

6-1-2013

Using Procedural Justice to Understand, Explain, and Prevent Decision-Making Errors in Forensic Sciences

Scott J. Behson
Fairleigh Dickinson University

Roger Koppl
Syracuse University

Follow this and additional works at: <https://scholarship.shu.edu/omj>



Part of the [Organizational Behavior and Theory Commons](#), and the [Organizational Communication Commons](#)

Recommended Citation

Behson, Scott J. and Koppl, Roger (2013) "Using Procedural Justice to Understand, Explain, and Prevent Decision-Making Errors in Forensic Sciences," *Organization Management Journal*: Vol. 10: Iss. 2, Article 5. Available at: <https://scholarship.shu.edu/omj/vol10/iss2/5>

Using Procedural Justice to Understand, Explain, and Prevent Decision-Making Errors in Forensic Sciences

Scott J. Behson¹ and Roger Koppl²

¹Department of Management, Silberman College of Business, Fairleigh Dickinson University, Teaneck, New Jersey, USA

²Department of Finance, Whitman School of Management, Syracuse University, Syracuse, New York, USA

It has been estimated that in the United States there are 20,000 false felony convictions a year due to deficiencies in the forensic science and criminal justice systems (Koppl, 2010c). As many of these errors can be attributed to flaws in the processes by which forensic science decisions are made, the principles of procedural justice are a useful lens for analyzing these processes and recommending improved practices. In this secondary analysis of current research, decision-making processes in forensic sciences are analyzed using Leventhal's six criteria for establishing procedural justice. Specifically, we assesses the current state of forensic science, explain how some industry practices may be prone to error and bias, and provide practical suggestions for improving industry practices to better adhere to the principles of procedural justice. In addition, the implications of this analysis for practitioners outside of forensic sciences are discussed. *Organization Management Journal*, 10: 99–109, 2013. doi: 10.1080/15416518.2013.801743

Keywords organizational justice; procedural justice; forensic science; decision-making processes; industry-specific research

INTRODUCTION

The Forensic Science Industry

Research has demonstrated that flaws in the forensic science (FS) and criminal justice systems lead to errors in how forensic testing is conducted and how its results are interpreted.¹ As a result, it has been estimated that, in the United States, there are 20,000 false felony convictions a year due to these system-based errors:

There are over one million felony convictions per year. Risinger (2007) has established that the "minimum factual wrongful conviction rate" for capital rape-murders from 1982 through 1989 is at least 3.3% (pp. 768 & 778). The study of Saks and Koehler (2005) suggests that about two thirds of false convictions arise in part from forensic science testing errors or false or misleading forensic science

testimony. Multiplying these numbers gives you a number greater than 20,000. (Koppl 2010c, p. 222)

In making this estimate, Koppl treated Risinger's estimate as a conservative benchmark for the global rate of false felony convictions in the United States.

In both the United States and the United Kingdom there is increasing awareness that there may be a relatively large number of FS errors each year and that significant change may be desirable. Increasing awareness of FS errors in the United States led Congress to commission a study of FS and its needs. The study (NAS, 2009) identified some important vulnerabilities of the system and made specific recommendations for significant change. The Forensic Regulator in the United Kingdom seems to moving in a similar direction in the wake of the revelation of significant forensic-science errors such as the false fingerprint identifications in the cases of Shirley McKie (McBeth, 2004; McDougall, 2006) and of Peter Kenneth Smith (Smith, R. v [2011] EWCA Crim 1296 (24 May 2011)). Thus, in both the United States and the United Kingdom, there seems to be a climate for change in FS.

FS errors have been examined from both economic and psychological perspectives. The economic approach to analyzing FS has elucidated how systemic flaws lead to errors. In particular, Koppl (2010a) explains (a) that despite the illusion of precise technology and scientific testing, most evidence is decided upon based on the subjective judgment of forensics professionals, (b) that forensic labs are often dependent upon law-enforcement agencies for funding and oversight, (c) that evidence usually goes to one lab only, giving that lab monopoly status that reduces the chance to catch and correct errors, and (d) that the use of objective performance criteria for law enforcement rewards the number of convictions rather than correct verdicts. All of these structural defects create a bias toward finding guilt and, therefore, toward the risk of error. This bias seems inconsistent with the presumption of innocence, the notion that one should err on the side of preventing false convictions, even if this means some guilty persons are exonerated.

Address correspondence to Scott J. Behson, Department of Management, Fairleigh Dickinson University, 1000 River Road, Teaneck, NJ 07666, USA. E-mail: behson@fdu.edu

From a psychological standpoint, Risinger et al. (2002) and Dror et al. (2005) discuss how FS errors may be created by decision-making biases such as selection bias and confirmation bias, as well as the relationships and communication between forensic labs and law-enforcement agencies. Helsoot and Groenedall (2011) take a different, though complementary, approach by studying the decision-making processes of forensic researchers.

In both the economic and psychological approaches to forensic-science error, researchers are not criticizing individual forensic scientists. Researchers are instead seeking beneficial changes in the context of forensic-science decision making. In this article, we bring ideas from the domain of organizational behavior, an interdisciplinary area of study that uses a blend of psychological, sociological, economic, and anthropological concepts and focuses them on understanding how individuals, groups, and whole systems behave in organizational settings. By doing so, we add to the discussion of how to improve FS, both in furthering understanding of the current problems in FS and in the search for positive change.

Purpose of This Study

This study uses procedural justice, a central topic in organizational behavior research, as a lens to assess common practices in FS. Specifically, the major criteria of procedural justice in organizations, as developed by Leventhal (1980), are applied to forensics science as it is commonly practiced in the criminal justice system. In this way we can better assess the current state of FS, explain how some industry practices may be prone to error and bias, and provide practical suggestions for improving industry practices to better adhere to the principles of procedural justice.

We believe the industry-specific focus of this article does not mean it is relevant only to those in FS. In this article, we hope not only to advance practice in FS, but to help practitioners and researchers in many management fields better understand the implications of making procedural justice a more central feature in their decision making. The lessons we draw from the FS industry can be applied to many industries and business organizations. Further, explicitly examining procedural justice in a specific industry context allows organizational scholars to consider the generalizability, applicability, and limiting factors of this classic organizational behavior (OB) theory—leading to potential new avenues for research and application (see Aguinis & Pierce, 2008; Cascio, 2008; Rousseau & Fried, 2001).

PROCEDURAL JUSTICE

When making decisions that involve important consequences for individuals and groups, it is important that decision-making processes are perceived to be equitable by affected parties (Cropanzano, Bowen, & Gilliland, 2007). As a result, organizational behavior researchers have extensively studied fairness in decision making and identified four major components of

organizational justice: distributive (based on outcomes relative to employee contributions), procedural (based on the fairness of decision-making processes), interpersonal (based on how one is personally treated), and informational (based on data-based explanation of decisions) (Behson, 2011; Colquitt, 2001; Greenberg & Colquitt, 2005). There is considerable evidence that, despite some conceptual and measurement overlap, these dimensions of justice are valid, distinct but interrelated, and useful to managers in improving decision-making accuracy and acceptance, as well as influencing a wide range of employee reactions (Colquitt, Greenberg, & Zapata-Phelan, 2005).

