

Relevance of Willpower Dynamics, Self-Control, and Ego Depletion to Flawed Student Decision Making

Roy F. Baumeister

Florida State University
United States of America

&

King Abdulaziz University
Saudi Arabia

Nawal al-Ghamdi

King Abdulaziz University
Saudi Arabia

Abstract

Students make decisions with far-reaching consequences. This manuscript applies recent advances in understanding decision processes to illuminate several sources of bias and error in student decisions. Decision making uses an energy resource (willpower) also involved in self-control, and so when people experience depleted resources, their decisions may be less effective than usual. We review factors that contribute to depleted willpower (e.g., decision fatigue, poor diet, lack of sleep), as well as well as results of decision making in depleted state (decision avoidance and postponement, irrational bias, passive endorsement of status quo and default options, lack of integrative compromise, heeding of irrelevant criteria).

Keywords: Decisions, self-control, ego depletion, course selections, student choice, will power

Being a university student is typically a relatively brief phase of a person's life. Its purpose is to acquire knowledge, skills, and credentials that will prepare the student to become a productive member of society. Most university students have spent much of their previous lives in schools. A key difference is that university students have much more control over what they study than they probably had as school pupils. The decisions they make about their education will in many cases set them on a path toward a particular adult life, and it may be difficult to change that path later on. In many cases, these decisions are not optimal, resulting in problems and unhappiness later (e.g., Ombaba et al., 2014).

In this article, we seek to shed light on student decisions by drawing on recent work on self-control and decision-making. Research has indicated that making decisions is affected by the same limited energy resource (akin to the folk notion of willpower) that is used for self-control. We shall briefly review this work and then summarize its implications for student decision-making.

The difficulty of making optimal decisions may well have increased substantially in recent decades (and seems likely to continue to do so). As universities, departments, and topic areas proliferate, students are faced with an increasing array of choices. That alone makes the process of deciding more difficult. Moreover, there is a case to be made that today's young people in many cultures are brought up with less self-control than in the past, so that decision-making could be further compromised. Such observations were already beginning to be made in the 1950s (e.g., Wheelis, 1958), and in recent years writers who merely advocate parenting styles that emphasize strictness and self-control (e.g., Chua, 2011) have come under fire. We shall also argue that current social trends, especially regarding diet, create special problems for willpower and self-control. Recent decades have seen a worldwide increase in consumption of so-called junk food, characterized by sugar and carbohydrates.

Students may be especially susceptible to these eating patterns, and these may have unprecedented impact on their decision making.

Students make many decisions. In this brief article, we focus mainly on decisions about which courses to take. In principle the selection of courses is guided by career goals, and the selection of those goals is itself a highly problematic decision process. Indeed, adolescents' preoccupation with career prospects has been shown to predispose many toward irrationality (Rottinghaus et al., 2009). Selection of future occupation may be guided by information conveyed in the mass media or garnered from peers, and it may be unrealistic in terms of what employment opportunities will actually be available. Students may lack or fail to consider relevant information about what courses will offer suitable preparation for a particular career (Adegun & Aremu, 2014). Many students may therefore choose college courses that will not prepare them for productive employment in a modern economy and technological society (Adomeh & Alli, 2013). As a result, many end up in careers for which they are unsuited, producing a pattern of lifelong regret (Ombaba et al., 2014).

Self-Control as Limited Resource

Theories about the self from early on incorporated self-awareness and self-knowledge but were much slower to incorporate any understanding of the self as an agent who chooses, acts, and exerts control. More recently, the latter understanding has begun to emerge.

An influential theory has proposed that some form of energy or strength may be needed to augment the more purely cognitive understanding of self-concepts. Based on a survey of diverse research areas, Baumeister, Heatherton, and Tice (1994) speculated that the traditional folk theory of willpower may have some validity. Next, laboratory experiments began to show that after exerting self-control on one task, research participants performed relatively poorly on a subsequent test of self-control, even though the latter task had no apparent relevance to the first task (e.g., Baumeister, Bratslavsky, Muraven, & Tice, 1998; Muraven, Tice, & Baumeister, 1998). The implication was that people expended some energy on the first task, leaving less available for performing well on the second. This state of reduced energy was dubbed *ego depletion*. An early review found converging evidence that the capacity for self-control depends on a fluctuating energy resource and is reduced when the energy is somewhat depleted (Muraven & Baumeister, 2000). A recent meta-analysis confirmed that the ego depletion effect has been well established in many studies and has a moderately large effect size (Hagger, Wood, Stiff, & Chatzisarantis, 2010).

