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INTERROGATION-RELATED REGULATORY DECLINE: Ego Depletion, Failures of Self-Regulation, and the Decision to Confess

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As reflected in rulings ranging from trial courts to the U.S. Supreme Court, our judiciary commonly views as "voluntary," and admits into evidence, interrogation-induced confessions obtained under conditions entailing stressors sufficient to severely compromise or eliminate the rational decision making capacities and self-regulation abilities necessary to justify such a view. Such decisions reflect, and sometimes explicitly state, assumptions soundly contradicted by science regarding the capacity of normal suspects lacking mental defect to withstand such stressors as severe fatigue, sleep deprivation, emotional distress—and aversive interrogation length, tactics and circumstances—and nevertheless resist the powerful pressures of the interrogation to self-incriminate. Notwithstanding excessive length and other severe interrogation-related stressors and tactics demonstrably associated with elicitation of false confessions, judges overwhelmingly admit confessions into evidence and juries overwhelmingly convict. In this review, we introduce the concept of "interrogation-related regulatory decline" (IRRD)—or decline in the self-regulation abilities necessary to resist the forces of influence inherent to interrogation. We review scientific evidence of the unexpected ease with which self-regulation abilities can be significantly compromised, with the hope that this evidence can (a) encourage more evidence-based objectivity, realism, clarity and specificity in the criteria for assessing voluntariness underlying admissibility decisions, (b) promote reforms aimed at prevention of interrogation practices entailing substantial risk of severe IRRD, and (c) encourage more scholarly research on acute sources of interrogative suggestibility.

Keywords: interrogation, false confession, acute suggestibility, self-regulation, voluntariness

Juan Rivera, a mentally handicapped 20-year-old, was arrested for the murder of 11-year-old Holly Staker in Waukegan, Illinois, 1992. Rivera underwent approximately 33 hours of unrecorded interrogation by at least 10 different officers over four days, and ultimately signed two confession statements written by police admitting that he had raped, stabbed, and murdered Staker. Prior to signing the two police-written confessions, during this extraordinarily long and intense set of interrogations, Rivera began to hyperventilate and bang his head against the cell wall so violently that he was medicated, and his arms and legs were shackled. He had suffered an acute (interrogation-induced) psychotic break-

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down, later stating that he had lost consciousness during the interrogation ordeal and didn't remember signing the police-written statements.

Despite the great amount of physical evidence left at the crime scene (including hair, semen, and fingerprints), none of more than 350 pieces of physical evidence linked Rivera to the crime. Moreover, Rivera was wearing an electronic leg monitor showing him at home the night of the crime, not at the crime scene. Nevertheless, he was convicted of the murder and rape of Staker three times! His 1992 conviction was reversed, as was his second conviction in 1998. After his second conviction was also reversed—and although Rivera was excluded in 2005 by DNA tested from sperm taken from the victim at autopsy—he was convicted for the third time in 2009. At each of his three trials, defense counsel tried—but ultimately failed—to suppress the police-written statements as the involuntary product of psychologically coercive interrogations (Leo & Ofshe, 1998; Marshall, 2010; Raley, 2011). Three trial judges did not believe the that totality of the circumstances surrounding Rivera's interrogation sufficiently overrode his will to render the confession involuntary—nor did three juries view them as sufficiently coercive as to render his confession false, despite the wealth of exculpatory evidence supporting his innocence.

Rivera's third conviction was also reversed in December of 2011 (*People v. Rivera*, 2011). The appellate court relied heavily on the exonerating DNA evidence, the unreliability of witnesses, and contamination of the confession (evidence that seemingly incriminating crime knowledge contained in Rivera's signed confessions had been communicated to him by his interrogators and other sources). The appellate court rejected the prosecution's argument that the specialized knowledge in the confession confirmed Rivera's guilt. However, the stated bases of the reversal addressed only implications of the content of the confession, and did not include the coerciveness of the interrogation or the involuntariness of the confession.

Cases like Rivera's are more commonplace than one would hope. Although most confessions obtained through police interrogation are arguably true, Rivera's false confession is only one among several hundred confessions that have been proven false to near or absolute certainty (Leo & Ofshe, 1998), and have been documented by scholars, independent researchers, and journalists over the last two decades (Drizin & Leo, 2004; Gudjonsson, 2003; Leo, 2008). Moreover, 20–25% of cases of postconviction exoneration, of which there are now close to 300 in the United States (*http://www.innocenceproject*.org), have implicated police-induced false confessions as a primary cause. Though elicited through interrogations entailing many coercive tactics that were also deployed upon Rivera, and though sometimes elicited from suspects already impaired by mental handicap or severe preexisting stressors, these confessions were admitted at trial by judges who viewed them as voluntary, and were later viewed as definitive evidence of guilt by juries who believed them valid. Such stories reflect a disturbing pattern in the American justice system. While the law prohibits the use of physical violence, or explicit threats and promises contingent on confession, police are largely free to interrogate using deceptive, exhausting, and aversive tactics, and to continue as long as the suspect fails to invoke his *Miranda* rights and demand that it stop—with virtually no risk that any confession obtained will be ruled involuntary and excluded from trial.

Admissibility rulings for contested confessions often reflect poor understanding of the power of the weapons of influence inherent in American interrogation. They further reflect assumptions soundly contradicted by science regarding the capacity of normal suspects lacking mental defect to withstand such stressors as severe fatigue, sleep deprivation, emotional distress—and aversive interrogation length, tactics, and circumstances—and nevertheless resist the powerful pressures to self-incriminate. Herein, we review evidence of factors that induce "acute situational suggestibility" in police interrogation, namely, acute situational forces preceding and during interrogation that compromise the ability to resist police pressures toward self-incrimination. Specifically, we focus on interrogation-related factors that impair self-regulation: that is, causes of "interrogation-related regulatory decline" (IRRD) underlying impairments of rational decision making and exertion of one's will. We argue that these abilities are more easily compromised than commonly assumed. Finally, we argue for reforms in judicial standards used to guide judgments of voluntariness, for reforms in police interrogation practices likely to severely compromise rational decision making and the exertion of one's free will, and for the conduct of additional research addressing such acute sources of vulnerability.

Interrogation, Confession and the Fundamental Attribution Error

Police interrogation is a powerful social situation in which detectives with apparent authority to affect the suspect's long-term legal outcomes subject him or her to an often lengthy and relentless process, employing a full armament of the most powerful weapons of social influence, to convince the suspect to provide a complete and incriminating account of his involvement in the crime at hand. The interrogation may begin when the suspect is already fatigued or distressed, may last many hours, or even days, and will typically entail a variety of tactics or procedures experienced as stressful or aversive. The latter may include forensic assessments such as polygraph tests, DNA, fingernails and other swabs, blood testing, and others; and interrogation tactics such as stringent and unrelenting accusations, refusal to attend to or believe suspect accounts of the events in question, extreme duration, multiple interrogators, invasion of personal space, physical deprivation or discomfort, and others.

Given the power of the forces of influence during interrogation, it is no surprise that interrogations are effective at eliciting confessions—both true and false. Because no registry or database exists from which to take a statistically meaningful random sample, we do not know the incidence of interrogation-induced confessions. But reviews of English and American field studies suggest a rate ranging from 42%–76% (Gudjonsson, 2003; Thomas, 1996). The incidence of false confessions likewise cannot be established absent reliable truth criteria, but is likely to be higher than commonly assumed. Police investigators estimate from their own experience that roughly 5% of the confessions they obtain are false (Kassin et al., 2007), suggesting that they elicit thousands of false confessions every year. But those who falsely confess in response to such tactics represent a small portion of those who offer true confessions against self-interest. This very power of interrogation gives rise to the three-pronged "confession problem" of voluntariness, validity, and prejudicial impact (Davis & Leo, 2011).

Once given, a confession may be retracted and disputed at trial as invalid, involuntary, or both. If the trial judge agrees that the interrogation overrode the defendant's will and coerced the confession, it will not be admitted. If the judge disagrees, and admits the confession, the defendant may claim it was false; given as the result of an extremely stressful, deceptive, and coercive interrogation. He or she may also claim enhanced vulnerability due to factors such as mental illness or defect, or others (Follette, Davis, & Leo, 2007). But a confession carries enormous prejudicial impact at all levels of the justice system. Except in the most egregious circumstances of suspect vulnerability and physical coercion (often even then), it will likely be presumed true and voluntary by police, (even defense) attorneys, judges, juries and appellate courts (see Leo & Davis, 2010 for review). When claims of invalidity or involuntariness arise, judgments tend to focus on issues of extreme physical coercion, or what could be wrong with the confessor. If no mental defect is identified, in the absence of clear physical coercion, the tendency is to believe the confession to be voluntary and true (Leo, 2008; Wrightsman, 2010).

