Perceived Teacher Confirmation
The Development and Validation of an Instrument and Two Studies of the Relationship to Cognitive and Affective Learning

KATHLEEN ELLIS
University of Colorado, Colorado Springs

This article reports an initial attempt to operationalize perceived teacher confirmation in behavioral terms and to explore relationships among perceived teacher confirmation, cognitive learning, and affective learning. Results for 2 samples (N = 446; N = 303) indicate that the final 16-item version of the Teacher Confirmation scale (TCS) is valid and reliable. Confirmatory factor analysis revealed that teacher confirmation is best represented by a 3-factor solution: (a) teachers’ response to students’ questions—comments, (b) demonstrated interest in students and in their learning, and (c) teaching style. Results also indicate that teacher confirmation plays a significant role in college students’ cognitive and affective learning. For Sample 1, confirmation uniquely explained 18% of the variance in cognitive learning and 30% of the variance in affective learning, after controlling for demographic variables and relevance of assignments. For Sample 2, confirmation uniquely explained 17.6% of the variance in cognitive learning and 31% of the variance in affective learning, after controlling for the same variables. Structural equation modeling revealed strong, significant paths between confirmation and affective learning and between affective and cognitive learning. The study revealed a large, significant, indirect effect of teacher confirmation on cognitive learning, suggesting that affective learning serves as a mediating variable between teacher confirmation and cognitive learning. A multiple groups comparison demonstrated that the structural model was invariant for the 2 samples.

Educators have long been interested in identifying teacher behaviors that influence academic outcomes. Recent studies by instructional communication scholars have focused on a variety

Kathleen Ellis (Ph.D., University of Denver, 1998) is an assistant professor in the Department of Communication at the University of Colorado, Colorado Springs. This article is based on the author’s doctoral dissertation, completed under the direction of Dr. Carl Larson, University of Denver. The author thanks Dr. Larson and Dr. Susan Hutchinson, Virginia Tech, for their advice regarding methodological procedures used in this research project. An earlier version of the paper was presented as the top paper in the Instructional Communication Division at the 1999 convention of the National Communication Association. Address correspondence to Kathleen Ellis, Department of Communication, University of Colorado, Colorado Springs, CO 80933-7150, phone: (719) 262-4130, fax: (719) 262-4030, e-mail: kellis@mail.uccs.edu.
of factors, including teacher immediacy, perceived teacher caring, teaching style, teacher questioning behavior, teacher expectancies, and teachers’ use of humor. One type of teacher behavior that has not been examined adequately is teacher confirmation, the process by which teachers communicate to students that they are valuable, significant individuals. Yet, scholars have posited the fundamental importance of confirmation in human interaction for many years (Buber, 1957; Cissna & Sieburg, 1981, 1990; Friedman, 1983; Laing, 1961; Sieburg, 1975, 1985; Watzlawick, Beavin, & Jackson, 1967).

The term “confirmation” has appeared in an interpersonal sense in the philosophical, religious, psychiatric, and communication literature for more than 4 decades, beginning with the writings of theologian Martin Buber (1957). Buber alleged that confirmation is the interactional phenomenon by which we discover and establish our identity as humans. He argued that confirmation may well be the most significant feature of human interaction. Laing (1961) further developed the construct and emphasized that confirmation is the process that includes actions on the part of others that cause one to feel “endorsed,” “recognized,” and “acknowledged” as a unique, valuable human being. Thus, “confirming behaviors are those that permit people to experience their own being and significance as well as their connectedness with others” (Cissna & Sieburg, 1981, p. 269). So important is confirmation that Watzlawick, Beavin, and Jackson (1967) claimed it to be the “greatest single factor ensuring mental development and stability” (p. 84).

Given the alleged fundamental importance of the confirmation construct, one might reasonably assume that confirmation has been the subject of thorough research in the past. However, such is not the case. A review of the literature reveals that little empirical attention has been paid to the confirmation construct in general and, in particular, to the role of teacher confirmation in educational contexts, such as the college classroom.

That is not to say, however, that research about confirmation and related constructs has not appeared in the literature at all. It has, and, as discussed in the review of literature to follow, the available research has consistently indicated that the presence or absence of confirmation or disconfirmation influences the outcome of communication experiences (Cissna, 1975; Cissna & Keating, 1979; Clarke, 1973; Ellis, 1995, 1996; P. Leth, 1977). Further, in the context of the college classroom, related constructs, such as teacher immediacy, have received much attention. Teacher confirmation, however, has been severely understudied. To date, no empirical investigations have examined teacher confirmation as it relates to student learning.

The purpose of this article, therefore, is to report an initial attempt to explore the pedagogical role of perceived teacher confirmation in the col-
lege classroom. The article reports (a) the development and preliminary validation of a low-inference, behaviorally oriented measure of perceived teacher confirmation, (b) a cross-validation study of the new instrument and an attempt to establish concurrent validity of the new instrument, and (c) the results of two investigations of the relationships among perceived teacher confirmation, affective learning, and cognitive learning.

This research is significant for three reasons. First, the study has theoretical value, because it expands and clarifies our understanding of the confirmation construct. Second, the study has pedagogical implications, because teacher confirmation was operationally defined in low-inference behavioral terms, thus providing useful clues regarding how to address the confirmation construct in teacher training. Third, the study has heuristic value, in that it demonstrates a psychometrically sound method for developing an instrument and for empirically studying the confirmation construct in a particular context. This opens the doors for further study of the construct in other contexts.

For the purposes of this research, teacher confirmation was defined as the transactional process by which teachers communicate to students that they are endorsed, recognized, and acknowledged as valuable, significant individuals. This definition applies Laing’s conceptualization of confirmation to the educational setting. Contrastingly, teacher disconfirmation was defined as the process by which teachers communicate to students that they are not endorsed, recognized, or acknowledged as valuable, significant individuals.

**REVIEW OF LITERATURE**

For many years, communication scholars have maintained that all communication includes a relational, as well as a content, dimension (Bavelas, 1992; Burgoon & Dillman, 1991; Burgoon & Hale, 1984; Fisher & Drecksel, 1983; Millar & Rogers, 1976; Watzlawick et al., 1967; Wood, 1982). During the past 20 years, interpersonal researchers have paid increased attention to the role of relational communication. It has been established that certain communication behaviors, both verbal and nonverbal, send relational messages and, taking a symbolic interactionist view, arouse in the receiver feelings of “being real or unreal, accepted or rejected, valued or scorned, understood or misunderstood, humanized or objectified” (Sieburg, 1985, p. 188). Communication behaviors that evoke such feelings in the receiver have been labeled confirmation and disconfirmation.
Using the conceptual framework provided by Laing (1961) and the descriptive work by Watzlawick et al. (1967), Sieburg (1969) extracted the basic dimensions of confirmation and disconfirmation and systematized confirming and disconfirming responses into interrelated clusters. According to the Sieburg typology, confirmation includes (a) recognition, (b) acknowledgement, and (c) endorsement. Disconfirmation includes (a) indifference, (b) imperviousness, and (c) disqualification of the speaker, his or her message, or both. Thus, disconfirmation negates the other as a valid message source and communicates to the other that he or she is less than human, that he or she is merely a thing, an object in the environment, valueless and insignificant as a human being.

