book, you might have guessed that there's something more to this exercise than a test of your language abilities. If you look back at the lists, you will see that half of them contain words loosely associated with politeness: *respect, sensitively, discreetly, cautiously, yield, optimistically*. As you worked quickly to complete the unscrambling, you probably didn't notice the connection between these words. But your

brain will have. When John Bargh and colleagues gave a similar exercise to volunteers (who weren't expecting to be primed), their behaviour changed, as described in the main body of the book.

56. (12)
57. It might equally be that I infer that I want to finish this book by observing the fact that I'm sitting here tapping away. The unconscious might in fact be following a goal of postponing a difficult conversation with my wife, in which case my inference about my book-finishing goal would be wrong. This is the subject matter of Part Three.
58. (34). A short review of unconscious goal pursuit is (45).
59. (115). In fact the effect has been found to be weaker for Japanese listeners (140). It may be that Japanese listeners depend less on visual cues when listening.
60. e.g. *http://www.youtube.com/watch?v = P vHRkB37aE*
61. (141, 142)
62. (3). (81) deals with some confounds: in the original experiment, the smaller discs were closer to the poker chip than the larger discs, which distorted the effect.
63. (26)
64. These results are consistent with those from earlier, more gruesome experiments. Through the Sixties, Dr Delgado operated on the brains of animals and humans (47). To do this, the doctor removed part of their skulls under local anaesthetic (think of the scene in the film *Hannibal* for an idea of what this looks like in a non-clinical setting). Dr Delgado didn't offer his patients a taste of their prefrontal cortex, but while their brains were open he did insert electrodes.

    By passing current through these electrodes, he could alter aspects of their behaviour. In one case, he was able to make the patient move. This wasn't a sudden, jerky movement, but apparently normal, smooth head and body turning. In spite of the doctor's control, his patient remained convinced that the movements were spontaneous. When Dr Delgado asked them

what they were doing, the patient replied: 'I am looking for my slippers,' 'I heard a noise,' and 'I am restless.'

65. You might have noticed that the decisions made in the finger-extending experiment were very fast. You might argue that perhaps in slower decisions we do make a conscious decision first. We shall see later in the book that we often do have conscious knowledge of our actions before we begin them – and need to do so if consciousness is to be of any use. We still don't make conscious decisions, but we do use consciousness to check that a decision is socially acceptable.
66. (166)
67. (149)
68. (125)
69. (112)
70. (63, 62)
71. A similar experiment found that children also know how important reward is in motivating behaviour (100). Teams of children played games. When they won prizes for doing well, they said that they enjoyed the games less (than players in a separate competition for which prizes weren't given) even though they hadn't expected the prizes when they played. I wonder whether this is why I found pass-the-parcel so dull as a child.
72. (22)
73. (54)
74. It's possible to imagine alternative explanations for these results. Perhaps the frightening bridge was in a more romantic site and it was these feelings which were transferred to the experimenter, or maybe the high bridge attracted thrill-seeking tourists who were by their nature more likely to try their luck with her. The researchers therefore tried to get the same results in the laboratory.

    Participants, all male heterosexuals, believed that they were taking part in a series of experiments to test the effects of electric shocks on learning. They would do this at the same time as

another subject. In fact, the other subject was always an attractive female chosen by the experimenters. There were two different levels of shock that could be applied: a weak, tingling one and a strong, painful one. The participants tossed a coin to decide which level of shock they would experience, and were then sent away while the experimenter set up the equipment.

While the participants waited for the shock experiment, they completed a questionnaire and wrote a creative story. Those who were expecting strong shocks wrote stories with more sexual content, said that they were more likely to ask out the pretty girl also doing the experiment, and admitted to a stronger desire to kiss her.

Interestingly, the experimenters also included a condition in which instead of using a pretty girl as the second subject they used a man. Subjects who were paired with a man expressed much more anxiety about the upcoming shocks than those paired with the girl. They answered questions about this in a private cubicle, so the less fearful men weren't just acting macho in front of the woman they'd decided they wanted to kiss. It seems that the threat of shocks caused sweaty hands and a throbbing heart in all the men. Those who were in the presence of an attractive woman thought they were due to sexual attraction, but those who weren't had to attribute them to fear.

75. (94)

76. The film *Twelve Angry Men* is a riveting exploration of how hard it is to support a view when everybody else is against it. One of the most famous experiments showing conformity was Solomon Asch's (8) experiment on the judgement of the length of lines. He presented three lines of different lengths and a fourth line, which matched that of one of the others. One of the participants was the subject, and the others were all stooges. The stooges gave an incorrect answer to the question of which of the three lines the fourth matched. Most of the subjects gave an incorrect answer to at least one question (but by no means all). This question had a clear objective answer (error rates without social

pressure were tiny): the fact that people conformed at all is amazing. Some of the subjects knew they were conforming with the others, others thought retrospectively that they had answered correctly. Even when they answered correctly they were often visibly uncomfortable.

I had a teacher who repeated this experiment for us. He sent a boy out of the classroom for talking. While the boy was out, he briefed us and called the lad back into the classroom. Later in the lesson, the teacher drew up three lines as part of a set of 'illusions' and asked us each what we saw. After several people had said that the shorter line was longest he asked the boy who had earlier been sent out. He did indeed claim that he also thought the shorter line was longest – and sparked a fascination with psychology in at least one of his classmates.

Interestingly, the teacher claimed his demonstration never failed. In Asch's experiment, many of the subjects did give correct answers. It would be fascinating to know whether the added pressure of real peers increased the effect, whether my teacher was good at choosing people who would conform, or whether being sent out of class beforehand increased the pressure on the subject to fit in afterwards.

Given that we frequently conform on objective questions, it is not surprising that we so often conform on questions where the answer is less clear cut: which is most of the things we think of as forming culture.

77. The foot-in-the-door technique (67), much studied in the field of social compliance (40), is the standard demonstration of this. In the first step, subjects are asked to comply with some small request, such as putting a badge for a charity on their bag (35). In the second step, participants are asked for a larger action, such as helping out on a stall for three hours. With the larger request, participants are typically unwilling to help just because they have been asked. However, acceding to the initial smaller request generally leads to higher participation rates (29).
78. (43, 73)

79. Pardon the pun.
80. (166)
81. (13)
82. (14)
83. Recent research suggests that infants may have an understanding of other people's minds earlier than this, which they are, for some reason, unable to verbalise. A discussion of this is in (148).
84. (130)
85. You might argue that the autistic children do not fail the Smarties test because they have a deficit in their understanding of their own mental states, but rather because they fail to appreciate that the experimenter will be able to catch them out lying about their earlier knowledge. However, other experiments such as (132) show that this is not the root of their problem. A fascinating article by Frith and Happé discusses in more depth the problems autistic children have in understanding their own minds (68). See also (171).
86. (10)
87. Incidentally, as the addicts were prepared to pay more when they were craving than when they had taken the drug, it confirms that avoidance of withdrawal is a bigger driver of their addiction than the pleasant experience that got them hooked in the first place. Beware kids!
88. (136, 135, 37)
89. (158, 159)
90. (175)
91. This question was put by Ap Dijksterhuis (49).
92. There is much literature on the subject. A good review is (57).
93. This experiment (15) is one of the trippiest I have ever read about. The participants were describing the ball-bearings to a teddy bear wearing a blindfold. Because some people clam up when asked to talk to a stuffed toy they had practice sessions first in which they told him about a tower they were building and described cartoon villains such as Cruella de Vil and Captain Hook. Unfortunately, the experimenters felt it appropriate to exclude data from one participant who 'seemed to be unusually flippant

about the task, calling the bear "Mister Bear" and at one point even naming a marble "Bob".' But with or without this participant's contribution, there was a big difference in the way that volunteers who had control over the magnets and those who didn't described what was happening.

94. Whether or not such minds really exist.
95. (46)
96. See (107) for a controversial experiment showing that conscious reactions are slow.
97. The standard test is the implicit association test (IAT) (77, 126). But others include making quick decisions about whether somebody is holding a gun (44, 128), in which white people typically choose in a way that indicates a less favourable attitude towards black people, and one that suggests the use of a stereotype that black people are aggressive.

    An interesting study shows that subliminally priming white subjects with images of black faces causes them to be more aggressive in interactions over a phone (36). In this experiment, subjects have no way of knowing that the stereotype is causing their behaviour.
98. For example, Fazio et al. (60) found that measures of explicit racism (a questionnaire) correlated with subjects' opinions on the Rodney King verdict and the justifiability of the ensuing anger in the black community. However, their implicit measure of racism was a better predictor of subjects' friendliness towards a black experimenter. In the absence of a control test, it would have been impossible for the subjects to infer that their friendliness or otherwise towards the black experimenter was caused by the race of the experimenter.

