
Reactions to Skill Assessment: The Forgotten Factor in Explaining Motivation to Learn

Bradford S. Bell, J. Kevin Ford

The study presented here examined the effects of trainees' reactions to skill assessment on their motivation to learn. A model was developed that suggests that two dimensions of trainees' assessment reactions, distributive justice and utility, influence training motivation and overall training effectiveness. The model was tested using a sample of individuals ($N = 113$) enrolled in a truck driving training program. Results revealed that trainees who perceived higher levels of distributive justice and utility had higher motivation to learn. Training motivation was found to significantly predict several measures of training effectiveness. Trainees' performance on the pretraining assessment and trait goal orientation exhibited direct and interactive effects on their reactions to the skill assessment. Implications of these findings for future research on reactions to skill assessments are identified, along with the practical implications for the design and conduct of training needs assessment.

In recent years, a number of significant demographic, technological, sociocultural, and economic forces have combined to create a work environment characterized by rapid change and increasing complexity (Goldstein & Gilliam, 1990; Howard, 1995; Thayer, 1997). As the changing nature of work requires employees to continually develop and change, many organizations have recognized the potential for workplace learning and continuous improvement to serve as a source of sustained competitive advantage (Hall & Mirvis, 1995; Salas & Cannon-Bowers, 2001). Indeed, recent research suggests that organizational training is one of the most pervasive and potentially potent methods of enhancing individual productivity and organizational effectiveness (Arthur, Bennett, Edens, & Bell, 2003).

It is well acknowledged that one of the keys to developing a systematic approach to training that can lead to improved productivity and effectiveness is a thorough assessment of needs (Goldstein, 1986; McGehee & Thayer, 1961). It is not surprising, then, that the growing emphasis on employee development as a strategic organizational priority has been accompanied by greater interest in assessing employees' development needs (Herriot & Anderson, 1997). For example, American College Testing (ACT) has identified basic foundational and advanced skill competencies for the workplace and has developed an extensive testing and assessment process, WorkKeys, that measures an individual's level of competency (McLarty & Vansickle, 1997). Training and developmental opportunities are then provided to individuals to address key skill gaps (see Nash & Korte, 1997). A similar model has been followed by many corporate universities. Meister (1994), for example, highlighted a skill inventory program at IBM that identified employee skill gaps relevant to the functional skill requirements of the company. To close this gap, an employee individual education plan is developed to provide each employee with a road map of instructional modules, training courses, and individual learning activities.

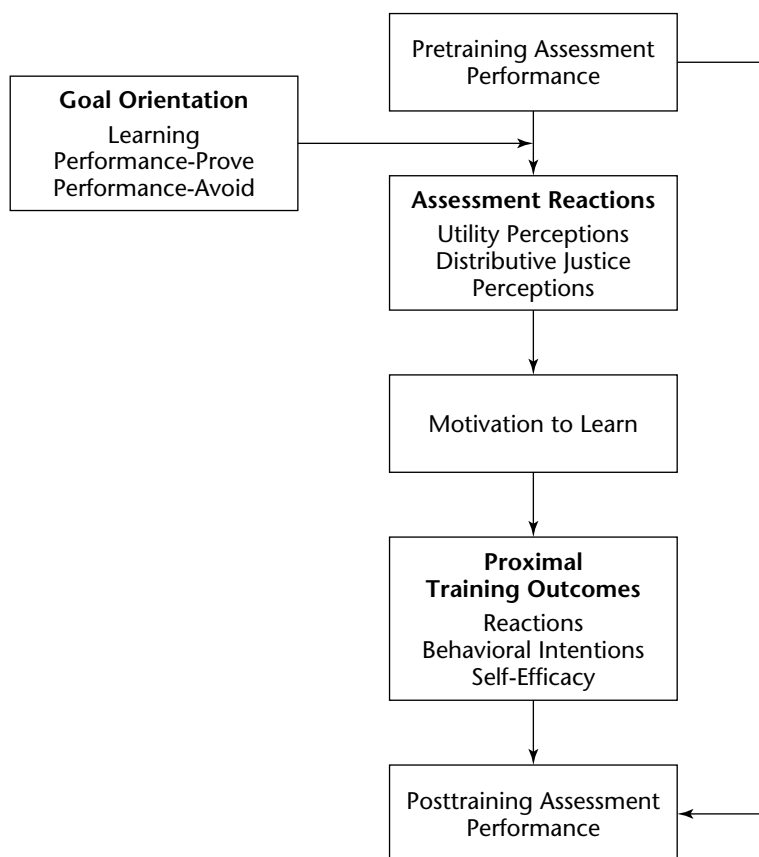
Skill assessments and the development of skill inventories make sense from an organizational perspective to link developmental learning activities to the organization's strategic plan. Yet as Ryan, Brutus, Greguras, and Hakel (2000) noted, the effectiveness of these assessments rests in part on the assumption that individuals want to be assessed and that they are motivated to gain insight into their skill gaps. Farr (1993) contends that organizations should be concerned about how individuals perceive the feedback from skill assessment because these perceptions can bear on what insights are gained from the assessments. However, little is known about individuals' responses to skill assessment feedback and how those responses affect subsequent motivation to address the identified skill gaps through organizationally sponsored training programs (Noe, Wilk, Mullen, & Wanek, 1997).

Consequently, it is important to ask not only how we can assess trainee skills in order to determine appropriate training placement but also what impact the assessment process can have on a trainee's motivation to learn (Goldstein & Ford, 2002). For example, Noe's model of training motivation (1986) posited that motivation to learn would be affected by trainees' reactions to skill assessments and feedback on those assessments given prior to training. Yet very few empirical studies have been conducted on person analysis or the implications of individuals' reactions to skills assessments (Colquitt, LePine, & Noe, 2000). As Salas and Cannon-Bowers (2001, p. 477) note, "Whereas most training researchers believe and espouse that training-needs analysis is the most important phase in training, this phase remains largely an art rather than a science."

The purpose of the study examined here is to develop and test a model of reactions to assessment and their implications for training motivation. There are several expected contributions of this effort. First, this study begins to address the gap in research on training needs assessment and offers insight into the

process by which trainees' reactions to the needs assessment process influence training effectiveness (Salas & Cannon-Bowers, 2001). Second, the study examines two distinct types of assessment reactions, utility perceptions and justice perceptions. While earlier work by Quiñones (1995, 1997) suggests that justice perceptions may serve as an important predictor of trainees' motivation to learn, very little subsequent research has incorporated justice constructs into theories of training effectiveness. Our study extends Quiñones's work by advancing our understanding of how different facets of assessment reactions influence motivation to learn. Finally, Colquitt et al. (2000) note the need for research that considers a broader array of personality variables in models of motivation to learn. In our study, we examine trainees' trait goal orientation as one facet of personality that may influence how trainees react to pretraining skill assessments. The specific relationships examined in this study are presented in Figure 1 and discussed in more detail below.

Figure 1. Conceptual Model of Reactions to Skill Assessment



Literature Review and Theoretical Framework

In this section, we provide a brief review of research on motivation to learn and discuss its relationship to training effectiveness. We then present the two dimensions of assessment reactions examined in this study and discuss their antecedents and consequences.

Training Effectiveness. Noe (1986) presented one of the first comprehensive models of the motivational influences on training effectiveness. In the model, he highlighted the important role of trainability in understanding training effectiveness. In particular, he noted that trainability is a function of three factors: ability, motivation, and perceptions of the work environment. As he notes, even if trainees possess the ability needed to learn the program content, training outcomes will be poor if motivation is low.

The Noe model contended that motivation to learn and environmental favorability are critical factors affecting learning and behavioral change as a function of training. Motivation to learn is affected by individual differences (for example, locus of control, perceived self-efficacy), career and job attitudes (for example, job involvement), and reactions to skill assessments and feedback on those assessments given prior to training. The Noe model has stimulated a large number of studies on motivation to learn and training outcomes, and the field has progressed to where a meta-analytical study could be completed fifteen years later on 106 empirical studies (Colquitt et al., 2000). The meta analysis yielded two major findings. First, it showed that a number of individual characteristics, such as locus of control and anxiety, predict training motivation and learning outcomes. However, the authors also noted that very few personality variables have been examined with great frequency and recommended that future research consider expanding the scope of personality variables to include individual differences such as trait goal orientation and affectivity. Second, the meta-analytical results provided strong evidence that pretraining motivation has a significant impact on a variety of training outcomes (such as reactions, self-efficacy, and skill acquisition) over and above the effects of cognitive ability.

Reactions to Skill Assessment. Noe (1986) contends that the positive or negative reactions to the information individuals receive from an assessment regarding their strengths and weaknesses are likely determinants of their motivation to learn or develop skills in a particular training program. Noe identified a number of possible dimensions relevant to skill assessment reactions, including trainee beliefs concerning the accuracy of the needs assessment information, overall satisfaction with the person analysis method used, and the extent to which the information results in improvement in the trainee's understanding of his or her skill strengths and limitations (utility perceptions). Noe (1986, p. 743) notes that "if trainees perceive the needs assessment as credible and as providing useful information regarding skill strengths and weaknesses, they will react favorably to the information received. As a result,

trainees likely will be motivated to improve skill weaknesses through participation in a training program specifically designed on the basis of the needs assessment information.”