Thus, the strength model of self-control holds that people have a limited supply of energy and that when some has been expended, the human body naturally seeks to conserve its remaining energy (Baumeister, Vohs, & Tice, 2007; Baumeister, in press). Early speculations that ego depletion occurs because the brain runs out of fuel have not been supported. Ego depletion involves only a partial depletion of available energy. Hence people are able to overcome mild to moderate levels of ego depletion and continue to exert self-control, if they are sufficiently motivated. For example, Muraven and Slessareva (2003) showed that offering cash or social incentives for good performance enabled people to perform well despite mild depletion. Muraven, Shmueli, and Burkley (2006) showed that ego depletion is essentially a matter of conserving energy rather than having none left. DeWall et al. (2010) found that assigning people to a position of power and leadership energized them so that they continued to perform well despite ego depletion — but then they were severely depleted later on.

The folk term “willpower” was admittedly a metaphor, and the initial reports on studies of ego depletion invoked energy metaphorically as well. The possibility that genuine energy might be involved was raised by findings linking self-control exertion to glucose, a chemical in the human body and bloodstream that carries energy to brain and muscles (Gailliot et al., 2007). Early findings that blood glucose levels decreased after acts of self-control have not been reliably replicated (see Baumeister & Vohs, 2014). However, abundant evidence has confirmed that low levels of blood glucose contribute to poor self-control (see review by Gailliot & Baumeister, 2007). Moreover, multiple studies have now found that ingesting a dose of glucose restores performance among ego-depleted persons (e.g., Alquist, Baumeister, & Tice, 2014).

Ego depletion indicates that the capacity for self-control can fluctuate as a state, so that the same person's self-control varies across time. This does not however imply that everyone's capacity is the same, and in fact there are reliable differences in self-control that are somewhat stable in the aggregate (e.g., Tangney, Baumeister, & Boone, 2004; also see extensive evidence regarding conscientiousness (e.g., Roberts et al., 2009, 2012).

Thus far, evidence has not consistently indicated that people with either high or low trait self-control are more susceptible to depletion than the others. Nonetheless, we think it essential to begin by proposing that some students will be better equipped than others to control themselves effectively.

To be sure, various researchers have criticized the theory, and some of these critiques have made useful points for revising and advancing the theory. In particular, Beedie and Lane (2011) pointed out that the human body typically has extensive reserves of glucose and therefore is unlikely to run out. They proposed replacing the notion of depletion with one of allocation. Baumeister and Vohs (2014) suggested that allocation is an important advance and a highly useful insight — but selective allocation is nonetheless generally a sign that a resource is limited. Hence the idea of allocation should be integrated into the theory of resource depletion rather than replacing it.

Willpower and Decisions

An important extension of the research on self-control established that willpower, the energy resource used for self-control, is also used for making decisions. Vohs et al. (2008) showed that making choices and decisions depletes willpower, as indicated by subsequent impairments in self-control. More relevant to the present work, Pocheptsova et al. (2010) demonstrated that after exerting self-control, people exhibit changes in their decision processes and outcomes. We shall outline these, as they provide the framework by which we shall discuss the impact of low willpower and low self-control on students' decisions.

Briefly summarized, the effects of low willpower and poor self-control on decision making are as follows. Compromise and integrative thinking are reduced, leading often to fairly simplistic decisions (e.g., “just give me the cheapest”). Decisions can be irrationally biased by logically irrelevant information, because people fail to recognize the irrelevance of certain factors. Some decision makers also prefer to avoid or postpone decisions when they are depleted (Pocheptsova et al., 2010). The latter finding of postponing decisions may reflect a broader general pattern of passivity that is characteristic of ego depletion (Vohs, Baumeister, Vonasch, Pocheptsova, & Dhar, 2014).

Passivity is also evident in the tendency of depleted persons to choose default options (Levav, Heitmann, Herrmann, & Iyengar, 2010). For example, in many choices, there is a standard response, which the person can passively accept or actively decide to reject in favor of a different alternative. The depleted person becomes increasingly likely to stick with the standard option. A variation on this is the so-called status quo bias, which inclines people to keep things as they currently stand rather than opting for change (e.g., Anderson, 2003).