In part, this tendency to default to considering issues of physical coercion and mental defect is due to the complexity of the issue. To adequately assess voluntariness or validity, the judge or jurors must understand the nature and impact of the influences to which the suspect is subjected during the interrogation, as well as what factors would enhance the vulnerability of the suspect to these influences—and *how much* they are likely to do so. And finally, they must apply this knowledge to determine the likelihood that the suspect's will was sufficiently overborne to cross the legal threshold of involuntariness (the vague and ill-defined "totality-of-the-circumstances" standard lacking specific guidelines), or the threshold of influence necessary to induce a false confession—thresholds that are not clearly defined in the law and not readily estimable. When the issue is validity, evidence of guilt must also be weighed. In many cases, the confession is the only evidence against the suspect, rendering the ability to accurately judge the coerciveness of the interrogation the only pathway to accurate charging, plea, admissibility decisions, and verdicts. But these judgments are extremely difficult, and in practice, tend to reflect incomplete and inaccurate knowledge of the nature and impact of both interrogation forces and individual vulnerability (see Davis & Leo, 2010).

The power of the situational forces acting upon police suspects is routinely underestimated by those at all levels of the legal system and by clinical interrogation scholars. We have reviewed the powerful, but often subtle and unrecognized, interrogation forces elsewhere (Davis, 2008; Davis & Leo, 2010; Davis & O'Donohue, 2004; Leo, 2008). Here, we focus on the issue of individual vulnerability to interrogation-related influences. Further, we do not review sources of *chronic* individual vulnerability such as personality, mental abilities or illness, or life-event histories that have been extensively reviewed by ourselves (Follette et al., 2007) and others (Gudjonsson, 2010; Kassin et al., 2010). We focus instead on what we refer to as acute situational suggestibility, namely, acute situational forces preceding and during interrogation that compromise the target's ability to resist police pressures toward self-incrimination, up to and including full confession.

Substantial evidence has demonstrated that the power of acute situational forces to undermine suspects' willpower and cognitive capacities is much greater

than commonly reflected in judicial rulings and jury verdicts (Davis & O'Donohue, 2004), and that these forces are sufficient to undermine the will and abilities of "normal" suspects possessing no defects of personality, mental health or abilities, or character. Here, we present a model of acute situational suggestibility. We first review the personal resources needed to resist interrogative influence. Then, drawing largely from literature on ego-depletion and self-regulation, (Vohs & Baumeister, 2011), we review evidence that these resources are more easily depleted and impaired by interrogation-related influences than commonly assumed—a process we refer to as "Interrogation-related regulatory decline" (henceforth IRRD). Finally, we offer policy recommendations designed to minimize IRRD and the resulting acute situational suggestibility, as well as to aid observers who must render judgments of coercion, voluntariness, and validity.

A Model of Interrogation-Related Acute Situational Suggestibility

Generally, theories of resistance to persuasion suggest that resistance requires at least two intact resources, the *ability* and the *motivation* to resist influence (Petty, Cacioppo, Strathman, & Priester, 2005). If one or both are compromised, susceptibility to influence will increase.

Ability to Resist

The ability to resist influence consists of two components: (a) the ability to effectively assess relevant information to arrive at the best judgment or choice of behavior to achieve one's goals under the circumstances, and (b) the ability to exert one's will and act on what one considers to be the best course of action. While chronic cognitive resources and willpower are clearly central to these abilities, situational forces crucially affect the capacity to marshal and use them effectively.

The ability to arrive at the best choice of behavior entails the intact functioning of a number of cognitive resources. First and foremost, one must be able to maintain focus on the goal at hand—in interrogation, to achieve the best legal outcomes, in part by avoiding incrimination—and avoid diversion toward goals such as pleasing the interrogator, escaping the interrogation immediately through compliance, and so forth. One must continually recognize, remember, and give priority to long-term best interests over immediate, and often overwhelming, impulses, and control what is said and done in the service of these long-term interests. Second, one must control attention, such that goal-relevant incoming information is attended to and irrelevant distracting information is unattended or quickly dismissed. Third, one must be able to access relevant information from long-term memory and evaluate and integrate incoming information in that context. Fourth, one must have the working memory resources to hold all relevant information in mind and use it appropriately as options are evaluated. Fifth, one must be able to control one's emotions sufficiently to make use of these abilities. Finally, one must possess the willpower to engage and persist in resisting influence, notwithstanding fatigue, the persistence of the interrogators' influence attempts, or the ineffectiveness of one's own initial attempts to resist.

Motivation to Resist

Motivation to resist influence can also arise from a number of sources. Incompatibility with other important goals or beliefs may promote resistance to the targeted belief or course of action. Resistance can also arise from perceptions that confession will lead to aversive legal, social, or other personal consequences—or by awareness of innocence and the conviction that one can successfully defend it. Goal-based motivation to resist will also depend heavily upon the ability to maintain focus on such goals and protect their priority, rather than to be diverted toward those promoted by the interrogator (such as pleasing the interrogator, or minimizing consequences of guilt rather than avoiding incrimination entirely) or prompted by the situation (such as escaping the interrogation through compliance rather than enduring it to protect long-term legal interests). One may also be resistant to the source of the influence attempt, due to dislike, distrust, low-perceived credibility, reactance, or other reasons: such as when the interrogator is perceived as hostile, coercive or deceptive. Moreover, motivation to resist can derive from the perceived availability and feasibility of other alternatives, for example, from knowledge of one's legal rights to stop the interrogation, demand an attorney, and avoid self-incrimination; or from the very fact of one's innocence, or perceptions that one can successfully establish innocence or avoid incrimination. Finally, it can derive from a sense of self-efficacy, or perceptions that one possesses and can successfully marshal the necessary abilities to resist.

Such sources of resistance can be undermined by personal or situationally induced impairments in self-confidence, general motivational deficits, awareness of relevant negative consequences of resistance, priority given to short rather than long-term goals, or inappropriate liking, and belief in the helpful motives of the interrogators. Further, interrogation tactics themselves are designed to impair motivation to resist, largely by convincing the suspect that resistance is futile and that it will only hurt the suspect's long-term legal interests, and by impairing general motivation through distress or fatigue. The skills and motivations necessary to avoid interrogation-induced self-incrimination are clearly many and vital, as are the many interrogation-related forces against which they must be deployed. Yet, the many interrogation-related assaults on these abilities and motivations are likewise surprisingly powerful. But what are these assaults? How powerful are they? And, by what mechanisms do they work?

What Must Be Resisted? The Nature of Influence in Interrogation

At all stages of police interrogation, several primary sets of strategies are operative, though specific manifestations differ. The first of these may be broadly termed "choice architecture" (Thaler & Sunstein, 2008), in which the interrogator attempts to promote confession by defining and limiting suspects' perceptions of the set of available choices. Toward this end, he or she attempts to establish the purpose and agenda of the interrogation, and to define and restrict the choices available to the suspect, primarily to exclude the possibility of establishing innocence. The interrogator attempts to undermine resistance to him- or herself by establishing "beneficence" and "authority" (Davis, 2010; Davis, Leo, & Follette, 2010), and casting him- or herself as a trustworthy ally whose goals are to help

the suspect and as someone with the authority to affect whether and what charges will be filed, based on the results of the interrogation.

The second choice architecture strategy is to redefine the nature of the interrogation. Rather than acknowledging the real purpose, which is to facilitate the suspect's ultimate conviction—or even the apparent purpose, which is to investigate guilt—the interrogator redefines the interrogation as a situation in which guilt is already clearly established. Instead, the goal is represented as allowing the suspect to "explain" him- or herself and therefore "help" him- or herself, with the implication that this explanation will affect (in a positive way) whether and what charges will be filed, with what consequences, and so forth. Thereby, what would naturally be the suspect's primary goal of exoneration is removed from the suspect's apparent choices, such that his or her attention and efforts will shift to the goal of minimizing consequences of guilt.

Choice architecture is also important during administration of *Miranda* warnings. Resistance is most effective if the suspect refuses interrogation without an attorney. Recognizing this, interrogators have adopted strategies designed to promote the illusion that the person actually doesn't have, the "right to invoke his rights." Interrogator may say something like: "Listen, we need to get this thing straightened out, but before we can do that we need to get this *formality* out of the way." This and similar statements clearly convey that the detective *will* be talking to the suspect, and that he or she is clearly not expected to refuse.