Using a sample of high school administrators attending a training program on leadership, Noe and Schmitt (1986) examined the consequences of trainees' reactions to skill assessment. They found an effect of reactions to skill assessment on trainees' overall reactions (for example, how much a trainee liked the program) to the training program they attended. That is, people who were more favorable toward the pretraining skill assessment process were more likely to react favorably to the training program itself. They also found a positive relationship between reactions to skill assessment and pretraining motivation ($\beta = .17$), although this relationship was not statistically significant. However, Noe and Schmitt suggest that the path coefficients generated for their model are unlikely to remain stable in future research because of the small sample ($N = 60$ trainees) used in their study. This suggests that additional research is needed on the relationship between assessment reactions and motivation to learn. Unfortunately, Colquitt et al. (2000) noted that they could not meta-analyze the impact of reactions to skill assessments on motivation to learn as there were no other studies besides Noe and Schmitt's article on the topic.

Although direct studies on person assessment are lacking, there is research on the framing of training that has relevance to person analysis and skill assessment reactions. For example, Martocchio (1992) and Quiñones (1995) have conducted research that shows the importance of pretraining organizational contextual effects on trainee attitudes and behaviors. Quiñones (1997) writes that contextual factors represent higher-order variables that are perceived by individuals and influence “their thoughts and actions” (p. 181), which in turn can influence trainee motivation and training outcomes. In particular, he argues that organizational context factors are likely to bear on trainee motivation to learn, self-efficacy, and fairness perceptions.

Quiñones (1995), for example, noted that feedback information regarding past performance can also be viewed as a framing event for trainees. He had individuals work on an assessment instrument that tapped declarative and procedural knowledge relevant to the training that was to be offered. He then created two types of frames prior to individuals' attending training. One frame was that the assessment indicated that the person was ready for an advanced training course, and the other was that the assessment indicated the individual should be assigned to a remedial course. He noted that future trainees may question the fairness of the assignments when the assignment is inconsistent with their perceptions of past performance and their assignment expectations. The results showed that perceptions of past performance and expected assignment moderated the relationship between actual assignment and fairness perceptions. Furthermore, Quiñones found that trainees with more favorable fairness perceptions had higher levels of motivation to learn.

In our study, we examine the effects of two types of reactions, justice perceptions and utility perceptions, on trainees' motivation to learn. The importance of justice perceptions for motivation is highlighted by research on equity theory (Adams, 1965). According to Goodman (1977), perceptions of equity are affected by whether individuals see that their level of inputs (effort, knowledge) is consistent with their level of outputs (for example, rewards). Utility perceptions are forward looking and expectancy based, that is, to what extent we think that our efforts will lead to a certain performance level and thus to valued outcomes (Lawler, 1973). These two dimensions are not only theoretically relevant but are also consistent with Noe's multidimensional conceptualization (1986) of reactions such as credibility and utility. These concepts are also supported by recent work in the performance appraisal field showing that fairness and perceived utility represent distinct dimensions of ratees' reactions (Keeping & Levy, 2000).

Distributive Justice Perceptions. One set of relationships examined in this study concerns the effects of trainees' pretraining perceptions of distributive justice on subsequent motivation to learn. Research by Colquitt (2001) has revealed four dimensions of organizational justice: (1) the fairness of outcome distributions—distributive justice; (2) the fairness of procedures used to determine outcome distributions—procedural justice; (3) the quality of interpersonal treatment received when procedures are implemented—interpersonal justice; and (4) the adequacy of information conveyed about why procedures were used a certain way or how outcomes were determined—informational justice. Prior research suggests that the effect of these different dimensions of justice in a specific situation depends on the referent of the outcome under investigation. In particular, distributive justice appears to have a greater influence on person-referenced outcomes such as satisfaction, while procedural justice and interactional justice (interpersonal, informational) exert a greater influence on system-referenced outcomes (for example, organizational commitment) and agent-referenced outcomes (for example, supervisory trust), respectively (Cohen-Charash & Spector, 2001; Colquitt et al., 2001; Folger & Konovsky, 1989; Lind & Tyler, 1988; Sweeney & McFarlin, 1993). Because motivation to learn represents a person's attitudes toward training, it falls within the category of person-referenced outcomes and therefore should relate most strongly to trainees' perceptions of distributive justice. Accordingly, we focus on the dimension of distributive justice in our study.

Distributive justice exists to the extent that individuals see that their outcomes are consistent with implicit norms for allocation (Colquitt, 2001). Although different allocation rules, such as equality or need, may be important depending on the goals of a particular situation, most distributive justice research has focused on the equity rule. Leventhal (1976, p. 94) describes the equity rule as "a single normative rule which dictates that rewards and resources be distributed in accordance with recipients' contributions." When

conceptualized according to the equity rule, distributive justice is fostered when individuals perceive their outcomes as appropriate, given their inputs or contributions.

Noe (1986) argued that one facet of assessment reactions that will influence trainees' motivation is the perceived credibility of the assessment feedback. When the needs assessment information is viewed as credible, trainees are more likely to accept the feedback and be motivated to participate in a training program that helps them address their skill weaknesses (Noe, 1986; Noe & Schmitt, 1986). One factor that may underlie the perceived credibility of assessment feedback is distributive justice. When trainees view the feedback as appropriate and justified given their performance on the assessment (they view the feedback as equitable), they are more likely to perceive the feedback as credible and demonstrate enhanced motivation to learn. Accordingly, we expect a positive relationship between trainees' perceptions of distributive justice and their motivation to learn. Additional support for this hypothesis is provided by the findings of Quiñones (1995) already reviewed, as well as research that has examined the motivational consequences of justice in other organizational settings. For instance, studies have demonstrated that job applicants' justice perceptions relate positively to motivational outcomes, such as test-taking motivation and self-efficacy (Hausknecht, Day, & Thomas, 2004; Ryan & Ployhart, 2000).

HYPOTHESIS 1. Trainees' distributive justice perceptions will be positively related to their motivation to learn.

Utility Perceptions. The second reaction dimension we examine in this study is trainees' utility perceptions, or the extent to which trainees perceive the assessment feedback as useful for identifying their strengths and weaknesses and ultimately improving their skills. Noe and Schmitt (1986) suggested that when trainees perceive the needs assessment as providing useful information regarding skill strengths and weaknesses, they will react favorably to the information received and will be more motivated to rectify skill weaknesses in training. However, they focused on the effect of overall assessment reactions and did not examine the implications of specific reaction dimensions. Brett and Atwater (2001) conducted a study to examine individuals' reactions to feedback designed for developmental purposes (360-degree feedback). They proposed that "individuals who find the feedback more useful will express motivation to change and focus on development" (p. 933). Consistent with their arguments, they found that participants' ratings of feedback usefulness were significantly related to the 360-degree feedback facilitator's ratings of the participants as development focused. Based on this evidence, we expect a positive relationship between trainees' utility perceptions and their motivation to learn:

HYPOTHESIS 2. *Trainees' utility perceptions will be positively related to their motivation to learn.*

Antecedents of Reactions to Skill Assessment. In the few previous studies that have examined the effects of pretraining factors on trainees' motivation, experimental manipulations have been used to induce different reactions from trainees. In the field, however, variability in trainees' reactions may result not only from trainees' experiences during the assessment but also by what they bring with them to the situation. Individual differences serve as a lens through which trainees interpret and react to their assessment experiences. In our study, we examine the direct and interactive effects of trainees' assessment performance and trait goal orientation on trainees' assessment reactions.

Assessment Performance. Prior research using the organizational justice framework has found that the favorability of the outcome one receives has an influence on perceptions of the fairness of the outcome (Brockner & Wisenfeld, 1996; Hausknecht et al., 2004). For example, Bauer, Maertz, Dolen, and Campion (1998) found that job applicants who received feedback that they had passed an employment test had more positive fairness perceptions than those who failed. Similarly, Gilliland (1994) found that individuals who received a positive selection decision perceived higher levels of distributive justice than those who received a negative selection decision. Accordingly, we expect that individuals who perform better on the pretraining assessment will have more positive perceptions of distributive justice:

HYPOTHESIS 3. *Trainees' pretraining assessment performance will be positively related to their perceptions of distributive justice.*

Outcome favorability may also influence individuals' utility perceptions. Ilgen, Fisher, and Taylor (1979) note that an individual's desire to respond to feedback is related to the sign of the feedback. In particular, positive feedback enhances individuals' perceptions of their response capability, which may bolster individuals' perceptions of the usefulness of the feedback (Martocchio & Webster, 1992). Brett and Atwater (2001), for example, found that lower 360-degree feedback ratings from others such as boss or peers generated more negative reactions (angry, confused, discouraged), which in turn had a detrimental impact on the perceived usefulness of the feedback. Based on this evidence, we predict that trainees who perform better on the pretraining assessment will have more positive utility perceptions:

HYPOTHESIS 4. *Trainees' pretraining assessment performance will be positively related to their utility perceptions.*

Goal Orientation as a Moderator. Goal orientation is a construct originating within the educational literature that suggests that individuals demonstrate goal preferences in achievement situations (Bell & Kozlowski, 2002;

Brett & VandeWalle, 1999; VandeWalle, 2003). Recent research has posited three dimensions of goal orientation: a learning orientation focused on the development of competence and task mastery, a performance-prove orientation focused on the attainment of favorable judgments of competency, and a performance-avoid orientation focused on avoiding perceptions of failure and incompetence (Elliot & Church, 1997; VandeWalle, 1997).