Some decision changes seem directly linked to self-control issues. Indeed, some of the earliest empirical work on self-control involved choosing whether to take an immediate reward or a delayed but greater one (for review, see Mischel, 1974), and poor self-control or deficient willpower is associated with taking the immediate reward (e.g., Mischel, 1996; note, however, that his use of “willpower” did not make the same theoretical assumptions of limited energy, and was presumably more metaphorical). Along similar lines, depleted persons tend to choose more self-indulgent and unhealthy options than other people (e.g., Wang, Novemsky, Dhar, & Baumeister, 2012). Both of these patterns indicate a focus on immediate pleasures and benefits to the detriment of long-term outcomes, thus in a sense devaluing the future in favor of the present. Indeed, one argument is that the capacity for self-control (i.e., willpower) evolved primarily to facilitate the opposite, namely guiding present actions and choices so as to bring about what will produce the best outcomes in the future (e.g., Ainslie, 2001).

Another theory is that self-control evolved as the “moral muscle” so as to help people do what is best for society (i.e., perform morally virtuous actions) rather than selfish ones that benefit the individual at society's expense (e.g., Baumeister & Exline, 1999). Evidence for moral breakdown during ego depletion supports that argument. Mead et al. (2009) showed that when students are ego depleted, they become increasingly willing to cheat on a test and thereby increase their monetary payment. Still, recent findings have suggested that not all apparently selfish behavior is truly selfish. Banker et al. (2014) had participants play the so-called dictator game, in which the participant is given a sum of money and can decide how much to share with another participant. Participants tended to keep most of the money for themselves, which is consistent with selfishness. However, further studies used a variation in the game, in which the money was first given to the other participant, and the first participant could decide how much to take for self. Logically, the two decisions are equivalent, but when the money was first allocated to the partner, participants took less than half for themselves.

The implication is that people were exhibiting a status quo bias and simply following the external cues. Their decisions tended to leave most of the money where it already was, either with the self or the other person.

The implication is that decisions by people with low willpower have two overlapping tendencies. First, they do have a tendency to be selfish and self-serving, even when that is immoral. Second, they seem to be highly swayed by trivial external cues, such as a fairly arbitrary version of the status quo bias. When one person is supposed to divide the money between self and other, the fact that the money is temporarily lodged with one or the other person is logically irrelevant, yet it exerted a significant impact on decisions.

One last finding is relevant to decision making. Logical reasoning is impaired during ego depletion (Schmeichel et al., 2003). On a test of intelligence, for example, depleted persons show no apparent deficits on tests of automatic thinking, such as general knowledge, memorization, and vocabulary — but they show significant and substantial deficits on mental operations that require control, such as inference, deduction, and extrapolation. Insofar as intelligent processing of information is central to the role of student, it is perhaps vitally important to understand that some of that processing is substantially impaired when willpower is low.

Laboratory studies have confirmed a link between glucose and some of the decision impairments noted above. These studies have typically induced ego depletion or decision fatigue and then administered a dose of glucose (vs. placebo) to some participants. The finding noted above, that depleted persons succumb to irrational bias in decisions, was reversed among participants who were given a dose of glucose (Masicampo & Baumeister, 2008). The tendency to discount the future in favor of the present was reduced among participants who received glucose (Wang & Dvorak, 2010).

McMahon and Scheel (2010) showed that glucose restored effortful learning in a task that comprised 200 trials, though ironically in that particular task effortful thought impaired performance. That finding is illuminating because it shows that ego depletion does not simply produce bad decisions. Rather, it reduces effortful thinking.

General Relevance to Student Decisions

We assume that (1) students make many bad decisions, and (2) students are vulnerable to ego depletion. Regarding the former, the evidence of regret and underachievement is hard to deny (e.g., Adegun & Aremu, 2013; Ombaba et al., 2014). Regarding the latter, we propose that many aspects of student life are likely to produce a depleted state. First, students experience demands for academic performance, and these likely require frequent self-control and decision making, so that students engage in activities that deplete willpower. Second, many students are for the first time becoming somewhat independent of parental control, so they must make their own decisions and regulate themselves — thereby depleting their willpower more than what they experienced while living under direct, daily parental control. Third, studying at a university is a phase that requires making momentous decisions that will shape the course of one's entire life, such as finding a mate and a vocation. Fourth, the university environment confronts students with new demands for task performance and social life, thus requiring self-regulation beyond the familiar demands of earlier life stages. Fifth, students become responsible for managing small aspects of daily life, such as eating, sleeping, and hygiene, which up till now were supervised by parents. Sixth, occasional failures to manage these demands will create new problems, which the student must address and seek means of coping. Seventh, separating from parents so as to form an adult identity requires one to reassess values and options and to accept responsibility for one's acts and choices.

