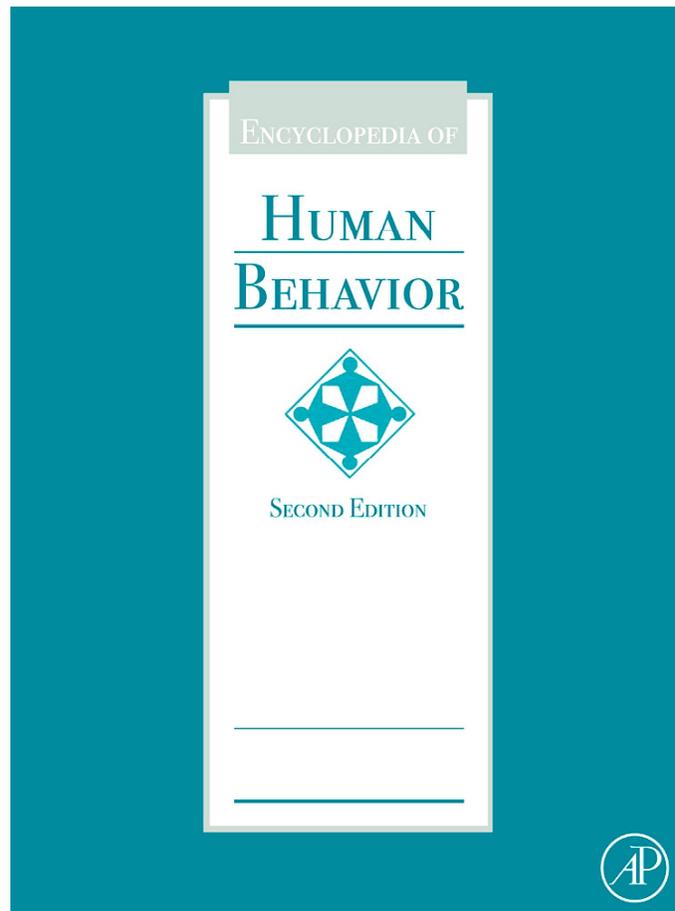


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Planning

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Glossary

Circadian rhythm A roughly 24-h physiological cycle that determines our sleep and arousal patterns.

Ego depletion The idea that self-control or will power is an exhaustible resource that can be used up.

Frontal lobe The front portion of each hemisphere of the brain. Responsible for higher intellectual functioning, including planning.

Implementation intention A simple plan that states links a situational cue (e.g., time, event, thought) to a desired behavior.

Planning fallacy The tendency to underestimate task-completion times.

Procrastination The act of putting off actions or tasks to a later time.

Subgoal A lesser goal that forms part of a greater goal.

Working memory Short-term mental storage of information created by consciously thinking about something. Working memory is needed for complex tasks such as comprehension, reasoning, comparing, and planning.

Introduction

Understanding the complex nature of human behavior requires consideration of how we mentally represent past experiences, respond to present events, and prepare for future events. This article focuses on the last of these: planning and goal-setting. To be able to carry out, effectively, behaviors necessary to achieve future goals requires planning. Planning has a variety of definitions, but at its core it is a mental activity that prepares us for future action. We make travel plans, plan a meal, plan our next move in a chess match, or plan how we will engage the attractive person sitting across the room at a party. Plans can be quite simple (e.g., mailing a letter) or relatively complex (e.g., writing an article on planning).

Elements of Planning

Planning requires several steps. We must first develop a mental representation of our goal as well as the context in which we wish to achieve it. Then we must imagine different possible actions that might help us reach this goal, comparing them to determine which will be the most effective. Comparing mental representations, of course, requires that we are able to store them, at least temporarily, in our working memory.

Planning is useful because it allows us to explore different possibilities, without committing to them, changing our minds as we mentally simulate different possible solutions to a problem or goal. Although planning can consume cognitive resources, the alternative – action without planning – certainly has potential costs of its own.

Planning also encourages creative solutions, as you think about the world in ways that might not be possible physically. For example, you might work backwards, starting from your goal (e.g., say a location on a map) in order to determine the most effective path to it.

Early Research on Planning

Early work on planning was based on the relatively simple idea that we formulate plans to resolve discrepancies between an undesirable present state and an imagined ideal state (i.e., a goal). Resolving this discrepancy required one to act on the environment in such a way that the ideal state could be achieved.