These orientations differentially influence how individuals interpret and respond to failure and negative feedback. Individuals with a learning orientation tend to hold an incremental theory about their ability (Dweck, 1986; Dweck & Leggett, 1988). That is, they tend to view ability as a malleable attribute that can be developed. Accordingly, individuals high in learning orientation view negative feedback as useful diagnostic information and an opportunity to develop their competence and improve their performance (VandeWalle & Cummings, 1997; VandeWalle, Ganesan, Challagalla, & Brown, 2000). In contrast, individuals with a performance orientation tend to hold an entity theory about their ability, which views ability as a fixed, uncontrollable attribute. As a result, performance-oriented individuals interpret negative feedback as an evaluation of their competence and a threat to their ego (see also Farr, 1993; Noe et al., 1997; VandeWalle, 2003; VandeWalle, Cron, & Slocum, 2001). They typically perceive little value in negative feedback and may adopt a self-protective posture in which they devalue or discredit the assessment to protect their ego (Dweck & Leggett, 1988; VandeWalle et al., 2000).

Based on this evidence, we predict that the response patterns associated with these different types of goal orientation will moderate individuals' reactions to assessment feedback. In particular, when individuals perform well during the assessment and receive mostly positive feedback, we anticipate there will be little variation in the reactions of individuals with different levels of learning and performance goal orientation. However, when individuals perform more poorly during the assessment, we anticipate that goal orientation will moderate individuals' reactions to the negative feedback. Consistent with the arguments reviewed above, we expect that individuals high in learning orientation will perceive negative feedback as an opportunity and therefore react more positively than individuals low in learning orientation. In contrast, individuals high in performance orientation (both prove and avoid) will perceive negative feedback as an ego threat and therefore react more negatively than individuals low in performance orientation. VandeWalle (2003) suggests that both the prove and avoid dimensions of performance orientation should create negative perceptions of feedback, although the strength of this effect may be greater for the avoid dimension.

HYPOTHESIS 5. Learning orientation will moderate the relationship between pretraining assessment performance and assessment reactions (utility and distributive justice) such that trainees high in learning orientation will react more positively to negative feedback than trainees low in learning orientation.

HYPOTHESIS 6. *Performance orientation (prove and avoid) will moderate the relationship between pretraining assessment performance and assessment reactions (utility and distributive justice) such that trainees high in performance orientation will react more negatively to negative feedback than trainees low in performance orientation.*

Training Outcomes. In an effort to demonstrate the importance of trainees' motivation to learn in the current training context, we examine the relationship between training motivation and several measures of training effectiveness (Kraiger, Ford, & Salas, 1993). In particular, we examine the relationship between training motivation and several proximal training outcomes, including training reactions, posttraining self-efficacy, and behavioral intentions. While training reactions and self-efficacy have received considerable attention as outcomes of motivation to learn, behavioral intentions have been less studied. Research has demonstrated that behavioral intentions account for considerable variance in actual behavior (Ajzen, 1991), and they were identified as an important outcome in our study given the focus of the training on promoting safe, everyday driving behaviors. These three proximal training outcomes are expected to significantly predict the more distal outcome of posttraining assessment performance, after controlling for trainees' pretraining skill level:

HYPOTHESIS 7. *Trainees' motivation to learn will be positively related to their training reactions, posttraining self-efficacy, and behavioral intentions.*

HYPOTHESIS 8. *Training reactions, posttraining self-efficacy, and behavioral intentions will be positively related to posttraining assessment performance, after controlling for pretraining assessment performance.*

Method

This study used a field sample of adults participating in a truck driving training program. A series of questionnaires and performance tests distributed over six time periods were used to measure the study variables. In this section, we provide information on the participants, procedures, and measures used in this study.

Participants. The population for this study was 152 individuals enrolled in truck driving training school. The program teaches the knowledge and skills necessary to earn a commercial driver's license (CDL). Prior to completing a pretraining skill assessment, individuals were invited to participate in the research project. Usable data were collected from 113 individuals (74.3 percent response rate). The demographic makeup of the participants was 93.8 percent male, 6.2 percent female; 67.3 percent Caucasian, 22.1 percent African American, 5.3 percent Hispanic, 0.9 percent Asian, and 4.4 percent chose not

to identify race; and the average age was 36.55 years. We asked participants whether they had any previous experience driving non-CDL trucks (gross vehicle weight rating 10,000 to 26,000 pounds), to which 70.8 percent reported no previous experience, 27.4 percent indicated having previous experience, and 1.8 percent chose not to report experience. Among participants with previous experience, the average number of years of experience was 5.45. Participants who provided usable data did not differ significantly in age, gender, race, or experience from the total trainee population.

Procedure. This study was conducted in conjunction with a training program focused on teaching defensive driving skills. The program was run by a nonprofit truck safety organization and was offered as a voluntary opportunity for individuals enrolled in the truck driving training school. The truck driving school, though, did encourage individuals to attend the program. The defensive driving course consisted of two two-hour classroom sessions separated by approximately one week. The program focuses on actions that truck drivers can take to decrease the probability of having an accident while on the road. The sessions emphasize information that has direct application to the safe and skillful operation of a truck. In particular, the program focuses on issues of situational awareness and close calls, how driving tasks and driving behaviors are interrelated, and issues of search, speed, direction control, and timing (Vanosdall, Irwin, & Ring, 2000).

Approximately two weeks before the first classroom session and two weeks after the second classroom session, trainees participated in a road course evaluation in which their defensive driving skills were evaluated by a trained observer. In the road course evaluation, referred to as driver performance measurement (DPM), trainees are tasked with driving a tractor-trailer through a preset route, which was the same for both assessments. The route combines city and highway driving and takes approximately ninety minutes to complete. Observers provide navigational directions and record trainees' performance on standardized evaluation forms. There were eight different observers used during this training program, all of whom have received extensive training on how to evaluate drivers' performance based on well-defined performance criteria. Following the evaluation, the observer discusses for approximately thirty minutes his evaluation with the trainee, providing feedback on the trainee's strengths and weaknesses in areas such as situational awareness and accident prevention. The pretraining assessment served as a mechanism for highlighting trainees' skill gaps. In addition, individuals' experiences during the assessment were used as discussion topics throughout the training program. The post-training assessment was one of several measures used to evaluate the training program.

In this study, participants were surveyed at six different points in time. This research design introduced a time lag, ranging from several hours to several weeks, between the measurement periods, which Podsakoff, MacKenzie, Lee, and Podsakoff (2003) suggest is an effective technique for

controlling for common method variance. In particular, temporal separation of predictor and criterion variables eliminates the saliency of any contextually provided retrieval cues and allows previously recalled information to leave short-term memory. Furthermore, temporal separation reduces consistency motifs and demand characteristics by diminishing the respondent's ability and motivation to use prior responses to answer subsequent questions (Podsakoff et al., 2003).

Immediately prior to the pretraining assessment, we measured trainees' trait goal orientation. Following the road course evaluation and feedback session, we assessed trainees' distributive justice and utility perceptions. At the beginning of each of the two classroom sessions, we assessed trainees' motivation to learn, and at the end of the second classroom session, we assessed trainees' reactions and behavioral intentions. Finally, immediately prior to the posttraining assessment, we measured trainees' posttraining self-efficacy.

Measures. In this section, we outline the measures used to assess the predictor and outcome variables examined in this study.

Assessment Performance. The route that trainees drove during the skill assessment contained seventeen distinct segments. These segments are of approximately the same length and require trainees to perform specific driving tasks such as shifting lanes, merging, and making a turn. During each of the segments, observers evaluated trainees' performance in four areas: search, speed control, direction control, and overall accident reduction. Trainees were rated as satisfactory (1) or unsatisfactory (0) in each of these areas, based on well-defined performance criteria (Gustafson, Bradshaw, & Vanosdall, 1981). In our study, we used the ratings of trainees on the search dimension as our measure of performance. The decision to focus on the search ratings was guided by three factors. First, a review of the training materials revealed that the topics of search and situational awareness were emphasized in the classroom sessions. Hence, motivation to learn (and actual learning) during the training should have the greatest impact on this facet of trainees' driving performance. Second, the greatest variance in trainees' performance was observed on the search dimension, which is likely a product of the fact that the mean ratings on search were consistently lower than the other three performance dimensions. For example, on the pretraining assessment, trainees received satisfactory search ratings on only 43 percent of the segments, whereas they received satisfactory speed ratings on 93 percent of the segments, satisfactory direction ratings on 83 percent of the segments, and satisfactory ratings on overall accident reduction in 84 percent of the segments. Finally, perhaps because search was the most difficult performance dimension, an examination of feedback notes recorded by observers indicated that this element of trainees' performance was emphasized during the feedback sessions. Thus, we calculated trainees' pre- and posttraining assessment performance by averaging observers' ratings of trainees' search behavior on the seventeen route segments. Internal consistency reliability was .83 for the pretraining performance measure and .87 for the posttraining performance measure.