    Our conscious attitudes can only be applied when (i) there is time for our self-model to be consulted, and (ii) it is possible for our social model of ourselves to infer from our choice of behaviour that they have or haven't been applied.
99. (156)
100. (171)

101. An interesting aspect of the work was that nearly all of those who chose a poster without giving reasons chose a picture by Monet or Van Gogh. About a third of those who gave reasons chose a humorous poster. It is noticeable that people who talk a lot about art and literature like different art and books to the rest of us. A cynic might argue that conceptual art is easy to talk about rather than intrinsically attractive and that this is the source of its apparent popularity among those who like to discuss art.
102. We only infer other people's minds so that we can work out what they will do before they do it. But we can only use information from what they have already done (and the situation etc.).
103. See for example the discussion on the 'language of the eyes' in (13).
104. (87)
105. (28)
106. Or a switch in my visual attention. If I spill water, it is plausible that my brain could send a signal that what has happened is socially relevant and ensure that visual cues (which an outside observer will share) are sent to consciousness. Later in this part, we will examine evidence that the brain is able to select socially relevant information and make it accessible to the model that produces consciousness.
107. (66, 92)
108. (145)
109. Analogous results are also found among experienced typists. Experimenters inserted errors into subjects' typing, and corrected some actual errors (110). The typists slowed marginally when they had actually erred. However, they were as likely to believe that the artificially corrected words had been typed correctly as words that they had indeed typed correctly.
110. There are lots of scenarios where having access to private knowledge that cannot be inferred by counterparts improves our ability to predict and manipulate the behaviour of other people. There is information that other people will later find out (e.g. I burnt a hole in my wife's dress while ironing it). There is information

that other people might already know (e.g. my wife might have seen the dress when getting changed). There is also information that I can choose to communicate (e.g. that I burnt a hole in the dress and that I have booked a table for dinner on Saturday after she's had time to buy a new one).

A further reason to selectively incorporate knowledge that others don't have access to is the problem of multiple interaction partners. In the changing-room example above, my friend has the knowledge that my stuff is in locker 87. The man at locker 87 will probably infer the knowledge when we march towards him. But the other occupants of the changing room will not have this information until later, and some of the men we pass will never know it. We could hypothetically build a separate model of ourselves for each person we interact with, but it seems simpler to build one shared model and incorporate adjustments to this model in terms of explicit knowledge that other people are mistaken about. One of these adjustments, that of false beliefs, seems to be what is tested in the Smarties and Sally / Anne experiments (14, 130).

A social model of ourselves that *only* incorporated knowledge that other people are likely to have about us might seem to be a purer model. But a self-model that has access to some information that is not available to other people is more effective at giving us advice on what other people will infer about us and how we can manipulate and respond to their behaviour.

111. (165)

112. You could improve the robot a bit. When there's more light at the front than the back it would be nice if the back wheels weren't trying to pull it backwards. You could add a circuit that turned them off when this happens. Now you seem to have a central decision maker. It compares the amount of light seen in front of it to that behind it and decides which set of wheels should be running.

But in practice this decision maker is some kind of switch. There are electrical signals coming from the front of the machine

and more coming from the back. Depending on the comparative strength of these signals it sends an electrical current of its own. The decision maker doesn't need to know what is causing these signals or what the effect of its own signal is. It could be a switch in a mobile phone, a computer or a toaster.

So knowing the state of this switch doesn't negate the need for a model. The model still needs to understand how the electrical signals received by this switch relate to the inputs and how the signals sent correspond to the outputs. If it knows all this, it doesn't need to know what the switch is actually doing at all: it just needs to know which wheels are moving and how fast. It can infer the state of the switch from this information, and access to the actual state of the switch doesn't add anything.

113. Morsella and colleagues (120, 122, 121) have noted this difference between what we are and are not conscious of. Morsella (120) lists examples of conflicts between competing systems that are resolved unconsciously, including the McGurk effect (115), binocular rivalry, and depth perception.
114. e.g. (51)
115. e.g. (65)
116. There are many further examples of actions we usually make automatically becoming conscious when there is a conflict making it socially interesting. We generally reach for a glass of water without noticing that we are doing so, but if we have an injury we become aware of our actions. Again, there are social questions which could affect the effort I should put into reaching for the glass. Will you help me if my injured arm prevents me from reaching the cup? Will you infer that I'm exaggerating my injury because I'm lazy? Should I risk damaging myself further to hide my injury because you will take advantage of my weakness if you notice it?
117. Because scientists don't get enough invites to parties, they have confirmed the results in the lab. In 1959, Moray described the 'cocktail party effect' (119). Moray played subjects two messages of equal intensity, one through each ear, asking subjects to repeat

out loud the list played in one ear. Generally, participants blocked out the message in the other ear, and could recall no content from that message. However, when the recording in the ignored ear included a message preceded by the subjects' name, the subjects were frequently aware of that message.

This experiment is consistent with other studies showing that conscious perception of stimuli is affected by the social significance of the stimuli, such as in perceptual defence (114, 58).

118. See (52, 53) for discussion of the social brain hypothesis.
119. (78)
120. I've been lucky to have some very good bosses. One of the best explained to me that he no longer produced anything directly himself. His job was therefore about working out how to get other people, some of whom he thought were smarter than himself, to do the work for him. He spent all day thinking about what motivated one person or why another turned up in the mornings. He thought about what he could do to explain something to somebody else and why another pair didn't seem to get on. He described management as a profoundly humble experience, where the only ego that didn't matter was his own. (Given his benignly Machiavellian view, I wondered what he was hoping to change about me by telling me this.) The least effective boss I've known took the opposite perspective: that he'd made it and the role of his employees was to guess what he wanted. I can see the advantage to the employees of taking this view, but not of the firm hiring such a manager who, while technically very talented, never understood why he had such high employee turnover.
121. Peter Carruthers' (31) arguments are most close to this, 'metacognition, on this view, results from turning one's mindreading capacities upon oneself, its emergence will be a byproduct of the evolution of mindreading'. (Metacognition being 'cognition about one's own cognition' – he also distinguishes between access consciousness and phenomenal consciousness.) He allows that metacognition might have come under 'secondary' selection later.

However, without considering the selection, I think the important asymmetries between the way we infer our own mind and those of others cannot be adequately accounted for. Nor that information in a form that can be used by the mind inference machinery (with necessary omissions) is prepared and made available to it.

122. Baumeister and Masicampo discuss a possible social purpose of consciousness (17) (see also (18)) differing somewhat from that proposed in this book. They argue that consciousness 'enables communication across different parts of the mind and brain' – a common part of several theories that I discuss in the following endnotes. However, they also note the close connection between conscious thought and speech, and recognise that social needs probably drove the evolution of conscious thought.

    Nicholas Humphrey also developed a theory (89) which connected consciousness to a social purpose. In this, our own experience allows us to understand our own behaviour. Because it allows us to understand ourselves, we are better able to understand other people: 'the explanation we have of our own behaviour could then form the basis for explaining other people's, too'. (So by feeling pain and knowing how we respond to it, we can understand what other people will do in such a situation.) Humphrey himself seems to have moved on from this idea, which he developed long before most of the experiments in this book were conducted (see (90)).

123. In this work, we have not considered all the many theories of consciousness that exist. There are books (e.g. (160)) that compile various theories of what consciousness does for us, some of them decidedly odd.

124. Bernard Baars (9) argues that 'consciousness might help to mobilize and integrate brain functions that are otherwise separate and independent'. The conscious access theory has gained some support.

    Certain evidence claimed in support of this theory is also consistent with the current theory. Consciousness does integrate information from many processes, as I argue in the main text.

That it needs to do so in order to serve its role doesn't show that this is its role.

Other evidence compares results from similar tasks done without awareness and with awareness. In some cases, the differences might be due to the strength of the input. When the input is small (e.g. a word presented for a few milliseconds) the brain responds in one, simple way. When the input is larger (e.g. a word presented for longer), the brain reacts in a more effortful way, processing it in other parts of the brain unrelated to consciousness but also sending a signal to the self-model to work out what the social implications of the word are. It could be that consciousness and certain other brain processes are costly and the brain only makes use of them when it is worthwhile. That consciousness is set in motion on a problem at the same time as other processes doesn't show that consciousness is needed to set the other processes in motion or to integrate the results of these processes.

Dissociation experiments are also used in support of other possible roles for consciousness. I think the results of these are suggestive rather than conclusive. In this experimental paradigm (e.g. (48)), subjects' consciousness is given either a heavy distracting load by e.g. counting backwards from 917 in sixes (19), or a lesser load such as counting forward in single digits. If the subject is more or less able to perform some task under the heavy load, then a role for consciousness (positive or negative) is inferred. However, consciousness definitely relies on many other processes feeding into it. It may be that one of these other processes is also being distracted in the heavy load condition and that it is this which interferes with the tested task. The paradigm of the dissociation tasks places great weight on the assumption that all unconscious systems are parallel with infinite capacity and also homogenous (unconscious loads which may have been more or less relevant to the task did not affect the task (48)).