In addition to the typology just presented, Sieburg developed a system for coding and measuring observed confirming and disconfirming responses during interaction (1969), as well as developing the first instrument to measure perceived confirmation (1975). As a result of Sieburg’s work, limited empirical study has proceeded from two vantage points: (a) observation and (b) receiver perception.

Although observed confirmation has been studied more than perceived confirmation, both lines of research have been productive. In general, studies of observed confirmation have provided information about the nature of the confirmation construct, whereas studies of perceived confirmation have revealed information about how confirmation operates in relation to outcome variables. Following is a review of important findings in each line of research.

Studies of observed confirmation have indicated that (a) confirmation appears to be an important, pervasive communication variable that may be free from contextual restraints (Ellis, 1996; Ross, 1973; Waxwood, 1976); (b) confirmation may be identifiable only by the receiver (Cook, 1980; Ellis, 1996; Keating, 1977); (c) confirmation seems to be a reciprocal process (S. Leth, 1977; Sundell, 1972); and (d) confirmation appears to be manifest through both verbal and nonverbal behaviors (Bavelas, 1992; Bavelas & Chovil, 1986; Bavelas, Hagen, Lane, & Lawrie, 1989; Chovil, 1980, 1989).

Studies of perceived confirmation have been conducted primarily in the context of the family and have indicated that the variable is associated with desirable relational outcomes, including marital satisfaction (Clark, 1973), degree of intimacy (Cissna, 1975), amount of facilitative communication (Cissna & Keating, 1979), and level of self-esteem (Ellis, 1996). In the context of the classroom, the single existing empirical study suggests that perceived confirmation is associated with positive student-teacher relationships and that female public speaking instructors are perceived as more confirming than male instructors (P. Leth, 1977).
STUDY 1: DEVELOPMENT AND PRELIMINARY VALIDATION OF THE TEACHER CONFIRMATION SCALE

As noted above, a review of the literature revealed one existing measure of perceived confirmation. Sieburg (1975) operationalized perceived confirmation as a person’s score on the Perceived Confirmation Inventory, a 5-item, 4-step Likert scale. This instrument asks respondents to indicate their level of agreement on the following items:

1. He/she is not at all interested in what I have to say.
2. He/she accepts me.
3. He/she has no respect for me at all.
4. He/she dislikes me.
5. He/she trusts me.

Sieburg’s operationalization was not considered adequate for study in the college classroom, because the instrument is not behaviorally based and, consequently, is low in potential pedagogical value. To illustrate, if use of the above instrument revealed significant links between teacher confirmation and student outcomes such as learning, such findings would translate into recommendations that teachers exhibit the following qualities when interacting with students: interest, acceptance, respect, like, and trust. Although minimally useful, the findings would not indicate how a teacher exhibits these qualities. More useful would be findings that indicate a relationship exists between student outcomes and specific teacher communication behaviors, such as teachers’ responses to students’ questions, the use of specific teaching styles, and inquiries about how students feel about assignments or exams. Therefore, a new instrument, the Teacher Confirmation scale (TCS), was created.

Development and preliminary validation of the Teacher Confirmation scale (TCS) consisted of the following steps: (a) item development from focus groups and telephone interviews, followed by pilot testing, (b) instrument testing on a large sample, and (c) confirmatory factor analysis and assessment of reliability.

Item Development

Because it is the students themselves who know the specific teacher behaviors that communicate to them that they are valuable, significant individuals, information used to generate items was obtained directly from students. Three audiotaped focus groups were facilitated by the researcher to gather information. Each group consisted
of 10-12 undergraduate students of mixed sex, ethnicity, and majors. All had extensive experience as college students.

Each focus group received a clear explanation of the confirmation construct and a clear definition of key terms. Then, using the critical incident approach initially developed by Flanagan (1954), students recalled and related incidents when they had felt confirmed and disconfirmed by college teachers. With the incident in mind, students identified specific behaviors the teacher engaged in that communicated the teacher’s confirmation or disconfirmation. Ample research has demonstrated that data gathered using the critical incident approach are both valid and reliable and that results can be applied to develop operational definitions (Andersson & Nilsson, 1964; Patton, 1980; Ronan & Latham, 1974).

After relating critical incidents, students identified general teaching behaviors that foster feelings of confirmation and disconfirmation within them. Then, to supplement the focus group data, 20 students randomly selected from a comprehensive student list were interviewed by phone. Telephone interview participants answered the questions, “What do college teachers do that communicates to you that you are a valuable, significant individual?” and, “What do college teachers do that communicates to you that you are not a valuable, significant individual?” These questions were consistent with the definition of teacher confirmation used in this study and the questions discussed in the focus groups.

Data from focus groups and telephone interviews were subjected to content analysis. Specific behaviors that students perceived as communicating teacher confirmation and disconfirmation were extracted, and the frequency of mention of each behavior was noted. Additionally, to help with wording of the new instrument, I recorded the exact language students commonly used to describe confirming and disconfirming teacher behaviors.

Students made a total of 406 comments that described specific confirming and disconfirming teacher behaviors. The study identified 60 different teacher behaviors, the best examples of which appear in the final instrument (Table 1). Four general categories of behavioral patterns through which teachers communicate confirmation and disconfirmation emerged from the data: (a) teachers’ response to students’ questions—comments; (b) demonstrated interest in students and in their learning; (c) teaching style; and (d) aberrant disconfirmation. (Note: A complete report of the content analysis is available from the researcher.)

The 40 most frequently mentioned behaviors were used to develop the initial 5-step, 40-item scale, in which 0 = strongly disagree, 1 = disagree, 2 = undecided, 3 = agree, and 4 = strongly agree. The new instrument, the Teacher Confirmation scale (TCS), was pilot tested on a group of 24 students before the instrument was administered to a large sample.
### TABLE 1
Descriptive Statistics and Item/Total Correlations for the Final Teacher Confirmation Scale (TCS)