Of the four dimensions of justice, procedural justice is seen by many as particularly important for managers, as managers can often exert considerable control over the decision-making process (Cropanzano et al., 2007). Further, procedural justice is particularly important in shaping employee reactions to both decisions, as well as the larger system in which decisions are made (Ambrose, Hess, & Ganesan, 2007; Behson, 2011). For example, while the amount of bonus one receives is important, the knowledge that bonuses were distributed in a fair manner also affects employees' perceptions of the supervisors and decision-making processes involved, as well as of the overall organization.

These assessments may lead employees to either increase or decrease their job satisfaction, organizational commitment, and the level of trust they have in decision makers (Moorman & Byrne, 2005). In turn, these reactions may influence such behaviors as performance, counterproductive behaviors, citizenship behaviors, withdrawal, retaliation, reciprocation, and turnover (e.g., Conlan, Meyer, & Nowakowski, 2005). Some research has also linked procedural justice to the frequency of lawsuits, employee theft, sabotage, and aggressive behavior (e.g., Cropanzano et al., 2007). Finally, procedural justice is seen as particularly important in situations in which one does not receive an expected positive outcome, as procedural justice moderates the resulting negative reactions, making them less extreme (Brockner, 2010).

In his seminal study on procedural justice, Leventhal (1980) proposed the following criteria as essential for establishing just processes: (a) consistency of decision making, (b) freedom from bias, (c) basing decisions on accurate information, (d) the ability to correct flawed decisions, (e) conformity with prevailing morals, and (f) consideration of the opinions of those affected by decisions. Each of these criteria is distinct, although there is some overlap. For example, the use of a consistent process for decision making also reduces the chance of biased decisions and makes it easier to reassess or correct flawed decisions. While Leventhal and other justice researchers are primarily concerned with internal decisions affecting employees, such as compensation, promotions, and performance evaluations, this lens was initially adapted from a legal context, and seems particularly relevant to decision making in FS organizations.

This article discusses each of Leventhal's criteria, provides examples of their typical applications in business organizations,

and assesses the current state of FS practice on each procedural justice criterion. Finally, the principles of procedural justice are used to recommend how FS practice may be improved in order to create a more fair and accurate system.

Criterion 1—Consistency of Decision-Making

This criterion is focused on ensuring consistency of decision-making rules over time and across individuals. Just processes use similar criteria regardless of who is being evaluated, and these criteria should remain relatively constant over time. In this way, affected parties will better understand the basis by which they were evaluated and know that the same rules applied to all. One example of an organizational decision-making process that adheres to this criterion is the use of structured interviews and multiple raters during a hiring process, so that each applicant is asked the same set of questions and consistency among raters can be measured. These lead to less biased, more valid, and more legally defensible decisions, and also result in more positive applicant reactions (McCarthy, Van Iddekinge, & Campion, 2010). Employment laws regarding disparate treatment, comparable worth, and pay equity also exemplify concern for this criterion. Another related notion is ensuring that processes are not changed too often and that changes to a decision-making process are explained ahead of time (Cropanzano et al., 2007).

Consistency is also valued in FS. Crime labs have scientific protocols to which forensic scientists express allegiance. Those protocols, however, generally permit forensic scientists to exercise discretion and subjective judgment. Discretion and consistency may not be fully compatible principles. Helsloot and Groenendaal (2011), Dror et al. (2005), and Whitman and Koppl (2010) all note that the norms and values of the decision makers influence their decisions. For example, the amount of time forensic researchers would like to spend on a murder case may depend on whether the victim is a child or a convicted felon.

A study by the National Academies of Science (NAS, 2009) notes that many forensic disciplines, including traditional hair microscopy, handwriting comparison, bloodstain pattern analysis, fingerprint examinations, impression evidence (such as shoeprints and tire tracks), and toolmarks and firearms identification (commonly called “ballistics”), rely on subjective judgment (NAS, 2009). Thompson (2009) and Dror and Hampikian (2011) show that even DNA analysis often relies on subjective judgment. It may be surprising that fingerprint examination and DNA analysis are often subjective. Subjective judgment is an important element in fingerprint examinations when the “latent” print lifted from a crime scene is smudged, partial, lifted from an irregular surface, or overlain by other prints or marks (Thompson & Cole, 2004). Subjective judgment is also involved in DNA analysis when the crime-scene sample is small, contaminated, degraded, or is a mixture derived from two or more persons (Thompson & Cole, 2004).

Dror and Charlton (2006) provide experimental evidence of a lack of consistency in fingerprint examinations. They found that

12% of examiners reversed their original decisions when given the same evidence at two different times. Dror and Hampikian (2011) presented DNA evidence to 17 DNA analysts, but with the case information stripped away. Twelve judged that the suspects could be excluded, four found the evidence inconclusive, and one found evidence implicating the suspect. This result suggests that forensic DNA analysis may lack consistency.

Nichols (2007) vigorously defends subjective judgment in firearms and toolmark identification. Thus, by some in the industry, subjectivity is seen not as a flaw to be minimized, but rather an important feature of FS.

Criterion 2—Freedom From Bias

One focus of this criterion is ensuring that self-interest is removed from a decision-making process. In this way, bias is lessened by removing conflicts of interest and the possibility that decision makers can give themselves an advantage or undue benefit. Following this criterion often means that decision makers must recuse themselves from certain decisions that may affect them or their constituencies.

Other ways to conform to this criterion include making conflicts of interest known and having multiple people involved in making decisions. For example, executives do not set their own compensation; pay packages are commonly developed by the compensation committee of the board of directors, often with assistance from an outside consultancy. Many companies have strict romance and nepotism policies and do not allow romantically involved couples or family members to directly supervise or control outcomes for those with whom they have a personal relationship (Lickey, Berry, & Whelan-Berry, 2009). In addition, the possibility of bias is one of the cited disadvantages of 360-degree performance reviews, as employees may have an incentive to overrate themselves and underrate their coworkers (Morgeson, Mumford, & Campion, 2005).

Further, this criterion involves addressing decision-making biases, such as halo effects and confirmation bias (Jonas, Schultz-Hardt, Frey, & Thelan, 2001), often through anonymization. For example, research into employee selection has noted bias against resumés that contain unconventional or ethnic names and against interviewees who speak with certain foreign accents (Hosoda & Stone-Romero, 2010; Mullainathan & Bertrand, 2004). By stripping resumés of names and identifying information before passing them along to decision makers, and by using structured interviews and rating scales, one can eliminate much of this bias. Even some education researchers suggest that teachers should anonymize before grading student work to reduce the effect of biasing information (Walvoord & Anderson, 2009).