Goal Orientation. Participants' goal orientation was assessed using VandeWalle's trait goal orientation measure (1997). The measure asks individuals to indicate their goal preferences in the work domain, with responses made on a six-point scale ranging from Strongly Disagree (1) to Strongly Agree (6). The learning orientation scale consisted of four items ($\alpha = .81$). A sample item is, "I enjoy challenging and difficult tasks at work where I'll learn new skills." The performance-avoid orientation measure consisted of four items ($\alpha = .82$). A sample item is, "I prefer to avoid situations at work where I might perform poorly." Performance-prove orientation was assessed with four items ($\alpha = .86$). A sample item is, "I try to figure out what it takes to prove my ability to others at work."

Distributive Justice Perceptions. Trainees' perceptions of distributive justice in the assessment process were assessed using three items from Colquitt's measure of organizational justice (2001). The items were tailored to fit the assessment context and responses were made on a five-point scale ranging from Strongly Disagree (1) to Strongly Agree (5). A sample item is, "The assessment of my driving behavior was justified given my level of performance on the DPM." Reliability of this scale was .86.

Utility Perceptions. Perceptions of the utility of the skill assessment were measured using a six-item scale ($\alpha = .84$) administered after the feedback session. The items asked trainees to evaluate the extent to which the skill assessment was a valuable experience and one that provided feedback that would help them become a better driver. All items were rated on a five-point scale ranging from Strongly Disagree (1) to Strongly Agree (5). A sample item is, "The DPM feedback provided me with useful information to help improve my driving." We conducted a confirmatory factor analysis (CFA) to examine the factor structure of the reactions to assessment measures. The CFA revealed that a two-factor model of distributive justice and utility perceptions not only provided acceptable fit to the data $\chi^2(25, N = 113) = 52.08, p < .01; \chi^2/df = 2.08; CFI = .94$; root mean square error of approximation (RMSEA) = .099; and standardized root mean square residual (SRMR) = .073, but also fit significantly better than an alternative one-factor model ($\delta, \chi^2 = 150.16, df = 2, p < .01$). This provides support for the structure of assessment reactions used in this study.

Motivation to Learn. At the beginning of both classroom sessions, trainees' motivation to learn was measured using the eight-item scale (session 1, $\alpha = .87$; session 2, $\alpha = .89$) developed by Noe and Schmitt (1986). Items were modified to be consistent with our training setting and were rated on a five-point scale ranging from Strongly Disagree (1) to Strongly Agree (5). A sample item is, "I am motivated to learn the skills emphasized in this training program." Participants' motivation scores at the two sessions were averaged to create an overall measure of motivation to learn.

Reactions to Training. Participants' reactions to training were assessed using a six-item scale ($\alpha = .90$) that assessed their attitudes regarding the

quality and usefulness of the training program. All items were rated on a five-point scale ranging from Strongly Disagree (1) to Strongly Agree (5). A sample item is, "Overall, I was satisfied with the quality of instruction for this course." To ensure the unidimensionality of the reactions to training measure, we conducted an exploratory principal components factor analysis. Following the Kaiser normalization criterion guideline of selecting components with eigenvalues greater than one, the analysis produced a single factor solution (eigenvalue = 4.11; variance = 68.45 percent; all item loadings greater than .70).

Self-Efficacy. Self-efficacy was assessed using a six-item scale ($\alpha = .93$) adapted from Ford, Smith, Weissbein, Gully, and Salas (1998). This measure assessed self-efficacy with a Likert-type scale rather than with ratings of confidence about particular aspects of the task (Hysong & Quinones, 1997; Lee & Bobko, 1994). All items were rated on a five-point scale ranging from Strongly Disagree (1) to Strongly Agree (5). A sample item is, "I am certain I can manage the requirements of DPM."

Behavioral Intentions. A ten-item scale ($\alpha = .96$) administered at the end of the second classroom session was used to assess trainees' intentions to incorporate the skills learned in the training program into their everyday driving behavior. All items were rated on a five-point scale ranging from Strongly Disagree (1) to Strongly Agree (5). A sample item is, "I intend to apply what I learn from the course to my everyday driving." We again used an exploratory principal components factor analysis to confirm the unidimensionality of the behavioral intentions measure. The analysis revealed that the ten items loaded onto a single factor (eigenvalue = 7.37; variance = 73.68 percent; all item loadings greater than .75).

Analyses. An examination of the data revealed that there were no significant differences in reactions, motivation to learn, or training outcomes as a result of age, gender, race (Caucasian versus non-Caucasian), or experience, and these variables were therefore omitted from future analyses. The hypothesized structural model was tested using structural equation modeling. We used Mplus 3.12 to test the model (Kline, 2005; Muthén & Muthén, 2004), with variables treated as directly observed. Although not depicted in the model, a noncausal association among distributive justice and utility perceptions was estimated to reflect the interrelationship of these two dimensions of assessment reactions. Since all hypotheses were directional, one-tailed tests of significance were used.

Results

The means, standard deviations, and intercorrelations among the study variables are presented in Table 1. In Table 2 we present the full-model fit statistics for the hypothesized structural model. First, we present the chi-square value and the normed chi square (χ^2/df), for which a ratio of 2.0 or less

Table 1. Means, Standard Deviations, and Intercorrelations

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11
1. Learning Orientation	5.31	0.55	(.81)										
2. Performance-Prove Orientation	3.90	1.12	.16*	(.86)									
3. Performance-Avoid Orientation	2.59	1.02	-.26**	.43**	(.82)								
4. Distributive Justice	4.28	0.61	.27**	-.09	-.29**	(.86)							
5. Utility Perceptions	4.78	0.35	.31**	-.04	-.12	.40**	(.84)						
6. Motivation to Learn	4.31	0.48	.40**	.02	-.24*	.37**	.38**	(.88)					
7. Training Reactions	4.66	0.42	.43**	.05	-.15	.42**	.49**	.58**	(.90)				
8. Behavioral Intentions	4.69	0.42	.30**	-.02	-.17	.41**	.43**	.59**	.75**	(.96)			
9. Self-Efficacy	4.38	0.50	.36**	.12	-.15	.31**	.37**	.44**	.46**	.45**	(.93)		
10. Pretraining Assessment Performance	0.42	0.24	.04	.02	-.02	-.09	-.19*	-.10	.03	-.08	.02	(.83)	
11. Posttraining Assessment Performance	0.64	0.26	.18	-.02	-.03	.06	.00	.05	.11	.10	.20*	.35**	(.87)

Note: Internal consistency reliabilities of the measures are reported on the diagonal in parentheses.

* $p < .05$; ** $p < .01$ (one-tailed).

Table 2. Fit Statistics for Structural Models

<i>Statistic</i>	<i>Hypothesized Model</i>	<i>Alternative Model</i>
χ^2	130.99	57.81
χ^2/df	2.85	1.34
Comparative fit index (CFI)	.69	.95
Root-mean-square error of approximation (RMSEA)	.131	.056
90 percent confidence interval for RMSEA	.105, .157	.000, .091
SRMR	.104	.077

Note: The alternative model contains three additional paths: utility perceptions → training reactions; distributive justice → training reactions; and training reactions → behavioral intentions. For the hypothesized model, $n = 113$, $df = 46$; for the alternative model, $n = 113$, $df = 43$. The chi square for hypothesized model was significant at $p < .01$. The chi square for the alternative model was nonsignificant.

indicates good fit (Arbuckle, 1997). Next we present the comparative fit index (CFI), with values above .90 generally indicating favorable fit (Hu & Bentler, 1999). Finally, we present the root-mean-square error of approximation (RMSEA), its 90 percent confidence interval, and the standardized root-mean-square residual (SRMR). RMSEA and SRMR values between .05 and .10 indicate reasonable fit, and values below .05 indicate close approximate fit (Kline, 2005). The fit statistics presented in Table 2 indicate that the hypothesized model yielded poor fit to the data. Hence, we examined the modification indices in an effort to identify theoretically relevant model respecifications that may improve overall model fit.

The modification indices suggested the addition of three paths to the model. First, a direct path was added between trainees' utility perceptions and their reactions to the training program. Second, a path from trainees' distributive justice perceptions to their training reactions was also estimated. The addition of these two paths suggests that the relationships between trainees' assessment reactions and their reactions to the training program are only partially mediated by motivation to learn. This is consistent with Colquitt et al. (2000), who found that a partially mediated model of motivation to learn fit better than a completely mediated model. Finally, a path was modeled from training reactions to behavioral intentions. As expected, trainees who reacted more positively to the training were more likely to indicate positive intentions toward transferring what they have learned to their everyday driving.