<table>
<thead>
<tr>
<th>Questionnaire item</th>
<th>Mean</th>
<th>SD</th>
<th>Item/total corr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(N = 439)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Communicates that he/she is interested in whether students are learning.</td>
<td>2.88</td>
<td>1.08</td>
<td>0.71</td>
</tr>
<tr>
<td>2. Indicates that he/she appreciates students’ questions or comments.</td>
<td>3.07</td>
<td>0.95</td>
<td>0.76</td>
</tr>
<tr>
<td>3. Makes an effort to get to know students.</td>
<td>2.28</td>
<td>1.23</td>
<td>0.61</td>
</tr>
<tr>
<td>4. Belittles or puts students down when they participate in class.</td>
<td>3.38</td>
<td>0.95</td>
<td>0.63</td>
</tr>
<tr>
<td>5. Checks on students’ understanding before going on to the next point.</td>
<td>2.59</td>
<td>1.21</td>
<td>0.70</td>
</tr>
<tr>
<td>6. Gives oral or written feedback on students’ work.</td>
<td>2.24</td>
<td>1.25</td>
<td>0.52</td>
</tr>
<tr>
<td>7. Establishes eye contact during class lectures.</td>
<td>3.29</td>
<td>0.82</td>
<td>0.57</td>
</tr>
<tr>
<td>8. Talks down to students.*</td>
<td>3.25</td>
<td>0.99</td>
<td>0.66</td>
</tr>
<tr>
<td>9. Is rude in responding to some students’ comments or questions during class.*</td>
<td>3.23</td>
<td>1.07</td>
<td>0.73</td>
</tr>
<tr>
<td>10. Uses an interactive teaching style.</td>
<td>2.64</td>
<td>1.22</td>
<td>0.67</td>
</tr>
<tr>
<td>11. Listens attentively when students ask questions or make comments during class.</td>
<td>3.12</td>
<td>0.86</td>
<td>0.72</td>
</tr>
<tr>
<td>12. Displays arrogant behavior.*</td>
<td>3.08</td>
<td>1.17</td>
<td>0.68</td>
</tr>
<tr>
<td>13. Takes time to answer students’ questions fully.</td>
<td>2.97</td>
<td>1.03</td>
<td>0.76</td>
</tr>
<tr>
<td>14. Embarrasses students in front of the class.*</td>
<td>3.38</td>
<td>0.89</td>
<td>0.68</td>
</tr>
<tr>
<td>15. Communicates that he/she doesn’t have time to meet with students.*</td>
<td>3.24</td>
<td>0.91</td>
<td>0.51</td>
</tr>
<tr>
<td>16. Intimidates students.*</td>
<td>3.14</td>
<td>1.05</td>
<td>0.64</td>
</tr>
<tr>
<td>17. Shows favoritism to certain students.*</td>
<td>2.87</td>
<td>1.18</td>
<td>0.55</td>
</tr>
<tr>
<td>18. Puts students down when they go to the teacher for help outside of class.*</td>
<td>3.29</td>
<td>0.90</td>
<td>0.61</td>
</tr>
<tr>
<td>19. Smiles at the class.</td>
<td>3.22</td>
<td>0.88</td>
<td>0.62</td>
</tr>
<tr>
<td>20. Communicates that he/she believes that students can do well in the class.</td>
<td>3.06</td>
<td>0.95</td>
<td>0.69</td>
</tr>
<tr>
<td>21. Is available for questions before and after class.</td>
<td>2.97</td>
<td>1.02</td>
<td>0.59</td>
</tr>
<tr>
<td>22. Is unwilling to listen to students who disagree.*</td>
<td>3.07</td>
<td>1.05</td>
<td>0.59</td>
</tr>
<tr>
<td>23. Uses a variety of teaching techniques to help students understand course material.</td>
<td>2.33</td>
<td>1.27</td>
<td>0.67</td>
</tr>
<tr>
<td>24. Asks students how they think the class is going and/or how assignments are coming along.</td>
<td>2.31</td>
<td>1.21</td>
<td>0.63</td>
</tr>
<tr>
<td>25. Incorporates exercises into lectures when appropriate.</td>
<td>2.57</td>
<td>1.27</td>
<td>0.56</td>
</tr>
<tr>
<td>26. Is willing to deviate slightly from the lecture when students ask questions.</td>
<td>2.97</td>
<td>0.94</td>
<td>0.58</td>
</tr>
<tr>
<td>27. Focuses on only a few students during class while ignoring others.*</td>
<td>3.06</td>
<td>1.02</td>
<td>0.62</td>
</tr>
<tr>
<td>Total Teacher Confirmation scale (27 items)</td>
<td>79.67</td>
<td>1.06</td>
<td></td>
</tr>
</tbody>
</table>

*Item reversed for scoring.
Instrument Testing

Sample and Procedures

The TCS was administered to 446 undergraduate students of mixed sex (92 males, 349 females, and 5 unreported) and ethnicity (346 European Americans, 43 Latinos, 23 African Americans, 20 Asians, 6 Native Americans, and 6 unreported) and representing 36 different academic majors. Age ranged from 18 to 55 years ($M = 24.3$). Participation was voluntary and anonymous.

The method of data collection used in a number of recent studies of teacher behavior and student learning was employed (Christophel, 1990; Christophel & Gorham, 1995; Frymier, 1993; Frymier, Shulman, & Houser, 1996; Gorham, 1988; McCroskey, Richmond, Sallinen, Fayer, & Barraclough, 1995; McCroskey, Sallinen, Fayer, Richmond, & Barraclough, 1996; Plax, Kearney, McCroskey, & Richmond, 1986; Teven & McCroskey, 1997). Following this method, respondents completed the instrument based on the teacher and class immediately preceding the one in which they were serving as respondents. This method of data collection has been known to generate data that evaluate a wide range of subject areas, class sizes, and teachers.

In the present study, data were collected during Week 14 of the 16-week semester, when students were very familiar with their instructors' typical communication behavior. Although respondents were not asked to provide the names of the instructors they evaluated, respondents were asked to provide the course titles and course numbers. A total of 77 different classes were evaluated, ranging in size from 17 to 116 students. Approximately half of the respondents evaluated male instructors (49.3%), and half of them evaluated female instructors (50.7%). Thirty-nine percent of the respondents indicated that they were taking the course they evaluated as a general education requirement, 34% indicated they were taking the course as a requirement for their major, and 27% indicated they were taking the course as an elective.

Because data were collected in intact classes, there was a possibility of dependency in the data. However, efforts were made to minimize the potential effects: (a) Much of the data were collected in general education classes that enroll students from all areas of the university, and (b) as suggested by Stevens (1996), a stringent alpha was set for significance ($\alpha = .01$).

Factor Analysis and Reliability

Confirmatory factor analysis (CFA) was selected as the most appropriate procedure to examine the factor structure of the new instrument. The
advantages of CFA over exploratory factor analysis have been well docu-
mented (Bollen, 1989; Byrne, 1989; Coovret, Penner, & MacCallum, 1990;
Hoyle, 1995; Marsh, 1987; Rindskopf, 1984). Perhaps the most compelling
advantage is that CFA is driven by theory, rather than by data. As such,
CFA allows the researcher to formulate, define specifically, and test one
or more a priori models of the construct that have been suggested by the
theoretical underpinnings of the construct. Data are then analyzed to de-
termine the extent to which each hypothesized model fits the data. A good
model fit provides support for the theory and some evidence of validity.