Bias is now a recognized problem in FS, although there is disagreement as to how much of a problem it presents. There are several causes of potential bias in FS, including its relationship to law enforcement and the role of context information.

The National Academies study notes, “The majority of forensic science laboratories are administered by law

enforcement agencies, such as police departments, where the laboratory administrator reports to the head of the agency” (NAS, 2009, p. 6-1). Dependence on law enforcement for budgets, resources, or personal advancement creates a risk of bias. “Forensic scientists who sit administratively in law enforcement agencies or prosecutors’ offices, or who are hired by those units, are subject to a general risk of bias” (NAS, 2009, p. 6-2). Much of this biasing pressure is likely to be subtle rather than overt, but it still may exert influence (Yukl & Tracey, 1992).

Context information in FS is information about the circumstances of the crime or underlying event. Some context information, such as the criminal history of the suspect, may be extraneous to the scientific analysis of physical evidence. Other context information, such as the genetic profile of the suspect, may be relevant but potentially biasing (Risinger et al., 2002, Krane et al., 2008).

Risinger et al. (2002, p. 37) gives an example of potentially biasing context information drawn from lab notes in a real case. “Suspect-known crim gang member—keeps ‘skating’ on charges—never serves time. This robbery he gets hit in head with bar stool—left blood trail. [Detective] Miller wants to connect this guy to scene w/DNA.” In another case an examiner writes, “Death penalty case! Need to eliminate Item #57 [name of individual] as a possible suspect” (Krane, 2008). Such context information has the potential to skew the results of a forensic examination, particularly under the frequently encountered condition of ambiguous evidence.

Masking is the most basic strategy for minimizing the biasing potential of context information. Rosenthal (1978, p.1007) enjoins us to “keep the processes of data collection and analysis as blind a possible for as long as possible.” Risinger et al. (2002) have an excellent discussion of bias and masking. Krane et al. (2008) outline a protocol called “sequential unmasking” for applying the principle of masking to forensic DNA analysis. Unfortunately, we do not know of any public crime lab that has adopted sequential unmasking or similar protections against bias by context information.

Criterion 3—Basing Decisions on Accurate Information

This criterion is focused on use of information that is correct, can be verified, and is not overly subjective. Objective data are favored over subjective data, and one should use reliable data and informed opinion when making decisions (Leventhal, 1980). Decision makers must be competent, and should be held responsible for making good decisions and keeping records about the decision-making process.

In business, this criterion is adhered to with such practices as management by objectives (MBO), goal setting, and the use of objective performance standards during performance reviews. The use of multiple independent raters is also important for this criterion. Further, managers need to be fully trained and knowledgeable so that they can use information wisely. Finally, the results of decision-making processes need to be continually assessed to determine whether decision makers are doing their

jobs well. In this way, supervisors who are not conducting thorough and objective performance reviews can be sent for training or otherwise held accountable.

The need for accurate information has two aspects. First, the information presented to forensic scientists should be accurate. Subjective protocols are not entirely consistent with this criterion because the subjectively perceived degree of similarity between two patterns is not always accurate, particularly when it can be influenced or distorted by context. Second, good record keeping is important. In addition, FS practice does not always include good record keeping; this fact compounds the problems associated with subjectivity, interrater variance, and bias.

One example of problematic record keeping is provided by an official report by the Justice Department’s Office of the Inspector General (OIG, 1997) on the explosives section of the FBI crime lab. This report shows that a forensic scientist consistently failed to document the tests he performed before testifying in federal cases. Further, an FBI audit of the Houston Crime Lab (FBI Director, 2002) provides copious evidence of multiple serious errors and inadequacies, including the mixing of different types of evidence in a central screening area, a leaking roof that dripped on evidence, improper sealing of evidence in storage freezers, technicians not wearing proper gloves and lab coats, improperly calibrated instruments, improper documentation of equipment maintenance, minimal note-taking, sloppy and incomplete lab reports, inconsistent cleaning procedures, and even inadequately educated and trained staff.

Accurate information can be difficult or impossible to obtain when files are difficult to access (Gold, 2008) or forensic evidence is destroyed (Greene & Moffeit, 2007). Greene and Moffeit (2007) found cases of 141 prisoners in different states “whose bids for freedom [through exoneration] have stalled because officials lost or destroyed DNA.”

Criterion 4—The Ability to Correct Flawed Decisions

This criterion is focused on the ability for those affected by a decision to have their case reviewed and checked for errors in both process and outcome. This often involves creating and implementing proper grievance procedures that may involve third parties or skipping a part of the chain of command (i.e., removing initial decider from the appeal). One should be able to review the information used at various stages of the process, as well as various elements of the process, such as rater selection, criteria, and consistent application of decision rules. Organizational sexual harassment policies adhere to this principle by requiring companies to set up grievance procedures run by someone outside of the chain of command of those involved, such as a designated human resources (HR) professional or an outside arbiter (Steingold, 2011).

Forensic-science errors are often difficult to correct. In addition to the risk of evidence destruction noted earlier, some forensic tests including DNA analysis “consume” a portion of the evidence. If the quantity of evidence is low, testing may

consume all of it. If evidence has been consumed or destroyed, any analytic error will be hard to correct.

The organization of FS also increases the difficulty of correcting errors. FS today is characterized by a twofold monopoly. First, evidence is typically examined by one crime lab only (NAS 2009; Giannelli, 2004). In this sense, the crime lab receiving evidence has a monopoly on examination of that evidence. Second, that same lab will normally be the only one to offer an interpretation of the results of the examination it performs. The current process does not commonly produce multiple examinations by defense experts or independent experts (Thompson, 1995). Noting this fact, the National Academies report says, “Prosecutors usually have an advantage over most defendants in offering expert testimony in criminal cases” (NAS, 2009, p. S-8). Giannelli (2004) finds that the defense’s right to expert assistance recognized by the Supreme Court in the 1985 case *Ake v. Oklahoma* “has not been effectively implemented” (p. 1419). Monopoly in examination and interpretation may allow errors, false interpretations, or even fraud to go undetected and unchallenged, leaving alternative hypotheses unexamined.

Thompson and Dioso-Villa (2008) examined the case of Robin Lovitt, who was convicted of murder and sentenced to death in Virginia. They note problems with the crucial DNA evidence and explain how various attempts for a new trial have failed. “Whether Lovitt is actually guilty or not can be debated, but it seems quite clear that his trial was unfair. Close examination of this case suggests that we have a trial system where scientific findings can be misrepresented. Perhaps equally important, it shows us that our system of appellate and habeas review can fail to recognize these problems” (p. 142). Though Governor Warner commuted his sentence to life imprisonment, Lovitt has not been released or exonerated, illustrating the difficulty in getting even unambiguous errors corrected.