This early model assumed that individuals would operate in a kind of feedback loop where they continued to engage in behaviors aimed at accomplishing their goal, repetitively comparing their present state to their desired ideal until it was achieved. Thus, this model purported that, when planning a solution to a problem, rather than choosing our actions blindly, we select actions most likely to lead us to the final goal, and evaluate the impact of those means. However, a major limitation of this model was that it could not account for adapting to the situation by alternating between different goal-related behaviors or even changing the goal entirely. In short, it was a little too simple. Moreover, this model emphasized efforts to return to a state of equilibrium, thus avoiding change. Of course, we now know that people will create discrepancies even when they are not lacking anything – that is, besides merely satisfying deficiencies, people can identify goals that seek development and growth.

More recent work on planning has focused primarily on examining how factors such as the difficulty (easy or hard), time frame (long or short term), and the degree of detail (general or specific) particular to a given plan can impact goal achievement. Studies that investigated these factors found evidence that regardless of whether goals were short or long term in nature (although breaking down large goals into more manageable subgoals is beneficial – more on this idea will be discussed below), the degree of difficulty and specificity was especially important, with more specific and more challenging goals tending to lead to greater achievement. Specificity appears to be important because it provides guidelines that enable individuals to determine how well they are adhering to their

plan: in other words, how people know if their best is good enough without an objective set of criteria to base it on. Difficulty is also important in that it defines a higher level of achievement as necessary for goal attainment, thus motivating greater effort expended toward accomplishing a goal.

The role of developing a plan with specific, objective performance goals versus planning on simply doing well (and on having fun) became a central focus in research on academic goal-setting. In one study that examined outcomes associated with performance-oriented goals (i.e., to get good grades) and mastery-oriented goals (i.e., to simply enjoy learning the material), students with mastery goals reported greater interest in the course material but tended to have lower grades; the opposite was true for students who had set performance goals. Thus, these findings suggest that the nature of the goal one sets influences the type of outcome: if your goal is to do well relative to an objective standard, you tend to perform better; if the aim is to simply 'get the most out of it that you can,' you will not perform as well, although you are more likely to enjoy yourself. However, a follow-up study revealed that the students who had set mastery-oriented goals were more likely to enroll in related courses the following semester as compared to students who had set performance-oriented goals (although the same pattern in grades was also found). These results suggest that how we plan out a specific goal not only affects the relevant outcome but may also impact subsequent plans we make.

Measures of Planning Ability

Tower of Hanoi

The most commonly used tool to study planning, especially by cognitive psychologists and neuropsychologists, has been the Tower of Hanoi, a puzzle created by the mathematician Édouard Lucas in 1883. In the classic version of this game, there are three rods, and between four and nine disks of increasingly smaller diameter. The goal is to move the stack of disks from the first rod to the third while following these two rules:

1. You may only move one disk at a time
2. You may not place a larger disk onto a smaller disk

The puzzle can be played with any number of disks, and though it seems impossible to many novices, it is always solvable with a minimum of $2n - 1$ required moves, where n is the number of disks. Researchers usually use a five-disk version, which would require 31 moves, although the typical novice takes about 64 moves to complete the task. Clearly, an individual cannot plan and maintain that many moves in memory. Research on how individuals solve the Tower of Hanoi problem showed that people break their plans down into separate subgoals, usually by first trying to get the largest disk into its final location. Once the largest disk has been placed, a new subgoal of placing the next largest disk is planned. **Figure 1** shows the eight moves required of a very simple version of the game with only three disks.

It appears that most people try out different subgoal strategies to determine which is the most effective. People with higher intelligence and greater working memory capacity (which are related to each other) tend to perform better on the task. Performing a secondary task will consume cognitive resources and reduce performance. However, with practice

people can improve solving the puzzle in fewer moves. Rather than merely memorizing all of the moves, practice appears to improve people's ability to choose effective subgoals.

Tower of London

A variation on the Tower of Hanoi is the Tower of London developed to detect deficits in planning that typically accompany brain damage. In particular, damage to the left anterior frontal lobe has been shown to be associated with individuals needing to make a greater number of moves to solve the puzzle. Those with damage to other areas of the frontal lobe (e.g., right anterior, left, or right posterior) do not exhibit this impairment. The ability to withhold responses and direct attention and memory processes to ongoing and future tasks appears to be controlled by neurons in the prefrontal cortex. These neurons, particularly those concentrated in the principal sulcus, enable individuals to coordinate attention and memory in order to develop plans and then act on them. Conversely, damage to the prefrontal cortex is associated with poor impulse control.