The alternative structural model containing these three additional paths was tested. As can be seen in Table 2, the alternative model exhibited improved fit. A chi-square difference test revealed that the alternative model fit the data significantly better than the hypothesized model (δ , $\chi^2 = 73.18$, $df = 3$, $p < .01$). Furthermore, the alternative model yielded a more favorable RMSEA value,

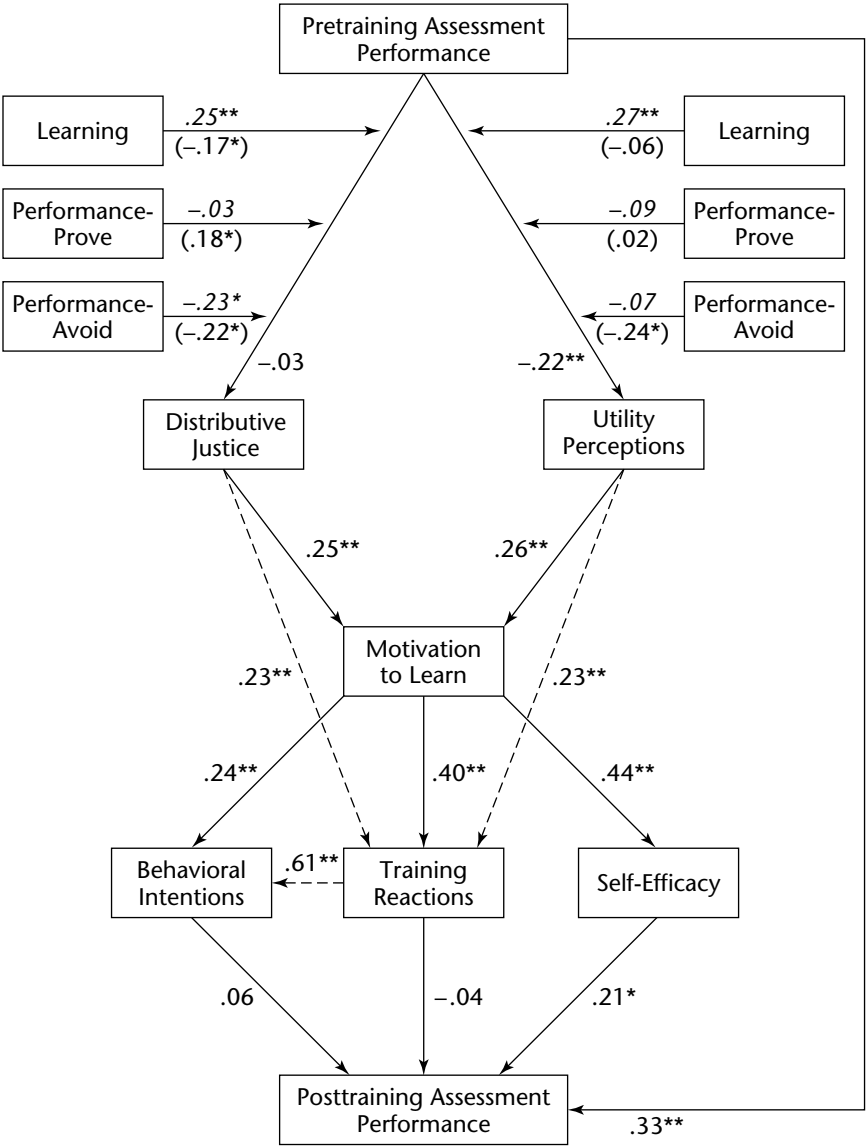
with no overlap between the upper bound of the confidence interval of the alternative model and the lower bound of the confidence interval for the hypothesized model. Accordingly, the alternative model was retained. The structural equation modeling results for the alternative model are presented in Figure 2 and discussed below.

Hypotheses 1 and 2 predicted that trainees' motivation to learn would be positively related to their distributive justice perceptions and utility perceptions, respectively. The model accounted for 19.1 percent of the variance in trainees' motivation to learn. Both distributive justice perceptions and utility perceptions exhibited significant, positive relationships with motivation to learn. The magnitude of these effects was nearly identical, suggesting that the two dimensions of trainees' assessments reactions play an equally important role in driving motivation to learn. Thus, hypotheses 1 and 2 were supported.

Hypotheses 3 and 4 predicted that trainees' pretraining assessment performance would be positively related to their perceptions of distributive justice and utility perceptions, respectively. Overall, the model accounted for 19.4 percent of the variance in trainees' distributive justice perceptions. However, trainees' performance on the pretraining assessment was not a significant predictor of distributive justice perceptions. Hypothesis 3 therefore was not supported. The model explained 18.0 percent of the variance in trainees' utility perceptions. Contrary to expectations, trainees' performance on the pretraining assessment exhibited a significant, negative relationship with utility perceptions. This finding is inconsistent with research in the performance management arena, which has shown that individuals generally respond more favorably to feedback with a positive sign (Brett & Atwater, 2001). However, if individuals are focused on development rather than evaluation, this pattern of results is more logical. Specifically, trainees who performed more poorly would likely perceive the feedback as more diagnostic and developmental, which may have bolstered their perceptions of the pretraining assessment as a useful exercise. This suggests that the perceived utility of negative feedback may depend on whether the assessment context is framed as evaluative or developmental.

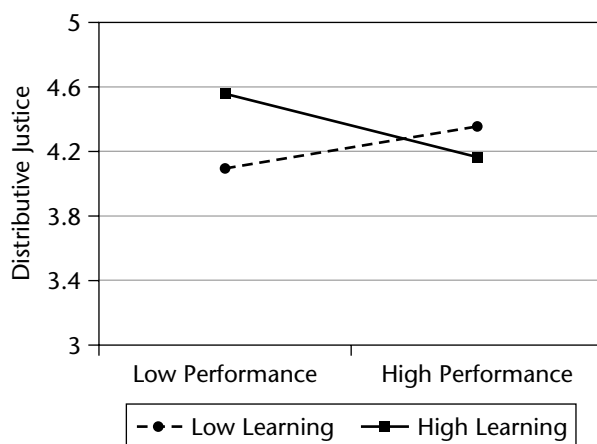
Hypothesis 5 predicted that learning orientation and pretraining assessment performance would interact in their effect on trainees' assessment reactions, such that trainees high in learning orientation would react more positively to negative feedback than trainees low in learning orientation. Figure 2 shows that learning orientation was significantly and positively related to trainees' utility perceptions and their distributive justice perceptions. Although a significant interaction was not observed for utility perceptions, learning orientation and pretraining assessment performance significantly interacted to effect trainees' distributive justice. This interaction is shown in Figure 3. Using the method described by Aiken and West (1991), we performed tests to determine whether the simple regression lines for low and

Figure 2. Structural Equation Modeling Results



Note: Standardized path coefficients reported. For trait goal orientation paths, main effect reported in italics and interactive effect reported in parentheses. When a significant interaction term is present, the main effects are conditional, although the direct relationship can be interpreted as the average effect (Aiken & West, 1991). Dashed paths represent model respecifications.

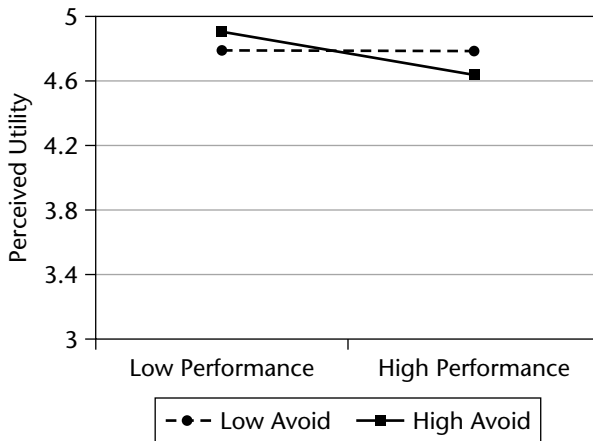
Figure 3. Interaction Between Learning Orientation and Assessment Performance on Distributive Justice Perceptions



high levels of learning orientation differs significantly at the high (one standard deviation above the mean) and low (one standard deviation below the mean) values of assessment performance. This analysis revealed that when individuals received low ratings on the pretraining assessment, there was a significant, positive relationship between learning orientation and distributive justice perceptions ($\beta = .390, p < .01$). The analysis also revealed that there was no significant relationship among learning orientation and distributive justice when individuals received high ratings on the pretraining assessment ($\beta = 2.107, ns$). These findings provide partial support for our hypothesis that trainees high in learning orientation would exhibit more positive reactions than trainees low in learning orientation when presented with negative feedback.

In hypothesis 6 we predicted that performance orientation would moderate the relationship between pretraining assessment performance and assessment reactions such that trainees high in performance orientation would react more negatively to negative feedback than trainees low in performance orientation. Neither of the dimensions of performance orientation exhibited a significant direct relationship with utility perceptions, but performance-avoid orientation significantly interacted with assessment performance to predict perceived utility. This interaction is depicted in Figure 4. Using the technique described by Aiken and West (1991), we conducted simple slope tests to provide an indication of whether the relationship between assessment performance and utility was significant within each level (low versus high) of performance-avoid orientation. This analysis revealed a nonsignificant relationship between assessment performance and perceived utility among

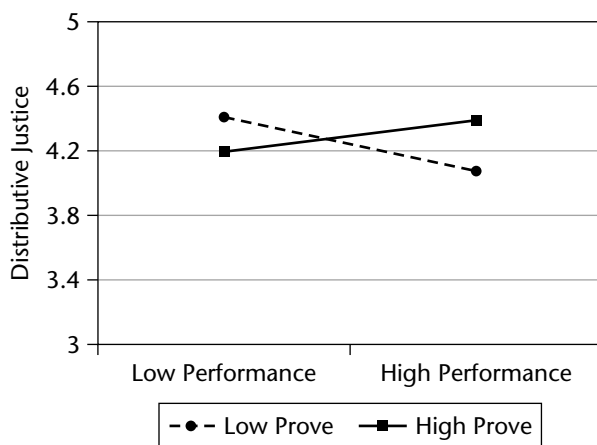
Figure 4. Interaction Between Assessment Performance and Performance-Avoid Orientation on Utility Perceptions



individuals low in performance-avoid orientation ($\beta = -.015$, *ns*). However, there was a significant, negative relationship between assessment performance and perceived utility among trainees high in performance-avoid orientation ($\beta = -.379$, $p < .01$). As expected, this pattern of results indicates that the impact of trainees' performance on their utility perceptions was greater among trainees high in performance-avoid orientation. However, contrary to expectations, the results indicate that individuals high in avoid orientation perceived greater utility when they performed more poorly on the assessment. Again, this pattern of results may be explained by the developmental nature of the assessment. That is, trainees high in performance-avoid orientation may have reacted more positively to a negative assessment because the developmental feedback would help them improve their driving performance and avoid errors in the future.

