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A Meta-Analytical Review of Students' Out-of-Class Communication and Learning Effects

Zachary W. Goldman, Alan K. Goodboy, & San Bolkan

A random-effects meta-analysis (N = 7,113) was conducted examining the relationships between students' out-of-class communication (OCC) and learning outcomes. The findings revealed positive summary effects for OCC on affective learning (k = 7, N = 1478, r = 0.321, p < 0.001) and perceived cognitive learning (k = 11, N = 5635, r = 0.261, p < 0.001). Several moderators were identified, indicating the association between OCC and cognitive learning varied systematically because of the measurement instruments used to operationalize OCC and learning and because of interdisciplinary treatments of the constructs. Recommendations are made for future researchers including the need for a theoretical explanation of the OCC-learning relationship.

Keywords: Affective Learning; Cognitive Learning; Meta-Analysis; Out-of-Class Communication

For many college students, the traditional classroom is the lone point of contact between themselves and their instructors. Unfortunately, this interaction may not be sufficient to promote learning at the highest level, as students' questions do not simply disappear with the dismissal of class, their concerns and anxieties are not alleviated when they get up to leave, and their need for clarification, reinforcement,

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support, and guidance does not cease when they walk out the door. Rather, learning at the collegiate level requires significant time and effort outside of the classroom (Kuh, 1994). While the majority of this effort is assumed by students, instructors offer significant contributions through out-of-class communication (Pascarella & Terenzini, 2005).

Research on out-of-class communication has developed significantly over the last decade (e.g., Aylor & Opplinger, 2003; Bippus, Kearney, Plax, & Brooks, 2003; Jaasma & Koper, 2002; Myers, Martin, & Knapp, 2005; Nadler & Nadler, 2000); however, there have been few, if any, attempts to synthesize the findings from these investigations using a quantitative approach. Such attempts are needed to generate a “more objective appraisal of the evidence than traditional narrative reviews, provide a more precise estimate of...effect[s], and explain heterogeneity between the results of individual studies” (Egger, Smith, & Phillips, 1997, p. 1533). Specifically, a comprehensive view of the relationship between out-of-class communication and students’ learning outcomes is needed to evaluate the importance of these experiences and to determine if future investigations are warranted on the topic. Therefore, the primary purpose of this study was to conduct a meta-analysis to synthesize the magnitude of effects for out-of-class communication on students’ cognitive and affective learning. The secondary purpose of this study was to determine if significant moderators existed for these learning effects. The final purpose of this study was to provide recommendations for future out-of-class communication scholarship.

Review of Literature

Out-of-class communication (OCC) initially received attention from disciplines outside of communication, including student development, education, and student affairs (e.g., Astin, 1984; Kuh, 1995; Milem & Berger, 1997; Pascarella & Terenzini, 1978; Tinto, 1975). Over the last several decades, this multidisciplinary interest has resulted in numerous definitions, terms (e.g., student-faculty contact, out-of-class experiences, out-of-class interactions), and operationalizations to reference and measure the interactions that occur between instructors and students outside of class (for a review, see Pascarella & Terenzini, 2005). For instance, in the education and development literature, the term “out-of-class experiences” generally refers to the “structured and unstructured activities or conditions that are not directly part of an institution’s formal, course-related, instructional processes” (Terenzini, Pascarella, & Bliming, 1996, p. 150). Included within this definition is a wide spectrum of student experiences that range from voluntary involvement in campus organizations (e.g., student government, academic honor societies, extracurricular activities) to interpersonal conversations with faculty members or administrative personnel (Pascarella, 1980). In other words, education researchers conceptualize out-of-class experiences using a broad

set of interactions that students initiate with their peers or faculty members on campus but not within the confines of the classroom (Kuh & Hu, 2001).

Communication researchers have relied on a narrower focus of out-of-class experiences centered on the interactions that occur between students and faculty members outside of the classroom (Nadler & Nadler, 2001). Fusani (1994) defined OCC (or extra-class communication) as the face-to-face communication that occurs between instructors and students outside of traditional class periods. Thus, from this perspective, OCC may include conversations before and after class, student-initiated visits to an instructor's office hours, advising sessions, and informal meetings on campus (Aylor & Oppliger, 2003; Jaasma & Koper, 1999; Nadler & Nadler, 2000). Similarly, Zhang (2006) defined OCC as "the formal and/or informal interaction between faculty and students which takes place outside of formal classrooms and during times other than when class is scheduled" (p. 34). According to this definition, email messages and other mediated interactions may also be considered OCC because they occur outside of traditional classrooms and away from scheduled course meetings (Bippus et al., 2003). Although OCC may include mediated exchanges between students and instructors, this study limits the focus to face-to-face OCC for two reasons: (a) face-to-face interactions have predominately been the focus of this area of research for multiple decades, and (b) other studies have not labeled email exchanges as OCC (Bolkan & Holmgren, 2012; Kelly, Duran, & Zolten, 2001; Stephens, Houser, & Cowan, 2009).