An experiment that suggests that the assumptions made in the

dissociation paradigm may not be appropriate used distractors to moderate the McGurk effect. The McGurk effect (115) is a preconscious effect in which visual cues and auditory cues are combined to form a conscious percept. Alsius et al. (5) asked participants to attend to a series of beeps while watching a video of a woman mouthing one syllable when another syllable had been dubbed over the audio recording. If the dissociation paradigm is correct, we might expect that the conscious load of counting beeps would not interfere with the unconscious processes underlying the effect. Alternatively, we might expect the beeps to degrade the auditory signal and increase the visual effect (a control experiment showed that playing white noise over the auditory recording did just this). But in fact the conscious auditory distractor reduced the McGurk effect and led to dramatically more conscious reports of the auditory syllable.

We also believe that some processes may be consciously accessible not because consciousness is needed to perform them but because we need to be able to communicate reliably about these processes. So with the type of instinctive reasoning in Maier's experiment (112), the answer is all that really matters. Our inferred (incorrect) reasoning process should correspond with other people's, but does not have to be accurate. In logical problem-solving, we may need to be able to communicate the steps in order to convince other people of the correctness of our conclusions. Things that may need to be communicated must necessarily interact with our social model.

Nevertheless, we would be surprised if conscious thought did not do more than provide us with a socially useful model of ourselves, however impressive and useful that role is. The tools that go into creating a social model of ourselves are tremendously powerful, and presumably costly. It might be that the same processes that infer our mind, combining many sources of information, are useful for logical reasoning, say, and have been adapted to do so. Our conscious awareness of the steps would then be an artefact of the origin of the process that we use for logical reasoning.

125. Supramodular interaction theory (SIT) (120, 122, 121) is a particular theory which claims that consciousness is needed to integrate certain types of information and form a final decision. By considering this particular theory, which carefully considers and avoids some of the more obvious weaknesses in a general conscious access theory, in some more depth, we'll highlight our general objections to this class of theory.

The theory posits that there are a number of response systems, each consisting of a number of modules, and each with a single concern. These supramodular systems concerns have direct skeletal muscle tendencies. For example, a tissue-damage system can directly, and without conscious mediation, cause us to pull our hand away from a hot object. However, different systems can have conflicting demands on skeletomotor action. The authors of SIT argue that phenomenal states are needed for producing integrated action, which they define as follows (121): 'Integrated action occurs when two (or more) action plans that could normally influence behaviour on their own (when existing at the level of activation) are simultaneously co-activated and trying to influence the same skeletal muscle effector.'

I will outline four reasons for preferring the present theory over supramodular interaction theory. The fourth is a direct difference in apparent empirical predictions between the two theories, which I believe has been tested experimentally.

Firstly, if phenomenal states are needed for integrated action then it is a feature that we likely share with much of the animal kingdom. Salamanders, for example, have to weigh their desire for food against their risk of being eaten while they search for it. Whitham and Mathis (169) show that hungrier salamanders forage more frequently, but do so less when the experimenters add hormones of a natural predator to the water. The conflict salamanders face and resolve is of the type described in supramodular integration theory. Similarly, every time a predator decides whether to conserve energy or to continue hunting, or a male decides whether to fight for a mate or to avoid tissue

damage, they are settling conflicts of the type described in SIT. It is possible that salamanders use a different mechanism to deal with conflicting action plans. However, it is not clear why humans should have replaced an old and effective system, which successfully navigates the same types of conflict in other animals. The suggestion implicit in SIT that salamanders and other simple animals are phenomenally aware is not in itself a reason to reject the theory, but it is an implication which is easily overlooked.

Secondly, SIT does not explain (and does not attempt to explain, being a correlational analysis) why we should be phenomenally aware of the process that integrates the output of the supramodules. Within the proposed supramodules there are many conflicts which are resolved unconsciously. Morsella (120) lists examples of these including the McGurk effect (115), binocular rivalry and depth perception. These effects are not obviously less complex than the conflicts that SIT deals with. The consistent difference is that they cannot directly cause skeletal muscle action. Yet it is not clear within SIT why this particular sort of conflict, and no other type of conflict, gives rise to consciousness. Unlike the theory described in this paper, SIT is unable to explain the phenomenal aspect of phenomenal states. (Within the social theory of consciousness presented in this book, the connection between consciousness and skeletal muscle actions is clear: it is skeletal muscle actions which typically have social consequences.)

Thirdly, SIT does not explain why we are so often unaware of why we make decisions. If consciousness is an aware decision maker how can it not be aware of which decisions it makes and how it makes them? Why should it be tricked into thinking that it chose the left stocking because of the quality of the knit? Why does it invent reasons for why we picked one jam over another? These are not readily explainable by SIT and would be fundamental flaws in a system that is designed to choose one course of action over another by integrating conflicting information.

Finally, we examine a difference in the predictions that the explanation in this paper and SIT make. The theory presented in this book claims that the social model of ourselves, which produces consciousness, is one of several inputs that go into a decision. SIT, on the other hand, claims that 'one is aware of (. . .) the computational processes underlying the interaction of system outputs' (120). In SIT, phenomenal states are the final point at which the decision is made between possible competing actions, and we are aware of what goes into making this decision.

In our theory, it is possible that the advice formed in consciousness is overridden, and we will be unaware of the reason that it is overridden (though we will then infer why we made this decision, and we will be aware of the inferred, possibly incorrect, reasoning). In SIT, this is not possible. It should not be possible in SIT to 'prime one system to counter the tendencies of another system' (120).

A handgrip experiment (131) (also discussed in the body of the book) appears to provide an initial test of this scenario directly. In a series of trials, subjects squeezed a handgrip on cue. Each trial was worth a penny or a pound. A thermometer showed how much force participants were exerting, and the greater the force, the greater the proportion of the purse the participants were able to keep. After each trial, subjects saw their accumulated total.

This seems to be a conflict of the type that SIT envisages. The competing responses are to squeeze hard (to attain the maximum reward for the trial) and to avoid fatigue (directly relevant given the sequence of trials). When participants were supraliminally presented with the reward before each trial, they squeezed the handgrip harder on the pound trials, demonstrating the existence of the conflict.

However, participants also squeezed harder on trials with subliminal presentation of the monetary award. This result appears to be in conflict with the predictions of SIT.

One could, in principle, argue that the money primes influenced

the supramodule that initiates action. The impulse to squeeze on penny trials was perhaps less powerful and therefore more easily overwhelmed by the impulse to avoid fatigue. However, if all the information necessary to manage the conflict is contained in the signals from the supramodules then it is not clear what role the supramodular integration system (phenomenal state) plays beyond the comparison of the strength of two signals.

I argue that it is easier to explain the correlational analysis of Morsella and Bargh in terms of our theory that consciousness arises from our social model. In our theory, conflicts play an especially interesting role. It is possible that the advice from our social model can conflict with other drivers of our action. For example, we may hold our hand in cold water to win a prize or please an experimenter, but we will ultimately pull our hand out of the water to avoid tissue damage. Similarly, our social model may advise us to stop smoking or avoid having another slice of cake, but other signals in the brain may lead us to fail. This type of conflict has been heavily studied (123), and we note that managing the conflicts is energy intensive (71), and that the outcome can be influenced by unconscious primes (150).

To create the social model, we must integrate a large quantity of information from our different senses and the output of other processing systems. But we argue that integration of this information is necessary to produce consciousness rather than vice-versa. The type of information that is integrated is a function of the social model's purpose rather than being of a special type that only consciousness can deal with.

126. My claim, as set out earlier, is that a narrower set of things enter consciousness. We don't have conscious access to all the information necessary to infer the states. Instead, it is generally the inferred states (e.g. that we like somebody) themselves that we are conscious of rather than what goes into creating these inferences (e.g. that they are mimicking us). Some of the things we have conscious access to – such as vision – might seem to fall outside this. However, vision is a state we do attribute to others.

We might say John got up and left because he saw Julie enter. So to understand what others are inferring about us we do need to know what we see as a state of the model not just as an input to the inference.