Social Cognitive Aspects of Planning

Research on planning used to be the exclusive domain of cognitive psychologists and those studying artificial intelligence. In the past two decades, however, it has become increasingly less common to find studies on planning in cognitive journals (or textbooks!). This is primarily because cognitive psychologists have turned their sights to various aspects of memory and expertise.

The research on planning continues, however, but is now studied primarily by social psychologists who have changed the focus of the research. Planning as studied by social psychologists tends to focus more on the plans needed to meet personal goals that people have for themselves (or that have been imposed upon them by others). Unlike the Tower of Hanoi, which can be completed in a matter of minutes, personal goals, especially self-improvement goals, tend to take much longer.

Examples of personal goals studied by social psychologists range from the mundane to the complex, and include everything from shopping for groceries, to writing a term paper, to losing weight, to getting married. As such, the research questions have changed somewhat. Social psychologists do not disparage cognitive accounts, and often embrace them. But social psychologists also acknowledge the role of desires, fears, and various other social motives. Indeed, a complete examination of how we plan for such far-reaching goals really must include motivation. Consider, for example, two people who are both planning to complete their income taxes by hand: one person expects to have to pay additional taxes beyond what was withheld by the government, and the other person expects to get a refund from the IRS. Of these two individuals, who is more likely to actually finish sooner? Who will plan to finish sooner? We'll get to this answer in a little while.

How to Set Effective Goals

An important part of planning is setting realistically achievable goals. Good goals motivate hard work and lead to improved performance. The concept of effective goal setting

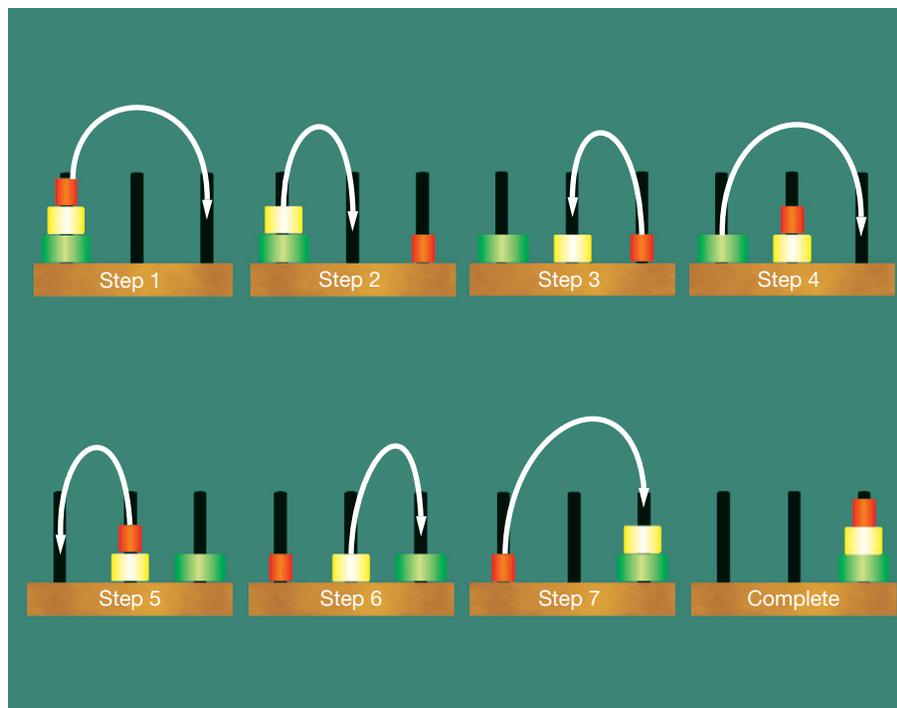


Figure 1 A simple version of the Tower of Hanoi puzzle. The puzzle is always solvable with $2n - 1$ moves, where n is the number of disks. With only 3 disks, 8 moves are required.

is so important in Industrial/Organizational (I/O) psychology that entire management systems have been based on it. As noted previously, we find that specific and difficult goals tend to lead to better task performance than vague or easy goals. The researchers Locke and Latham, who have spent over four decades studying this area, offer four principles of successful goal setting – to which we have added a fifth.