Eighth, not being accustomed to managing their own lives, and confronted with the newly broad scope of options and temptations, many students may fail to get enough sleep and to eat properly. The unhealthy diet and inadequate sleep may further reduce the individual's willpower — thereby impairing the student's ability to maintain self-discipline and to make good choices. The recent societal shift toward fast food and sugary snacks presents a particular conundrum for students. Newly liberated from parents, they find that their opportunities for consuming such unhealthy foods have increased substantially. But frequent consumption of such foods will hamper the body's normal glucose systems, and as a result the person becomes less capable of effective self-control and rational, future-oriented decision making.

Implications of Willpower Research for Student Decisions

In this section we speculatively elaborate the implications of the research findings covered above for explaining why many students make poor decisions. Rigorous, systematic collection of data would be desirable to verify the power and relevance of these processes, and we call for future research to test these hypotheses.

But until such findings establish which of these ideas are correct and which are not, these may guide counselors and other practitioners as best-guess appraisals of factors that produce bad student decisions. Knowingly rectifying them is a promising strategy for helping many students find an educational plan and life path that will increase the rate at which today's students become productive members and indeed leaders of society.

Failure to compromise. The first effect of ego depletion that we noted involved reduction of compromise, not in an interpersonal sense but in the sense that the decision maker integrates multiple competing criteria and finds an outcome that is best overall. When students choose courses to take, they may either synthesize the relevant implications of multiple criteria — or they may settle on one criterion and simply select the outcome that produces the best result according to that. The depleted decision maker is more likely than others to use the latter, simpler style of choosing. This could result in a student picking courses that may not be the best in terms of long-range enhancement of educational and occupational opportunities. A student may select courses to take based on a single dimension instead of integrating multiple factors. A given course may, for example, be likely to require considerable work, give good grades, have an entertaining lecturer, provide information useful to one's intended career, and be held at an inconvenient time. A depleted student would be likely to focus on a single one of these dimensions when deciding whether to take it, but a more rational and useful decision would integrate all those factors. Deciding not to take a particular course simply because its meeting time is inconvenient (for example) could be detrimental to a student's long-range aspirations.

Irrational bias by logically irrelevant information. A second established effect of ego depletion on decision-making is that choices become biased by information that logically should be irrelevant to the decision. Regarding student course selections, some information should not logically influence the decision. The particular decision bias used in studies by Pocheptsova et al. (2010) and Masicampo and Baumeister (2008) is that when two options are difficult to compare, people succumb to the decoy effect. That is, a third option that is similar but inferior to one of the options may quickly be ruled out but will leave a lingering preference to the option to which it was compared.

To illustrate, suppose a student is choosing between two courses. One of them is highly inconvenient in terms of schedule and demands but promises considerable relevance to career advancement. The other offers some (but less) career advancement while being highly congenial to the student's schedule plan. A third course is highly available that is quite similar to the first course but is clearly not as good: it is slightly less inconvenient than the first as well as being slightly less beneficial for building the relevant knowledge. No one would choose this course, as the first course is clearly better on both dimensions. However, the process of considering and rejecting this course causes people to increase the relative preference for this course over the second course, even though that is illogical (Huber, Payne, & Puto, 1982).

Such illogical decisions are made by people who are ego depleted (Pocheptsova et al., 2010), although a dose of glucose can temporarily undo that dysfunctional bias (Masicampo & Baumeister, 2008). Students who make course selections that are distorted by irrational biases may end up with credentials that are not optimal for their intended careers.

Avoiding and Postponing Decisions. Low and depleted willpower inclines students to avoid making decisions, and when they encounter choice situations, they may seek to defer them till later. This tendency has multiple implications for students' choices among classes.