The interrogator next turns to the second general set of strategies, which is to alter the perceived costs of denial versus confession. During this phase, referred to as "theme development," the interrogator will suggest that the crime was probably committed under circumstances and for reasons that appear to minimize its seriousness and apparent legal consequences, such as for self-defense, to help others rather than out of greed, toward a "victim" who probably provoked or deserved it, and so on. These minimizing suggestions or scenarios can be complemented by arguments concerning how the judge or jury will react to a person who won't take responsibility for what she or he has done, or who lies about any involvement (see Davis, 2008, 2010; Davis & Leo, in press-a for examples).

The final set of strategies is overarching, in that it is enacted from the beginning to the end of the interrogation. Some strategies are designed to control the interaction completely. In part, this occurs through the earlier efforts to define the purpose and agenda of the interrogation. In addition, the interrogator attempts to control the focus of the suspect's attention, such that the suspect has difficulty diverting attention from the interrogator's push toward confession. This diversion renders the suspect less likely to remember his rights and why he or she should exert them, or failing this, less likely to focus instead on the possibility of innocence, any arguments or evidence favoring innocence or highlighting the negative long-term legal or social consequences of confession, or even simply away from the interrogator or toward ties with others who might discourage confession. The focus of attention tends to narrow under stress (Christianson, 1992; Easterbrook, 1959). Thus, the stressful circumstances of the interrogation are likely to enhance the effectiveness of the strong pull of the interrogators' efforts to control attention, and undermine the influence of other considerations that might otherwise effectively deter confession. Multiple strategies are enacted in service of this general purpose, including speaking quickly (so that the suspect

can't think of anything else), interrupting the suspect if he or she tries to offer denials, invading his or her personal space to prevent withdrawal, and others.

The second overarching set of strategies is those of emotion manipulation. The prominent Inbau and colleagues interrogation manual (Inbau, Reid, Jayne & Buckley, 2011), for example, argues for the effectiveness of emotions such as anxiety, pride, and guilt in promoting confession. Anxiety about one's fate, for example, can render one susceptible to solutions presented as a mechanism to minimize legal consequences. Raising guilt regarding the morality of the crime might render confession attractive as a means of atonement. Raising pride in the cleverness of the crime can raise the motivation to take credit for it. All promote confession, and most effective of all is to maintain a state of strong anxiety or fear that will have the additional effects of impairing cognition and promoting the need to escape. Vulnerability will increase among those experiencing powerful negative emotions, intolerance of distress, and difficulty controlling the emotions or associated distress (Follette et al., 2007).

To recap, a suspect may enter the interrogation deeply impaired by the physical and emotional stresses of the crime and its aftermath, only to face a potentially lengthy and aversive interrogation in which the suspect may be subject to aversive physical tests, and in which he or she is likely to be deceived throughout (Davis, 2010). If the suspect tries to defend her- or himself, he or she might be interrupted, called a liar, argued with and presented with apparently incriminating evidence to contradict arguments for innocence, and any efforts to defend innocence will be generally discounted. If the suspect fails to exert his or her rights to avoid or terminate the interrogation, this may go on for many hours, or days. Even if the suspect is offered food or rest, he or she may be too anxious to take advantage of those opportunities. There may be physical discomforts due to temperature, unsatisfied needs, or uncomfortable seating, and fatigue and stress are likely to increase as time goes on. The accused might feel greater and greater need to terminate the interrogation and get away. Without enormous strength of will and self-control, the suspect may do or say whatever is necessary to make it stop.

In this context, to avoid confessing against self-interest, the suspect would be best served by avoiding interrogation. Police interrogation may take place in two broad phases. During the first, the preinterrogation interview, the suspect may be interviewed in a nonaccusatory fashion designed to inquire about background issues, and establish rapport between suspect and interrogator. A significant purpose of this stage is to evaluate the person for deception, but interrogators are trained to interpret, inappropriately, reflections of suspect anxiety as indicating deception and guilt (Inbau et al., 2011; Vrij, 2008). Accordingly, the suspect's ability to control emotions is crucial, in that apparent anxiety can lead the interrogator to presume guilt, and proceed to interrogation.

If this happens, suspects can exert their *Miranda* rights and refuse questioning without legal counsel. But to do so, they must remember everything they know about their rights, and understand what those rights are, why they are important, and the damaging things that can happen if questioning continues without an attorney present. They must resist interrogators' efforts to imply that their rights aren't real, and understand that detectives' insinuations of their guilt if they refuse to talk are less important than the long-term damage that can occur if they do. If

they do agree to the interrogation, they must control powerful emotions deriving from the events in question and the interrogation itself, control distress, and suppress impulses to do anything to get away. They must control attention and focus on the goal of exoneration, despite powerful forces pulling attention toward the lesser goal of minimizing consequences. They must be able to remember relevant knowledge and use it to critically evaluate the information and arguments presented by interrogators, and recognize when they are being deceived.

Moreover, suspects must resist intense pressures to confess from one or more authorities, who presumably have much greater relevant knowledge of evidence against suspects, and other issues, and significant apparent control over their fates. Suspects must resist tactics designed to distract attention away from what they know about their rights, recognize the foibles of evidence presented against them and the prospects for eventual acquittal, and focus on what is important. They must remember what really happened, and not become confused by what they are now being told. And most of all, suspects must have the willpower to continue resistance despite the unremitting interrogation, and the possible frustration of failure to convince their interrogators of their innocence. Suspects must not let motivation to resist fail by falling prey to the apparent beneficence of the interrogator or to feelings of hopelessness and ineffectiveness. A tall order indeed! But how effectively can individuals mount such defenses, in the face of the many influences they may face in interrogation, with so much potential to compromise needed resources of resistance?

The Depletion and Impairment of Resistance: What Is Self-Regulation? Why Does it Matter? And How Easily Is it Impaired?

Self-regulation refers to processes by which individuals control their thoughts, emotions, and behaviors in service of the pursuit of one or more goals. One of the most rapidly burgeoning and vibrant areas of research in psychology, the study of self-regulation has implicated chronic or acute self-regulation capacities and strategies as playing crucial roles in most areas of human life or endeavor: from clinical psychopathology, to thinking, memory and creativity; school and work performance; successful interpersonal relationships; problem behaviors such as risk taking, criminality, or drug abuse; efforts toward self-improvement such as dieting, and others (see Vohs & Baumeister, 2011 for reviews).

Baumeister and his colleagues proposed a "limited-resource" view of self-regulation resources (Baumeister, Bratslavsky, Muraven, & Tice, 1998), suggesting that prior exertion of self-control depletes these resources (termed ego depletion), leading to greater likelihood of self-regulation failure on subsequent self-regulation efforts. Studies in the limited resource paradigm use dual-task procedures in which participants are first subjected to an ego-depleting task presumed to consume self-regulatory resources, and subsequently perform a second unrelated task, one presumed to also demand such resources. The general finding of such studies is that prior use of self-regulatory resources impairs performance on subsequent resource demanding tasks, but does so less or not at all for less demanding tasks (see Hagger, Wood, Stiff, & Chatzisarantis, 2010 for a review of moderators of these effects).

Studies in this tradition have used a variety of tasks to serve as both manipulations of ego-depletion and measures of its effects, including tasks requiring control of cognitive resources such as attention, working memory, and others; effort and persistence in the face of difficulty or failure; emotion regulation, physical effort, control of impulses, tolerance of distress, active choice or exertion of will, and others. Qualifying tasks must entail overriding acute impulses, or inhibition of automatic, habitual or dominant responses, and include tasks of difficulty or tedium sufficient to require effort to override impulses to quit. Depletion through any such task can impact subsequent self-regulatory control in any others. Poor regulatory resources may also result from fatigue, illness, or chronic regulatory weakness.

Of particular relevance to interrogation are the self-regulatory functions of control of short-term impulses in favor of long-term best interests, control of cognition to facilitate optimal decision-making and control of behavior, and control of emotion to facilitate each of these. In the following sections, we review evidence of (a) the importance of intact self-regulatory resources for each area of control, (b) the surprising ease with which self-regulatory function can be impaired, and (c) the impact of ego-depletion on suggestibility and the ultimate decision to confess. We then consider common, yet unrecognized or underappreciated, sources of interrogation-related ego-depletion and self-regulatory failure.

Impulse Control: Maintaining Priority of Long-Term Goal Pursuit Over Short-Term Impulse

A prerequisite for successful self-regulation is having a clearly defined behavioral goal. At the beginning of interrogation, a suspect may have the goal of establishing his or her innocence. As the interrogation persists, the suspect may become increasingly fatigued or distressed. If the suspect gives priority to his or her immediate needs to escape the aversive situation over long-term best legal interests, he or she may confess simply to terminate the interrogation. This can happen through two mechanisms involving (a) simple lack of interest in long-term goals and/or (b) an inability to override the impact of immediate needs and demands, sometimes despite strong concern with long-term goals (e.g., due to distress intolerance).