Beyond differences in conceptualization, education and communication researchers have also varied in regards to how they examine and measure OCC (Fusani, 1994). Communication researchers have historically explored face-to-face OCC as a dependent variable by examining the impact of instructors' and students' communication traits and behaviors on the occurrence of out-of-class interactions (Cotten & Wilson, 2006). To do this, communication scholars have typically relied on frequency-based instruments that assess the quantity, rather than the quality of OCC (Frymier, 2005; Fusani, 1994; Nadler & Nadler, 2001). For instance, Knapp and Martin's (2002) Out-of-Class Interaction Scale is a nine-item measure that assesses the frequency in which students participate in OCC and has been used by several researchers (e.g., Goodboy, Martin, & Bolkan, 2009; Myers, 2004; Myers et al., 2005). Although this scale is reliable, it does not assess the nature of OCC or the extent to which students are satisfied with their experiences.

Conversely, education and development researchers have often explored out-of-class interactions as an independent variable by studying its effects on various student outcomes such as retention, integration, and development (Terenzini et al., 1996). Toward this goal, education researchers have utilized measurements that assess the frequency, nature, and/or functions of out-of-class communication. For example, modeled after Tinto's (1975) student persistence theory, Pascarella and Terenzini (1980) developed the Institutional Integration Scale (IIS) to assess out-of-class interactions as one of five dimensions of students' academic and social integration. Unlike the majority of communication research, Pascarella and

Terenzini's five-item subscale assesses the nature and values of student-faculty interactions, rather than the mere frequency in which these interactions occur. Moreover, education researchers have also used The Experiences with Faculty instrument, which is one of 14 original subscales subsumed with the College Student Experiences Questionnaire (CSEQ; Pace, 1990), to measure students' OCC experiences. Pace's measure begins with items that necessitate less effort (e.g., having informal conversations with an instructor before class) and progress toward items that require more substantive investments of time and energy (e.g., seeking voluntary feedback on a research proposal).

Despite the distinct disciplinary differences that exist between education and communication scholarship (i.e., conceptualizations, terminology, operationalizations), one conclusion that can be safely made from both of these approaches is that many college students do not fully take advantage of opportunities to speak with their instructors outside of class (Nadler & Nadler, 2000). For instance, Fusani (1994) found that 23% of students report never visiting or chatting informally with their instructors outside of their scheduled class meetings, and Bippus et al. (2003) found that students typically initiate an average of only two OCC encounters with their instructors throughout the course of a semester. That being said, students who do engage in OCC tend to discuss a variety of topics with instructors during their interactions. Jaasma and Koper (2002) summarized these topics into six categories: *course related information* (e.g., explaining information about an upcoming assignment), *self-disclosure* (e.g., revealing previously unknown information about one's self), *advice* (e.g., seeking input about future courses), *small talk* (e.g., discussing recent news stories), *intellectual ideas* (e.g., sharing ideas for a research study), and *favor asking* (e.g., requesting a letter of recommendation). Combined, these categories suggest that OCC serves rhetorical and relational purposes, a notion that has been discussed for nearly a decade at the time of this writing (Mottet, Frymier, & Beebe, 2006).

One of the more consistent findings in the education and development literature over the last several decades is that students' out-of-class interactions with faculty relate positively to their academic achievement and intellectual growth (Pascarella & Terenzini, 2005). For example, Wilson, Woods, and Gaff (1974) discovered that students who frequently communicate with their instructor outside of class report greater academic competencies, skills, and developmental outcomes compared to students who do not communicate outside of class. Moreover, education researchers have found that out-of-class experiences are related positively to students' intellectual growth and development (Pascarella, Duby, Terenzini, & Iverson, 1983), retention (Berger & Milem, 1999), personal development (Pascarella & Terenzini, 1978), academic adjustment (Milem & Berger, 1997), and overall performance in college (Terenzini et al., 1996).