One straightforward implication is that being reluctant to make definite decisions will cause students to postpone signing up for classes for the upcoming semester. Postponing is often costly, however. At many universities, highly desirable courses have limited enrollments, and so delaying one's decision may entail that by the time one decides that a particular course is the best option, its quota may be full so that no further enrollments are permitted. Hence low willpower could result in a student failing to be able to take the courses he or she wants. Accumulated over the course of a university education, this alone could cause a student to have to spend an extra year or two before achieving a degree.

At a more macro level, the reluctance to commit to a particular decision can be reflected in the double-major pattern. For example, a student may be highly fascinated by women's studies but also be attracted to civil engineering. The former is perhaps more intellectually stimulating, whereas the latter may offer more promising and secure career pathways. Willpower is required to decide which one to choose.

In such a case, indeed, the two options are quite different and so selecting one means losing out on all the advantages of the other, and choices of that nature have been shown to demand especially high levels of willpower (Novemsky et al., 20xx). Decision researchers have documented a tendency for people generally to avoid committing choices that preclude particular options, under the rubric of “keeping doors open” (Shin & Ariely, 2004). Students can accomplish this by virtue of the double major. In the example we gave, a student might enroll in a double major in Portuguese literature and civil engineering. Some may contend that such a double major is in fact a good decision by the student, but others may criticize it. The two majors in this case would not enrich each other (unlike, for example, double-majoring in Portuguese literature and linguistics, or civil engineering and environmental psychology). Satisfying the requirements of two such disparate majors would prevent the student from taking other courses that might have ultimately yielded more value and benefit.

Bias toward Default Options. Another consequence of depleted or deficient willpower is a tendency to favor standard or default options. It takes energy to depart from the easy, standard, straightforward path, and the lack of energy that characterizes low or depleted willpower entails that people will find it easier to stay on that path. As a result, creative, individually tailored, and otherwise nonconformist pathways toward a university degree will become less likely.

Students who make decisions in states of low willpower will be inclined to follow well established pathways. Many departments recommend specific sequences of courses. To be sure, conforming mindlessly to such plans is not inherently bad. Most likely, those sequences were developed by thoughtful committees seeking to provide standard pathways toward educational outcomes they valued. One can certainly do far worse than simply follow the standard course sequence. But ambitious and individualistic students could do better by thinking carefully about what is specifically best for them and making selections on that basis.

Status Quo Bias and Other Passivity. Choosing the default option is related to a general trend toward passivity. Being passive in decision situations is empirically and conceptually linked to states of low willpower, because the opposite (being proactive) requires energy (see Vohs, Baumeister, Ramachandran, et al., 2014). Hence, although the status quo bias is presumably a general pattern across all decision makers, it gains power and influence among depleted persons.

Passivity and the status quo bias can have a broad assortment of detrimental effects on student decisions. They predispose the student to continue with things as they are, even if that is not the optimal course. Here we delineate several relevant illustrations. Some students can benefit by studying overseas, which exposes the student to different cultures and different systems, yet a passive or status quo bias would militate against considering foreign study (because the status quo is simply to take another year at one’s home university).

Many universities have programs that allow students to spend a semester or a year studying abroad. The authors of this article both benefited immensely from such experiences, but we recognize that they require overcoming the status quo bias. That bias predisposes students to spend the next semester following directly in the footsteps of the current one: living in the same town, studying on the same campus, socializing with the same friends, learning for the same professors. Foreign study demands a huge break from the status quo, insofar as none of those continuities will be sustained, plus a large unknown quantity of uncertainties will need to be dealt with. The novelty is part of the value of foreign study, but that requires overcoming the status quo bias and taking an active rather than passive approach to one’s education. (Moreover, to return from foreign study requires that another status quo will have to be upended, and returning to one’s home campus is not likely to yield simple continuities with the same friends and mentors.) Thus, deficient willpower may prevent students from capitalizing on a profoundly enriching experience of foreign study.

Passively clinging to the status quo can produce a variety of other detrimental effects on education. A student may simply follow the prescribed path, taking standard sequences of prerequisites and then advanced courses. Such an approach will prevent the student from taking advantage of more individualized pathways that many universities offer and support, such as creating a new major with special combinations (e.g., medicine and engineering, toward the career of developing innovative technology for health care).

More profoundly and unfortunately, a passive embrace of the status quo may direct certain students into following a standard pattern of study that has been established by others and may not capitalize on the student’s particular interests and aptitudes. Students may simply pursue courses of study recommended by their parents, or another authority such as a favored teacher or guidance counselor.