127. There are a number of ways that we can try to understand behaviour and consciousness experimentally. Some of these offer fairly direct evidence, others are more suggestive than conclusive. To see why this is so, let's consider four classes of experiment.
    1. If we manipulate a group of subjects and their behaviour changes versus that of controls, we can be fairly sure that the manipulation caused the change in behaviour. For example, if we hit fifty subjects on the nose and they all step back, but we treat fifty other subjects identically but don't hit them on the nose and they don't step back we can be fairly sure that hitting people on the nose causes people to step back, at least in the situation we're studying (you might get a different answer in a boxing ring).
    2. If we manipulate a group of subjects and their conscious reports change versus controls then we can be fairly sure that the manipulation causes a change in their conscious reports. (Note that conscious reports are a form of behaviour; we have assumed throughout this book that conscious reports correspond to an underlying consciousness that it is sensible to talk about. Conscious reports are a measurable signal. The existence of consciousness is an inference. Science relies on measuring signals. When a physicist talks about an electron he's inferring its presence because it is the best way she has to explain the signals she measures.) So if the fifty subjects we bop on the nose report liking us less than the fifty we don't, we can be fairly sure that hitting someone on the nose leads them to report liking you less. If we're happy to assume that conscious reports reflect an underlying consciousness then we can also infer that hitting someone on the nose leads to a conscious dislike of the person hitting them on the nose (again with the same limitations to the situation).

3. If we manipulate a group of subjects and their conscious reports do NOT change, but their behaviour does, we can be fairly sure that the manipulation changes their behaviour through unconscious processes. Because our manipulation changes behaviour, we are in case (1). But because there is no change in conscious reports, and if we are happy with our assumption that conscious reports reflect an underlying consciousness, we can rule out any hypothesis that a change in the contents of consciousness led to the behaviour. Note that we can use this method to investigate changes in conscious reports too. For example, the mimicking experiments led to changes in conscious reports. If you mimic a group of people they will report liking you better than the group you don't mimic. However, because they report being unaware that you were mimicking them, we can rule out certain mechanisms which led to the change in liking.
4. If we manipulate a group of subjects and their conscious reports do change and so also does their behaviour, we CANNOT infer that the change in consciousness led to their change in behaviour. So if we hit our fifty subjects on the nose and they all step back and report liking us less we cannot be sure that hitting them on the nose led them to dislike us and this dislike led them to step back from us, however tempting it is. (Indeed the slowness of consciousness and the quickness of stepping back may allow us to rule it out in this case.) It is possible that the manipulation changes both behaviour and conscious report independently.

For example, some studies try and show a use for consciousness by presenting a stimulus subliminally to one group of participants and supraliminally to another group. The behaviour of the second group is different to that of the first group and so are the conscious reports (they are able to report seeing the stimuli). The claim is that this demonstrates a causal role for consciousness in changing behaviour. However, this claim is not justified. It may be that the extended presentation of the stimuli

to the second group changes their behaviour (other than the conscious report) through unconscious mechanisms, and also, separately, leads to a change in the contents of consciousness.

Another attempt to separate the effect of conscious and unconscious processes leads to strongly suggestive, but not conclusive, evidence that we use consciousness for logical reasoning. In one experimental paradigm (48), subjects are given either a heavy distracting load by e.g. counting backwards from 917 in sixes (19), or a lesser load such as counting forward in single digits. If the subject is more or less able to perform some task under the heavy load, then a role for consciousness (positive or negative) is inferred. Logical reasoning is one of the things we are less able to do under a heavy load. However, consciousness relies on many other processes feeding into it. It may be that one of these other processes is also being distracted in the heavy load condition and that it is this which interferes with the tested task. The experimental paradigm places great weight on the assumption that all unconscious systems are parallel with infinite capacity and also homogenous (unconscious loads which may have been more or less relevant to the task did not affect the task (48)).

128. See (6) for examples and a discussion of neural re-use generally.
129. e.g. (33)
130. (151). It is notable that the areas in which people with high self-control excel are in social achievements. We also note that there are individual differences in the levels of people's self-control. Measurements made in childhood are predictive of self-control in adulthood (143).
131. (124)
132. (161)
133. For a review see (21). Other effects include: (i) making choices uses the same mental muscles as self-control. Volunteers who choose between alternative shampoos, T-shirts and socks are less able to hold their hands in cold water for long periods of time (161). (ii) Occasionally, an exercise that exhausts our mental muscles can improve our score on a subsequent test. Participants

who depleted themselves on one task claimed to have done better than others on a second task, which they marked themselves and for which they were paid (116). Avoiding the temptation to cheat also seems to require willpower.

134. (70)

135. (127)

136. Other self-control exercises, reviewed in (16), also develop our willpower. Improving your posture whenever you realise you're slouching or closely monitoring your finances will improve your self-control generally as well as giving you a straight back and a better bank balance.

But some exercises have very little impact. Improving your mood when you feel down takes self-control, but regularly doing so won't increase your willpower. In fact, the research group that discovered most of what we know about willpower estimate that only about half of their attempted interventions are successful.

This shouldn't surprise us. Not all physical exercise routines are equally effective either. A swimmer can improve his times with a well-designed gym routine; but a swimming regime won't greatly help you to lift weights. Holding a book above my head until my arms drop may test my stamina, but it's not necessarily the most efficient way to improve it.

137. (168)

138. (71)

139. (42). Another study (93) manipulated beliefs that willpower was a limited resource generally, and found similar results: those who believed that they would have sufficient resources used them. These studies show that our beliefs about our abilities influence our motivation to continue exerting willpower and the point at which we will give up and work out how to justify our failure. Some recent discussion of this is in (91). An alternative explanation, that these studies show that the belief that willpower is limited cause it to be limited, and there is no underlying resource being used up, is not consistent with experiments showing that sugary drinks (and not artificially sweetened placebos) restore it, e.g. (71,

72). However, on this we note that there is recent evidence that swilling a sugary juice around the mouth can improve self-control (and athletic effort) (118). This suggests that it may not be merely glucose levels in the blood that mediates self-control. It may be that the brain is prepared to use up more of its limited energy resources when it is assured that further supplies are on the way.

140. (150)
141. (25)
142. Other animals certainly modify their behaviour to change the behaviour of other animals. However, it is not yet clear whether any of them have the social models that we rely on, and therefore consciousness.

    You might argue that you shave because you yourself prefer the way you look without so much hair. However, inasmuch as this is a conscious preference, it is really a preference aimed at changing the way other people perceive you.
143. There is a certain circularity in this argument. When I say achieve more, I am implicitly talking about doing the things that improve our lot in the eyes of the world, i.e. socially. If the model that produces consciousness is aimed at doing this, then following its advice more often should have the desired effect. The trade-off that might have existed more often in the past between building social capital and eating or taking fewer risks with our life are probably rarer today.
144. Many of the following examples in this section are described in greater detail in (69). The article describes many further links between glucose levels, and our metabolism of glucose, and self-control.
145. (161)
146. Reference in (69).
147. (147)
148. Reference in (69).
149. (173)
150. There are some truly great writers who realise that our

explanation of why we are doing what we are doing comes after we have done it.

I cannot fix on the hour, or the spot, or the look, or the words, which laid the foundation. It is too long ago. I was in the middle before I knew that I had begun.

Mr Darcy, when Elizabeth asked him to explain why he had fallen in love with her.
Pride and Prejudice, Jane Austen

In 'I love the way you lie', Eminem raps, 'I can't tell you what it really is, I can only tell you what it feels like,' which may be a deep reflection on the separation between the unconscious that controls us and what we are consciously aware of and able to report. In his song he later discusses the separation between his (conscious) intentions and expectations and what really happens.

REFERENCES

(1) H. AARTS, R. CUSTERS, AND H. MARIEN. Preparing and motivating behavior outside of awareness. *Science*, **319**(5870): 1639–1639, 2008.

(2) J. M. ACKERMAN, C. C. NOCERA, AND J. A. BARGH. Incidental haptic sensations influence social judgments and decisions. *Science*, **328**:1712–1714, 2010.

(3) S. AGLIOTI, J. F. X. DESOUZA, AND M. A. GOODALE. Size-contrast illusions deceive the eye but not the hand. *Current Biology*, **5**(6):679–685, 1995.

(4) M. D. ALICKE. Culpable causation. *Journal of Personality and Social Psychology*, **63**(3):368–378, 1992.

(5) A. ALSIUS, J. NAVARRA, R. CAMPBELL, AND S. SOTO-FARACO. Audiovisual integration of speech falters under high attention demands. *Current Biology*, **15**(9):839–843, 2005.

(6) M. L. ANDERSON. Neural reuse: A fundamental organizational principle of the brain. *Behavioral and Brain Sciences*, **33**(4):245–313, 2010.

(7) J. ANTONAKIS AND O. DALGAS. Predicting elections: Child's play. *Science*, **323**:1183, 2009.

(8) S. E. ASCH. Opinions and social pressure. *Scientific American*, **193**(5):31–35, 1955.