While education and development researchers have studied the relationship between OCC and longitudinal outcomes such as retention/personal development (e.g., Pascarella, 1980), communication researchers have been more concerned with

the relationships between OCC and course-specific outcomes such as students' state motivation, affective learning, and cognitive learning (e.g., Cotten & Wilson, 2006; Jaasma & Koper, 1999; Knapp & Martin, 2002). Typically, these researchers have found that OCC is associated positively with students' perceptions of affective learning (Fusani, 1994), motivation to learn (Aylor & Oppliger, 2003), and perceived cognitive learning in a given course (Dobransky & Frymier, 2004). OCC has also been related positively with students' perceived learner empowerment (Goodboy et al., 2009), which includes perceptions of competence, meaningfulness, and impact of the course material (Frymier, Shulman, & Houser, 1996). Moreover, researchers have found that OCC is associated positively with students' communication satisfaction (Goodboy et al., 2009), class participation (Shimotsu-Dariol, Mansson, & Myers, 2012), and feelings of self-worth in class (Kuh, 1995).

The majority of these findings are derived from self-report data; however, two experimental investigations also support the positive relationships between OCC and student learning outcomes. In the first experiment, Clark, Walker, and Keith (2002) randomly assigned participants to either a treatment or a control group for an entire semester. Noting that "a mid-term conference with each student might establish greater academic integration" (Fusani, 1994, p. 249), participants in the treatment group were required to meet with their instructor outside of class for a mid-semester feedback session, whereas those in the control group did not. The findings revealed positive main effects for OCC on affective learning but not for cognitive learning, prompting Clark et al. (2002) to conclude that OCC plays a small but causal role in student learning. In the second experiment, Jones (2008) explored how instructors engage in social support as a specific type of OCC, a term in which he labeled out-of-class support (OCS). Using scenarios, Jones randomly assigned participants to one of three hypothetical conditions (i.e., highly supportive, moderately supportive, or nonsupportive) and examined the effects of OCS on students' motivation to learn. As expected, results showed that OCS was related positively to students' motivation and satisfaction prompting the conclusion that, "student state motivation is a modifiable condition that teachers can influence not only with the messages and behaviors they use inside the classroom, but those outside the classroom as well" (p. 382).

Collectively, the narrative evidence from the fields of education, development, and communication studies suggests that instructor-student interactions outside of the classroom significantly enhance students' learning experiences in college (Cotten & Wilson, 2006). However, similar to the concerns raised by Witt, Wheelless, and Allen (2004) in their meta-analysis of immediacy and student learning, "inconsistencies of measurement and controversy over interpretation render narrative literature reviews subjective and imprecise" (p. 190). In other words, quantitative and objective reviews are routinely needed in all academic disciplines to advance areas of research such as OCC and to justify continued investigations (Borenstein, Hedges, Higgins, & Rothstein, 2009). Additionally, the contributions of OCC on student learning experiences may be more influential

than initially expected, as the study of communication inside the classroom has largely overshadowed the importance of OCC (Fusani, 1994). As Terenzini et al. (1996) noted, experiences that occur outside of the classroom “appear to be far more influential in students’ academic and intellectual development than many faculty members and academic and student affairs administrators think” (p. 157). Therefore, to substantiate the existing narrative evidence, and to corroborate the numerous studies which suggest that out-of-class experiences enhance students’ educational outcomes, a meta-analysis was conducted to empirically synthesize the effects of OCC on students’ cognitive and affective learning.

Method

Literature Search/Inclusion Criteria

A search was conducted to attain studies that empirically examined college students’ out-of-class communication and learning (i.e., affective and cognitive learning). First, a keyword search using the following databases was used to find previously published articles: Academic Search Complete, Education Research Complete, ERIC, Communication and Mass Media Complete, and PsychInfo. The search terms included “out of class communication,” “extra class communication,” “out of class interaction,” “faculty-student interaction,” “faculty-student contact,” and “faculty-student communication” in conjunction with “student learning,” “intellectual growth,” and “academic achievement.” Second, ProQuest Dissertations and Theses database was examined with the same search terms to uncover unpublished doctoral dissertations and/or master theses. Third, a call for unpublished manuscripts was posted on the listserv CRTNET (Communication, Research, and Theory Network) to solicit convention papers or other manuscripts examining OCC and student learning. Finally, all of the obtained studies were back referenced to uncover other potential articles. A total of 86 potential studies were discovered.