Prior to analysis, data were examined to assess the tenability of the
statistical assumptions for CFA. Examination of descriptive statistics, his-
tograms, and scatterplots indicated linearity of data, but moderate skew-
ness and kurtosis on some variables. Mardia’s measure of multivariate
normality, which includes skewness and kurtosis, was significant, indi-
cating that the data were multivariate nonnormal. However, research has
indicated that the potential effect of nonnormality is that most fit indices
“underestimate” model fit in its presence, and fit indices should be con-
sidered lower bound measures (Hu, Bentler, & Kano, 1992; Hutchinson &
Olmos, 1998). Hence, because violation of the normality assumption did
not increase the chance for Type I error, the analysis was conducted.

In the present study, three alternative conceptualizations of the factor
structure of the TCS were tested, using maximum likelihood CFA meth-
ods within LISREL 8 (Jöreskog & Sörbom, 1996): (a) the two-factor model
supported in most of the existing theoretical literature, with confirmation
and disconfirmation as two hypothesized factors of the confirmation con-
struct, (b) the four-factor model suggested by the four general behavioral
patterns that emerged from the focus group and telephone interview data,
and (c) a one-factor model suggested in theoretical literature that stresses
the interrelatedness of confirmation and disconfirmation. The effective
same size was 439. A covariance matrix was used as input for all analy-
ses. Latent variables were allowed to correlate freely, but error variances
of individual items were not allowed to correlate.

Because it was the intent of the researcher to reduce the number of
items in the scale, retaining only the best items, results of the initial CFA
analysis for the two-factor model were scrutinized and items eliminated
one by one on the basis of redundancy, relatively low factor loadings,
changes in model fit, and relatively low squared multiple correlations (a
lower bound measure of item reliability). Thirteen items were eliminated,
leaving 27 items with high factor loadings and high item reliabilities.
Table 1 reports the means, standard deviations, and item-total corre-
lations for the final 27 items.

After results had been obtained for the three hypothesized models,
goodness of fit indices were examined to compare the relative fit of the
three models. These indices measure the difference between the covariance matrix predicted by the model and the one resulting from the sample data. A nonsignificant chi-square indicates that the model fits the data. However, the chi-square test is extremely powerful, and statistical insignificance is seldom achieved when the sample size and number of variables are large.

Not surprisingly, all observed chi-square values were significant for all models in the current study. Thus, model fit was assessed by using several of the additional goodness of fit indices provided by LISREL 8. These indices have been rigorously tested and provide a basis for the subjective evaluation of whether a statistically significant chi-square is small enough to constitute adequate fit. Given the large sample obtained for this study, the Non-Normed Fit Index (NNFI), also known as the Tucker-Lewis Index, and the Comparative Fit Index (CFI) were selected as appropriate indices, because neither index is sensitive to sample size (Bollen, 1989). NNFI and CFI levels beyond .90 signal good fit. Additionally, the Root Mean Square Error of Approximation (RMSEA), which provides a reasonable approximation of the degree of deviation from a perfect fit, was also selected for use in this study. RMSEA values of less than .05 indicate “close” fit, values of .08 suggest “reasonable” fit, and values of .10 or above signal “poor” fit (Browne & Cudeck, 1989).

Results of the initial analysis of the models suggested a reasonable fit for the two-factor model, $\chi^2(323, N = 439) = 1039.80, p < .01; \text{RMSEA} = .07; \text{NNFI} = .89; \text{CFI} = .90$ and four-factor model, $\chi^2(318, N = 439) = 844.45, p < .01; \text{RMSEA} = .06; \text{NNFI} = .92; \text{CFI} = .93$), but a poor fit for the one-factor model, $\chi^2(324, N = 439) = 1840.67, p < .01; \text{RMSEA} = .10; \text{NNFI} = .77; \text{CFI} = .79$. Therefore, the one-factor model was eliminated from the analysis, and results for the two- and four-factor models were examined for possible refinements that would result in a better fit to the data. Refinements were accomplished by freeing parameter constraints individually, as suggested by the modification indices provided by LISREL 8 (Bollen, 1989; Steiger, 1990). In the two-factor model, a total of seven refinements were made, one by one, to allow error variances to correlate between conceptually similar items. Each refinement resulted in an improvement of fit. In the four-factor model, six refinements were made.

Final results indicated an excellent fit for both the refined two-factor solution, $\chi^2(316, N = 439) = 786.48, p < .01; \text{RMSEA} = .06; \text{NNFI} = .93; \text{CFI} = .93$, and the refined four-factor solution, $\chi^2(312, N = 439) = 644.63, p < .01; \text{RMSEA} = .05; \text{NNFI} = .95; \text{CFI} = .95$, with all fit statistics exceeding recommended levels. Additionally, the Goodness of Fit Index (GFI) proposed by Jöreskog and Sörbom (1989) that measures the relative amount of variance-covariance in the sample covariance matrix that can be accounted for by the model was .87 for the two-factor solution and .90 for
the four-factor solution. Hence, the two-factor solution accounted for 87% of the variance in the sample covariance matrix, whereas the four-factor solution explained 90%.

Although the fit indices suggested that the refined four-factor model provided the best fit, a chi-square difference test was conducted to see if the difference in fit of the two nested models was significant. It was, with a chi-square difference of 141.85 and a difference of four degrees of freedom. Because this chi-square value is much greater than the critical value for four degrees of freedom at the .01 significance level, it was concluded that the four-factor solution was the best representation of the data. The four factors were labeled (a) teachers’ response to students’ questions—comments, (b) demonstrated interest in the student, (c) teaching style, and (d) absence of disconfirmation. Table 2 presents the factor loadings for the items. Loadings ranged from .56 to .84, with more than half above .70.

Regarding reliability, Cronbach’s alpha for the 27-item scale was .95, whereas alphas for the individual factors were .86 for teachers’ response to students’ questions, .85 for demonstrated interest, .85 for teaching style, and .92 for absence of disconfirmation.

Taken together, the results of the examination of the psychometric qualities of the Teacher Confirmation scale were promising and suggested that the new instrument was valid and reliable. Nonetheless, as with all new instruments, there was a clear need to administer the instrument to a second sample to see if results would cross-validate and to further evaluate the instrument’s validity.

**STUDY 2: CROSS-VALIDATION OF THE TEACHER CONFIRMATION SCALE**

Sample and Data Collection Procedures

The 27-item version of the Teacher Confirmation scale was administered to a second sample consisting of 303 students of mixed sex (75 males, 220 females, and 8 unreported) and ethnicity (230 European Americans, 19 Latinos, 14 African Americans, 14 Asians, 5 Native Americans, and 6 unreported) and representing 28 different academic majors. Age ranged from 18 to 54 years (M = 23.4).