(9) B. J. BAARS. The conscious access hypothesis: Origins and recent evidence. *Trends in Cognitive Sciences*, **6**(1):47–52, 2002.

(10) G. J. BADGER, W. K. BICKEL, L. A. GIORDANO, E. A. JACOBS, G. LOEWENSTEIN, AND L. MARSCH. Altered states: The impact of immediate craving on the valuation of current and future opioids. *Journal of Health Economics*, **26**(5):865–876, 2007.

(11) J. N. BAILENSON AND N. YEE. Digital chameleons. *Psychological Science*, **16**:814–819, 2005.

(12) J. A. BARGH, M. CHEN, AND L. BURROWS. Automaticity of social behavior: Direct effects of trait construct and stereotype activation on action. *Journal of Personality and Social Psychology*, **71**(2):230–244, 1996.

(13) S. BARON-COHEN. *Mindblindness: An essay on autism and theory of mind*. MIT Press, 1997.

(14) S. BARON-COHEN, A. M. LESLIE, AND U. FRITH. Does the autistic child have a 'theory of mind'? *Cognition*, **21**(1):37–46, 1985.

(15) J. L. BARRETT AND A. H. JOHNSON. The role of control in attributing intentional agency to inanimate objects. *Journal of Cognition and Culture*, **3**(3):208–217, 2003.

(16) R. F. BAUMEISTER, M. GAILLIOT, C. N. DEWALL, AND M. OATEN. Self-regulation and personality: How interventions increase regulatory success, and how depletion moderates the effects of traits on behavior. *Journal of Personality*, **74**:1773–1801, 2006.

(17) R. F. BAUMEISTER AND E. J. MASICAMPO. Conscious thought is for facilitating social and cultural interactions: How mental simulations serve the animal-culture interface. *Psychological Review*, **117**(3):945–971, 2010.

(18) R. F. BAUMEISTER, E. J. MASICAMPO, AND K. D. VOHS. Do conscious thoughts cause behavior? *Annual Review of Psychology*, **62**:331–361, 2011.

(19) R. F. BAUMEISTER, B. J. SCHMEICHEL, C. N. DEWALL, AND K. D. VOHS. Is the conscious self a help, a hindrance, or an irrelevance to the creative process? *Advances in Psychology Research*, **53**:137–152, 2006.

(20) R. F. BAUMEISTER, J. M. TWENGE, AND C. K. NUSS. Effects of social exclusion on cognitive processes: Anticipated aloneness reduces intelligent thought. *Journal of Personality and Social Psychology*, **83**:817–827, 2002.

(21) R. F. BAUMEISTER, K. D. VOHS, AND D. M. TICE. The strength model of self-control. *Current Directions in Psychological Science*, **16**:351–355, 2007.

(22) D. J. BEM. Self-perception: An alternative interpretation of cognitive dissonance phenomena. *Psychological Review*, **74**(3):183–200, 1967.
(23) R. J. R. BLAIR. Responsiveness to distress cues in the child with psychopathic tendencies. *Personality and Individual Differences*, **27**(1):135–145, 1999.
(24) R. J. R. BLAIR. The amygdala and ventromedial prefrontal cortex in morality and psychopathy. *Trends in Cognitive Sciences*, **11**(9):387–392, 2007.
(25) L. B. BRÄCKER, K. P. SIJU, N. VARELA, Y. ASO, M. ZHANG, I. HEIN, M. L. VASCONCELOS, AND I. C. GRUNWALD KADOW. Essential role of the mushroom body in context-dependent *CO2* avoidance in *Drosophila*. *Current Biology*, **23**(13):1228–1234, 2013.
(26) J. P. BRASIL-NETO, A. PASCUAL-LEONE, J. VALLS-SOLÉ, L. G. COHEN, AND M. HALLETT. Focal transcranial magnetic stimulation and response bias in a forced-choice task. *Journal of Neurology, Neurosurgery & Psychiatry*, **55**(10):964–966, 1992.
(27) K. A. BRAUN, R. ELLIS, AND E. F. LOFTUS. Make my memory: How advertising can change our memories of the past. *Psychology & Marketing*, **19**(1):1–23, 2002.
(28) C. A. BROWN, B. SEYMOUR, Y. BOYLE, W. EL-DEREDY, AND A. K. P. JONES. Modulation of pain ratings by expectation and uncertainty: Behavioral characteristics and anticipatory neural correlates. *Pain*, **135**(3):240–250, 2008.
(29) J. M. BURGER. The foot-in-the-door compliance procedure: A multiple-process analysis and review. *Personality and Social Psychology Review*, **3**(4):303–325, 1999.
(30) J. T. CACIOPPO, L. C. HAWKLEY, AND G. G. BERNSTON. The anatomy of loneliness. *Current Directions in Psychological Science*, **12**:71–74, 2003.
(31) P. CARRUTHERS. How we know our own minds: The relationship between mindreading and metacognition. *Behavioral and Brain Sciences*, **32**(2):121–182, 2009.
(32) H. A. CHAPMAN, D. A. KIM, J. M. SUSSKIND, AND A. K.

ANDERSON. In bad taste: Evidence for the oral origins of moral disgust. *Science*, **323**:1222–1226, 2009.

(33) T. L. CHARTRAND AND J. A. BARGH. The chameleon effect: The perception-behavior link and social interaction. *Journal of Personality and Social Psychology*, **76**:893–910, 1999.

(34) T. L. CHARTRAND, J. HUBER, B. SHIV, AND R. J. TANNER. Non-conscious goals and consumer choice. *Journal of Consumer Research*, **35**(2):189–201, 2008.

(35) T. L. CHARTRAND, S. PINCKERT, AND J. M. BURGER. When manipulation backfires: The effects of time delay and requester on the foot-in-the-door technique. *Journal of Applied Social Psychology*, **29**(1):211–221, 1999.

(36) M. CHEN AND J. A. BARGH. Nonconscious behavioral confirmation processes: The self-fulfilling consequences of automatic stereotype activation. *Journal of Experimental Social Psychology*, **33**(5):541–560, 1997.

(37) J. J. CHRISTENSEN-SZALANSKI. Discount functions and the measurement of patients' values: Women's decisions during childbirth. *Medical Decision Making*, **4**(1):47–58, 1984.

(38) R. B. CIALDINI. Crafting normative messages to protect the environment. *Current Directions in Psychological Science*, **12**(4):105–109, 2003.

(39) R. B. CIALDINI, L. J. DEMAINE, B. J. SAGARIN, D. W. BARRETT, K. RHOADS, AND P. L. WINTER. Managing social norms for persuasive impact. *Social Influence*, **1**(1):3–15, 2006.

(40) R. B. CIALDINI AND N. J. GOLDSTEIN. Social influence: Compliance and conformity. *Annual Review of Psychology*, **55**:591–621, 2004.

(41) S. A. CLANCY, R. J. MCNALLY, D. L. SCHACTER, M. F. LENZENWEGER, AND R. K. PITMAN. Memory distortion in people reporting abduction by aliens. *Journal of Abnormal Psychology*, **111**(3):455–461, 2002.

(42) J. J. CLARKSON, E. R. HIRT, L. JIA, AND M. B. ALEXANDER. When perception is more than reality: The effects of perceived versus actual resource depletion on self-regulatory behavior.

Journal of Personality and Social Psychology, **98**(1):29–46, 2010.

(43) M. K. COLVIN AND M. S. GAZZANIGA. Split-brain cases. In M. S. VELMANS AND S. SCHNEIDER, editors, *The Blackwell Companion to Consciousness*, pages 181–193. Blackwell Publishing, 2006.

(44) J. CORRELL, B. PARK, C. M. JUDD, AND B. WITTENBRINK. The police officer's dilemma: Using ethnicity to disambiguate potentially threatening individuals. *Journal of Personality and Social Psychology*, **83**(6):1314, 2002.

(45) R. CUSTERS AND H. AARTS. The unconscious will: How the pursuit of goals operates outside of conscious awareness. *Science*, **329**(5987):47–50, 2010.

(46) J. M. DARLEY AND P. H. GROSS. A hypothesis-confirming bias in labeling effects. *Journal of Personality and Social Psychology*, **44**(1):20–33, 1983.

(47) J. M. R. DELGADO. *Physical Control of the Mind: Toward a Psychocivilized Society*. Harper and Row, 1969.

(48) C. N. DEWALL, R. F. BAUMEISTER, AND E. J. MASICAMPO. Evidence that logical reasoning depends on conscious processing. *Consciousness and Cognition*, **17**(3):628–645, 2008.

(49) A. DIJKSTERHUIS. Automaticity and the unconscious. In S. T. FISKE, D. T. GILBERT, AND G. LINDZEY, editors, *Handbook of Social Psychology*, pages 228–267, 2010.