Should that recommendation prove not to be the best program of study for a particular student to pursue, the student should ideally shift to another — but passivity and status quo bias render such a change difficult and unlikely. Therefore, some students may persevere in a suboptimal course of study because parents, teachers, mentors, or others have advocated it in the past, even though the best interests of the student would prescribe shifting to a different plan.

Psychologically, it is probably easier in general to follow along with a preset plan than to change it toward something new and different. Indeed, the uncertainty associated with adopting a new plan may pose extra threats and demands on the already overburdened executive function (e.g., Alquist et al., 2013). Therefore, to the extent that willpower is depleted or chronically low, the student is likely to plod ahead according to the plan rather than seriously considering alternative, potentially more promising and rewarding options.

Excessive susceptibility to salient external cues. When self-control is low and/or willpower is depleted, students are likely to let their decisions be guided by external factors and situational cues. This can be counterproductive. For example, they may choose courses based on parental suggestions and peer recommendations. To be sure, it may be appropriate to allow oneself to consider those factors. But one must recognize that these are not highly reliable, and for best results one should carefully consider which criteria are most important. Failing to do this, as is likely to happen in a depleted state, may cause one to give inordinate weight to these factors.

Many universities will recommend standard sequences of courses. These too are guidelines that presumably have some positive value. But each person is different, and it is important to consider when it one's goals and prospects require departing from these standard pathways. Failing to do so may cause students to follow these preset plans even when they are not the optimal pathways for their own specific goals and plans.

Other salient external cues may include course ratings or the simple popularity of a course. The fact that many students take a particular course is no guarantee that it is what a particular student should take. For example, course ratings are often strongly influenced by how easy a course is (for getting a good grade) and by how entertaining a lecturer is.

Self-indulgent preferences and immediate gratification. Last, the well-established tendencies for people with low self-control and/or depleted willpower to seek pleasure and disregard the future can contribute to poor decisions and unfortunate course selections. Students may choose a course because it seems like it will be fun. Courses featuring aspects of popular culture, such as movies and popular songs, may be an appealing way to spend time but furnish little that will actually advance most students' educational and occupational goals. Likewise, choosing a course based on a highly entertaining instructor may yield short-term gains (the course will be pleasant) but little in the way of long-term benefits. Some courses may be relevant to personal interests and hobbies, and some such activity may be acceptable, but these need to be limited insofar as they fail to move the student toward becoming able to become a productive member of society.

Discussion and Conclusions

The fact that the same energy resource (a.k.a. willpower) is used for making decisions as for self-control offers a new basis for understanding decision processes and pitfalls. This article undertook to apply this new understanding to the problematic sphere of student decisions, with particular emphasis on course selection. Abundant information may be available to students so as to enable them to make good decisions in principle — but ego depletion may impair the decision process, such as by causing them not to consider the information fully, not to discriminate among competing recommendations effectively, or not to base the decisions on the criteria that matter most in the long run. We have proposed that students may often experience ego depletion in their daily lives and therefore be faced with making decisions when not fully able to do their best. The problem is further complicated insofar as people often do not realize that they are depleted.

By understanding just how decision processes are altered and impaired during the state of ego depletion, it should be possible for people to anticipate what might go wrong. Ultimately, a better grasp of possible pitfalls and decision errors may enable students to make wiser choices and in that way move onto a pathway toward a productive and fulfilling life.