Data were collected during Week 14 of the 16-week semester in classes not surveyed for Study 1. Like Study 1, students evaluated the teacher and class they attended immediately prior to the class in which they were taking the instrument. This resulted in the evaluation of 53 classes ranging in size from 16 to 190. Fifty-eight percent of the students evaluated male instructors, while 42% of them evaluated female instructors. Thirty-
<table>
<thead>
<tr>
<th>Questionnaire items</th>
<th>Response to questions</th>
<th>Demonstrated interest</th>
<th>Teaching style</th>
<th>Absence of disconfirmation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Takes time to answer students’ questions fully.</td>
<td>0.83</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Listens attentively when students ask questions or make comments during class.</td>
<td>0.82</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indicates that he/she appreciates students’ questions or comments.</td>
<td>0.81</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is available for questions before and after class.</td>
<td>0.64</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is willing to deviate slightly from the lecture when students ask questions.</td>
<td>0.64</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communicates that he/she is interested in whether students are learning.</td>
<td>0.78</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communicates that he/she believes students can do well in the class.</td>
<td>0.74</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asks students how they think the class is going and/or how assignments are coming along.</td>
<td>0.71</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Makes an effort to get to know students.</td>
<td>0.67</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smiles at the class.</td>
<td>0.64</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Establishes eye contact during class lectures.</td>
<td>0.59</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uses an interactive teaching style.</td>
<td></td>
<td>0.79</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uses a variety of teaching techniques to help students understand course material.</td>
<td></td>
<td>0.78</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Checks on students’ understanding before going on to the next point.</td>
<td></td>
<td>0.76</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incorporates exercises into lectures when appropriate.</td>
<td></td>
<td>0.69</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gives oral or written feedback on students’ work.</td>
<td></td>
<td>0.62</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is rude in responding to some students’ comments or questions during class.*</td>
<td></td>
<td>0.84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Displays arrogant behavior.*</td>
<td></td>
<td>0.80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Embarrasses students in front of the class.*</td>
<td></td>
<td>0.78</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belittles or puts students down when they participate in class.*</td>
<td></td>
<td>0.78</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
TABLE 2 Continued
Standardized Factor Loadings for the Refined Four-Factor Model of the Teacher Confirmation Scale (TCS)

<table>
<thead>
<tr>
<th>Questionnaire items</th>
<th>Factor</th>
<th>Response to questions</th>
<th>Demonstrate interest</th>
<th>Teaching style</th>
<th>Absence of disconfirmation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Talks down to students.*</td>
<td>0.77</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intimidates students.*</td>
<td>0.75</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Puts students down when they go to the teacher for help outside of class.*</td>
<td>0.68</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Focuses on only a few students during class while ignoring others.*</td>
<td>0.68</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shows favoritism to certain students.</td>
<td>0.63</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is unwilling to listen to students who disagree.*</td>
<td>0.63</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communicates that he/she doesn’t have time to meet with students.*</td>
<td>0.56</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Items reversed for scoring.

eight percent were taking the class as a general education requirement, 34% were taking it as a requirement for their major, and 28% were taking the class as an elective.

Cross-Validation Procedures and Results

The cross-validation procedures recommended by Browne and Cudeck (1989) were employed. Following these procedures, the factor structure and parameter estimates obtained from the first sample, labeled the calibration sample (effective sample size = 439), were used as fixed values. These values were then forced upon the data collected from the second sample, labeled the validation sample (effective sample size = 296). Model fit for the two samples was then compared. As expected, some deterioration of fit occurred, $\chi^2(378, N = 296) = 846.88, p < .01; \text{RMSEA} = .06; \text{NNFI} = .91; \text{CFI} = .90$. A chi-square difference test was conducted to determine whether the amount of deterioration was significant. Because the chi-square difference ($202.25/66 \text{ df}$) was greater than the critical value for 66 degrees of freedom at the .01 significance level, it was concluded that there was indeed a significant difference in fit. Hence, the 27-item instrument did not cross-validate adequately.

Further analysis revealed that the source of the problem was the factor labeled absence of disconfirmation. Therefore, this factor was dropped
from the scale, leaving a 16-item scale with three factors: (a) teachers’ response to questions-comments, (b) demonstrated interest, and (c) teaching style. As indicated by Cronbach’s alpha, reliability of the 16-item measure was .93, with subscale reliabilities of .84 for teachers’ response to questions, .85 for demonstrated interest, and .83 for teaching style.

Data from Study 1 were then reanalyzed using the CFA procedures described earlier to see whether adequate model fit could be obtained using the first sample with the 16-item, 3-factor structure. Results revealed excellent fit, $\chi^2(97, N = 442) = 251.44, p < .01$; RMSEA = .06; NNFI = .95; CFI = .96. Additionally, the Goodness of Fit Index was .94, suggesting that the model explained 94% of the variance in the Sample 1 covariance matrix.

Next, cross-validation procedures were repeated. Accordingly, the three-factor structure and all parameter estimates obtained from the reanalysis of the sample for Study 1 were forced onto the sample for Study 2. As anticipated, there was some deterioration of fit, $\chi^2(136, N = 297) = 293.46, p < .01$; RMSEA = .06; NNFI = .95; CFI = .94. However, this time a chi-square difference test indicated that the deterioration was nonsignificant, $\chi^2$ diff $(39, N = 297) = 42.02, ns$. Hence, the 16-item, 3-factor version of the TCS cross-validated well and was selected as the model to use for the remaining analyses reported in this article. Like Sample 1, reliability for Sample 2, as indicated by Cronbach’s alpha, was .93.

Male-Female Comparison

Because the sample was overwhelmingly female in both data collections, the multiple groups procedure discussed by Byrne, Shavelson, and Muthén (1989) was used to determine whether measurement on the TCS was equivalent for both sexes. First, data on the TCS from the two studies were combined to ensure that the sample size was adequate for each group. Then, separate covariance matrices were generated for males (effective sample size = 167) and females (effective sample size = 569). Next, the model fit for females was forced onto the covariance matrix obtained for males. This was accomplished through a series of increasingly restrictive tests to determine the plausibility of (a) a three-factor solution for both sexes, (b) invariance of the magnitude of the factor loadings for males and females, (c) equivalence of the latent variable variance covariance, and (d) invariance of the residuals. At each step, goodness of fit statistics were noted and a chi-square difference test was conducted to see if the change in the chi-square obtained from the previous test was significant. When nonsignificance was obtained, measurement was considered invariant across the sexes.
Results indicated that the three-factor structure was an excellent fit for both sexes, $\chi^2(192, N = 167) = 482.46, p < .01; \text{RMSEA} = .04; \text{NNFI} = .94; \text{CFI} = .96$. Additionally, factor loadings were invariant for males and females, $\chi^2(208, N = 167) = 513.62, p < .01; \text{RMSEA} = .04; \text{NNFI} = .95; \text{CFI} = .95; \chi^2 \text{ diff}(16, N = 167) = 31.16, ns$, as was the latent variable variance covariance, $\chi^2(211, N = 167) = 514.51, ns; \text{RMSEA} = .04; \text{NNFI} = .95; \text{CFI} = .95; \chi^2 \text{ diff}(3, N = 167) = .89, ns$. Further, residuals were also invariant, $\chi^2(232, N = 167) = 545.28; \text{RMSEA} = .04; \text{NNFI} = .95; \text{CFI} = .95; \chi^2 \text{ diff}(21, N = 167) = 30.77, ns$. Thus, measurement equivalence was obtained for males and females.