As it proceeds, interrogation is likely to substantially shift the balance between the strength of impulses to escape the interrogation versus cognitive and emotion control functions that might otherwise override them. As this balance shifts, attention will likewise shift to cues relevant to escape over those relevant to the initial goal of exoneration. As the increasingly impaired suspect becomes more stimulus-driven and less responsive to internal goals and beliefs, the interrogator's push toward confession will become more persuasive. The interrogator will thwart efforts to establish innocence but strongly encourage other goals, such as being seen as cooperative, explaining how one might have been caught up in the moment, avoiding a bad legal outcome if one cooperates, or, where alleged coperpetrators are also being interrogated, "telling your side of the story" and assigning blame to them before they assign it to you. Interrogation is designed to increase anxiety, guilt, and other negative emotions to increase the impulse to escape; and to misrepresent what are the most desirable and attainable goals. If

either occurs, self-regulation toward preventing incrimination is inevitably weakened.

Metcalfe and Mischel (1999) proposed a dual-process system for regulation of impulsive responses to situational stimuli. They summarized the two systems as follows:

> A cool, cognitive "know" system and a hot, emotional "go" system. . . .The cool system is cognitive, emotionally neutral, contemplative, flexible, integrated, coherent, spatiotemporal, slow, episodic, and strategic. It is the seat of self-regulation and self-control. The hot system is the basis of emotionality, fears as well as passions—impulsive and reflexive—initially controlled by innate releasing stimuli (and, thus, literally under "stimulus control"); it is fundamental for emotional (classical) conditioning and undermines efforts at self-control. The balance between the hot and cool systems is determined by stress, developmental level, and the individual's self-regulatory dynamics (p. 3).

Self-regulation studies often apply the conflict between these "hot" and "cold"" systems to the issue of rational restraint of emotional impulses. However, restraint may also derive solely from the hot system, as when anxiety prevents response to either cool cognitive evaluations and plans, or to situational stimuli provoking contrary emotional responses (such as when desire says "go" and anxiety says "stop;" Carver, 2005). A wealth of evidence has accumulated to support the role of self-regulatory strength in suppression of impulse-driven behavior in favor of functional, carefully considered behavior, and to illustrate the roles of both major and minor forms of ego-depletion on impulse-driven behavior (see reviews in Vohs & Baumeister, 2011). Much such literature concerns resistance to dysfunctional behaviors, such as overeating, substance abuse, risk-taking, inappropriate sexual actions, and so on. However, other literature has concerned the issue of choices maximizing long- versus short-term gain.

Metcalfe and Mischel (1999) reviewed a host of studies concerning delay of gratification (i.e., resisting the impulse to accept an immediate smaller award in favor of a delayed, but larger one), showing that interference with the "cool, cognitive, 'know' system" resulted in greater reaction to the "hot 'go' system;" that is, choosing the immediate smaller reward (for more recent review, see Tobin & Graziano, 2010). This situation is particularly pertinent to the interrogation-related choice of whether to comply and confess to achieve the short-term goal of escape from the stresses of the interrogation, but with the price of facing the long-term consequences of incrimination, prosecution, and probable incarceration. A second, particularly relevant issue of impulse control—that of controlling the impulse to quit a prolonged, demanding or frustrating task (such as interrogation)—has likewise been shown to depend upon intact self-regulatory resources (Hagger et al., 2010; Vohs & Baumeister, 2011).

Current views suggest that impulse control depends upon at least three self-regulatory functions (e.g., Hofmann, Friese, & Roefs, 2009). The first, "inhibitory control," refers to the capacity to choose how to react to the impulse, and potentially willfully override it. The second and third affect the strength of the impulse, thereby modulating the difficulty of inhibitory control. One relies on the cognitive functions of executive control of attention; that is, the ability to divert attention from triggers of the impulse, and redirect it to stimuli and thoughts that

would inhibit the impulse. This can include Metcalf and Mischel's rational cool, cognitive "stop" analysis of consequences and reasons the impulse should be inhibited. The other entails down-regulation of the hedonic affect (emotion) triggering the impulse—in effect, to weaken the impulse itself. Thus, we turn in the next two sections to the general self-regulatory functions of control of cognition and regulation of emotion. In the process, we illustrate the ease with which self-regulatory resources, and thus performance in each of these areas, can be compromised.

Control of Cognition

The cognitive system is responsible for deliberative judgments, strategic planning for goal pursuit, and inhibition, or overriding of prepotent impulses or habits. Central to these functions are memory and control of attention. Rational analysis requires one to selectively attend to, comprehend, and remember relevant incoming information; access other relevant information from memory; hold all relevant information in working memory; and use it to assess the desirability and feasibility of goals and strategies to achieve them; and then select plans for their execution. Then, the person must have the strength of will to execute those plans, notwithstanding strong stimulus draws toward other goals and behaviors.

A number of studies have specifically examined the effects of depletion of cognitive resources on tasks demanding self-regulatory resources, many using the dual-task depletion paradigm described earlier. Others have used manipulations of cognitive load, placing heavy demands on working memory in order to decrease capacity for the target task—often by requiring the person to engage simultaneously in a distracting secondary task while completing the primary task. Impairment of cognitive resources through either experimental strategy has been shown to result in poorer self-regulation—with respect to impulse control and rational analysis (see Hofmann, Friese, Schmeichel, & Baddeley, 2011 for review).

Impulse control and the pursuit of conscious or long-term goals are weakened by impairment of important cognitive functions. Effective goal pursuit entails the ability to maintain current goals and relevant supportive information and plans in mind over time, and to engage in the executive attentional control to screen out distraction and maintain their priority over other situationally prompted goals (i.e., goal shielding). These functions entail intact working memory and attentional control—for inhibition of interfering thoughts and emotions. Attention must also be controlled to update relevant information and the status of goal pursuit, and flexibly adjust—potentially to switch goals when one goal becomes infeasible or inadvisable, or to switch strategies in pursuit of the same goal. Finally, one must exert the will to override conflicting impulses in favor of the preferred goal. Effective decision-making is likewise undermined by cognitive deficits. Again, incoming information must be screened for relevance, understood, and evaluated in light of relevant information accessed from long-term memory. Distracting thoughts' content and emotions must be suppressed in order to process and integrate relevant information to form a decision—which may require updating as more information is added. And, again, the person must exert the will to act on the decision (now a goal), and pursue it despite countervailing influences.

Hoffman and colleagues (2011) presented evidence that both chronic and acute working memory capacities (WMC) are crucial to all of these cognitive

functions. Further, both chronic and acute WMC impairment has been empirically linked to the end results of impairments in impulse control, long-term goal pursuit, decision-making, and emotion regulation. In other words, cognitive control is necessary for all additional areas of self-regulation, just as it also depends upon them. Strong impulses and emotions deplete cognitive resources through attempts to either control or pursue them.

Unfortunately, depletion of cognitive resources and other self-regulation failures have been proven to occur in response to tasks that are much less resource-consuming than those facing suspects in police interrogation. Thus, it is important to note specific examples of apparently minor manipulations of depletion, and their surprising power to affect crucial underlying cognitive processes and the resulting self-regulatory failures (for a vast array of additional examples, see Vohs & Baumeister, 2011).

Schmeichel (2007) illustrated the ease with which prior exertion of cognitive executive control can impair subsequent executive control functions, obtaining impairment on subsequent tasks due to prior attentional control (e.g., watching a video while ignoring distracting information at the bottom of the screen), response inhibition (e.g., writing a story while instructed not to use an "a" or an "n"), memory updating, including the operation span (e.g., performing mathematical calculations while performing a recall task), sentence span (e.g., combining a recall task with verbal or spatial distractors), reverse digit span (e.g., attempting to recall a series of numbers backward rather than forward), and response exaggeration (e.g., exaggerating facial expression of emotion during an emotion-provoking film).

In another set of studies, Schmeichel and colleagues (Schmeichel, Vohs, & Baumeister, 2003) used the dual-task method to examine the effects of executive depletion on verbal comprehension and reasoning. Participants who first performed the depleting attention-control task whereby they watched a video while suppressing attention to distractor stimuli, compared to those who had no distractor stimuli, subsequently persisted less in attempting to answer GRE analytical questions and answered fewer correctly, and also performed more poorly on a reading comprehension section of the GRE. In a second study, participants who watched a distressing film while instructed to suppress their emotional reactions subsequently performed more poorly on demanding cognitive tasks than those not given suppression instructions.