1. Set challenging, but attainable goals. So long as they are within your ability, a difficult goal is more likely to produce higher levels of effort and increase performance than an easy goal. Commitment to very difficult goals does not last long.
2. Set specific rather than vague goals. Specific (and difficult) goals tend to produce higher performance than merely urging people to 'try hard' or 'do your best.' There should be little or no ambiguity about what has to be achieved.
3. Set measurable goals. For goals to be effective, people need feedback about their progress. It is difficult to modify your plan of action if you do not know how you are progressing.
4. Set your own goals; do not let others set them for you. Commitment is higher for goals that you set yourself.
5. Break long-term goals into smaller subgoals. Following from the previous principles, if you have a long-term goal (i.e., get a college degree) you must break it down into smaller subgoals that are specific, challenging, attainable, and measurable.

In the sections that follow, we will outline various difficulties people have in following these rules of goal setting, and also difficulties people have in following the plans they have made for themselves. Finally, we address some biased thoughts people have when planning their future (and past).

Self-Improvement Plans: The New Year Resolution Fallacy

Americans are obsessed with self-improvement. Each New Year, we make a resolution to improve some aspect of ourselves, and each year most of us fail to keep our resolutions, often within the first month! Paradoxically, many of us will make the same resolution next year! Why? As it turns out, resolutions that make us feel good about our future potential self (i.e., thinner, better read, or otherwise improved) are less effective at actually helping us to reach that potential. This is because resolutions that make us feel good about ourselves are poorly structured – they merely restate the goal (e.g., lose weight), but do not elaborate on the steps required to achieve the goal – and also tend to lack concreteness or specific details about the behaviors required at each step. Indeed, people who make poor self-improvement plans tend to feel more energized and actually predict that they have a greater likelihood of success than do those who make good plans. It seems that poor planning can be rewarding, albeit in a short-sighted way.

Delay Discounting

The tendency to focus on the immediate good feelings produced by (poor) self-improvement planning rather may be rooted in a concept called delay discounting. This is the tendency to prefer a smaller, more immediate reward to larger reward obtained in the more distant future. Consider the following two choices:

- Choice A: Receive \$1000 today
 Choice B: Receive \$4000 in 10 years

Most people will choose A over B, because the 10-year wait in choice B lessens the appeal of the \$4000. Delay-induced discounting can help to explain seemingly irrational behaviors such as gambling, taking drugs, or failing to save money for retirement in favor of purchasing a big-screen TV. As one might predict, however, individual differences in the tendency to discount long-term gains are (negatively) related to both intelligence and working memory. Further, preliminary evidence suggests that a reduction of brain activity in the anterior prefrontal cortex may exacerbate delay discounting.

Construal Level and Procrastination

Research also shows that events that are distant in time are mentally represented in a more abstract fashion than immediate events which are represented in a more concrete fashion. When an event is distant, abstract thinking dominates, and this tends to focus on whether to engage in the event at all or not ("Should I start working on my chapter for the Encyclopedia of Behavior?"). As an event – in this case, a deadline – grows closer in time, it becomes more important to plan a specific course of action ("I'd better create an outline and start writing"). Interestingly, the opposite is also true. If you are induced to think about an event in less concrete terms (i.e., more abstractly), then you are also likely to perceive the event as more distant, and thus less likely to initiate action. Thus, the level at which you construe an event (abstract vs. concrete) can explain the extent to which you will procrastinate.

Construal level theory is most likely to apply to tasks that are relatively easy and not extremely important to you. For more difficult and important tasks, the case can be made for maintaining at least some high-level representation of the situation. This is because abstraction has been found to improve self-control, presumably by allowing people to focus on the reasons why they are engaged in the difficult behavior in the first place. So, although concrete representations make events seem more immediate, and thus require plans and action, abstract representations can help us stay focused by increasing the perceived importance of the task.

Chronic procrastinators may not benefit from such advice. Indeed, research has shown that they tend to represent tasks more concretely than do people who do not procrastinate. Focusing on task details too much may overwhelm people, ironically causing them to avoid the situation altogether. Clearly, more research is needed in this area.

Self-Control and Ego Depletion

One important predictor of success in life is the ability to delay gratification. A series of fascinating studies has found that children who are able to wait longer to eat a marshmallow tend to do better in school – even as young adults – than do children who cannot wait and eat the marshmallow immediately. Like marshmallows, temptations abound that can derail our goal pursuits. Pursuing one's goals often means forgoing activities that are rewarding in the short term. Unfortunately, overriding temptations requires controlled effort that takes cognitive resources. Put differently, it takes less effort to do

something than it does not to do something. When you are on a diet, it can be much more difficult to turn down dessert than it is to eat it.