Concurrent and Discriminant Validity

Establishing concurrent and discriminant validity for a new instrument involves evaluating the instrument against instruments that measure theoretically related constructs. With this in mind, respondents for Study 2 completed two additional instruments: (a) the Nonverbal Teacher Immediacy scale originally developed by Andersen (1979) and later revised by Richmond, Gorham, and McCroskey (1987); and (b) the Perceived Teacher Caring scale recently introduced by Teven and McCroskey (1997). In the current study, reliability, as indicated by Cronbach’s alpha, was .83 for the Nonverbal Teacher Immediacy scale and .94 for the Teacher Caring scale.

Several issues must be addressed in order to answer questions about concurrent validity. First, we must determine whether the new instrument correlates in a conceptually meaningful direction with scales with which it should correlate. For example, early theorists hypothesized that confirmation communicates acknowledgement and endorsement of another and fosters feelings of connectedness (Laing, 1961; Cissna & Sieburg, 1981). Thus, we can expect that if teacher confirmation is communicated in the classroom, then psychological closeness (teacher immediacy) between teachers and students should develop, and that teacher caring is likely to be perceived. Therefore, perceived teacher confirmation should correlate positively with teacher immediacy and with teacher caring. Such was the case. The Pearson correlation between scores for the TCS and scores for the Nonverbal Immediacy scale was .71, $p < .001$. The Pearson correlation between scores for the TCS and scores for the Perceived Teacher Caring scale was .80, $p < .001$. Thus, the direction of these relationships is as expected, offering support for the concurrent validity of the TCS.

The second issue that must be addressed relates to concurrent validity, but addresses discriminant validity, as well. That is, although it is important that the TCS correlate in the appropriate direction with conceptually related scales, it is also important that the strength of the correlation not be so strong that the scales are completely redundant. Nonetheless, one
might reasonably expect strong correlations among the constructs measured in the present study, given their conceptual underpinnings and the use of the same method to collect data (i.e., self-report). The amount of shared variance between the TCS and the Nonverbal Immediacy scale was 50%, and the amount of shared variance between the TCS and the Perceived Teacher Caring scale was 64%. Thus, it appears that the TCS is not completely redundant with the other measures.

Although there are no hard and fast rules for deciding when a test is so redundant with other measures that its existence becomes unwarranted, in the present study, the correlation between the TCS and the Teacher Caring scale may strike some as so high as to question the need for the TCS. However, it is important to note the method of operationalization used for the two scales. The TCS defines teacher confirmation in low inference, behavioral terms that suggest how a teacher communicates the confirmation construct (e.g., checks on students’ understanding before going on to the next point, takes time to answer questions fully). This is in contrast to the Teacher Caring scale, which identifies characteristics that communicate caring (i.e., sensitive, empathetic, understanding, responsive, concerned). Thus, the TCS is needed because of its clear pedagogical value.

Summary

In brief, the 3-factor, 16-item Teacher Confirmation scale (TCS) appears to be a psychometrically sound measure of perceived teacher confirmation. Based on two samples, with a total of 749 respondents, the TCS demonstrated excellent reliability, excellent fit with a theoretical model, appropriateness for both sexes, and evidence of validity. The instrument also cross-validated adequately on a second sample. Thus, the scale is ready and suitable for use.

THE RELATIONSHIPS AMONG PERCEIVED TEACHER CONFIRMATION, AFFECTIVE LEARNING, AND COGNITIVE LEARNING

A leading purpose for development of the Teacher Confirmation scale was to facilitate the investigation of the relationship between perceived teacher confirmation and student outcomes such as learning. Accordingly, appropriate data regarding learning were collected from the respondents in the two samples with the intent to conduct further analysis if the TCS demonstrated adequate psychometric properties. Because such was the case, the following hypotheses and research question were tested:
H1: There is a positive relationship between perceived teacher confirmation and college students’ cognitive learning.
H2: There is a positive relationship between perceived teacher confirmation and college students’ affective learning.
RQ1: What are the relationships, both direct and indirect, among perceived teacher confirmation, students’ cognitive learning, and students’ affective learning.

Method

Measurement

Cognitive learning. According to Bloom (1956, 1976), cognitive learning refers to comprehension and retention of knowledge. In the present study, cognitive learning was measured by two instruments. The first instrument consisted of the first item of the two-item measure proposed by Richmond, Gorham, and McCroskey (1987). This item reads, “On a scale of 0–9, how much did you learn in the class, with 0 meaning you learned nothing and 9 meaning you learned more than in any other class you’ve had” (M = 6.33, SD = 2.10 for Sample 1; M = 6.27, SD = 2.09 for Sample 2). The second item of the Richmond et al. scale was not used in the present study, because of methodological restrictions that required independent measures.

The second measure of cognitive learning was the 13-item Cognitive Learning Indicators scale developed by Frymier, Shulman, and Houser (1996). In the current study, reliability as indicated by Cronbach’s alpha was .83 for Sample 1 and .84 for Sample 2. Confirmatory factor analysis revealed an excellent model fit for a two-factor solution, χ²(17, N = 438) = 61.73, p < .01; RMSEA = .07; NNFI = .97; CFI = .98. The factors were labeled (a) learning activities involving thinking and (b) learning activities involving talking. Alpha reliability for the thinking subscale was .76 in Study 1 and .71 in Study 2, whereas alpha reliability for the talking subscale was .77 in Study 1 and .80 in Study 2.

Affective learning. According to Bloom (1956, 1976), affective learning focuses on the development of a positive or negative attitude toward the subject or teacher. Two measures of affective learning were used in the present study. First, the concept was operationalized as the student’s score on a measure introduced by Scott and Wheeless (1975), further developed by Anderson (1979), and expanded and refined by McCroskey, Richmond, Plax, and Kearney (1985). The McCroskey et al. version has been used in most recent studies on affective learning. The instrument assesses students’ attitudes toward (a) the course content, (b) the course instruc-
Affective learning is measured in each of the three areas through the use of four 7-step bipolar scales: good–bad, worthless–valuable, fair–unfair, and positive–negative. Alpha reliability for the 12 items has ranged from .91 to .98 in previous studies. In the present study, Cronbach’s alpha was .96 for Sample 1 and for Sample 2.

Confirmatory factor analysis using a covariance matrix and maximum likelihood estimation indicated that affective learning is best conceptualized as a three-factor solution: (a) liking of teacher, (b) liking of course content, and (c) liking of behaviors recommended in the course. This solution provided an excellent fit to the data, \( \chi^2 (52, N = 419) = 115, p < .01; \) RMSEA = .05; NNFI = .99; CFI = .99. In Study 1, reliability for the subscales, as indicated by Cronbach’s alpha, was .94 for liking of teacher, .91 for liking of course content, and .95 for liking of behaviors. In Study 2, Cronbach’s alpha was .94 for liking of teacher, .90 for liking of course content, and .94 for liking of behaviors.