The ego-depleting impact of the simple act of making a choice among alternatives was investigated by Vohs and colleagues (Vohs et al., 2008), who showed that making choices among college courses or consumer goods (compared to just thinking about the options) led to less tolerance of physical distress (persistence in the cold-pressor task of holding one's arm submerged in ice water), reduced persistence in the face of failure, and poorer performance and persistence in completing math calculations. The depleting effects of choice are greater, however, when under circumstances characteristic of police interrogation, where the decision is more difficult, or the person feels pressured, coerced, or seduced into action, compared with circumstances in which the person more easily or freely chooses among naturally interesting or desirable alternatives (Baumeister, Sparks, Stillman, & Vohs, 2008; Moller, Deci, & Ryan, 2006). Those asked to

make more controlled, versus autonomous, choices persisted less in attempts to solve unsolvable puzzles, as well as solvable, but tedious puzzles.

A number of studies examined the end-product of such processes, showing that the choices of ego-depleted participants were guided more by simple heuristics and irrelevant context effects rather than by deliberate, effortful trade-off comparisons (see Baumeister et al., 2008 for review). In addition, choices appear to become more passive, in that the already powerful tendency to choose the "default" option—one engaged automatically unless one actively chooses otherwise—is greater when individuals are depleted. Choices are also more likely to be guided by the affective feelings generated by the various alternatives rather than their objective rational advisability. And, when all is said and done, memory for what was chosen is poorer among depleted choosers (Baumeister et al., 1998).

While these and many other studies have implicated ego-depletion in subsequent failures of cognitive performance, substantial research has also implicated impairment of cognitive executive functions, and specifically working memory (WMC), in failures of impulse control, such as restraint of eating or substance use, risk taking, aggression, inappropriate sexual behavior, and others; and in failures of emotion-regulation, including both enactment of specific emotional control strategies such as reappraisal or diversion of attention, and the end product of dampening undesired emotions (see Gross, 2007; Hofmann et al., 2011; Vohs & Baumeister, 2011). In sum, ego-depletion renders a person more stimulus-driven and responsive to immediate impulses, less rational and reflective in decision-making, and more vulnerable to suggestion and persuasion, as we discuss below.

Affect Regulation and the Management of Distress

A central problem of self-regulation for a suspect under interrogation is the need to control his emotions, or at least his reaction to them. The suspect may need to suppress affective states such as distress, anxiety, and fear that might otherwise disable cognition, interfere with rational decision-making, increase susceptibility to interrogation tactics playing on emotion, and lead to greater impulsivity or confession to terminate the interrogation. Emotions selectively drive attention toward emotion-related, goal-relevant stimuli and information (see Levine & Edelstein, 2009). This can exert powerfully distracting effects, diverting attention from the goal of exoneration, and rendering the suspect more responsive to suggested mechanisms to minimize legal consequences, or to mechanisms of escape from the aversive interrogation. In contrast, successful emotion regulation facilitates pursuit of preferred goals, and yet increases needed flexibility in thinking and behavior in pursuit of those goals.

Self-regulation of emotion is dependent upon several processes potentially impaired by ego-depletion. Among them is regulation of attention to divert thinking from emotion-provoking information or stimuli. One may also self-regulate emotion through cognitive reappraisals of the source of emotion, rendering it less threatening (see Koole, 2009 for review). Each mechanism can be dysfunctional in the interrogation room, where effective decision-making requires the suspect to attend to relevant information and to realistically appraise and evaluate the situation. The suspect may also self-regulate emotions by avoiding physical expressions of emotion such as facial expressions, physiological re-

sponses, or gestures; or may engage in relaxing exercises such as yoga-like controlled breathing or progressive muscle relaxation techniques, and so on (see Gross, 2007; Koole, 2009 for reviews).

Unfortunately, all such mechanisms require self-regulation to override automatic responses with more controlled, effortful responses—the very processes compromised by ego-depletion. Moreover, such efforts to control emotion are themselves depleting—and lead to self-regulation failures such as aggression, overeating, inappropriately simplified or poor decision making, unfocused attention, impaired memory and other decrements in cognitive performance (DeWall, Baumeister, Stillman, & Gailliot, 2007; Dillon, Ritchey, Johnson, & LaBar, 2007; Johns, Inzlicht, & Schmader, 2008; McRae et al., 2011; Richards & Gross, 2000; Tice, Baumeister, & Zhang, 2004). Efforts to cope with stress, specifically, lead to self-regulatory failures directly relevant to the ability to resist pressures toward confession, such as impaired attentional control or persistence in the face of frustration. Intense emotions are more difficult to regulate, and efforts to control them more depleting. Moreover, emotional control itself becomes more difficult as the person suffers greater depletion, thereby exacerbating such effects (Schmeichel & Demaree, 2010).

Efforts to control the overt expression of emotion can boost arousal while failing to reduce negative emotions, and paradoxically reducing positive emotions (Butler et al., 2003; Gross, 1998; Gross & Levenson, 1997), creating a cycle of greater and greater difficulty in self-regulation of emotion. Expressive suppression can also impair social functioning (Srivastava, Tamir, McGonigal, John, & Gross, 2009), disrupt communication, and magnify negative emotions. Emotion suppression has additional negative effects, including impairing memory for ongoing interactions or events (Dillon et al., 2007; Egloff, Schmukle, Burns, & Schwerdtfeger, 2006; Richards & Gross, 2000), and can be particularly detrimental when a suspect or interrogator must later recount the events of an interrogation.

The Role of Fear

Among the many emotions likely to arise in the interrogation room, perhaps the most common is fear. Among the most powerful sources of such fears is the specter of prison or death. The former entails a number of specific fears such as isolation, separation from friends and family, boredom, physical threats of violence, deprivations of liberty and material resources, and many others. Some such fears have been specifically shown to impair self-regulation. Effects of thoughts of death, for example, were investigated in nine studies by Gailliot and colleagues (Gailliot, Schmeichel, & Baumeister, 2006). Participants lower in either chronic or acute measures of self-control, or those experimentally depleted through prior resource-consuming tasks, were less able to keep thoughts of death at bay. In turn, when participants were led to confront and cope with thoughts of death, this led to self-regulation failures of attentional control, logical reasoning, and persistence. Lesser fears of social isolation, exclusion, separation from loved ones, or rejection—highly relevant for those facing possible incarceration—have also been shown to impair self-regulation, including impairments of impulse control, such as aggression, unhealthy behaviors, or foolish risk taking; distorted time perception and emphasis on the present over the future; and an assortment of impair-

ments in cognitive functions (Baumeister, Brewer, Tice, & Twenge, 2007; Baumeister & DeWall, 2005; Blackhart, Baumeister, & Twenge, 2006).

The Costly Pursuit and Maintenance of Self-Esteem

Among the pervasively present self-regulation goals are those directed toward maintenance of self-esteem and specific desired self-images (see Crocker, Moeller, & Burson, 2010; Morf & Horvath, 2010). Both unconscious and conscious processes operate, whereby the person becomes especially attentive and responsive to opportunities for threats to the pursuit of preferred self-images (Morf & Horvath, 2010). Such selective attention can render the suspect more responsive to theme development, for example, where the interrogator flatters the suspect and offers seemingly more acceptable scenarios for how and why the crime was committed (e.g., self-defense). Interrogation manuals instruct that such scenarios will facilitate confession by offering mechanisms through which the suspect can confess and nevertheless save face (e.g., Inbau et al., 2011).

Whereas goals of ego maintenance can facilitate receptiveness to the interrogator's tactics directly, it may also do so through ego-depletion. The pursuit and defense of self-esteem has been shown to be effortful (Crocker et al., 2010; Morf & Horvath, 2010), and to lead to self-regulatory failures manifest in a variety of behavioral and cognitive arenas. This represents one of a number of interrogation-related sources of distress—and ultimately suggestibility—that tend to go unrecognized or underestimated. As with many classes of threats, those to the ego engage the "hot" emotional system (Crocker et al., 2010), that is, provoking negative emotions such as shame, fear, embarrassment, feelings of failure, and others; increasing stress and arousal; and provoking voluntary coping strategies designed to deflect the threat and restore the ego. Efforts to manage emotions and address the threat trigger thoughts that divert attention, consume cognitive capacity, and undermine pursuit of other long-term goals. Perceived threats to one's self-image can function like threats to physical well-being or survival, thereby activating the fight-or-flight system and provoking the release of stress hormones such as cortisol (Crocker et al., 2010), which themselves undermine cognitive performance (see later sections on stress).