Criterion 5—Conformity With Prevailing Morals

This criterion involves ensuring that procedures are made in accordance with precedent, law, and cultural standards. Elements such as deception, privacy violations, bribery, and spying would generally run afoul of this criterion. In businesses, this may also involve ensuring that processes are consistent with organizational culture and norms.

For example, employers are usually within their rights to monitor employee e-mails and telephone communications in the workplace, as well as to conduct searches and surveillance on company property (Steingold, 2011). While legal under most circumstances, however, extensive and indiscriminant use of these practices is generally seen as a violation of societal norms regarding expectations of privacy. As a result, most organizations do not comprehensively monitor employees without extensive warning, and those that do often limit such surveillance to very specific circumstances (e.g., after evidence of employee theft) (Repa, 2005). Further, differences in national and corporate policy regarding parental leave and

family-friendly human resource practices can often be attributed to the degree to which a culture’s prevailing norms are aligned with work–family balance. Thus, countries like Norway and Denmark offer up to a full year of paid parental leave, while the United States only requires 12 weeks of unpaid leave (Henderson & White, 2004).

One dimension of prevailing morals that is of paramount importance to FS is the standard of presumptive innocence. That is, as a moral viewpoint, suspects should be presumed innocent, and treated as such, until guilt can be proven beyond a reasonable doubt. Some FS practices seem to compromise this viewpoint. For instance, FBI fingerprint expert Bruce Budowle and his co-authors (2006) report, “A latent print examiner tends to approach the comparison to ‘make an ident[ification],’ rather than to attempt to exclude.”

The case of Kirk Turner is an example of how the moral principle of a presumption of innocence was compromised by the actions of forensic scientists. The scientists’ initial examination of evidence seemed not to implicate Mr. Turner and was consistent with his claim of self-defense (Neff, 2010a, 2010b). However, after meeting with prosecutors, the scientists conducted a series of experiments designed to support the prosecution’s case for murder charges. These experiments were captured on video (some footage can be seen at http://www.newsobserver.com/videos/?media_id=17182298) and were aimed at proving the prosecution’s theory instead of at making an evenhanded determination of what the physical evidence revealed.

In addition, the verification procedures for fingerprint examination might also compromise the presumption of innocence. Fingerprint examiners in the United States use the “ACE-V” methodology, consisting of four stages: analysis, comparison, evaluation, and verification (SWGFAST, 2006). The last stage applies if the examiner believes that the known and unknown fingerprints match. In that case the examiner seeks out another qualified examiner to verify the initial identification.

As verification is only sought after a match, the second examiner knows that a match has been made, potentially biasing her or his judgment. Further, the current guidelines for fingerprint analysts do not prohibit verification shopping, whereby a failure of verification may be ignored and another, more favorable, verification sought. Guidelines give responsibility and authority to individual agencies to review situations in which initial identifications are not verified and to decide whether documentation or corrective action is needed. Such loose policy and self-policing leave open the possibility of bias toward confirming guilt rather than exploring all possible avenues of innocence (Cole, 2005; Dror et al., 2006; OIG, 2006). Indeed, there are at least two documented cases in which verification shopping seems to have been tolerated as a matter of policy.

In 2007, in Seminole County, Florida, a whistleblower who is a latent fingerprint examiner issued a memo accusing her coworker of misbehavior and incompetence (Stutzman 2007a, 2007b; Williamson 2007). She reported that, after two

nonconfirming attempts at verification, her coworker sent the print in question to a retired fingerprint examiner whom the whistleblower considered incompetent. The complaint focused on her colleague seeking verification from someone who was not competent. While verification shopping also clearly occurred, the whistleblower made no objection to it, indicating that verification shopping may be an accepted practice, deemed legitimate even by whistleblowers.

The second case comes from an official report on the case of Brandon Mayfield, whom the FBI mistakenly identified as the source of a print left at the scene of the Madrid train bombing.

The [FBI's Latent Print Unit (LPU)] Quality Assurance Manual provided that if the second examiner reached a different conclusion, the matter "must be referred to the supervisor and/or the Unit Chief for resolution" . . . One option available to the supervisor was to select another verifier if the first verifier declined to confirm the identification. In that instance, there was no policy requiring that the first verifier's disagreement be documented in the case file. (OIG, 2006, p. 115)

The report does not suggest that there was verification shopping in the Mayfield case. But it does reveal that it was considered legitimate procedure to shop for positive verifications.

Criterion 6—Consideration of the Opinions of Affected Parties

This criterion includes such considerations as participation, voice, and consent. Before a decision-making process is designed and implemented, those involved should make sure that opinions over a wide range, including dissenting ones, are heard. For example, during strategic planning, decision makers should make an effort to get input from a wide variety of employees, from many levels and departments (Cropanzano et al., 2007). Many organizations set up representative bodies, focus groups, or task forces for this purpose. By the organizations doing so, those affected by the decision will better understand the decisions that are made and are less likely to feel that the process did not consider their views. This criterion also encourages a broad definition of stakeholders and constituents.

Another organizational application of this criterion is employee participation in performance evaluations, whereby employees self-assess and then discuss their ratings with their supervisors. Finally, having an employee and supervisor jointly set performance goals generally leads to more acceptance and commitment to goals, and to better performance and job satisfaction (Locke & Latham, 2002).

We previously noted that forensics labs are generally organized under law enforcement agencies. This governance structure reduces the voice of other participants in the criminal justice system, especially public defenders and other defense attorneys. In some cases, public defenders have difficulty gaining access to state crime labs and forensic scientists. Further, the FBI has so far refused to release anonymized data from its large criminal DNA data set. This policy prevents both disinterested scientists and defense experts from studying the

data for patterns, anomalies, and suggested improvements to the FS process. Krane et al. (2009) call on the FBI to give qualified researchers greater access to this data.

Cowan (2012) argues that crime labs should be governed by a board consisting of a local prosecutor, a prominent defense attorney, a representative from the public defender's office, a traditional scientist (nonforensic), and a forensic scientist from a cross-jurisdictional laboratory. This governance structure seems likely increase the participation, voice, and consent of at least some participants in the criminal justice system who are underrepresented in FS today.

RECOMMENDATIONS FOR IMPROVED PRACTICE IN THE FORENSIC SCIENCES

Leventhal's analysis of procedural justice can be used as a template for improving organizational processes and, therefore, organizational outcomes (see Cropanzano et al, 2007). The results of this study can help those who conduct FS and those who manage FS operations to better understand potential structural flaws and take steps to correct them, leading to a more just and rigorous system. We have found deficiencies in FS under each of Leventhal's six criteria. We now examine organizational changes that might improve performance and outcomes for each of Leventhal's six criteria within FS. Table 1 summarizes our analysis. After this discussion of FS, we consider some applications of our analysis for those outside that industry.