Figure 4 also reveals that performance-avoid orientation exhibited a significant negative relationship with trainees' distributive justice perceptions. In addition, both performance-prove and performance-avoid orientations moderated the relationship between pretraining assessment performance and trainees' distributive justice perceptions. The significant interaction among performance-prove orientation and assessment performance on distributive justice perceptions is presented in Figure 5. This figure reveals that trainees high in performance-prove orientation reported more positive distributive justice perceptions than individuals low in performance-prove orientation when they performed well on the pretraining assessment, but more negative justice perceptions when they received low ratings on the pretraining assessment. This pattern of results provides support for our hypothesis that

Figure 5. Interaction Between Performance-Prove Orientation and Assessment Performance on Distributive Justice Perceptions

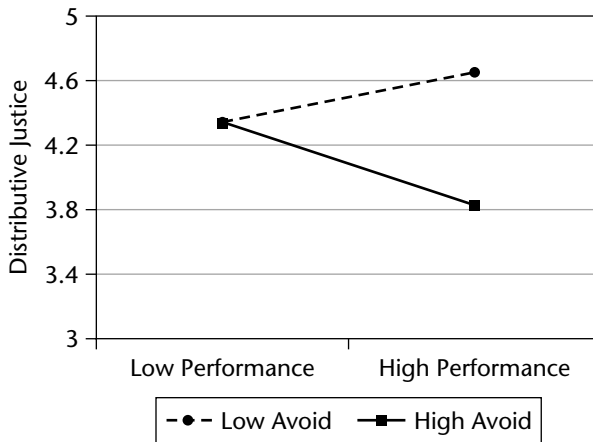


individuals high in performance-prove orientation would react more negatively to negative feedback than individuals low in performance-prove orientation. However, these findings should be interpreted cautiously since a comparison of regression lines did not reveal a significant difference among individuals high and low in performance-prove orientation at the different levels of assessment performance ($\beta = -.191$, *ns* at low performance; $\beta = .232$, *ns* at high performance).

The significant interaction among performance-avoid orientation and assessment performance on distributive justice perceptions is shown in Figure 6. The analysis of regression lines revealed, contrary to expectations, that performance-avoid orientation was not significantly related to distributive justice perceptions when individuals received low ratings on the pretraining assessment ($\beta = -.005$, *ns*). However, there was a significant, negative relationship between performance-avoid orientation and distributive justice perceptions when individuals performed well on the pretraining assessment ($\beta = -.658$, $p < .01$). Although unexpected, this finding is consistent with the earlier results reported for trainees' utility perceptions and suggests that trainees high in performance-avoid orientation may have reacted more favorably to the negative feedback because its diagnostic and developmental nature would help them avoid unsafe driving behaviors and accidents.

Hypothesis 7 predicted that motivation to learn would be positively related to individuals' reactions to training, posttraining self-efficacy, and behavioral intentions. The results revealed that motivation to learn significantly and positively predicted trainees' self-efficacy, explaining 19.1 percent of the variance. Motivation to learn also exhibited a significant, positive relationship

Figure 6. Interaction Between Performance-Avoid Orientation and Assessment Performance on Distributive Justice Perceptions



with individuals' reactions to training. Moreover, trainees' reactions to the pretraining assessment (both utility and distributive justice) were significantly and positively related to training reactions. Overall, these three predictors accounted for 45.3 percent of the variance in individuals' reactions to training. The model also explained 58.9 percent of the variance in trainees' behavioral intentions. Both motivation to learn and training reactions exhibited significant, positive relationships with trainees' intentions to transfer the training to their everyday driving. In summary, the hypothesized relationship between motivation to learn and the proximal training outcomes was supported.

Finally, hypothesis 8 predicted that the proximal training outcomes would be positively related to trainees' posttraining assessment performance after controlling for pretraining skill level. The model accounted for 15 percent of the variance in trainees' posttraining assessment performance. As expected, pretraining performance exhibited a significant, positive relationship with posttraining performance. After controlling for pretraining skill level, only self-efficacy emerged as a significant predictor of posttraining performance. As expected, self-efficacy was positively related to posttraining performance. Neither training reactions nor behavioral intentions significantly predicted performance. Thus, hypothesis 8 was partially supported.

Discussion

This research provides support for Noe's argument (1986) that reactions to skill assessment have important consequences for trainees' motivation to learn. One contribution of this research is that we examined two related yet distinct

dimensions of assessment reactions: utility and distributive justice. Our findings revealed that these two dimensions emerged as equally important predictors of trainees' motivation to learn. Trainees who had more positive perceptions of the utility of the assessment process were more motivated to learn in the subsequent training program. This finding supports Noe's assertion (1986) that trainees who perceive the needs assessment as providing useful information regarding skill strengths and weakness will be more motivated to improve their skill weaknesses through participation in a related training program. We also found that trainees with more positive distributive justice perceptions were more motivated to learn. These results provide evidence that the credibility of the needs assessment outcomes is an important factor in driving motivation to learn. An important issue for future research to examine is whether perceptions of other elements of the assessment process, including the procedures and interpersonal treatment, influence trainees' motivation.

This study also aimed to address Colquitt, LePine, and Noe's call (2000) for more research on the role of personality characteristics in models of motivation to learn. We argued that trait goal orientation may serve a framework through which individuals interpret and react to their pretraining assessment performance. We found that trainees high in learning orientation reacted more favorably to the skill assessment than trainees low in learning orientation. Furthermore, we found evidence to support our argument that learning orientation moderates the relationship between trainees' assessment performance and their reactions. In particular, learning orientation appears to have an important influence on how trainees react to negative assessment feedback. Specifically, when trainees performed well on the pretraining assessment, the relationship between learning orientation and reactions was nonsignificant. When they performed poorly on the pretraining assessment, trainees high in learning orientation reported more positive distributive justice perceptions than trainees low in learning orientation.

The effects of performance-prove orientation in the current study were limited, although we did observe a significant interaction of performance-prove orientation and pretraining assessment performance on distributive justice perceptions. This interaction revealed that high levels of performance-prove orientation led to more negative reactions to negative feedback and more positive reactions to positive feedback. Although these results are in line with the predicted pattern, the interaction effect was modest, and a comparison of regression lines at low and high levels of assessment performance suggests that these differences were not significant.

Probably the most intriguing findings for goal orientation were observed for the performance-avoid dimension. Consistent with the arguments of VandeWalle (2003), performance-avoid orientation was a more consistent predictor of trainees' assessment reactions than performance-prove orientation. In particular, we found a negative relationship between performance-avoid orientation and trainees' perceptions of distributive justice. In addition, the results

revealed that performance-avoid orientation moderated the relationship between assessment performance and both utility and distributive justice perceptions. Contrary to our expectations, however, both of these interactions suggest that trainees high in performance-avoid orientation had more positive reactions to the skill assessment when they received low performance ratings. These findings conflict with prior research that has shown a negative relationship between performance-avoid orientation and reactions to negative feedback (VandeWalle, 2003; VandeWalle et al., 2001). One potential explanation for these conflicting findings concerns differences in feedback contexts (Ashford, Blatt, & VandeWalle, 2003). Specifically, much of the prior research examining the effects of goal orientation on reactions to feedback has been conducted in the context of college classes, a setting that several authors have noted is characterized by a climate of competition and evaluation (Cron, Slocum, VandeWalle, & Fu, 2005; Harackiewicz, Barron, Pintrich, Elliot, & Thrash, 2002). In contrast, the feedback context in the research reported here was noncompetitive and emphasized personal development, growth, and improvement. In purely developmental contexts, negative feedback may not present the typical threat to the ego and self-esteem of individuals high in performance-avoid orientation. As a result, the drivers may have viewed the negative feedback as valuable information for improving their performance and demonstrating their competence in their future career. Some evidence for this argument is provided by the fact that we found an inverse relationship between trainees' performance on the skill assessment and their perceptions of utility. Ultimately these results are interesting because they suggest that there may be conditions under which avoidance-oriented individuals do not exhibit aversive reactions to negative feedback, and in fact may respond favorably. Future research is needed to explore the implications of performance-avoid orientation in different feedback contexts.