The Role of Stereotype Threat

Many of these processes have been reflected in the literature on "stereotype threat." When negative stereotypes applying to one's social group are salient, thereby also threatening one's own ego, performance in stereotype-relevant areas is impaired. Such decrements result in part from the increased cognitive load caused by worry about potentially confirming the undesirable stereotypes. This work has recently been extended to show a broader range of self-regulation failures under stereotype threat, such as increased aggression, unhealthy eating, more risky decision making, reduced physical stamina, failures of attentional control and working memory, and increased loss-aversion in decision making (the tendency to overweight the potential for loss). Stereotype threat impairs performance, in part due to depletion of executive resources resulting from (a) physiological stress responses directly impairing prefrontal processing, (b) active monitoring of threat-related performance, and (c) the person's attempts to regulate

the negative emotions raised by the threat (Beilock, Rydell, & McConnell, 2007; Carr & Steele, 2010; Inzlicht & Kang, 2010; Inzlicht, McKay, & Aronson, 2006; Johns et al., 2008; Schmader, 2010; Schmader & Johns, 2003; Schmader, Johns, & Forbes, 2008).

It is noteworthy that substantial potential for the operation of stereotype threat exists in the interrogation room. Minorities such as Hispanics and African Americans, for example, may be aware of stereotypes associating their groups with criminal behavior. Similar processes may affect other defendants—for example, step-fathers accused of sexual assault of step-children, and others accused of crimes viewed as likely committed by a person of their category (husbands accused of spouse murder). Awareness that others may assume they are personally criminal as the result of such stereotypes can promote the sense of hopelessness regarding establishing innocence that interrogators encourage and rely on, and through the processes mentioned above, directly impair thinking and self-regulation. Further, the anxiety associated with awareness of and attempts to manage stereotype threat may give rise to the appearance of deception and guilt, as cues of anxiety tend to be interpreted by interrogators and others as indicators of deception (Vrij, 2008; Najdowski, 2011). Finally, as with other classes of ego threat, stereotype threat may render the person more susceptible to interrogation tactics of flattery or face-saving themes.

The Related Issue Of Impression Management

An overriding task of the suspect in police interrogation is to attempt to manage the impressions he or she conveys to his interrogators—all the while keeping in mind the ultimate audiences of prosecutors, judges, and juries. Vohs and colleagues (Vohs, Baumeister, & Ciarocco, 2005) provided evidence that such impression-management goals and activities are depleting and lead to self-regulatory failures on subsequent tasks, particularly when one must override natural behavioral tendencies in order to convey desired impressions. Depletion effects have included failures of persistence on difficult math tasks or acts of physical endurance, and failures of emotional control. Likewise, Vrij and colleagues (Vrij, 2008) have provided evidence that lying is cognitively demanding compared with truth telling, along with the related activities of keeping track of the lies one has told and the lie-relevant information that might betray them as such, and the need to monitor carefully other information one might disclose in light of the lies. Vohs and colleagues (Vohs et al., 2005) also documented the reverse: that resource-demanding activities impair successful impression management. Ego-depletion through emotion regulation or attention control has led to more uncontrolled talking, inappropriate self-disclosure and negative self presentations.

Of particular interest for the context of interrogation, Crocker and colleagues (Crocker et al., 2010) pointed out that self-regulation in the "'hot' system" can lead to failures to discriminate when one should persist versus quit. That is, hot emotions triggered in response to ego threat may provoke such strong needs to restore one's self-esteem or to manage others' impressions of oneself that one may persist in such efforts even when they are dysfunctional or failing, such as continuing to talk to police hoping to convince them of one's innocence rather

than more wisely invoking *Miranda* rights. The degree to which the ego is at stake can vary between situations and people (Crocker et al., 2010; Morf & Horvath, 2010). This offers an avenue of attack for the interrogator to use such ego-related threats to increase the suspect's level of distress (and need to escape), and his or her susceptibility to tactics such as flattery or theme development. It also indicates an unrecognized source of individual vulnerability, both to interrogation-related regulatory decline (IRRD) and to specific interrogation tactics; see, e.g., Morf and Horvath's (2010) discussion of reactions of narcissists to self-threats.

The Bottom Line: Ego Depletion, Decision Making, and Persuasion

Together, the stresses of the interrogation and emotional responses to them can be extreme and debilitating. Substantial evidence has implicated stress in poor decision making, and therefore much research has addressed mechanisms to override such negative effects and protect decision-making faculties in extremely stressful and demanding environments (Hammond, 2000; Kennedy & Moore, 2010; McNeil & Morgan, 2010; Orasanu & Lieberman, 2011). Impairments result in more impulse-driven emotional decisions, in part reflecting less reflective processes such as active analysis of incoming information—a crucial liability when faced with unrelenting attempts to persuade.

Interrogation tactics may persuade suspects (whether guilty or not) that confession will serve their long-term best interests. Effects of ego-depletion on the effectiveness of persuasive attempts can be understood in the context of the "elaboration-likelihood" (Petty, Barden, & Wheeler, 2009; Petty et al., 2005) and related dual-process models of persuasion. According to such models, persuasion may take place via a more effortful form of "central-route" processing, whereby the person carefully attends to and thinks actively about incoming messages, and critically analyzes them in light of existing knowledge. Persuasion via this route depends upon the quality of the arguments presented, and the recipient's ability and motivation to critically appraise them. If the person does not possess the ability or motivation to process a message on the central route, he or she will be shunted to the "peripheral route," where processing is much less reflective and effortful, and the content of the message is not as carefully scrutinized for quality. Instead, persuasion depends on peripheral or heuristic cues serving as proxies for quality—such as source credibility or trustworthiness, the number (vs. quality) of arguments presented, and so on. Message quality impacts persuasion more when processing resources and message importance are high; whereas, if one or both are low, persuasion is affected less by message quality and more by peripheral cues such, as source characteristics (e.g., expertise, likability, trustworthiness, or authority) or the simple number of arguments (see Petty et al., 2005 for review).

Illustrating the effects of ego depletion on reaction to argument quality, for example, Wheeler and colleagues (Wheeler, Briñol, & Hermann, 2007) found that nondepleted participants were more persuaded by the high- than the low-quality arguments, whereas depleted participants were equally persuaded by both. Further, depleted participants generated significantly less counterarguments against the couterattitudinal message—that is, they responded less thoughtfully and critically to the message. Even as resource depletion reduces responsiveness to argument quality and enhances persuasion based on source credibility, it ironi-

cally renders targets of persuasion less likely to respond to cues of manipulative intent on the part of the communicator that would otherwise lead them to discount the message (Wentzel, Tomczak, & Herrmann, 2010). Such a process can increase susceptibility to tactics designed to increase trust of an actually malevolent interrogator and shunt the suspect to peripheral-route processing, where he or she would likely fail to critically evaluate the content of the interrogator's persuasive efforts and simply rely on his or her apparent trustworthiness as an heuristic cue to truth and accuracy.

Findings from the dual-process tradition of persuasion research fit well with a second line of research conducted by Daniel Gilbert and his colleagues (Gilbert, Tafarodi, & Malone, 1993), indicating that people tend, as a default, to first believe information they encounter as part and parcel of the process of understanding it. In a second, less automatic process, they may or may not carefully think about that information and deliberately decide to believe it or not. But the second stage may not occur, and if not, the person may yet believe what "should not" be believed (e.g., Gilbert et al., 1993). Typical resource depleting circumstances can enhance cognitive load and reduce the likelihood of, or prevent, this second stage.

In a particularly relevant set of three studies, Gilbert et al. (1993) found that, under enhanced cognitive load or increased time pressure, participants exposed to false information about either a criminal defendant or a college were more likely to use the false information in making consequential decisions about the target. In effect, they were less likely to "unbelieve" the false information. Likewise, distraction decreases the effects of argument quality on persuasion and increases effects of peripheral heuristic cues (see Petty et al., 2005 for review).

Common but Underappreciated Sources of Self-Regulation Failure in Interrogation

A central point of our review of the importance and impact of self-regulation has been the ease with which the underpinnings of successful decision making and resistance to influence can be undermined. This stands in stark contrast to the (in our view) amazing insensitivity among those in the legal system to the effects of far more exhausting and depleting circumstances faced by criminal defendants. Interrogations that clearly pass reasonable limits of suspects' abilities to actively exert their wills, to "knowingly and intelligently" waive their rights, or to decide to confess (allegedly voluntarily and rationally), are routinely ruled voluntary and admitted into evidence (Wrightsman, 2010). Among the circumstances posing what should be the most obvious of interrogation-related factors undermining these capabilities are extreme preexisting stress, fatigue or sleep-deprivation, or extremely lengthy and/or stressful interrogations. Self-regulatory resources can be depleted through use, and through efforts to cope with distress, as described in preceding sections, but may also be compromised through simple physical deprivations associated with long and aversive interrogations, including glucose depletion, fatigue, and sleep deprivation. In the following sections, we consider the effects of these physical deprivations. We also cover in more detail the effects of severe stress, and evidence from studies of military personnel in extreme circumstances of the combined effects of these factors.