(50) A. DIJKSTERHUIS, M. W. BOS, L. F. NORDGREN, AND R. B. VAN BAAREN. On making the right choice: The deliberation-without-attention effect. *Science*, **311**(5763):1005–1007, 2006.

(51) J. DOYON AND H. BENALI. Reorganization and plasticity in the adult brain during learning of motor skills. *Current Opinion in Neurobiology*, **15**(2):161–167, 2005.

(52) R. I. M. DUNBAR. The social brain hypothesis. *Evolutionary Anthropology*, **6**:178–190, 1998.

(53) R. I. M. DUNBAR AND S. SHULTZ. Evolution in the social brain. *Science*, **317**(5843):1344–1347, 2007.

(54) D. G. DUTTON AND A. P. ARON. Some evidence for heightened

sexual attraction under conditions of high anxiety. *Journal of Personality and Social Psychology*, **30**:510–517, 1974.

(55) A. J. ELLIOT, D. NIESTA KAYER, T. GREITEMEYER, S. LICHTENFELD, R. H. GRAMZOW, M. A. MAIER, AND H. LIU. Red, rank, and romance in women viewing men. *Journal of Experimental Psychology: General*, **139**:399–417, 2010.

(56) A. J. ELLIOT AND D. NIESTA. Romantic red: Red enhances men's attraction to women. *Journal of Personality and Social Psychology*, **95**:1150–1164, 2008.

(57) N. EPLEY, A. WAYTZ, AND J. T. CACIOPPO. On seeing human: A three-factor theory of anthropomorphism. *Psychological Review*, **114**(4):864–886, 2007.

(58) M. H. ERDELYI. A new look at the new look: Perceptual defense and vigilance. *Psychological Review*, **81**(1):1–25, 1974.

(59) X. FANG, S. SINGH, AND R. AHLUWALIA. An examination of different explanations for the mere exposure effect. *Journal of Consumer Research*, **34**(1):97–103, 2007.

(60) R. H. FAZIO, J. R. JACKSON, B. C. DUNTON, AND C. J. WILLIAMS. Variability in automatic activation as an unobtrusive measure of racial attitudes: A bona fide pipeline? *Journal of Personality and Social Psychology*, **69**(6):1013–1027, 1995.

(61) R. FERRARO, J. R. BETTMAN, AND T. L. CHARTRAND. The power of strangers: The effect of incidental consumer brand encounters on brand choice. *Journal of Consumer Research*, **35**(5):729–741, 2009.

(62) L. FESTINGER. *A Theory of Cognitive Dissonance*, **2**. Stanford University Press, 1962.

(63) L. FESTINGER AND J. M. CARLSMITH. Cognitive consequences of forced compliance. *The Journal of Abnormal and Social Psychology*, **58**(2):203–210, 1959.

(64) L. FESTINGER, H. W. RIECKEN, AND S. SCHACHTER. *When Prophecy Fails*. University of Minnesota Press, 1956.

(65) A. FLOYER-LEA AND P. M. MATTHEWS. Changing brain networks for visuomotor control with increased movement automaticity. *Journal of Neurophysiology*, **92**(4):2405–2412, 2004.

(66) P. FOURNERET AND M. JEANNEROD. Limited conscious monitoring of motor performance in normal subjects. *Neuropsychologia*, **36**(11):1133–1140, 1998.

(67) J. L. FREEDMAN AND S. C. FRASER. Compliance without pressure: The foot-in-the-door technique. *Journal of Personality and Social Psychology*, **4**(2):195, 1966.

(68) U. FRITH AND F. HAPPÉ. Theory of mind and self-consciousness: What is it like to be autistic? *Mind and Language*, **14**(1):82–89, 1999.

(69) M. T. GAILLIOT AND R. F. BAUMEISTER. The physiology of willpower. *Personality and Social Psychology Review*, **11**(4):303–327, 2007.

(70) M. T. GAILLIOT AND R. F. BAUMEISTER. Self-regulation and sexual restraint: Dispositionally and temporarily poor self-regulatory abilities contribute to failures at restraining sexual behavior. *Personality and Social Psychology Bulletin*, **33**(2):173–186, 2007.

(71) M. T. GAILLIOT, R. F. BAUMEISTER, C. N. DEWALL, J. K. MANER, E. A. PLANT, D. M. TICE, L. E. BREWER, AND B. J. SCHMEICHEL. Self-control relies on glucose as a limited energy source: Willpower is more than a metaphor. *Journal of Personality and Social Psychology*, **92**:325–336, 2007.

(72) M. T. GAILLIOT, B. M. PERUCHE, E. A. PLANT, AND R. F. BAUMEISTER. Stereotypes and prejudice in the blood: Sucrose drinks reduce prejudice and stereotyping. *Journal of Experimental Social Psychology*, **45**(1):288–290, 2009.

(73) M. S. GAZZANIGA. Cerebral specialization and interhemispheric communication: Does the corpus callosum enable the human condition? *Brain*, **123**(7):1293–1326, 2000.

(74) N. J. GOLDSTEIN, R. B. CIALDINI, AND V. GRISKEVICIUS. A room with a viewpoint: Using social norms to motivate environmental conservation in hotels. *Journal of Consumer Research*, **35**(3):472–482, 2008.

(75) J. D. GREENE, L. E. NYSTROM, A. D. ENGELL, J. M. DARLEY, AND J. D. COHEN. The neural bases of cognitive conflict and control in moral judgment. *Neuron*, **44**(2):389–400, 2004.

(76) J. D. GREENE, R. B. SOMMERVILLE, L. E. NYSTROM, J. M. DARLEY, AND J. D. COHEN. An fMRI investigation of emotional engagement in moral judgment. *Science*, **293**:2105–2108, 2001.

(77) A. G. GREENWALD, D. E. MCGHEE, AND J. L. K. SCHWARTZ. Measuring individual differences in implicit cognition: The implicit association test. *Journal of Personality and Social Psychology*, **74**(6):1464–1480, 1998.

(78) D. M. GROMET AND E. PRONIN. What were you worried about? Actors' concerns about revealing fears and insecurities relative to observers' reactions. *Self and Identity*, **8**(4):342–364, 2009.

(79) N. GUÉGUEN. Mimicry and seduction: An evaluation in a courtship context. *Social Influence*, **4**:249–255, 2009.

(80) C. L. HAFER AND L. BÉGUE. Experimental research on just-world theory: Problems, developments, and future challenges. *Psychological Bulletin*, **131**:128–167, 2005.

(81) A. M. HAFFENDEN, K. C. SCHIFF, AND M. A. GOODALE. The dissociation between perception and action in the Ebbinghaus illusion: Nonillusory effects of pictorial cues on grasp. *Current Biology*, **11**(3):177–181, 2001.

(82) J. HAIDT AND S. KESEBIR. Morality. In S. T. FISKE, D. T. GILBERT, AND G. LINDZEY, editors, *Handbook of Social Psychology*, pages 797–832. 2010.

(83) W. T. HARBAUGH, U. MAYR, AND D. R. BURGHART. Neural responses to taxation and voluntary giving reveal motives for charitable donations. *Science*, **316**:1622–1625, 2007.

(84) R. D. HARE, S. D. HART, AND T. J. HARPUR. Psychopathy and the DSM-IV criteria for antisocial personality disorder. *Journal of Abnormal Psychology*, **100**(3):391–398, 1991.

(85) A. A. HARRISON. Mere exposure. *Advances in Experimental Social Psychology*, **10**:39–83, 1977.

(86) L. C. HAWKLEY AND J. T. CACIOPPO. Loneliness and pathways to disease. *Brain, Behavior, and Immunity*, **17**:S98–S105, 2002.

(87) M. HÖFLE, M. HAUCK, A. K. ENGEL, AND D. SENKOWSKI. Viewing a needle pricking a hand that you perceive as yours enhances unpleasantness of pain. *Pain*, **153**(5):1074–1081, 2012.