The final set of relationships examined in this study focused on the effects of motivation to learn on several measures of training effectiveness. These relationships were generally consistent with previous research and provide evidence for the importance of motivation to learn in the current training context. Trainees who exhibited higher levels of motivation to learn had more positive reactions to the training, as well as higher levels of posttraining self-efficacy. The magnitude of these relationships was generally consistent with those reported by Colquitt et al. (2000) in their training motivation meta-analysis. Training reactions also exhibited a significant, positive relationship with trainees' utility and distributive justice perceptions. This suggests that the positive relationship between trainees' assessment reactions and their reactions to the training program was only partially mediated by motivation to learn. We also found that trainees who were more motivated to learn had more positive behavioral intentions. This finding is important since one of the primary goals of safety training is to encourage trainees to integrate their new skills into their everyday activities and routines. Finally, we found that trainees with higher

levels of posttraining self-efficacy performed significantly better on the post-training assessment. It is important to note that the relationship was found even after controlling for trainees' pretraining skill level.

Limitations and Directions for Future Research. Several limitations of this study can be identified to help guide future research. One limitation is the self-report nature of a number of the measures used in this study, which creates the potential for common method variance to bias the results. The research design employed six different measurement periods in an effort to control for common method bias. This introduced a time lag between the predictor and criterion variables, which helps to control for several potential sources of common method bias, such as consistency motif, transient mood state, context effects, and demand characteristics (Podsakoff et al., 2003). There is some evidence that these efforts may have been successful. First, the fact that several of the observed relationships were nonsignificant suggests that an overall response bias does not account for the findings. Second, where it is possible to compare observed relationships to culminated research findings (for example, motivation to learn to training outcome relationships), one finds effects of a similar magnitude and little evidence of inflation. Nonetheless, future research can benefit by including measures from a variety of sources, such as observational measures of trainee effort or persistence.

A second issue is that our examination of antecedents of trainees' assessment reactions was limited to pretraining assessment performance and trait goal orientation. Other individual differences may play an important role in shaping individuals' reactions to assessment and developmental feedback. For example, Ryan et al. (2000) found that racial similarity of the feedback recipient and giver was the most consistent predictor of receptivity to management development feedback. Similarly, elements of the assessment process and the assessment context may influence trainees' reactions. For example, research in the selection arena has also demonstrated that characteristics of procedures (for example, transparency) and outcomes (for example, explanations, face validity) have a significant effect on applicant perceptions (Hausknecht et al., 2004; Ryan & Ployhart, 2000). While it is important not to simply assume these results generalize to training settings, research from other domains can be used to help guide future studies on factors that may have an impact on trainees' reactions to assessment.

A final issue concerns the fact that in this study, all individuals who participated in the pretraining assessment attended the training sessions. This is likely due, at least in part, to the fact that the assessment process and classroom training were framed as integrated components of an overall training program. It is often the case, however, that skill assessments are only loosely tied to specific developmental opportunities. A good example is multisource feedback systems, which are frequently used to highlight individuals' weaknesses and developmental needs with the goal of stimulating self-directed learning and development (Brett & Atwater, 2001; Smither, London, Flautt,

Vargas, & Kucine, 2003). In these situations, an important issue concerns the extent to which the assessment process motivates individuals to seek out development opportunities. Our results suggest that individuals who react more positively to the assessment process may be more motivated to identify and engage in development activities that will allow them to address their skill gaps, but we were unable to address this issue directly in our investigation. Future research should therefore examine the effects of trainees' assessment reactions in different training settings with alternative conceptualizations of trainees' motivation to learn (Noe et al., 1997).

Implications for Human Resource Development. The results of this study have several implications for future practice in the field of human resource development. First, the importance of training needs assessment for designing effective training has been well documented and is widely acknowledged within the field. For example, the 2004 State of the Industry report by the American Society for Training and Development revealed that top learning organizations map learning resources to competencies, individual development plans, jobs, and corporate goals (Sugrue & Kim, 2004). Practitioners are then urged to develop a systematic approach to identify skill gaps in employees so as to determine who needs to be trained and what types of learning experiences would be helpful to eliminate a skill gap (Goldstein & Ford, 2002).

In particular, the results of our study suggest that trainees' reactions to the skill assessment process have a significant impact on their motivation to learn, which in turn drives important learning outcomes. The importance of the assessment process for shaping individuals' attitudes toward training is not surprising when one considers that it is during this phase that trainees first become personally involved in the training process. Our research, though, suggests that identifying skill gaps is not simply an issue of developing a systematic approach to measurement. It also requires attention to developing a process that prospective trainees ultimately see as fair. This highlights the need to consider the psychological impact of our needs assessment processes and include steps to maximize the chances that the process will be seen as fair. For example, the literature on justice would suggest that employees should have a voice in the development of the assessment instrument, that the criterion for success is clearly noted to the employee prior to the assessment process, and that the scoring process is described prior to providing the results (Gilliland & Paddock, 2005). In addition, Latham, Almost, Mann, and Moore (2005) recommend training appraisers and coaches on principles of organizational justice so the assessment process is seen as fair. In addition, appraisers should be trained on how to provide feedback so that trainees will be more likely to perceive assessment feedback as meaningful and useful. As future research identifies the structural and social elements of the skill assessment process that influence individuals' utility and justice perceptions, organizations will be able to use this information to design and conduct skill assessments that are

perceived as fair, credible, and useful—ultimately enhancing their employees' motivation to learn.

Our results also suggest, however, that trainees are likely to react differently to skill assessments depending on their individual characteristics, such as goal orientation. This suggests that HRD practitioners need to avoid a one-size-fits-all approach to skill assessments and focus instead on tailoring the process to different trainees. For example, our results indicate that negative skill assessment feedback may be particularly damaging to the reactions and motivation of individuals low in learning orientation. If training practitioners understand these individual differences and their influence on trainees' assessment reactions, they can tailor the process to meet the needs of specific trainees. VandeWalle (2003), for example, notes that in addition to a learning orientation occurring as an individual difference, situational cues can be used to make a learning orientation state salient. Thus, assessors may compensate for individuals' low levels of learning orientation by emphasizing the value of learning and the developmental nature of the feedback during the assessment process. We hope that future research will provide additional insight into how individual differences can be leveraged so as to shape trainees' reactions and maximize their motivation to learn.

References

- Adams, J. S. (1965). Inequity in social exchange. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 2, pp. 267–295). Orlando, FL: Academic Press.
- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Thousand Oaks, CA: Sage.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179–211.
- Arbuckle, J. L. (1997). *Amos users' guide* (Version 3.6). Chicago: Small-Waters.
- Arthur, W., Bennett, W., Edens, P. S., & Bell, S. T. (2003). Effectiveness of training in organizations: A meta-analysis of design and evaluation features. *Journal of Applied Psychology*, 88, 234–245.
- Ashford, S. J., Blatt, R., & VandeWalle, D. (2003). Reflections on the looking glass: A review of research on feedback-seeking behavior in organizations. *Journal of Management*, 29, 773–799.
- Bauer, T. N., Maertz, C. P., Dolen, M. R., & Campion, M. A. (1998). Longitudinal assessment of applicant reactions to employment testing and test outcome feedback. *Journal of Applied Psychology*, 83, 892–903.
- Bell, B. S., & Kozlowski, S.W.J. (2002). Goal orientation and ability: Interactive effects on self-efficacy, performance, and knowledge. *Journal of Applied Psychology*, 87, 497–505.
- Brett, J. F., & Atwater, L. E. (2001). 360° feedback: Accuracy, reactions, and perceptions of usefulness. *Journal of Applied Psychology*, 86, 930–942.
- Brett, J. F., & VandeWalle, D. (1999). Goal orientation and goal content as predictors of performance in a training program. *Journal of Applied Psychology*, 84, 863–873.
- Brockner, J., & Wisenfeld, B. M. (1996). An integrative framework for explaining reactions to decisions: Interactive effects of outcomes and procedures. *Psychological Bulletin*, 120, 189–208.
- Cohen-Charash, Y., & Spector, P. E. (2001). The role of justice in organizations: A meta-analysis. *Organizational Behavior and Human Decision Processes*, 86, 278–321.
- 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., Conlon, D. E., Wesson, M. J., Porter, C.O.L.H., & Ng, K. Y. (2001). Justice at the millennium: A meta-analytic review of 25 years of organizational justice research. *Journal of Applied Psychology*, 86, 425–445.
- Colquitt, J. A., LePine, J. A., & Noe, R. A. (2000). Toward an integrative theory of training motivation: A meta-analytic path analysis of twenty years of research. *Journal of Applied Psychology*, 85, 678–707.
- Cron, W. L., Solocum, J. W., VandeWalle, D., & Fu, F. Q. (2005). The role of goal orientation on negative emotions and goal setting when initial performance falls short of one's performance goal. *Human Performance*, 18, 55–80.
- Dweck, C. S. (1986). Motivational processes affecting learning. *American Psychologist*, 41, 1040–1048.
- Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review*, 95, 256–273.
- Elliot, A. J., & Church, M. A. (1997). A hierarchical model of approach and avoidance achievement motivation. *Journal of Personality and Social Psychology*, 72, 218–232.
- Farr, J. L. (1993). Informal performance feedback: Seeking and giving. In H. Schuler, J. Farr, & M. Smith (Eds.), *Personnel selection and assessment: Individual and organizational perspectives* (pp. 163–180). Mahwah, NJ: Erlbaum.
- Folger, R., & Konovsky, M. A. (1989). Effects of procedural and distributive justice on reactions to pay raise decisions. *Academy of Management Journal*, 32, 115–130.
- Ford, J. K., Smith, E. M., Weissbein, D. A., Gully, S. M., & Salas, E. (1998). Relationships of goal orientation, metacognitive activity, and practice strategies with learning outcomes and transfer. *Journal of Applied Psychology*, 83, 218–233.
- Gilliland, S. W. (1994). Effects of procedural and distributive justice on reactions to a selection system. *Journal of Applied Psychology*, 79, 691–701.
- Gilliland, S. W., & Paddock, L. (2005). Organizational justice across human resource management decisions. In G. Hodgkinson & J. K. Ford (Eds.), *The International Review of Industrial and Organizational Psychology*, 20 (pp. 149–176). Hoboken, NJ: Wiley.
- Goldstein, I. L. (1986). *Training in organizations: Needs assessments, development, and evaluation* (2nd ed.). Monterey, CA: Brooks/Cole.
- Goldstein, I. L., & Ford, J. K. (2002). *Training in organizations* (4th ed.). Belmont, CA: Wadsworth.
- Goldstein, I. L., & Gilliam, P. (1990). Training system issues in the year 2000. *American Psychologist*, 45, 134–143.
- Goodman, P. S. (1977). Social comparison processes in organizations. In B. Staw & G. Salancik (Eds.), *New directions in organizational behavior* (pp. 97–132). Chicago: St. Clair.
- Gustafson, R. E., Bradshaw, A. O., & Vanosdall, F. E. (1981). *Volume II Model School Bus Road Test and Training Manual*. East Lansing: Highway Traffic Safety Center, Michigan State University.
- Hall, D. T., & Mirvis, P. H. (1995). Careers as lifelong learning. In A. Howard (Ed.), *The changing nature of work*. San Francisco: Jossey-Bass.
- Harackiewicz, J. M., Barron, K. E., Pintrich, P. R., Elliot, A. J., & Thrash, T. M. (2002). Revision of achievement goal theory: Necessary and illuminating. *Journal of Educational Psychology*, 94, 638–645.
- Hausknecht, J. P., Day, D. V., & Thomas, S. C. (2004). Applicant reactions to selection procedures: An updated model and meta-analysis. *Personnel Psychology*, 57, 639–683.
- Herriot, P., & Anderson, N. (1997). Selecting for change: How will personnel and selection psychology survive? In N. Anderson & P. Herriot (Eds.), *International handbook of selection and assessment* (pp. 1–33). Hoboken, NJ: Wiley.
- Howard, A. (Ed.). (1995). *The changing nature of work*. San Francisco: Jossey-Bass.
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6, 1–55.
- Hysong, S. J., & Quiñones, M. A. (1997). *The relationship between self-efficacy and performance: A meta-analysis*. Paper presented at the Twelfth Annual Conference of the Society for Industrial and Organizational Psychology, St. Louis, MO.