According to Leventhal's first criterion, procedural justice requires consistency of decision making. We have seen that this criterion of procedural justice is violated by the reliance on subjective judgment in each of the forensic-science disciplines, including fingerprint examination and DNA typing. Further, subjective judgments can be influenced by extraneous factors, which may lead to errors. To improve performance and outcomes, FS should use objective protocols. For example, Neumann et al. (2012) have proposed that fingerprint examiners quantify the degree of similarity between prints using methods "similar in principle to matching algorithms implemented in the UK national fingerprint database known as Ident1" (p. 23).

Jonakait (1991) noted the importance of "established protocols" and the general lack of them in FS. The situation has improved little since 1991: "Often there are no standard protocols governing forensic practice in a given discipline. And, even when protocols are in place . . . they often are vague and not enforced in any meaningful way" (NAS 2009, p. S-5). We also call for the establishment of more objective protocols in FS.

Fortifying the defense right to expertise would create a kind of competition between experts that would improve consistency of decision making in FS. The prosecution and the defense should have separate experts to help them understand the scientific evidence in a case. Unfortunately, as we previously noted, the defense right to expertise recognized in *Ake v. Oklahoma* "has not been effectively implemented" (Giannelli, 2004, p. 1419).

TABLE 1
Summary of findings and recommendations

Procedural justice criterion (Leventhal, 1980)	Forensic science procedure(s) in question	Identified potential solutions
1. Consistency of decision making	<ul style="list-style-type: none"> ● Reliance on subjective judgment in forensic testing ● Single lab conducts test and interprets results with limited opportunity for outside opinions 	<ul style="list-style-type: none"> ● Increased use of externally sanctioned objective protocols ● Expanding access to information to the defense ● Creating a process of competing experts each testing and interpreting data
2. Freedom from bias	<ul style="list-style-type: none"> ● Forensic science laboratories administered by, report to, and are dependent upon law enforcement agencies, such as police departments, for budgets, resources, and professional advancement ● Context information from a case often given to forensic scientists 	<ul style="list-style-type: none"> ● Reduce dependency of labs on law enforcement agencies ● Sequential unmasking procedures: removal of potentially biasing context information
3. Use of accurate information	<ul style="list-style-type: none"> ● Poor record keeping ● Destruction of evidence 	<ul style="list-style-type: none"> ● Standardized lab reports and protocols for documentation and evidence handling ● Auditing and oversight by independent agencies ● Competing experts
4. Ability to correct flawed decisions	<ul style="list-style-type: none"> ● Twofold monopoly status of forensics labs: a single lab conducts tests and verifies own results ● Labs create own quality-control procedures 	<ul style="list-style-type: none"> ● Competitive self-regulation: allowing other labs to verify work ● Sending evidence to multiple labs for testing and interpretation ● Establishing redundant testing systems
5. Conformity with prevailing morals	<ul style="list-style-type: none"> ● Labs responsible for verification procedures ● “Verification shopping” to find evidence confirming identifications ● Bias toward finding guilt 	<ul style="list-style-type: none"> ● Strengthen defense’s right to expertise and evidence ● Establishing redundant testing systems ● Adjust ACE-V to require blind verification ● Competing experts as a means to balancing biases
6. Consideration of the opinions of those affected by decisions	<ul style="list-style-type: none"> ● Blocking of access to information to other constituencies: public defenders, defense attorneys, academics, etc. 	<ul style="list-style-type: none"> ● Independent governance board ● Greater openness and transparency

Competition between experts would improve consistency of decision making in FS because any deviation from standard protocols, or the absence of standard protocols, would be an opening for the one side to point out limits and doubts attending the analysis of the other side. This exposure to criticism, in turn, would nudge forensic scientists toward more objective practices. And until such practices are adopted, jurors should be given a greater opportunity to recognize both the strengths and the weaknesses in FS testimony.

According to Leventhal’s second criterion, procedural justice requires freedom from bias. We have seen that this

criterion of procedural justice is violated by organizing crime labs under law enforcement. To improve performance and outcomes, crime labs should be independent of law enforcement, and they should practice sequential unmasking. The National Academies study calls for independence: “Forensic scientists who sit administratively in law enforcement agencies or prosecutors’ offices, or who are hired by those units, are subject to a general risk of bias” (NAS 2009, p. 6-2).

Sequential unmasking is likely to be quite effective in reducing the risk of bias-induced error. Forensic examiners should not have access to potentially biasing information until

after they have made the scientific decisions that might have been biased by such information (Krane et al. 2008). In this way, the examiner will not have the information required to act in a biased manner.

According to Leventhal's third criterion, procedural justice requires the use of accurate information. We have seen that this criterion of procedural justice is violated when crime labs do not keep good records and when evidence is not preserved properly. To improve performance and outcomes, crime labs should adopt standardized lab reports and be better audited for good recordkeeping. Increased oversight and auditing, either by federal agencies or by private accrediting bodies (Risinger et al., 2002; NAS, 2009; ASCLD, 2009; CLR, 2009), may also provide improvement in FS process and outcomes.

According to Leventhal's fourth criterion, procedural justice requires the ability to correct flawed decisions. We have seen that this criterion of procedural justice is violated in FS because of the twofold monopoly of examination and interpretation. Typically, one lab examines the evidence and interprets the results of those examinations. To improve performance and outcomes, forensic evidence should be subject to random redundant examination, which Koppl (2005) calls "competitive self-regulation." A fraction of forensic evidence should be chosen at random and sent to, say, three labs for testing. If they do not return consistent results, an inquiry would be required to determine why. Redundancy of this sort would help us to learn which labs are doing good work and which labs need to improve. Redundant testing and "competitive self-regulation" are the key proposals in Koppl's (2005) integrated suite of proposed changes in FS. It is surprising that the straightforward principle of redundancy (i.e., getting a second opinion) has not been consistently or widely applied in FS.

According to Leventhal's fifth criterion, procedural justice requires conformity with prevailing morals. We have seen that this criterion of procedural justice is violated when the procedures and biases of crime labs have the effect of substituting a presumption of guilt for the moral presumption of innocence. To improve performance and outcomes, ACE-V procedures should be modified and the defense right to expertise should be strengthened.

We have seen that ACE-V procedures require verification only when an examiner thinks he or she has a match (an "individualization") and that they do not prohibit verification shopping. Nor do they require that verifications be "blind," although blind verifications are encouraged. Thus, in the typical ACE-V verification the examiner doing the verification knows what the "right" answer is and may be unconsciously biased by that knowledge. Koppl (2010b) has examined the consequences of requiring redundant fingerprint examinations in felony cases. He finds that triplicate examinations for cases going to trial would dramatically reduce the number of false convictions caused by errors in fingerprint examinations while lowering the costs of administering the criminal justice system, through reduced appeals and unsuccessful prosecutions.