References

- Adegun, A., & Aremu, O. (2013). Effectiveness of career development and cognitive reframe therapy on irrational career thoughts among secondary school students in Ogun State, Nigeria. *The African Symposium, 13*, 94-103.
- Adomeh, I.O., & Alli, O.A. (2013). Career counseling: A tool for national growth in a global world. *Career's Guidance International*.
- Ainslie, G. (2001). *Breakdown of will*. New York: Cambridge.
- Alquist, J.L., Baumeister, R.F., & Tice, D.M. (2014). Uncertainty depletes self-regulatory resources. (Unpublished manuscript), Florida State University, Tallahassee, FL.
- Anderson, C.J. (2003). The psychology of doing nothing: Forms of decision avoidance result from reason and emotion. *Psychological Bulletin, 129*, 139-167.
- Banker, S., Ainsworth, S. E., Baumeister, R. F., Ariely, D., Vohs, K. D. (2014). The sticky anchor hypothesis: ego-depletion produces susceptibility to situational cues. (Unpublished manuscript), Princeton University, Princeton, NJ.
- Baumeister, R.F. (in press). Self-regulation, ego depletion, and inhibition. *Neuropsychologia*.
- Baumeister, R. F., Bratslavsky, E., Muraven, M., & Tice, D. M. (1998). Ego depletion: Is the active self a limited resource? *Journal of Personality and Social Psychology, 74*, 1252-1265. doi: [10.1037/0022-3514.74.5.1252](https://doi.org/10.1037/0022-3514.74.5.1252)
- Baumeister, R. F., Heatherton R. F., & Tice, D. M. (1994). *Losing control: How and why people fail at self-regulation*. San Diego, CA: Academic Press.
- Baumeister, R.F., & Vohs, K.D. (2014). Strength model of self-regulation as limited resource: Assessment, controversies, update. Manuscript submitted for publication, Florida State University.
- Baumeister, R. F., Vohs, K. D., & Tice, D. M. (2007). The strength model of self-control. *Current Directions in Psychological Science, 16*, 351-355. doi:10.1111/j.1467-8721.2007.00534.x
- Baumeister, R. F., & Exline, J. J. (1999). Virtue, personality and social relations: Self-control as the moral muscle. *Journal of Personality, 67*, 1165-1194. doi: 10.1111/1467-6494.00086
- Beedie, C. J., & Lane, A. M. (2012). The role of glucose in self-control: Another look at the evidence and an alternative conceptualization. *Personality and Social Psychology Review, 16*, 143-153. doi: 10.1177/1088868311419817
- Chua, A. (2011). *Battle hymn of the tiger mother*. New York: Penguin.
- DeWall, C. N., Baumeister, R. F., Mead, N. L., & Vohs, K. D. (2011). How leaders self-regulate their task performance: Evidence that power promotes diligence, depletion, and disdain. *Journal of Personality and Social Psychology, 100*, 47-65. doi: 10.1037/a0020932
- Gailliot, M. T., & Baumeister, R. F. (2007). The physiology of willpower: Linking blood glucose to self-control. *Personality and Social Psychology Review, 11*, 303-327. doi: 10.1177/1088868307303030
- Gailliot, M. T., Baumeister, R. F., DeWall, C. N., Maner, J. K., Plant, E. A., Tice, D. M., Brewer, L. E., & Schmeichel, B. J. (2007). 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. doi:10.1037/0022-3514.92.2.325
- Hagger, M. S., Wood, C., Stiff, C., & Chatzisarantis, N. L. (2010). Ego depletion and the strength model of self-control: A meta-analysis. *Psychological Bulletin, 136*, 495-525. doi: 10.1037/a0019486
- Huber, J., Payne, J. W., & Puto, C. (1982). Adding asymmetrically dominated alternatives: Violations of regularity and the similarity hypothesis. *Journal of Consumer Research, 9*, 90-98. doi:10.1086/208899
- Levav, J., Heitmann, M., Herrmann, A., & Iyengar, S. S. (2010). Order in product customization decisions: Evidence from field experiments. *Journal of Political Economy, 118*, 274-299. doi:10.1086/652463
- Masicampo, E. J., & Baumeister, R. F. (2008). Toward a physiology of dual-process reasoning and judgment: Lemonade, willpower, and expensive rule-based analysis. *Psychological Science, 19*, 255-260. doi: 10.1111/j.1467-9280.2008.02077.x
- McMahon, A. J., & Scheel, M. H. (2010). Glucose promotes controlled processing: Matching, maximizing, and root beer. *Judgment and Decision Making, 5*, 450-457. doi: journal.sjdm.org/10/10830a/jdm10830a.pdf