- Ilgen, D. R., Fisher, C. D., & Taylor, M. S. (1979). Consequences of individual feedback on behavior in organizations. *Journal of Applied Psychology*, 64, 349–371.
- Keeping, L. M., & Levy, P. E. (2000). Performance appraisal reactions: Measurement, modeling, and method bias. *Journal of Applied Psychology*, 85, 708–723.
- Kline, R. B. (2005). *Principles and practices of structural equation modeling* (2nd ed.). New York: Guilford Press.
- Kraiger, K., Ford, J. K., & Salas, E. (1993). Application of cognitive, skill-based, and affective theories of learning outcomes to new methods of training evaluation. *Journal of Applied Psychology*, 78, 311–328.
- Latham, G. P., Almost, J., Mann, S., & Moore, C. (2005). New developments in performance management. *Organizational Dynamics*, 34, 77–87.
- Lawler, E. E. (1973). *Motivation in work organizations*. Monterey, CA: Brooks/Cole.
- Lee, C., & Bobko, P. (1994). Self-efficacy beliefs: Comparison of five measures. *Journal of Applied Psychology*, 79, 364–369.
- Leventhal, G. S. (1976). The distributions of rewards and resources in groups and organizations. In L. Berkowitz & W. Walster (Eds.), *Advances in experimental social psychology* (Vol. 9, pp. 91–131). Orlando, FL: Academic Press.
- Lind, E. A., & Tyler, T. R. (1988). *The social psychology of procedural justice*. New York: Plenum Press.
- Martocchio, J. J. (1992). Microcomputer usage as an opportunity: The influence of context in employee training. *Personnel Psychology*, 45, 529–552.
- Martocchio, J. J., & Webster, J. (1992). Effects of feedback and cognitive playfulness on performance in microcomputer software training. *Personnel Psychology*, 45, 553–578.
- McGehee, W., & Thayer, P. W. (1961). *Training in business and industry*. Hoboken, NJ: Wiley.
- McLarty, J. R., & Vansickle, T. R. (1997). Assessing employability skills: The WorkKeys system. In H. O'Neil (Ed.), *Workforce readiness: Competencies and assessment*. Mahwah, NJ: Erlbaum.
- Meister, J. C. (1994). *Corporate quality universities: Lessons in building a world-class work force*. Alexandria, VA: American Society for Training and Development.
- Muthén, L. K., & Muthén, B. (2004). *Mplus user's guide* (3rd ed.). Los Angeles: Muthén & Muthén.
- Nash, B. E., & Korte, R. C. (1997). Validation of SCANS competencies by a national job analysis study (pp. 77–102). In H. O'Neil (Ed.), *Workforce readiness: Competencies and assessment*. Mahwah, NJ: Erlbaum.
- Noe, R. A. (1986). Trainees' attributes and attitudes: Neglected influences on training effectiveness. *Academy of Management Review*, 11, 736–749.
- Noe, R. A., & Schmitt, N. (1986). The influence of trainee attitudes on training effectiveness: Test of a model. *Personnel Psychology*, 39, 497–523.
- Noe, R. A., Wilk, S. L., Mullen, E., & Wanek, J. (1997). Employee development: Construct validation issues. In K. Ford & Associates (Eds.), *Improving training effectiveness in work organizations* (pp. 153–188). Mahwah, NJ: Erlbaum.
- Podsakoff, P. M., MacKenzie, S. B., Lee, J., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88, 879–903.
- Quiñones, M. A. (1995). Pretraining context effects: Training assignment as feedback. *Journal of Applied Psychology*, 80, 226–238.
- Quiñones, M. A. (1997). Contextual influences on training effectiveness. In M. A. Quiñones & A. Ehrenstein (Eds.), *Training for a rapidly changing workplace: Applications of psychological research* (pp. 177–199). Washington, DC: American Psychological Association.
- Ryan, A. M., Brutus, S., Greguras, G., & Hakel, M. D. (2000). Receptivity to assessment-based feedback for management development. *Journal of Management Development*, 19, 252–276.

- Ryan, A. M., & Ployhart, R. E. (2000). Applicants' perceptions of selection procedures and decisions: A critical review and agenda for the future. *Journal of Management*, 26, 565–606.
- Salas, E., & Cannon-Bowers, J. A. (2001). The science of training: A decade of progress. *Annual Review of Psychology*, 52, 471–499.
- Smither, J. W., London, M., Flautt, R., Vargas, Y., & Kucine, I. (2003). Can working with an executive coach improve multisource feedback ratings over time? A quasi-experimental field study. *Personnel Psychology*, 23–44.
- Sugrue, B., & Kim, K. (2004). *State of the industry: ASTD's annual review of trends in workplace learning and performance*. Alexandria, VA: American Society for Training and Development.
- Sweeney, P. D., & McFarlin, D. B. (1993). Worker's evaluations of the "ends" and the "means": An examination of four models of distributive and procedural justice. *Organizational Behavior and Human Decision Processes*, 55, 23–40.
- Thayer, P. W. (1997). A rapidly changing world: Some implications for training systems in the year 2001 and beyond. In M. A. Quiñones & A. Ehrenstein (Eds.), *Training for a rapidly changing workplace: Applications of psychological research* (pp. 15–30). Washington, DC: American Psychological Association.
- VandeWalle, D. (1997). Development and validation of a work domain goal orientation instrument. *Educational and Psychological Measurement*, 57, 995–1015.
- VandeWalle, D. (2003). A goal orientation model of feedback-seeking behavior. *Human Resource Management Review*, 13, 581–604.
- VandeWalle, D., Cron, W. L., & Slocum, J. W. (2001). The role of goal orientation following performance feedback. *Journal of Applied Psychology*, 86, 629–640.
- VandeWalle, D., & Cummings, L. L. (1997). A test of the influence of goal orientation on the feedback seeking process. *Journal of Applied Psychology*, 82, 390–400.
- VandeWalle, D., Ganesan, S., Challagalla, G. N., & Brown, S. P. (2000). An integrated model of feedback seeking behavior: Disposition, context, and cognition. *Journal of Applied Psychology*, 85, 996–1003.
- Vanosdall, F. E., Irwin, M., & Ring, R. (2000). *DPM Step II: A pilot study on the development and conduct of classroom instruction for truck drivers*. Lansing: Michigan Truck Safety Commission, Michigan Center for Truck Safety.

Bradford S. Bell is an assistant professor in the School of Industrial and Labor Relations at Cornell University, Ithaca, New York.

J. Kevin Ford is a professor of psychology at Michigan State University, East Lansing, Michigan.