Strengthening the defense right to expertise would create a forensic expert with an interest in interpreting the forensic evidence to exonerate the defendant. This bias would be a check on the contrary bias often characterizing experts working for law enforcement. This is an indirect strategy; rather than directly eliminating the effective presumption of guilt often characterizing the practices of state crime labs, it creates a system of checks and balances tending to push the overall system into greater conformity with the moral requirement of a presumption of innocence. One bias checks another.

Finally, according to Leventhal's sixth criterion, procedural justice requires consideration of the opinions of those affected by decisions. We have seen that this criterion of procedural justice is violated when defense attorneys and defense experts are denied access to crime labs and government data sets. It is also violated by the governance structure for most crime labs, which is dominated by law enforcement. To improve performance and outcomes, FS should adopt policies of greater openness and the governance of crime labs should be opened to a broader set of interests.

We are aware of no procedural or legal obstacles to greater openness in FS. Such openness, however, might expose crime labs to the risk of criticisms for possible errors, and such criticisms might threaten past and prospective convictions. Thus, crime labs and law enforcement share an incentive to restrict access and information. In the case of crime labs, changing the governance structure to bring in a greater variety of interests or stakeholders, such as the structure advocated by Cowan (2012), could alter this incentive.

Applications for Practitioners Outside of Forensic Sciences

Throughout our discussion of Leventhal's criteria, we have provided examples of how each criterion is often applied in typical business settings. Further, Copanzano et al. (2007) provide excellent advice to managers in how all aspects of organizational justice can be built into such organizational processes as performance evaluation, strategic planning, negotiation, and employee selection. It is not our intent to repeat their advice here. However, there are a few insights from our investigation of FS that have not been previously emphasized in procedural justice research.

One such insight is the importance of redundancy in decision-making processes. In FS, we have seen the importance of having multiple labs and experts independently test and interpret forensic evidence. Reducing any one actor's monopoly over decision making makes it more likely that errors can be detected and addressed before decisions are made, and that a broader set of stakeholders' concerns may be addressed. As redundancy is often seen as antithetical to efficiency, and efficiency is valued in business, it is not surprising we do not see more redundant decision-making practices. However, Koppl's (2005) recommendation for "competitive self-regulation" can

be replicated in a wide range of businesses, and would probably result in more careful and just decision-making processes.

One could implement redundancy by having two or more task forces provide independent assessments of problems before deciding on a course of action, having multiple independent search committees evaluate executive job candidates, having two independent groups conduct due diligence on prospective acquisition targets, and having more than one supervisor conduct performance evaluations of employees. Much as independent auditing results in better accounting practice, redundant decision-making processes throughout an organization should result in better and more just processes. In each of these cases, the benefits of redundancy would have to be weighed against its costs. We suspect that the benefits may often have been underestimated, leading to less optimal redundancy. Redundancy may be particularly useful in technical and scientific fields, and in circumstances in which erroneous decisions can have significant financial or human consequences.

A second insight from our analysis of FS is the recognition that the structure of an organization or system can lead to subtle and covert pressures that can bias decision making. In FS, we noted how forensic labs are often embedded within and report to law enforcement agencies and therefore are often dependent upon them for budgets and other resources. This arrangement can lead to subtle and often unconscious pressure to provide law enforcement with the interpretations it is looking for, instead of more objectively seeking the truth. Similar pressures operate within any hierarchical system, including businesses.

By acting to reduce the role of politics and political behavior in an organizational culture, one can reduce the amount of pressure middle managers may feel to making suboptimal decisions just to please a higher-up (Valle & Witt, 2001). Cowan's (2012) call for oversight by a board with diverse interests and constituencies can be adapted to business. If middle managers see themselves as responsible for addressing the needs of multiple constituencies (their boss, but also customers, coworkers, other departments) they are less likely to be unduly influenced by trying to please one particular superior. The same is true for upper level managers reporting to a corporate board that contains individuals who represent not just stockholders but other important constituencies. Further, managers can reduce conformity pressures among their employees by allowing for safer environments to provide ideas, criticism, or dissenting viewpoints, through such means as decision support systems, anonymous employee suggestions, or secret balloting procedures (McFadzean, 1997).

Conclusion

Applied and industry-specific research is rare in organizational behavior (see Aguinis & Pierce, 2008; Cascio, 2008). For example, while there has been more than 40 years of organizational behavior research into procedural justice, to date, none has been explicitly applied to FS. In fact, in two definitive works specifically aimed at examining past organizational

justice research and looking to future directions (Colquitt, Greenberg, & Scott, 2005; Greenberg, 1990), there is no mention of applying organizational justice in a variety of organizational and industry contexts and comparing the results and efficacy of justice in those contexts. Industry-specific inquiry in a variety of contexts can be a powerful method of investigating the generalizability, applicability, and limiting factors of OB theories, and can bridge the all-too-common gap between management theory and practice. OB scholarship would be advanced if more of this type of research were published in generalist journals.

NOTE

1. This article is part of the research program of the Institute for Forensic Science Administration at Fairleigh Dickinson University (<http://view.fdu.edu/default.aspx?id=3959>).

REFERENCES

- Aguinis, H., & Pierce, C. A. (2008). Enhancing the relevance of organizational behavior by embracing performance management research. *Journal of Organizational Behavior, 29*, 139–145.
- Ambrose, M., Hess, R. L., & Ganesan, S. (2007). The relationship between justice and attitudes: An examination of justice effects on event and system-related attitudes. *Organizational Behavior and Human Decision Processes, 103*(1), 21–36.
- American Society of Crime Lab Directors. (2009). ASCLD's comments on the release of the NAS report on forensic science. Retrieved from <http://www.asclcd.org/files/ASCLD%20NAS%20Comments%20090219.pdf>
- Behson, S. J. (2011). The relative importance of organizational justice dimensions on employee outcomes: A critical re-analysis using relative weights analysis. *Organization Management Journal, 8*, 205–217.
- Brockner, J. (2010). *A contemporary look at organizational justice; Multiplying insult times injury*. Mahwah, NJ: Erlbaum.
- Budowle, B., Buscaglia, J., & Perlman, R. S. (2006). Review of the scientific basis for friction ridge comparisons as a means of identification: Committee findings and recommendations. *Forensic Science Communications, 8*. Retrieved from http://www.fbi.gov/hq/lab/fsc/backissu/jan2006/research/2006_01_research02.htm
- Cascio, W. F. (2008). To prosper, organizational psychology should . . . bridge application and scholarship. *Journal of Organizational Behavior, 29*, 455–468.
- Cole, S. (2005). More than zero: Accounting for error in latent fingerprint identification. *Journal of Criminal Law & Criminology, 95*(3), 985–1078.
- Colquitt, J. A. (2001). On the dimensionality of organizational justice: A construct validation of a measure. *Journal of Applied Psychology, 86*, 386–400.
- Colquitt, J. A., Greenberg, J., & Scott, B.A. (2005). Organizational justice: Where do we stand? In J. Greenberg & J. A. Colquitt (Eds.), *The handbook of organizational justice* (pp. 590–614). Mahwah, NJ: Erlbaum.
- Colquitt, J. A., Greenberg, J., & Zapata-Phelan, C. P. (2005). What is organizational justice? A historical overview. In J. Greenberg & J. A. Colquitt (Eds.), *The handbook of organizational justice* (pp. 3–56). Mahwah, NJ: Erlbaum.
- Conlan, D. E., Meyer, C. J., & Nowakowski, J. M. (2005). How does organizational justice affect performance, withdrawal and counterproductive behavior? In J. Greenberg & J. A. Colquitt (Eds.), *The handbook of organizational justice* (pp. 301–328). Mahwah, NJ: Erlbaum.
- Cowan, E. J. (2012). Engaging cultural key masters in forensic science: Supervisors, laboratory directors and incentives for change. *Journal of Institutional Economics, 8*, 93–117.
- Crime Lab Report. (2009). *National Academy of Sciences report: Legacy of historical document depends on good-faith collaboration*. Retrieved from <http://www.crimelabreport.com/library/pdf/3-09special.pdf>