- Mead, N. L., Baumeister, R. F., Gino, F., Schweitzer, M. E., & Ariely, D. (2009). Too tired to tell the truth: Self-control resource depletion and dishonesty. *Journal of Experimental Social Psychology, 45*, 594-597. doi: 10.1016/j.jesp.2009.02.004
- Mischel, W. (1974). Processes in delay of gratification. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 7, pp. 249-292). San Diego, CA: Academic Press.
- Mischel, W. (1996). From good intentions to willpower. In P.M. Gollwitzer & J.A. Bargh (Eds.), *The psychology of action: Linking cognition and motivation to behavior*, (pp. 197-218). New York: Guilford Press.
- Muraven, M., & Baumeister, R. F. (2000). Self-regulation and depletion of limited resources: Does self-control resemble a muscle? *Psychological Bulletin, 126*, 247-259. doi: 10.1037//0033-2909.126.2.247
- Muraven, M., Shmueli, D., & Burkley, E. (2006). Conserving self-control strength. *Journal of Personality and Social Psychology, 91*, 524-537. doi: 10.1037/0022-3514.91.3.524
- Muraven, M., & Slessareva, E. (2003). Mechanisms of self-control failure: Motivation and limited resources. *Personality and Social Psychology Bulletin, 29*, 894-906. doi: 10.1177/0146167203029007008
- Muraven, M., Tice, D. M., & Baumeister, R. F. (1998). Self-control as a limited resource: Regulatory depletion patterns. *Journal of Personality and Social Psychology, 74*, 774-789. doi:10.1037/0022-3514.74.3.774.
- Ombaba, S., Keraro, F.N., Sindabi, A.M., & Asienyo, B.O. (2014). Adequacy of career guidance resources in secondary schools in Nakuru, Kisii, and Mitori Counties, Kenya. *International Journal of Innovation and Applied Studies, 6*, 921-928.
- Pocheptsova, A., Amir, O., Dhar, R., & Baumeister, R. F. (2009). Deciding without resources: Resource depletion and choice in context. *Journal of Marketing Research, 46*, 344-355. doi: 10.1509/jmkr.46.3.344
- Roberts, B.W., Jackson, J.J., Fayard, J.V., Edmonds, G., & Meints, J. (2009). Conscientiousness. In M. Leary & R. Hoyle (Eds), *Handbook of individual differences in social behavior* (pp. 369-381). New York: Guilford.
- Roberts, B.W., Lejuez, C., Krueger, R.F., Richards, J.M., & Hill, P.L. (2012). What is conscientiousness and how can it be assessed? *Developmental Psychology*. Advance online publication: doi: 10.1037/a0031109.
- Rottinghaus, P.J., Jenkins, N., Jantzer, A.M. (2009). Relation of depression and affectivity to career decision status and self-efficacy in college students. *Journal of Career Assessment, 17*, 271-285.
- Schmeichel, B. J., Vohs, K. D., & Baumeister, R. F. (2003). Intellectual performance and ego depletion: Role of the self in logical reasoning and other information processing. *Journal of Personality and Social Psychology, 85*, 33-46. doi:10.1037/0022-3514.85.1.33
- Shin, J., & Ariely, D. (2004). Keeping doors open: The effect of unavailability on incentives to keep options viable. *Management Science, 50*, 575-586. Doi:10.1287/mnsc.1030.0148
- Tangney, J. P., Baumeister, R. F., & Boone, A. L. (2004). High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *Journal of Personality, 72*, 271-324. doi: 10.1111/j.0022-3506.2004.00263.x
- Vohs, K. D., Baumeister, R. F., Ramanan, S., Mead, N. L., Schmeichel, B. J., & Hofmann, W. (2014). Depletion enhances urges and feelings. (Unpublished manuscript), University of Minnesota, Minneapolis, MN.
- Vohs, K. D., Baumeister, R. F., Schmeichel, B. J., Twenge, J. M., Nelson, N. M., & Tice, D. M. (2008). 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*, 883-898. doi: 10.1037/0022-3514.94.5.883
- Vohs, K. D., Baumeister, R. F., Vonasch, A., Pocheptsova, A., & Dhar, R. (2014). Self-control resource depletion impairs active initiative and thus produces passivity. (Unpublished manuscript), University of Minnesota, Minneapolis, MN.
- Wang, J., Novemsky, N., Dhar, R., & Baumeister, R. F. (2010). Trade-offs and depletion in choice. *Journal of Marketing Research, 47*, 910-919. doi: [10.1509/jmkr.47.5.910](https://doi.org/10.1509/jmkr.47.5.910)
- Wang, X. T., & Dvorak, R. D. (2010). Sweet future: Fluctuating blood glucose levels affect future discounting. *Psychological Science, 21*, 183-188. doi: 10.1177/0956797609358096
- Wheelis, A. (1958). *The quest for identity*. New York: Norton.