Glucose Depletion

Gailliot and Baumeister (2007) reviewed substantial evidence that self-regulatory resources rely on glucose, which itself is depleted by the many self-control activities studied in the self-regulation literature. They presented evidence of reciprocal influence between the two, such that acts of self-control reduce blood glucose levels and depleted glucose levels impair the many acts of self-control reviewed earlier. Further, replacement of glucose between acts of self-control reduces or eliminates depletion effects. Other evidence indicates that eating, per se, may be important for emotion regulation, and that, via its impact on emotion regulation, eating may aid in other acts of self-control. Eating has neuroendocrine effects such as the release of opioids that can relieve stress (Koole, 2009).

Severe glucose depletion is not uncommon in police interrogation. Suspects may be deprived of replenishing resources for hours, and, if offered food or sugary drinks, may decline due to dampening effects of psychological or physiological distress on appetite. Even if glucose is consumed sporadically, it may be insufficiently frequent relative to the demands imposed by the situation for replenishment, thereby exacerbating the already depleting effects of fatigue and other forces of the interrogation.

Fatigue/Sleep Deprivation

Fatigue and sleep deprivation may be extreme when an interrogation begins, and increase as the interrogation lasts as long as one or more days. Decrements in performance due to sleep deprivation of as little as 24–36 hrs have been reported for cognitive tasks entailing attention, working memory, long-term memory, visuomotor performance, decision making, verbal fluency, logical reasoning, creative thinking, response inhibition, error detection and correction, updating decisions in light of new information, planning, prioritization, and emotion regulation, though effects can vary among the specific tasks assessed (see Alhola & Polo-Kantola, 2007; Harrison & Horne, 2000; Walker & van der Helm, 2009; Wesensten & Balkin, 2010 for reviews). Illustrating extreme impairments of judgment under sleep deprivation, Banderet and colleagues (Banderet, Stokes, Francesconi, Kowal, & Naitoh, 1981) examined the effects of sleep deprivation on artillery training teams in sustained simulated combat. Decisions to fire on simulated enemy versus noncombatant targets revealed that after 24 hrs of sleep deprivation, teams inadequately kept track of the difference—firing without hesitation regardless of the nature of the target. In contrast, without sleep deprivation, the teams refused inappropriate requests.

Particularly relevant effects of sleep-deprivation on suspects concern resistance to influence, rational decision making, emotion regulation, impulse control, and memory for the interrogation and events in question. Several studies found enhanced suggestibility under sleep deprivation. Many others have focused on sleep-deprivation effects on the quality of decision making, indicating that sleep deprivation generates greater deficits in decision making when tasks involve novel judgments, requirements for greater integration, creativity, and flexibility in thinking, the presence of competing distractions, or the need for effective communication—all characteristic factors affecting the suspect's decision making in interrogation. Decisions also tend to become less sensitive to potential loss and

more risky and reward driven (Venkatraman, Huettel, Chuah, Payne, & Chee, 2011; Venkatraman, Chuah, Huettel, & Chee, 2007), and confidence in one's decisions and actual accuracy become more dissociated with increased sleep deprivation (see Alhola & Polo-Kantola, 2007 for reviews). Substantial research also indicates that fundamental processes of perception, encoding, consolidation, and maintenance of memory over time, and memory's susceptibility to alteration through various processes are strongly affected.

At extreme levels, sleep deprivation can sufficiently impair encoding, such that the unreal is perceived as real and vice versa (Larsen, 2001). If the event is encoded successfully, memory-consolidation processes are subject to disruption through sleep deprivation (see Diekelmann & Born, 2010 for review). A further level of consolidation occurs predominantly during REM sleep (Walker & Stickgold, 2010; Walker & van der Helm, 2009), supporting integration of new with old memories within associative networks, and facilitating schematic understanding and planning. The very process of integration of new memories with existing information, as well as with additional new, incoming information, can produce memory distortion, as illustrated by a significant body of research on distortion of memory toward supportive beliefs (Davis & Loftus, 2009). Suggestion occurring during informal or formal discussions of the events in question can alter memory upon retrieval, and, as noted earlier, has more impact upon the sleep deprived (Walker & van der Helm, 2009). Such findings suggest that sleep deprivation may render a suspect more vulnerable to distorted descriptions of the events in question (including the possibilities of false confession and false memories of committing the crime; Kassin, 2007), and yet less able to remember the interrogation that prompted the false memories.

Emotion regulation. The sleep-deprived brain is significantly less able to self-regulate emotions and produce controlled appropriate responses (Van der Helm & Walker, 2010; Walker & van der Helm, 2009). A large variety of dysfunctional behaviors become more disinhibited when an individual is sleep deprived, ranging from overeating and other forms of indulgence, to various forms of risk taking and aggression (Walker & van der Helm, 2009; Wesensten & Balkin, 2010).

Sleep deprivation and recovery. Although most studies of sleep deprivation have examined total sleep deprivation of varying degrees, studies of inadequate sleep across one or more nights have also shown similar deficits in self-regulatory functions resulting from one or more deficit hours per night. Moreover, whereas recovery from an acute, total sleep loss can occur in 1–2 nights of 8-hr sleep, recovery from chronic sleep restriction occurs less rapidly, and deficits may persist for days after normal sleep hours are resumed. Acute efforts to restore function in the sleep deprived are not effective substitutes for sleep. Activities such as bouts of physical activity, for example, are not effective in improving performance for more than several minutes, though agents such as caffeine in sufficient dose can help (Wesensten & Balkin, 2010). Thus, it is unrealistic to presume that a suspect will resume normal functioning if given a few hours of sleep, or even a full night's sleep, or if given opportunities to walk around or drink a caffeinated soda between repeated interrogation sessions, particularly if sleep loss has occurred for several days prior. Further, it is better to

rely on objective indices of deprivation rather than subjective reports of fatigue, as the two are inconsistently related (Wesensten & Balkin, 2010).

The Perfect Storm: A Cocktail of Glucose-Depleting Stress, Fatigue, and Sleep Deprivation

While glucose depletion, stress, fatigue, and sleep deprivation separately impair executive functions of cognition and control, together they pose the specter of much more profound impairment. Such a cocktail of forces is difficult to investigate in the typical research lab, but has been the subject of routine study in the military. Sometimes referred to as the "fog of war," military researchers have examined deficits of performance under stress commonly experienced in extreme combat-related circumstances. Lieberman and colleagues (Lieberman et al., 2005) described "combat stress-induced cognitive decline" as pervasive decrements in simple and complex cognition under combat conditions. McNeil and Morgan (2010) coined the term "operational demand-related cognitive decline" (ODRCD) to refer to "decrements in cognitive performance or decision-making resulting from the manifold pressures or acute stressors characteristic of dangerous or extreme environments."

Military training activities offer the opportunity to study such a constellation of stressors. For example, SERE (survive, evade, resist, escape) training subjects cadets to intense physical activity and discomfort, sleep deprivation over several days, and intense acute stress via mock POW capture and interrogation.

Charles Morgan and colleagues have conducted a series of studies to identify the degree and manifestations of the cadets' stress responses to SERE and other stressful military training exercises, as well as potential moderators of these responses. These and related studies have revealed an important role of stress in impairment of indices of executive control and cognitive performance, and various specific aspects of military performance, including performance in interrogation and memory for the interrogator (see McNeil & Morgan, 2010; Lupien, Maheu, Tu, Fiocco, & Schramek, 2007 for reviews). Dissociative symptoms such as a sense of unreality, feeling as if watching things from outside one's body, feeling disconnected from one's body, distorted sense of time or motion, "spacing out," and so on were common during training— and experienced among more than 90% of the general population of cadets.

Stress prompts the release of stress hormones in the brain related to impairment in executive functions, including, cortisol and norepinephrine . This is countered by the release of other agents that moderate the negative effects of C and NE, such as neuropeptide-Y (NPY) and sulfated and unsulfated forms of dehydroepiandrosterone (DHEA and DHEA-S). The relative balance of these substances is linked to the amount of impairment of executive functions under stress. Trainees develop higher levels of these substances during training—and cortisol is greatest after exposure to the interrogation segment of training. However, those with higher relative levels of the protective NPY and/or DHEA/DHEA-S suffered lesser impairments in cognitive functions, such as alertness during stress, memory, experiences of dissociative symptoms, and others; less psychological distress; and better performance in the interrogation segment of training (see McNeil & Morgan, 2010).