A host of other things can deplete the cognitive resources needed to engage in self-control. For example, being depressed, tired, or in a bad mood can reduce self-control. Additionally, resisting one temptation will make it harder to resist a second temptation. Consistent with this notion, it is also true that being in good physical condition, well-rested, or in a good mood can enhance our self-control.

How does this relate to planning? It suggests that we should take into account those situations and times in which we are most at risk for temptations that will derail us from our goals. When planning, we should keep in mind the extent to which our self-control resources might be depleted.

Circadian Rhythms

A related consideration here is one's circadian rhythm. We each have a 24-h biological cycle that determines our sleep-wake pattern. Although environmental factors (e.g., light, noise, temperature) can play a role, your circadian rhythm tends to be stable over your lifetime. Cognitive arousal is usually highest in the first third of the day, lowest in mid-afternoon, and after a sub-peak, drops off quickly right before sleep. There are individual differences, however. Some people prefer to work in the morning, whereas others prefer the evening because they feel more awake. Unfortunately, the increased arousal in night owls also tends to cause greater anxiety and worry about performance, which inevitably leads to procrastination – the tendency to delay a task.

Consider this example: Adrienne has a goal to exercise more. Her goal commitment is high; she considers exercise very important. She is also somewhat of an evening person and thus cannot get up early enough to exercise before work. Thus, daily she plans in her head to run on the treadmill after work. Unfortunately, she also has a demanding job that regularly requires her to stay in the office past 6 p.m. By the time Adrienne arrives home, she is so tired (and hungry) that she is much more likely to have a glass of wine, collapse on the couch, and watch TV, than to run on a treadmill. Clearly she is planning her exercise regimen at the wrong time of day. Her fatigue and hunger will both compromise her self-control. She either needs to change her plans to leave work sooner, or plan to exercise in the morning. After all, running does not require thinking, so if she can find a way to get herself out of bed; this may be a workable solution for her. The next section provides a technique that might help her to do just that.

Implementation Intentions

Peter Gollwitzer has developed a model of volitional planning that relies heavily on what are called implementation intentions. These are specific and (deceptively) simple action plans for how a goal will be attained. Implementation intentions are always stated in an 'if-then' format. Let's call your goal 'Z,' the effective response 'Y,' and the situation cue 'X.' An implementation intention to reach a goal would be stated like this:

When I encounter situation X, I will initiate behavior Y, in order to reach goal Z.

Specific examples of implementation intentions usually imply, but do not explicitly state, the goal. Instead, they focus on the situational cue and the required behavior:

1. After I start the coffee machine, I will take my vitamins.
2. If I feel tempted to eat a piece of chocolate, I will ignore that thought and eat an apple.
3. After I go swimming tomorrow, I will perform a breast self-examination.
4. When I arrive at the office, I will not turn on my computer until I have finished the paperwork on my desk.
5. When I turn on my computer, I will do a literature search before reading my email.
6. If it is Monday, then I will do my math homework.

Following our earlier guidelines for setting an effective goal, the situational cue and behavioral response of an implementation intention should be as specific as possible.

Poor: If it is the weekend, then I will exercise more.

Better: If it is 9 a.m. on Saturday, then I will run 3 miles on the treadmill.

Note the difference between an implementation intention and a simple statement of one's goal, for example, I will floss my teeth more. An implementation intention requires that an explicit connection be made between a situational cue (when the 11 p.m. news comes on) and a behavior (I will walk to the bathroom and floss my teeth). This helps to automate the process so that we need not depend on our memory to remember to do the task. Once the connection is made, the situation automatically cues the behavior. Implementation intentions have a moderate to large effect compared to simple goal intentions (i.e., I will perform a breast self-exam) that do not reference a situational cue (when I take a shower after swimming).

The benefits of implementation intentions are largest when people are confronted with aversive tasks (eat more vegetables) or difficult or complex ones (write a term paper). These sorts of goals tend to suffer from the following problems:

1. Failing to get started
2. Getting distracted
3. Overextending oneself
4. Failing to call a halt to fruitless goal-striving.