(88) D. HUME. *Enquiries concerning Human Understanding and concerning the Principles of Morals*. Oxford University Press, 1777.
(89) N. HUMPHREY. *The Inner Eye*. Faber, 1986.
(90) N. HUMPHREY. *Soul Dust*. Princeton University Press, 2011.
(91) M. INZLICHT AND B. J. SCHMEICHEL. What is ego depletion? Toward a mechanistic revision of the resource model of self-control. *Perspectives on Psychological Science*, 7(5):450–463, 2012.
(92) M. JEANNEROD. Consciousness of action as an embodied consciousness. In S. POCKETT, W. P. BANKS, AND S. GALLAGHER, editors, *Does Consciousness Cause Behavior*, pages 25–38. MIT Press, 2006.
(93) V. JOB, C. S. DWECK, AND G. M. WALTON. Ego depletion – is it all in your head? Implicit theories about willpower affect self-regulation. *Psychological Science*, **21**(11):1686–1693, 2010.
(94) P. JOHANSSON, L. HALL, S. SIKSTROM, AND A. OLSSON. Failure to detect mismatches between intention and outcome in a simple decision task. *Science*, **310**:116–119, 2005.
(95) R. KAUFMAN. *Inside Scientology*. The Olympia Press, 1972.
(96) J. KNOBE. Intentional action and side effects in ordinary language. *Analysis*, **63**(279):190–194, 2003.
(97) M. KOENIGS, L. YOUNG, R. ADOLPHS, D. TRANEL, F. CUSHMAN, M. HAUSER, AND A. DAMASIO. Damage to the prefrontal cortex increases utilitarian moral judgements. *Nature*, **446**(7138):908–911, 2007.
(98) T. KOGUT AND I. RITOV. The 'identified victim' effect: An identified group, or just a single individual? *Journal of Behavioral Decision Making*, **18**(3):157–167, 2005.
(99) M. KOSFELD, M. HEINRICHS, P. J. ZAK, U. FISCHBACHER, AND E. FEHR. Oxytocin increases trust in humans. *Nature*, **435**(7042):673–676, 2005.
(100) A. W. KRUGLANSKI, S. ALON, AND T. LEWIS. Retrospective misattribution and task enjoyment. *Journal of Experimental Social Psychology*, **8**(6):493–501, 1972.
(101) W. R. KUNST-WILSON AND R. B. ZAJONC. Affective

discrimination of stimuli that cannot be recognized. *Science*, **207**:557–558, 1980.

(102) J. L. LAKIN, V. E. JEFFERIS, C. M. CHENG, AND T. L. CHARTRAND. The chameleon effect as social glue: Evidence for the evolutionary significance of nonconscious mimicry. *Journal of Non-Verbal Behavior*, **27**(3):145–162, 2003.

(103) G. LAKOFF AND M. JOHNSON. *Metaphors We Live By*. University of Chicago Press, 1981.

(104) M. J. LERNER. Observer's evaluation of a victim: Justice, guilt, and veridical perception. *Journal of Personality and Social Psychology*, **20**:127–135, 1971.

(105) M. J. LERNER AND C. H. SIMMONS. Observer's reaction to the 'innocent victim': Compassion or rejection? *Journal of Personality and Social Psychology*, **4**(2):203–210, 1966.

(106) P. LEWICKI, T. HILL, AND E. BIZOT. Acquisition of procedural knowledge about a pattern of stimuli that cannot be articulated. *Cognitive Psychology*, **20**(1):24–37, 1988.

(107) B. LIBET. Unconscious cerebral initiative and the role of conscious will in voluntary action. **8**:529–566, 1985.

(108) E. F. LOFTUS AND J. C. PALMER. Reconstruction of automobile destruction: An example of the interaction between language and memory. *Journal of Verbal Learning and Verbal Behavior*, **13**(5):585–589, 1974.

(109) E. F. LOFTUS AND J. E. PICKRELL. The formation of false memories. *Psychiatric Annals*, **25**(12):720–725, 1995.

(110) G. D. LOGAN AND M. J. C. CRUMP. Cognitive illusions of authorship reveal hierarchical error detection in skilled typists. *Science*, **330**(6004):683–686, 2010.

(111) C. G. LORD, L. ROSS, AND M. R. LEPPER. Biased assimilation and attitude polarization: The effects of prior theories on subsequently considered evidence. *Journal of Personality and Social Psychology*, **37**:2098–2109, 1979.

(112) N. R. F. MAIER. Reasoning in humans. ii. The solution of a problem and its appearance in consciousness. *Journal of Comparative Psychology*, **12**(2):181, 1931.

(113) M. MCCLOSKEY AND M. ZARAGOZA. Misleading postevent information and memory for events: Arguments and evidence against memory impairment hypotheses. *Journal of Experimental Psychology: General*, **114**(1):1–16, 1985.

(114) E. MCGINNIES. Emotionality and perceptual defense. *Psychological Review*, **56**(5):244–251, 1949.

(115) H. MCGURK AND J. MACDONALD. Hearing lips and seeing voices. *Nature*, 1976.

(116) N. L. MEAD, R. F. BAUMEISTER, F. GINO, M. E. SCHWEITZER, AND D. ARIELY. Too tired to tell the truth: Self-control resource depletion and dishonesty. *Journal of Experimental Social Psychology*, **45**(3):594–597, 2009.

(117) B. E. MEYEROWITZ, J. G. WILLIAMS, AND J. GESSNER. Perceptions of controllability and attitudes toward cancer and cancer patients. *Journal of Applied Social Psychology*, **17**:471–492, 1987.

(118) D. C. MOLDEN, C. M. HUI, A. A. SCHOLER, B. P. MEIER, E. E. NOREEN, P. R. DAGOSTINO, AND V. MARTIN. Motivational versus metabolic effects of carbohydrates on self-control. *Psychological Science*, **23**(10):1137–1144, 2012.

(119) N. MORAY. Attention in dichotic listening: Affective cues and the influence of instructions. *Quarterly Journal of Experimental Psychology*, **11**(1):56–60, 1959.

(120) E. MORSELLA. The function of phenomenal states: Supramodular interaction theory. *Psychological Review*, **112**(4): 1000–1021, 2005.

(121) E. MORSELLA AND J. A. BARGH. Unconscious action tendencies: Sources of 'un-integrated' action. In DECETY AND CACIOPPO, editors, *Handbook of Social Neuroscience*. 2011.

(122) E. MORSELLA, S. C. KRIEGER, AND J. A. BARGH. The primary function of consciousness: Why skeletal muscles are voluntary muscles. In E. MORSELLA, J. A. BARGH, AND P. M. GOLLWITZER, editors, *Oxford Handbook of Human Action*, pages 625–634. 2009.

(123) M. MURAVEN AND R. F. BAUMEISTER. Self-regulation and

depletion of limited resources: Does self-control resemble a muscle? *Psychological Bulletin*, **126**(2):247–259, 2000.

(124) M. MURAVEN, D. M. TICE, AND R. F. BAUMEISTER. Self-control as a limited resource: Regulatory depletion patterns. *Journal of Personality and Social Psychology*, **74**:774–789, 1998.

(125) R. E. NISBETT AND T. D. WILSON. Telling more than we can know: Verbal reports on mental processes. *Psychological Review*, **84**(3):231–259, 1977.

(126) B. A. NOSEK, A. G. GREENWALD, AND M. R. BANAJI. The implicit association test at age 7: A methodological and conceptual review. In J. A. BARGH, editor, *Social Psychology and the Unconscious: The Automaticity of Higher Mental Processes*, pages 265–292. 2007.

(127) M. OATEN AND K. CHENG. Longitudinal gains in self-regulation from regular physical exercise. *British Journal of Health Psychology*, **11**(4):717–733, 2006.

(128) B. K. PAYNE. Prejudice and perception: The role of automatic and controlled processes in misperceiving a weapon. *Journal of Personality and Social Psychology*, **81**(2):181, 2001.

(129) R. M. PERLOFF. *The Dynamics of Persuasion*. Lawrence Erlbaum Associates, 2003.

(130) J. PERNER, U. FRITH, A. M. LESLIE, AND S. R. LEEKAM. Exploration of the autistic child's theory of mind: Knowledge, belief, and communication. *Child Development*, pages 689–700, 1989.

(131) M. PESSIGLIONE, L. SCHMIDT, B. DRAGANSKI, R. KALISCH, H. LAU, R. J. DOLAN, AND C. D. FRITH. How the brain translates money into force: A neuroimaging study of subliminal motivation. *Science*, **316**(5826):904–906, 2007.

(132) W. PHILLIPS, S. BARON-COHEN, AND M. RUTTER. Understanding intention in normal development and in autism. *British Journal of Developmental Psychology*, **16**(3):337–348, 1998.

(133) D. A. PIZARRO, C. LANEY, E. K. MORRIS, AND E. F. LOFTUS. Ripple effects in memory: Judgments of moral blame can distort memory for events. *Memory & Cognition*, **34**(3):550–555, 2006.

(134) A. R. PRATKANIS. *The Science of Social Influence*. Psychology Press, 2007.

(135) E. PRONIN, C. Y. OLIVOLA, AND K. A. KENNEDY. Doing unto future selves as you would do unto others: Psychological distance and decision making. *Personality and Social Psychology Bulletin*, **34**(2):224–236, 2008.

(136) D. READ AND B. VAN LEEUWEN. Predicting hunger: The effects of appetite and delay on choice. *Organizational Behavior and Human Decision Processes*, **76**(2):189–205, 1998.