Suspects in police interrogation are subject to multiple stressors, whose effects we earlier dubbed IRRD to include all aspects of impaired self-regulation. We suggest that neuroendocrine assessments such as those employed by Morgan and his colleagues and other indices of physiological stress-responsivity might be valuable additions to evaluations routinely performed by psychologists/psychiatrists as evidence of enhanced vulnerability to coerced confession.

It's Not Just the Suspects: Ego Depletion and Police Cognition

Police can also suffer depletion due to preexisting stressors and fatigue, and the length and stresses of the interrogation to which they are uniquely subjected. Among the many implications of ego depletion in interrogators are the following: More simplistic analysis of evidence and suspect behavior, enhanced tunnel vision and confirmatory biases; and reduced abilities to objectively assess the suspect and evidence, to correct initial judgments of the suspect or evidence, to recall evidence and construct arguments favoring confession, to manage emotions and impressions of himself, to lie effectively, and to manage other necessary tasks (see Davis & Leo, in press b).

Conclusions and Policy Recommendations

Our review and analysis of the import of literature on self-regulation and the process of interrogation-related regulatory decline (IRRD) suggest three policy implications regarding: (a) standards for admissibility of police-induced confessions, (b) limits on interrogation practices, and (c) future directions for interrogation research.

Standards for Admissibility Rulings

Police interrogation can be a perfect storm of forces undermining the capacity to exert one's will, restrain dysfunctional impulses, and engage in optimal decision making—for suspect and interrogator alike. With impaired self-regulatory resources, both become susceptible to stimulus control, more reactive to situationally induced emotions and impulses, less reflective, more likely to think reflexively and heuristically, and more likely to be influenced by the pressures and arguments of others.

Though many of these forces act on the interrogator, given the difference in power and roles, they are primarily brought to bear on the suspect. Indeed, research has demonstrated that lower relative social status or power—as is characteristic of a suspect being interrogated by the relatively powerful detective—is associated with poorer control of basic cognitive processes such as attention, and poorer decision-making (e.g., Fast, Gruenfeld, Sivanathan, & Galinsky, 2009; Guinote, 2007, 2010; Smith, Dijksterhuis & Wigboldus, 2008; Willis, Rodriguez-Ballon, & Lupianez, 2011). And it is the suspect's vulnerability that is eventually litigated. In this context, understanding bases of enhanced vulnerability to influence is complex, requiring appreciation of the diverse forces of influence inherent to interrogation, the personal resources necessary for resistance, as well as both chronic and acute underpinnings of these sources of resistance. Further, understanding bases of enhanced vulnerability to influence entails understanding of the magnitude of the persuasive power of the interroga-

tion forces, as well as the degree to which various chronic and acute factors compromise a person's capacity to resist.

Added to these problems is the difficulty of anticipating or judging the power of hot emotional or visceral impulses when not currently in such a state oneself. Even if one did understand how interrogation-related forces *can* affect a suspect, this gap makes it more difficult to appreciate the magnitude of such forces *actually* facing any given suspect. Given the necessity and difficulty of this multilevel analysis, in the context of widespread misunderstanding of the magnitude of acute effects on self-regulation and ability to resist, it is not surprising that the courts have yet to recognize the majority of relevant vulnerabilities as sufficient grounds for suppression (Wrightsman, 2010; see Davis & Leo, in press-c for more extensive review of sources of difficulty in judging the voluntariness or validity of interrogation-induced confessions).

These problems are made greater by the ambiguity and lack of specificity in standards for assessing voluntariness when confessions are challenged in suppression motions. The current "totality-of-circumstances" test allows for consideration of many factors, but almost none are absolute (Leo, 2008), allowing judges substantial leeway to weigh factors they consider important, and to subjectively interpret their severity and import. There is no guidance regarding what degree of acute impairment, or aversiveness of interrogation tactics might be sufficient to render the confession involuntary, or how such factors might interact with chronic personal vulnerabilities. This allows significant variability in judgments across cases, and permits findings of voluntariness (soundly contradicted by science) for confessions obtained from severely compromised suspects. Moreover, absent adequate understanding of the importance of situational forces, judges tend to suppress confessions almost exclusively based on chronic suspect vulnerabilities (Watson, Weiss, & Pouncey, 2010). We suggest that justice would be better served by the adoption of more specific guidelines regarding thresholds for these judgments, grounded in available science.

It is our hope that expanding interrogation science will inspire the courts to provide more evidence-based standards in the future. For the foreseeable future, this is most likely to occur via the presentations of defense attorneys arguing for suppression or for innocence, and through the expert testimony they offer in support of these arguments. Currently, the courts are most receptive to expert testimony on chronic mental disabilities that increase suggestibility, and tend to exclude or disregard testimony on acute suggestibility or the forces of the interrogation. Interrogation experts must argue more extensively and persistently for the relevance of broader psychological science to interrogation, as we have exemplified here, rather than defer to the tendencies of the courts to regard research not explicitly conducted with interrogation as irrelevant.

Interrogation Reform

Our review further suggests that interrogation practices should be reformed to avoid those likely to induce severe IRRD in interrogators and suspects, as they compromise the quality of information obtained from suspects as well as the quality of the detective's performance. Notwithstanding excessive interrogation length or other questionable tactics and circumstances, judges rarely suppress

confessions if a valid waiver is obtained and prohibitions against physical coercion or explicit use of threats and promises are observed. Thus, police can successfully conduct interrogations that severely compromise the self-regulatory resources of suspects largely without restraint.

Although impairments of self-regulation resulting from interrogation cannot be fully prevented without a complete overhaul of interrogation techniques, practices such as excessive length and deprivation of basic comforts and nourishment are unnecessary and can produce a level of self-regulation failure in which the risk of false confession is significantly raised. We hope that our review can provide empirical support for widely suggested (e.g., Kassin et al., 2010) interrogation reforms, such as limits on length and specific per se rules against any physical or psychological deprivations during interrogation that would be easy to implement.

Perhaps the easiest reform is limitation on length. More than a decade ago, Welsh White (1997) suggested a maximum of six hours for any interrogation; and prominent interrogation manuals suggest even fewer (e.g., 4 hrs; Inbau et al., 2011). A legislature or the Supreme Court could adopt limits of 3–4 hrs, and then create a rebuttable presumption that if the time limit is exceeded, any resulting confession, absent a compelling explanation by the prosecution, will be regarded involuntary. Length restrictions could be followed by evidence-based guidelines regarding acceptable limits on the acute physical and mental condition of the suspect. To support such an effort, however, additional evidence of the direct impact of IRRD on interrogation performance would be helpful to the courts.

A Call to Arms

Accordingly, we hope to encourage interrogation scholars to address the acute impairments in volition provoked by interrogation-related stressors. Although scientific literature currently exists to document the impact of such influences, we as scientists and experts will more successfully influence public policy through the accumulation of additional evidence specifically addressing their influence in interrogation. Two recent studies have shown a decrement in comprehension of *Miranda* rights under stress due to either participation in a mock crime or false accusations of cheating (Rogers, Gillard, Wooley & Fiduccia, 2011; Scherr & Madon, in press). We are currently extending this work to examine effects of stereotype threat on *Miranda* comprehension, and are further conducting laboratory studies to examine the impact of several sources of ego depletion on reactions to interrogation tactics. However, much remains to be done, particularly with respect to the addition of field studies of actual police interrogations, documenting forces with potential to impair self-regulation, and examining their abilities to predict confessions.

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New Editors Appointed, 2013–2018

The Publications and Communications Board of the American Psychological Association announces the appointment of 5 new editors for 6-year terms beginning in 2012. As of January 1, 2012, manuscripts should be directed as follows:

- *Journal of Experimental Psychology: Learning, Memory, and Cognition* (http://www.apa.org/pubs/journals/xlm/), **Robert L. Greene, PhD,** Department of Psychology, Case Western Reserve University
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- *Psychology and Aging* (http://www.apa.org/pubs/journals/pag), **Ulrich Mayr, PhD,** Department of Psychology, University of Oregon
- *Psychology, Public Policy, and Law* (http://www.apa.org/pubs/journals/law/), **Michael E. Lamb, PhD**, University of Cambridge, United Kingdom
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Current editors Randi C. Martin, PhD, Michael C. Roberts, PhD, Paul Duberstein, PhD, Ronald Roesch, PhD, and Randy W. Kamphaus, PhD, will receive and consider new manuscripts through December 31, 2011.