A second measure of affective learning consisted of a single item that paralleled the single item used as an indicator of cognitive learning. The item read, “On a scale of 0–9, how much did you like the class, with 0 meaning you did not like it at all and 9 meaning you liked it more than any other class you’ve had” (\( M = 6.14, SD = 2.62 \) for Sample 1; \( M = 6.02, SD = 2.67 \) for Sample 2).

Control variables. Demographic information was collected for use as control variables in the analysis. Respondents were asked to indicate their sex, ethnicity, age, academic major, particular course they evaluated, sex of the instructor they evaluated, and reason for taking the course (i.e., “required general education,” “required course for major,” “elective course for major”). In addition, because relevance of assignments can be expected to be related to college students’ learning, this variable was also included as a control variable in an attempt to avoid the specification error of omitting important variables. Respondents were asked to answer the following question: “On a scale of 0–9, how relevant do you think the assignments were to the course objectives, with 0 meaning that assignments were not relevant at all, and 9 meaning that assignments were more relevant than assignments in all other classes.”

Procedures

Two statistical approaches were used to analyze the hypotheses and research question: (a) multiple regression using SPSS software, and (b) structural equation modeling (SEM) using LISREL 8 software. This dual
approach increased the credibility of the results and provided a more comprehensive view of how the constructs appear to operate.

Multiple Regression

To address H1 and H2, two separate regressions were conducted. Cognitive learning, operationalized as students’ scores on the Frymier, Shulman, and Houser (1996) Cognitive Learning Indicators scale, was the dependent variable for the first regression, and affective learning, operationalized as students’ scores on the McCroskey, Richmond, Plax, and Kearney (1985) Affective Learning scale, was the dependent variable for the second. Perceived teacher confirmation and the eight demographic control variables previously described were independent variables in both analyses.

The SPSS “test” command was used. This procedure, sometimes called “setwise regression,” allows us to test subsets of any number of independent variables. First, each demographic variable is dummy coded and considered as a subset. The method removes, in turn, each subset from the equation and enters the subset as if at the last step of a hierarchical regression. The procedure calculates one Multiple $R$ for the entire equation, as well as $R$-square change and its test of significance for each subset of independent variables.
Structural Equation Modeling

To examine the relationships among teacher confirmation, cognitive learning, and affective learning (RQ1), latent variable path analysis using structural equation modeling (LISREL 8, Jöreskog & Sörbom, 1996) was employed. The fit of the model proposed in Figure 1 was tested for Sample 1. This model hypothesized paths leading from (a) teacher confirmation to affective learning, (b) teacher confirmation to cognitive learning, and (c) affective learning to cognitive learning. A covariance matrix was used as input with maximum likelihood estimation. For each latent variable, factor scores identified in the confirmatory factor analyses described earlier were used as indicators. The single-item measures for cognitive and affective learning were also included as indicators. This resulted in a total of 10 indicators for the structural model.

After results were obtained for Sample 1, the multiple groups comparison procedure discussed by Byrne et al. (1989) was used to determine whether the constructs operated similarly for Sample 2. First, separate covariance matrices were generated for each sample. Next, a series of increasingly restrictive tests was conducted to determine (a) the plausibility of the general model structure for both samples (e.g., same number of paths, same number of indicators); (b) invariance of the magnitude of the factor loadings of the several indicators onto their respective latent variables; and (c) invariance of the factor loadings and beta paths between the latent variables. At each step, goodness of fit statistics were noted and a chi-square difference test was conducted to see if the change in the chi-square obtained from the previous test was significant.

Results

H1: Teacher Confirmation and Cognitive Learning

The first hypothesis posited a positive relationship between perceived teacher confirmation and students’ cognitive learning. For Sample 1, the regression equation yielded a Multiple $R$ of .65, $F(9, 402) = 24.51, p < .0001$. Adjusted $R$-square was .41, indicating that 41% of the variance in cognitive learning could be attributed to the combination of the variables included in the equation. The part correlation for teacher confirmation was .43, $t(402) = 11.45, p < .0001$, indicating that, after controlling for all the other independent variables in the equation, 18.5% of the variance in cognitive learning was uniquely explained by perceived teacher confirmation.
For Sample 2, Multiple $R$ was .60, $F(9, 274) = 17.07$, $p < .0001$. Adjusted $R$-square was .35, suggesting that the variables in the equation accounted for 34% of the variance in cognitive learning. The part correlation for teacher confirmation was .42, $t(274) = 8.77$, suggesting that teacher confirmation uniquely accounted for 17.6% of the variance in cognitive learning. Thus, the results for the two samples were highly similar in regard to the contribution of perceived teacher confirmation.

$H2$: Teacher Confirmation and Affective Learning

Results for the second hypothesis, which posited a positive relationship between perceived teacher confirmation and affective learning, were more pronounced than were the results for the first hypothesis. For Sample 1, the regression equation yielded a Multiple $R$ of .72, $F(9, 406) = 36.83$, $p < .0001$. Adjusted $R$-square was .51, suggesting that 51% of the variance in affective learning could be attributed to the combination of the variables included in the equation. The part correlation for teacher confirmation was .55, $t(406) = 16.14$, $p < .0001$, indicating that, after controlling for all the other variables, 30% of the variance in affective learning was uniquely explained by perceived teacher confirmation.

For Sample 2, Multiple $R$ was .79, $F(9, 273) = 52.11$, $p < .0001$. Adjusted $R$-square was .62, and the part correlation for teacher confirmation was .56, $t(273) = 15.28$, $p < .0001$, indicating that teacher confirmation explained 31% of the variance in affective learning, after controlling for all other independent variables. Hence, the results for H2 were highly similar for both samples in regard to the unique contribution of perceived teacher confirmation to affective learning.

RQ1: Relationships Among Teacher Confirmation, Cognitive Learning, and Affective Learning

Results indicated that the proposed structural model (Figure 1) fit Sample 1 data very well, $\chi^2(27, N = 446) = 98.31$, $p < .01$; RMSEA = .07; NNFI = .96; CFI = .98. Additionally, the GFI was .96, suggesting that 96% of the variance in the covariance matrix could be explained by the model. Figure 2 presents the standardized parameter estimates. The loadings of all indicators onto their respective latent variables were significant and large in magnitude, ranging from .50 to .93.

Regarding the magnitude and significance of the beta paths among the latent variables, results revealed two very strong and significant paths. That is, (a) the path between perceived teacher confirmation and affective learning was .72, $p < .01$, and (b) the path between affective and cognitive learning was .86, $p < .01$. The third path, the path between teacher
confirmation and cognitive learning, was weak and nonsignificant at .15. This finding was explained by a large and significant indirect effect of teacher confirmation on cognitive learning (.62, p < .01). Thus, it appears that the effect of teacher confirmation on cognitive learning is not direct. Rather, it is mediated through affective learning. In other words, results indicate that teacher confirmation directly influences affective learning, and affective learning directly influences cognitive learning.