Implementation intentions are important because they facilitate both the initiation of desired behaviors as well as maintaining persistence in the face of potential distractions, setbacks, or challenges. But, they can also help us to drop subgoals if it appears that they are not working. For example, consider the amount of time one could spend (waste) researching a topic using a search engine like Google. A useful implementation intention here might be: if I do not find an answer after the fifth page, I will stop searching and move on to the next subgoal. Of course, Implementation intentions are most effective when you have a strong goal commitment. Indeed, you are unlikely to engage in such intentions if you are not committed to your goal.

Implementation intentions are most useful to people who have poor self-regulatory skills (e.g., schizophrenia, drug

addicts in withdrawal, children with attention deficit hyperactivity disorder (ADHD), and people with damage to their frontal lobe), but they are also useful for people who are preoccupied with distracting thoughts and anyone who has recently engaged in an ego-depleting task. As mentioned earlier, self-control suffers if we engage in multiple resource (ego) depleting tasks in a relatively short period. Working hard at one task makes us less likely to find the strength to work hard at a second task. Similarly, resisting one temptation makes a second temptation more difficult to resist, unless we remind ourselves to work harder. Research has found that making an implementation intention while engaged in an ego-depleting task can help us to persist longer and perform better at a difficult second task.

It is somewhat ironic that although the focus of social psychologists has been on long-range personal goals, the most effective solution to goal-striving seems to be to make very simple short-term plans!

Perfectionism

Because implementation intentions help us to stay on task and to worry less, one should find that perfectionists benefit from their use. There are, however, two types of perfectionists. First is the self-oriented perfectionist, who sets his or her own (overly high) standards. These people do benefit from implementation intentions. However, a second form of perfectionism exists, the socially prescribed perfectionist, who has a strong need to meet expectations and standards prescribed by significant others. For these people, implementation intentions can backfire. Rather than inspiring action, forming such intentions instead causes worry and self-criticism that actually interferes with goal progress.

Another limitation to implementation intentions would come in the form of a 'ceiling effect' in which performance is already so high that intention formation does little further good. Such results have been found when predicting class attendance with people scoring high and low on conscientiousness. Those who scored high did not benefit from implementation intentions.

Planning Fallacy

When planning a future task, individuals often underestimate how much time it will take for them to complete it. This optimistic 'planning fallacy' has been shown to occur for predictions about a wide range of tasks, including writing term papers, programming software, doing one's taxes, and Christmas shopping. The interesting thing about the planning fallacy (and the reason it's called a 'fallacy') is the fact that people seem to know that they do it! When told that other people underestimate how long it will take to accomplish a task, most people laugh, because they can think of times in which they have done this. And yet, this knowledge does not seem to help them make better predictions for the future. Why is this?

One reason has to do with a sort of cognitive neglect. When planning a task, people focus too much on the events

that are required to complete the task but neglect to consider any potential distractions that will slow them down. It seems that previous distractions are categorized as flukes, and thus unlikely to happen again. Although any particular distraction may not occur again, it is almost inevitable that some unknown distraction will rear its head before the task is completed.

A second reason for the planning fallacy is wishful thinking – simply wanting to finish. This is especially true when anticipating a desired outcome. As before, consider two people planning to do their taxes, one who expects to receive a tax return, and the other who expects to have to pay additional taxes. Although both people will estimate that they will finish sooner than they actually do, the person expecting the tax refund will show a stronger effect. Consistent with the cognitive neglect mechanism, those expecting the refund gave less credence to their past experiences when making their prediction.

One effective way to reduce the planning fallacy is to use implementation intentions discussed earlier. Note that this reduces the bias not by making people's plans more accurate, but by helping them to finish earlier than they normally would.

It is important to note that not everyone shows the planning fallacy. First, there is evidence to suggest that the bias is less likely to occur when predictions are made privately. Thus, we make optimistic predictions in order to appear more productive and successful to others.

Finally, the planning fallacy is sensitive to individual differences, for example, the extent to which people demonstrate hippie- or yuppie-oriented traits. People with yuppie traits are goal oriented, hard working, and organized, whereas people with hippie traits tend to have a live for the moment philosophy with few concerns for the future or regrets about the past. As you might expect, yuppie traits are associated with completing a task sooner and consequently showing less of an optimistic bias. In contrast, hippie traits are related to both earlier predicted times and later completion times, resulting in greater optimistic bias. People with hippie traits appear to have strong social concerns. This makes them more likely to promise others that they will finish things early, but also more likely to get distracted by opportunities for recreation (e.g., social functions).