- Cropanzano, R., Bowen, D. E., & Gilliland, S. W. (2007). The management of organizational justice. *Academy of Management Perspectives*, 21, 34–48.
- Dror, I. E., & Charlton, D. (2006). Why experts make errors. *Journal of Forensic Identification*, 56(4), 600–616.
- Dror, I. E., Charlton, D., & Péron, A. (2006). Contextual information renders experts vulnerable to making erroneous identifications. *Forensic Science International*, 156, 74–78.
- Dror, I. E., & Hampikian, G. (2011). Subjectivity and bias in forensic DNA mixture interpretation. *Science and Justice*, 51(4), 204–208.
- Dror, I. E., Péron, A. E., Hind, S.-L., & Charlton, D. (2005). When emotions get the better of us: The effects of contextual top-down processing on matching fingerprints. *Applied Cognitive Psychology*, 19, 799–809.
- FBI Director. (2002, December 12–13). An audit of Houston Police Department Crime Laboratory–DNA/Serology Section. Retrieved from <http://www.scientific.org/archive/Audit%20Document-Houston.pdf>
- Giannelli, P. C. (2004). Ake v. Oklahoma: The right to expert assistance in a post-Daubert, post-DNA world. *Cornell Law Review*, 89(6), 1305–1419.
- Gold, M. (2008, August 17). Va. DNA project is in uncharted territory: Legal experts seek more transparency. *Washington Post*. Retrieved from <http://washingtonpost.com>
- Greenberg, J. (1990). Organizational justice—Yesterday, today and tomorrow. *Journal of Management*, 16, 399–432.
- Greenberg, J., & Colquitt, J. A. (2005). *The Handbook of Organizational Justice*. Mahwah, NJ: Erlbaum.
- Greene, S., & Moffett, M. (2007, July 22). Bad faith is difficult to prove. *Denver Post*. Retrieved from http://www.denverpost.com/evidence/ci_6429277
- Helsloot, I., & Groenendaal, J. (2011). Naturalistic decision making in forensic science: Toward a better understanding of decision making by forensic team leaders. *Journal of Forensic Sciences*, 56(4), 890–897.
- Henderson, A., & White, L. (2004). Shrinking welfare states? Comparing maternity leave benefits and child care programs in European Union and North American welfare states, 1985–2000. *Journal of European Public Policy*, 11, 497–519.
- Hosoda, M., & Stone-Romero, E. (2010). The effects of foreign accents on employment-related decisions. *Journal of Managerial Psychology*, 25, 113–132.
- Jonas, E., Schultz-Hardt, S., Frey, D., & Thelen, N. (2001). Confirmation bias in sequential information search after preliminary decisions. *Journal of Personality and Social Psychology*, 87, 557–571.
- Koppl, R. (2005). How to improve forensic science. *European Journal of Law and Economics*, 20, 255–286.
- Koppl, R. (2010a). Organization economics explains many forensic science errors. *Journal of Institutional Economics*, 6(1), 71–81.
- Koppl, R. (2010b). Romancing forensics: Legal failure in forensic science administration. In E. Lopez (Ed.), *Government failure in the legal system: A public choice review of the law* (pp. 51–70). New York, NY: Palgrave.
- Koppl, R. (2010c). The social construction of expertise. *Society*, 47(3), 220–226.
- Krane, D. (2008). *Evaluating forensic DNA evidence*. Retrieved from <http://www.bioforensics.com/downloads/KranePhiladelphia.ppt>
- Krane, D. E., Bahn, V., Balding, D., Barlow, B., Cash, H., Desportes, B. L., . . . Zabell, S. (2009). Time for DNA disclosure. *Science*, 326, 1631–1632.
- Krane, D. E., Ford, S., Gilder, J. R., Inman, K., Jamieson, A., Koppl, R., . . . Thompson, W. C. (2008). Sequential unmasking: A means of minimizing observer effects in forensic DNA interpretation. *Journal of Forensic Sciences*, 53(4): 1006–1007.
- Leventhal, G. S. (1980). What should be done with equity theory? New approaches to the study of fairness in social relationship. In K. J. Gergen, M. S. Greenberg, & R. H. Willis (Eds.), *Social exchange: Advances in theory and research* (pp. 27–55). New York, NY: Plenum.
- Lickey, M. C., Berry, G. R., & Whelan-Berry, K. S. (2009). Responding to workplace romance: A proactive and pragmatic approach. *Journal of Business Inquiry*, 8, 100–119.
- Locke, E. A., & Latham, G. P. (2002). Building a practically useful theory of goal setting and task motivation: A 35-year odyssey. *American Psychologist*, 57(9), 705–717.
- McBeth, J. (2004, September 21). Fingerprint row detective cleared by US forensics. *Scotsman*.
- McCarthy, J. M., Van Iddekinge, C. H., & Campion, M. A. (2010). Are highly structured job interviews resistant to demographic similarity effects? *Personnel Psychology*, 63, 325–359.
- McCarthy, J. M., Van Iddekinge, C. H., & Campion, M. A. (2010). Are highly structured job interviews resistant to demographic similarity effects? *Personnel Psychology*, 63, 325–359.
- McDougall, L. (2006, February 12). Was it really an honest mistake? *Sunday Herald*.
- McFadzean, E. (1997). Improving group productivity with group support systems and creative problem solving techniques. *Creativity and Innovation Management*, 6, 218–225.
- Milgrom, P., & Roberts, J. (1986). Relying on information of interested parties. *RAND Journal of Economics*, 17, 18–32.
- Moorman, R. H., & Byrne, Z. S. (2005). How does organizational justice affect organizational citizenship behavior? In J. Greenberg & J. A. Colquitt (Eds.), *The handbook of organizational justice* (pp. 355–382). Mahwah, NJ: Erlbaum.
- Morgeson, F. P., Dierdorff, E. C., & Hmurovic, J. L. (2010). Work design *in situ*: Understanding the role of occupational and organizational context. *Journal of Organizational Behavior*, 31, 351–360.
- Morgeson, F. P., Mumford, T. V., & Campion, M. A. (2005). Coming full circle: Using research and practice to address 27 questions about 360-degree feedback programs. *Consulting Psychology Journal: Practice and Research*, 57(3), 196–209.
- Mullainathan, S., & Bertrand, M. (2004). Are Emily and Greg more employable than Lakisha and Jamal? A field experiment on labor market discrimination. *American Economic Review*, 94, 991–1013.
- NAS Committee on Identifying the Needs of the Forensic Sciences Community. (2009). *Strengthening forensic science in the United States: A path forward*. National Academies Press. Retrieved from http://www.nap.edu/catalog.php?record_id=12589
- Neff, J. (2010, August 18). Fantastic tales told in blood; A jury stunned by SBI's acts. *News Observer*. Retrieved from <http://www.newsobserver.com/2010/08/10/v-print/621810/fantastic-tales-told-in-blood.html>
- Neumann, C., & Champkin, J. (2012, February). Fingerprints at the crime-scene: Statistically certain or probable? *Significance*, pp. 21–25.
- Neumann, C., Evett, I. W., & Skerrett, J. (2012). Quantifying the weight of evidence assigned to a forensic fingerprint comparison: A new paradigm. *Journal of the Royal Statistical Society, Series A*, 175, 1–26.
- Nichols, R. G. (2007). Defending the scientific foundations of the firearms and toolmark identification discipline: Responding to recent challenges. *Journal of Forensic Science*, 52(3), 586–594.
- Office of the Inspector General, U.S. Department of Justice. (1997). *The FBI Laboratory: An investigation into laboratory practices and alleged misconduct in explosives-related and other cases*. Retrieved from <http://www.usdoj.gov/oig/special/97-04a/index.htm>
- Office of the Inspector General, U.S. Department of Justice. (2006). *A review of the FBI's handling of the Brandon Mayfield case: Unclassified executive summary*. Retrieved from <http://www.justice.gov/oig/special/s0601/final.pdf>
- Ramanujam, R., & Rousseau, D. M. (2006). The challenges are organizational not just clinical. *Journal of Organizational Behavior*, 27, 811–827.
- Repa, B. K. (2005). *Your rights in the workplace* (7th ed.). Berkeley, CA: Nolo Publishers.
- Risinger, M. (2007). Innocents convicted: An empirically justified factual wrongful conviction rate. *Journal of Criminal Law and Criminology*, 97(3), 761–806.
- Risinger, M., Saks, M. J., Thompson, W. C., & Rosenthal, R. (2002). The Daubert/Kumho implications of observer effects in forensic science: Hidden problems of expectation and suggestion. *California Law Review*, 90(1), 1–56.
- Rosenthal, R. (1978). How often are our numbers wrong? *American Psychologist*, 33, 1005–1007.
- Rousseau, D. M., & Fried, Y. (2001). Location, location, location: Contextualizing organizational research. *Journal of Organizational Behavior*, 22, 1–13.
- Saks, M., & Koehler, J. J. (2005). The coming paradigm shift in forensic identification science. *Science*, 309, 892–895.