(137) A. S. REBER. Implicit learning of artificial grammars. *Journal of Verbal Learning and Verbal Behavior*, **6**(6):855–863, 1967.

(138) A. S. REBER. Implicit learning and tacit knowledge. *Journal of Experimental Psychology: General*, **118**(3):219–235, 1989.

(139) P. ROZIN, J. HAIDT, AND K. FINCHER. From oral to moral. *Science*, **323**:1179–1180, 2009.

(140) K. SEKIYAMA AND Y. TOHKURA. McGurk effect in non-English listeners: Few visual effects for Japanese subjects hearing Japanese syllables of high auditory intelligibility. *The Journal of the Acoustical Society of America*, **90**:1797–1805, 1991.

(141) L. SHAMS, Y. KAMITANI, AND S. SHIMOJO. What you see is what you hear. *Nature*, **408**:788, 2000.

(142) L. SHAMS, Y. KAMITANI, AND S. SHIMOJO. Visual illusion induced by sound. *Cognitive Brain Research*, **14**(1):147–152, 2002.

(143) Y. SHODA, W. MISCHEL, AND P. K. PEAKE. Predicting adolescent cognitive and self-regulatory competencies from preschool delay of gratification: Identifying diagnostic conditions. *Developmental Psychology*, **26**(6):978–986, 1990.

(144) T. SINGER, B. SEYMOUR, J. P. O'DOHERTY, K. E. STEPHAN, R. J. DOLAN, AND C. D. FRITH. Empathic neural responses are modulated by the perceived fairness of others. *Nature*, **439**:466–469, 2006.

(145) A. SLACHEVSKY, B. PILLON, P. FOURNERET, P. PRADAT-DIEHL, M. JEANNEROD, AND B. DUBOIS. Preserved adjustment but impaired awareness in a sensory-motor conflict following pre-frontal lesions. *Journal of Cognitive Neuroscience*, **13**(3):332–340, 2001.

(146) D. A. SMALL, G. LOEWENSTEIN, AND P. SLOVIC. Sympathy and callousness: The impact of deliberative thought on donations to identifiable and statistical victims. *Organizational Behavior and Human Decision Processes*, **102**(2):143–153, 2007.

(147) A. P. SMITH, R. CLARK, AND J. GALLAGHER. Breakfast cereal and caffeinated coffee: Effects on working memory, attention, mood, and cardiovascular function. *Physiology & Behavior*, **67**(1):9–17, 1999.

(148) VICTORIA SOUTHGATE. Early manifestations of mindreading. In S. BARON-COHEN, H. TAGER-FLUSBERG, AND M. V. LOMBARDO, editors, *Understanding Other Minds*, pages 3–18. Oxford University Press, 2013.

(149) S. STEPPER AND F. STRACK. Proprioceptive determinants of emotional and nonemotional feelings. *Journal of Personality and Social Psychology*, **64**:211–220, 1993.

(150) T. F. STILLMAN, D. M. TICE, F. D. FINCHAM, AND N. M. LAMBERT. The psychological presence of family improves self-control. *Journal of Social and Clinical Psychology*, **28**(4):498–529, 2009.

(151) J. P. TANGNEY, R. F. BAUMEISTER, AND A. L. BOONE. High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *Journal of Personality*, **72**(2):271–324, 2004.

(152) A. TODOROV, A. N. MANDISODZA, A. GOREN, AND C. C. HALL. Inferences of competence from faces predict election outcomes. *Science*, **308**(5728):1623–1626, 2005.

(153) J. M. TWENGE, R. F. BAUMEISTER, C. NATHAN DEWALL, N. CIAROCCO, AND J. MICHAEL BARTELS. Social exclusion decreases prosocial behavior. *Journal of Personality and Social Psychology*, **92**:56–66, 2007.

(154) J. M. TWENGE, R. F. BAUMEISTER, D. M. TICE, AND T. S. STUCKE. If you can't join them, beat them: Effects of social exclusion on aggressive behavior. *Journal of Personality and Social Psychology*, **81**:1058–1069, 2001.

(155) J. M. TWENGE, L. ZHANG, AND C. IM. It's beyond my control: A cross-temporal meta-analysis of increasing externality

in locus of control, 1960-2002. *Personality and Social Psychology Review*, **8**(3):308–319, 2004.

(156) E. L. UHLMANN, D. A. PIZARRO, D. TANNENBAUM, AND P. H. DITTO. The motivated use of moral principles. *Judgment and Decision Making*, **4**(6):476–491, 2009.

(157) R. B. VAN BAAREN, R. W. HOLLAND, B. STEENAERT, AND A. VAN KNIPPENBERG. Mimicry for money: Behavioral consequences of imitation. *Journal of Experimental Social Psychology*, **39**:393–398, 2003.

(158) L. VAN BOVEN, G. LOEWENSTEIN, AND D. DUNNING. The illusion of courage in social predictions: Underestimating the impact of fear of embarrassment on other people. *Organizational Behavior and Human Decision Processes*, **96**(2):130–141, 2005.

(159) L. VAN BOVEN, G. LOEWENSTEIN, E. WELCH, AND D. DUNNING. The illusion of courage in self-predictions: Mispredicting one's own behavior in embarrassing situations. *Journal of Behavioral Decision Making*, **25**(1):1–12, 2012.

(160) M. VELMANS AND S. SCHNEIDER. *The Blackwell Companion to Consciousness*. Blackwell, 2007.

(161) M. VIRKUNNEN, J. DE JONG, J. BARTKO and F. K. GOODWIN AND M. LINNOILA. *Relationship of psychobiological variables to recidivism in violent offenders and impulsive fire setters: a follow-up study. Archives of General Psychiatry*, **46**(7):600, 1989.

(162) K. D. VOHS, R. F. BAUMEISTER, B. J. SCHMEICHEL, J. M. TWENGE, N. M. NELSON, AND D. M. TICE. Making choices impairs subsequent self-control: A limited-resource account of decision-making, self-regulation, and active initiative. *Journal of Personality and Social Psychology*, **94**(5):883–898, 2008.

(163) K. D. VOHS AND J. W. SCHOOLER. The value of believing in free will: Encouraging a belief in determinism increases cheating. *Psychological Science*, **19**(1):49–54, 2008.

(164) K. A. WADE, M. GARRY, J. D. READ, AND D. S. LINDSAY. A picture is worth a thousand lies: Using false photographs to create false childhood memories. *Psychonomic Bulletin & Review*, **9**(3):597–603, 2002.

(165) D. M. WEGNER. *The Illusion of Conscious Will*. MIT Press, 2002.
(166) L. WEISKRANTZ. *Blindsight*. Oxford University Press, 2009.
(167) G. L. WELLS AND R. E. PETTY. The effects of over head movements on persuasion: Compatibility and incompatibility of responses. *Basic and Applied Social Psychology*, **1**(3):219–230, 1980.
(168) R. WEST. Glucose for smoking cessation. *CNS Drugs*, **15**(4):261–265, 2001.
(169) J. WHITHAM AND A. MATHIS. Effects of hunger and predation risk on foraging behavior of graybelly salamanders, *Eurycea Multiplicata*. *Journal of Chemical Ecology*, **26**(7):1659–1665, 2000.
(170) L. E. WILLAMS AND J. A. BARGH. Experiencing physical warmth promotes interpersonal warmth. *Science*, **322**:606–607, 2008.
(171) D. WILLIAMS. Theory of own mind in autism: Evidence of a specific deficit in self-awareness? *Autism*, **14**(5):474–494, 2010.
(172) T. D. WILSON, D. J. LISLE, J. W. SCHOOLER, S. D. HODGES, K. J. KLAAREN, AND S. J. LAFLEUR. Introspecting about reasons can reduce post-choice satisfaction. *Personality and Social Psychology Bulletin*, **19**:331–339, 1993.
(173) J. C. WU, J. C. GILLIN, M. S. BUCHSBAUM, AND T. HERSHEY. The effect of sleep deprivation on cerebral glucose metabolic rate in normal humans assessed with positron emission tomography. *Sleep: Journal of Sleep Research & Sleep Medicine*, **14**(2):155–162, 1991.
(174) R. B. ZAJONC. Attitudinal effects of mere exposure. *Journal of Personality and Social Psychology*, **9**(2):1–27, 1968.
(175) R. ZIEGLER AND M. DIEHL. Is politician A or politician B more persuasive? *European Journal of Social Psychology*, **33**:623–627, 2003.
(176) C. ZHONG AND G. J. LEONARDELLI. Cold and lonely: Does social exclusion literally feel cold? *Psychological Science*, **19**:838–842, 2008.
(177) C. ZHONG AND K. LILJENQUIST. Washing away your sins: Threatened morality and physical cleansing. *Science*, **313**:1451–1452, 2006.