Related Areas

Readers interested in the social aspects of planning might also be interested in two additional areas of study: affective forecasting and hindsight bias.

Affective Forecasting

Affective forecasting is the prediction of one's future emotional state. Research has shown that people exhibit an 'impact bias' in which they overestimate their emotional reactions – both negative and positive – to things like sporting events, election outcomes, and romantic events. The reason for this bias is threefold: First, people underestimate their own ability to cope with negative events. Second, people tend to focus too

much on the target event and neglect other events and activities that will occupy their attention and thus reduce the strength of their emotions, whether positive or negative. Finally, when confronted with emotional events we usually spend some time trying to make sense of them, spending time thinking about both their causes and meaning. Rather than strengthening their emotional feelings, as might be expected, sense-making has been shown to reduce it.

Hindsight Bias

Sense-making also produces another bias, called hindsight bias. Hindsight bias is the tendency to believe that one could have predicted an event with greater accuracy than is really the case. Although the bias is not large, it is somewhat akin to the belief that you 'knew it all along.' Many researchers argue that hindsight bias prevents us from learning from the past because our mistakes are less surprising than they should be. The implication for planning, of course, is that people will continue to make the same mistakes in the future. One way to counteract the hindsight bias is to make an explicit prediction for an event before the event occurs. This allows you to compare your (unbiased) prediction with reality and, with any luck, learn from the past so that you can plan for a more successful future.

See also: Creativity; Intention; Problem Solving; Reasoning.

Further Reading

- Beuhler R, Griffin D, and Peetz J (2010) The planning fallacy: Cognitive, motivational, and social origins. *Advances in Experimental Social Psychology* 43: 1–62.
- Catrambone R (1998) The subgoal learning model: Creating better examples so that students can solve novel problems. *Journal of Experimental Psychology: General* 127: 355–376.
- Das JP, Kar BC, and Parrila RK (1996) *Cognitive Planning: The Psychological Basis of Intelligent Behavior*. London: Sage.
- Friedman SL and Scholnick EK (1997) *The Developmental Psychology of Planning: Why, How, and When Do We Plan?* Mahwah, NJ: Lawrence Erlbaum Associates.
- Gollwitzer PM (1999) Implementation intentions: Strong effects of simple plans. *American Psychologist* 54: 493–503.
- Kliegel M, Eschen A, and Thöne-Otto A (2004) Planning and realization of complex intentions in traumatic brain injury and normal aging. *Brain and Cognition* 56: 43–54.
- Locke EA and Latham GP (2002) Building a practically useful theory of goal setting and task motivation. *American Psychologist* 57: 705–717.
- Miller GA, Galanter E, and Pribram KA (1960) *Plans and the Structure of Behavior*. New York: Holt, Rinehart, & Winston.
- Morris R and Ward G (2005) *The Cognitive Psychology of Planning*. New York: Psychology Press.
- Muraven M and Baumeister RF (2000) Self-regulation and depletion of limited resources: Does self-control resemble a muscle? *Psychological Bulletin* 126: 247–259.
- Owen AM (1997) Cognitive planning in humans: Neuropsychological, neuroanatomical, and neuro-pharmacological perspectives. *Progress in Neurobiology* 53: 431–450.
- Pezzo MV, Litman JA, and Pezzo SP (2006) On the distinction between yuppies and hippies: Individual differences in prediction biases for planning future tasks. *Personality and Individual Differences* 41: 1359–1371.
- Phillips LH, Wynn VE, McPherson S, and Gilhooly KJ (2001) Mental planning and the Tower of London task. *Quarterly Journal of Experimental Psychology* 54: 579–597.

- Schouwenburg HC, Lay C, Pychyl T, and Rerrari JR (2004) *Counseling the Procrastinator in Academic Settings*. Washington, DC: American Psychological Association.
- Shallice T (1982) Specific impairments of planning. *Philosophical Transactions of the Royal Society of London B* 298: 199–209.
- Wohl MJA, Pychyl TA, and Bennet SH (2010) I forgive myself, now I can study: How self-forgiveness for procrastinating can reduce future procrastination. *Personality and Individual Differences* 48: 803–808.

Relevant Websites

- <http://http-server.carleton.ca/~tpychyl/> – Procrastination Research Group at Carleton University.
- <http://www.mazeworks.com/hanoi/index.htm> – Java Games.