- Steingold, F. (2011). *The employer's legal handbook: Manage your employees & workplace effectively* (10th ed.). Berkeley, CA: Nolo Publishers.
- Stutzman, R. (2007, June 7). *Fingerprint scandal costs analyst her job*. National Association of Criminal Defense Lawyers. Retrieved from http://www.nacdl.org/sl_docs.nsf/issues/crimelabs007
- SWGFAST. (2006). Quality assurance guidelines for latent print examiners. Retrieved from www.swgfast.org/Quality_Assurance_Guidelines_for_Latent_Print_Examiners_3.0.pdf
- Thompson, W. C. (1995). Subjective interpretation, laboratory error and the value of forensic DNA evidence: Three case studies. *Genetica*, *96*, 153–168.
- Thompson, W. C. (2009). Painting the target around the matching profile: The Texas sharpshooter fallacy in forensic DNA interpretation. *Law, Probability and Risk*, *8*(3), 257–276.
- Thompson, W. C., & Cole, S. A. (2007). Psychological aspects of forensic identification evidence. In M. Costanzo, D. Krauss, & K. Pezdek (Eds.), *Expert psychological testimony for the courts* (pp. 31–68). Mahwah, NJ: Lawrence Erlbaum Associates.
- Thompson, W. C., & Dioso-Villa, R. (2008). Turning a blind eye to misleading scientific testimony: Failure of procedural safeguards in a capital case. *Albany Law Journal of Science and Technology*, *18*, 151–204.
- Tranfield, D., Denyer, D., Marcos, J., & Burr, M. (2004). Co-producing management knowledge. *Management Decision*, *42*, 375–386.
- Valle, M., & Witt, L. A. (2001). The moderating effect of teamwork perceptions on the organizational politics–job satisfaction relationship. *Journal of Social Psychology*, *141*, 379–388.
- Walvoord, B. E., & Anderson, V. J. (2009). *Effective grading* (2nd ed.). Hoboken, NJ: Wiley.
- Williamson, T. (2007). *Memorandum to Captain Randy Pittman*. Available from the authors (Koppl).
- Yukl, G., & Tracey, J. B. (1992). Consequences of influence tactics used with subordinates, peers, and the boss. *Journal of Applied Psychology*, *77*(4), 525–535.

ABOUT THE AUTHORS

Scott J. Behson is Associate Professor of Management at the Silberman College of Business at Fairleigh Dickinson University, where he teaches and conducts research in work–family balance, organizational justice, and employee involvement. Behson received a PhD from the University at Albany, SUNY, and a BS from Cornell University. Behson also runs the popular blog FathersWorkandFamily.com and has several years of experience in management and human resources consulting. He is proud to have been named the Silberman College of Business Teacher of the Year for 2010–2011. He may be reached at behson@fdu.edu.

Roger Koppl is Professor of Finance in the Whitman School of Management of Syracuse University and a faculty fellow in the University's Forensic and National Security Sciences Institute. Koppl has served on the faculty of the Copenhagen Business School, Auburn University, Fairleigh Dickinson University, and Auburn University at Montgomery. He has held visiting positions at George Mason University, New York University, and the Max Planck Institute of Economics. Professor Koppl is a past president of the Society for the Development of Austrian Economics. He is the editor of *Advances in Austrian Economics*. He may be reached at rogerkoppl@gmail.com.