Concerning the multiple groups comparison between Sample 1 (effective sample size = 446) and Sample 2 (effective sample size = 303), a series of increasingly restrictive tests indicated that, when the model was imposed on the Sample 2 covariance matrix, the following results occurred: (a) The general model structure (i.e., same number of paths, same number of indicators) was invariant, $\chi^2 (54, N = 303) = 259.91, p < .05; \text{RMSEA} = .07; \text{NNFI} = .94; \text{CFI} = .96; (b)$ the magnitude of the factor loadings onto their respective latent variables was invariant, $\chi^2 (61, N = 303) = 3274.74, p < .05; \text{RMSEA} = .07; \text{NNFI} = .94; \text{CFI} = .96; \chi^2 \text{diff} (7, N = 303) = 14.83, ns; and (c) the magnitude of the factor loadings and beta paths was invariant, $\chi^2 (64, N = 303) = 284.76, p < .01; \text{RMSEA} = .07; \text{NNFI} = .94; \text{CFI} = .96; \chi^2 \text{diff} (3, N = 303) = 10.02, ns. Thus, the fit of the model was invariant for the two samples.
DISCUSSION

This article reports an initial attempt to operationalize perceived teacher confirmation in behavioral terms and to explore the relationships among perceived teacher confirmation, cognitive learning, and affective learning. Results from two samples of students ($N = 446; N = 303$) indicated that the final 16-item version of the Teacher Confirmation scale (TCS) is valid and reliable. Confirmatory factor analysis revealed that teacher confirmation is best represented by a three-factor solution comprised of (a) teachers’ response to students’ questions—comments, (b) demonstrated interest in students and in their learning, and (c) teaching style. This factor structure cross-validated to the second sample. A fourth factor, absence of disconfirmation, did not cross-validate and was deleted from the scale.

Results also indicated that teacher confirmation plays a large, significant role in college students’ cognitive and affective learning. For Sample 1, confirmation uniquely explained 18% of the variance in cognitive learning and 30% of the variance in affective learning, after controlling for demographic variables and relevance of assignments. For Sample 2, confirmation uniquely explained 17.6% of the variance in cognitive learning and 31% of the variance in affective learning, after controlling for the same variables. Structural equation modeling revealed strong, significant paths between confirmation and affective learning (.72, $p < .01$) and between affective and cognitive learning (.86, $p < .01$). A large, significant, indirect effect of teacher confirmation on cognitive learning was identified (.62, $p < .01$), suggesting that affective learning serves as a mediating variable between teacher confirmation and cognitive learning. A multiple groups comparison demonstrated that the model was invariant for the two samples. Following is a discussion of the implications, limitations, and areas for future research regarding perceived teacher confirmation and the confirmation construct in general.

Perceived Teacher Confirmation

This investigation has clear and practical pedagogical implications. Given the movement toward greater accountability in higher education and relentless pressure to increase instructional quality, the discovery of variables that are associated with student learning is important, indeed. Not only does the current investigation point to the importance of pre-service and in-service teacher training on teacher confirmation, but the items included in the TCS provide a springboard for that training.

Also of theoretical interest to educators are findings regarding the factor labeled teachers’ response to students’ questions. Although a vast body of literature links teachers’ use of questions with student learning (see,
for example, reviews by Brophy & Good, 1986, and Wilen, 1987), teachers’ response to students’ questions has largely been ignored. Yet, perhaps teachers’ response to students’ questions or comments may be as important to student learning as teachers’ use of questions. Certainly, the issue merits further study.

This investigation invites future research in additional educational contexts. For example: Is perceived confirmation a strong predictor of learning in K-12 classrooms? Do different age groups perceive different communication behaviors as confirming? If so, what are the specific behaviors, and are those behaviors linked to learning for elementary school children, high schoolers, etc.? Can teachers monitor their own behavior? Does training help? In addition to learning, are other educational outcomes, such as student satisfaction and retention, associated with teacher confirmation? The list of potential research questions regarding perceived teacher confirmation is long, but answers to these questions and others regarding teacher confirmation could be of serious importance.

Nonetheless, it must be remembered that this investigation was nonexperimental. Statements of causality based on the results of even the most sophisticated statistical techniques for making causal inferences, including the latent variable path analysis used in this study, must be treated with caution. Therefore, causal inferences of the present study are unwarranted.

The Confirmation Construct

This investigation provides valuable insights regarding the confirmation construct. First, the studies provide strong support for the early theoretical assertions of Buber (1957) and others (Cissna & Sieburg, 1990; Friedman, 1983; Laing, 1961; Sieburg, 1975, 1985; Watzlawick, Beavin, & Jackson, 1967), who argued that confirmation is a “crucial” communication variable. Certainly, the results of this investigation attest to the importance of confirmation in the college classroom.

Second, the investigation demonstrates that it is fruitful to study the influence of confirming behaviors. As noted earlier, little published research exists regarding the confirmation construct. Of that research, most studies have focused on the negative outcomes of disconfirming responses, as opposed to the positive outcomes of confirming responses. The current investigation indicates that confirmation is a dynamic, purposeful, active phenomenon comprised of specific communication behaviors. That the factor labeled absence of disconfirmation did not cross-validate to a second sample of students is puzzling. However, as a helpful peer pointed out, perhaps some of the items comprising the disconfirmation factor actually addressed rejection, not disconfirmation. More research is needed
to determine whether teacher disconfirmation can be operationally defined in ways that are distinct and consistent with the conceptual definition and, if so, whether a disconfirmation factor should be included in the TCS or whether it should be treated as a separate scale. It may be true that confirmation and disconfirmation function as two separate constructs. If so, perhaps the opposite of confirmed is simply “not confirmed,” rather than disconfirmed, and the opposite of disconfirmed is “not disconfirmed,” rather than confirmed. More research is needed to clarify this issue.

Third, results of the investigation support earlier research that indicates that confirmation may be a receiver-based variable (Cook, 1980; Ellis, 1996; Keating, 1977). Although the current study did not compare actual coded confirming and disconfirming behaviors to perceived confirming and disconfirming behaviors, certainly the study gives credence to the notion that, regardless of actual confirmation, perception of confirmation is indeed critical and strongly related to positive outcomes.

Fourth, this investigation provides valuable insight regarding one approach to the study of the confirmation construct. Specifically, the investigation demonstrates that confirmation can be operationally defined in low-inference behavioral terms specific to the context of the college classroom. It could be that, although the conceptual definition of confirmation remains unchanged from context to context, the particular behaviors that communicate confirmation may be context specific. Further research is needed to see if the type of operationalization used in this investigation can be applied in other contexts, such as doctor-patient relationships, superior-subordinate relationships, work teams, friendships, etc., making it possible to explore potential links between perceived confirmation and outcome variables that are important to a specific context. The possibilities for productive research regarding perceived confirmation in specific contexts are many, and they provide a rich future research agenda.

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