Investigations that were included in the meta-analysis had to meet the following criteria: (a) included quantitative measurements and/or manipulations of OCC (i.e., face-to-face between instructors and students), (b) included quantitative measurements of student affective learning and/or cognitive learning (i.e., student reported learning/learning loss, learning indicators, intellectual growth, academic achievement), and (c) reported necessary statistical information to allow for the calculation and conversion of effect sizes. Using these criteria, 72 of the studies uncovered in the keyword search that showed promise for inclusion were excluded. The majority of these studies were excluded for three reasons: (a) incompatible measurements of learning (e.g., many education studies used cumulative GPA as a learning proxy), (b) lack of information regarding OCC measurement (e.g., failure to report the measurement instrument and/or absence of sample items to provide face validity of the desired construct), and (c) lack of pertinent statistical reporting. As such, a total of 14 studies ($N = 7,113$) fully met our criteria and were retained for the meta-analysis (see Tables 1 and 2). Four of these studies contained measures of both cognitive and

Table 1 Meta-Analysis for Affective Learning

Study	N	r	95% CI		Z-Value	r-w	Moderators		
			LL	UL			a	b	c
Clark et al. (2002)	80	0.186	0.076	0.291	3.304	15.54	1	0	0
Claus (2013)	294	0.310	0.203	0.410	5.468	15.30	0	1	1
Dobransky & Frymier (2004)	284	0.350	0.244	0.448	6.126	15.16	1	0	1
Frymier (2005)	297	0.210	0.099	0.316	3.655	15.34	1	0	1
Goodboy et al. (2009)	158	0.470	0.339	0.583	6.350	12.50	1	1	1
Knapp (2001)	218	0.280	0.153	0.398	4.711	14.03	0	0	1
McNally (2005)	147	0.470	0.333	0.587	7.218	12.13	0	1	1
<i>Random Effects Average</i>		0.321	0.239	0.398	7.329				

Note. r-w = relative weight (random). For moderators: a = publication status (0 = unpublished, 1 = published), b = OCC measurement (0 = does not use the Knapp and Martin (2002) scale, 1 = uses the Knapp and Martin (2002) scale, c = discipline (0 = education, 1 = communication studies).

Table 2 Meta-Analysis for Cognitive Learning

Study	N	r	95% CI		Z-Value	r-w	Moderators			
			LL	UL			a	b	c	d
Claus (2013)	294	0.380	0.278	0.474	6.825	8.88	0	1	1	1
Dobransky & Frymier (2004)	284	0.370	0.265	0.466	6.511	8.81	1	0	1	1
Frisby et al. (2014)	194	0.240	0.103	0.368	3.383	7.92	1	1	1	0
Frymier (2005)	297	0.250	0.140	0.354	4.379	8.90	1	0	1	1
Goodboy et al. (2015)	292	0.450	0.353	0.537	8.240	8.86	1	1	1	1
Ibtesam (2006)	252	0.290	0.173	0.399	4.711	8.54	1	0	0	0
Maestas (2000)	2223	0.152	0.111	0.192	7.218	11.11	0	0	0	0
McNally (2005)	147	0.340	0.188	0.476	4.249	7.18	0	1	1	0
Pascarella & Terenzini (1978)	528	0.107	0.022	0.191	2.461	9.90	0	0	1	1
Terenzini et al. (1982)	469	0.160	0.070	0.247	3.484	9.72	1	0	0	0
Volkwein & Carbone (1994)	655	0.180	0.105	0.253	4.647	10.18	1	0	0	0
<i>Random Effects Average</i>		0.261	0.194	0.326	7.364					

Note. r-w = relative weight (random). For moderators: a = publication status (0 = unpublished, 1 = published), b = OCC measurement (0 = does not use the Knapp and Martin (2002) scale, 1 = uses the Knapp and Martin (2002) scale), c = discipline (0 = education, 1 = communication studies), d = cognitive learning measurement (0 = does not use the Frymier and Houser (1999) revised learning indicators scale, 1 = uses the Frymier and Houser (1999) revised learning indicators scale).

affective learning, thus a total of 18 unique effects were synthesized in our analysis (7 OCC studies measured affective and 11 OCC studies measured cognitive).

Effect Size Calculations and Statistical Analysis

Effect sizes were calculated using Comprehensive Meta-Analysis 2.0 (Borenstein, Hedges, Higgins, & Rothstein, 2006) in the metric of r . Average correlations were calculated for multiple measurements of affective learning and cognitive learning within the same study and we did not correct for measurement error (Schmidt & Hunter, 2015); these instances were not treated as independent effects from the same sample. A random effect meta-analysis was performed because we assumed that the true effect sizes were not identical (Anker, Reinhart, & Feeley, 2010) and we wanted to make an unconditional inference by generalizing beyond the observed studies (see Hedges & Vevea, 1998). Tests of heterogeneity were determined using the Q statistic and I^2 . The Q statistic tests the null hypothesis that the studies share a common effect size and “follow a central chi-squared distribution with degrees of freedom equal to $k - 1$ ” (Borenstein et al., 2009, p. 112). Furthermore, I^2 is the “ratio of true heterogeneity to total variation in observed effects” (p. 120). A significant Q statistic, and I^2 above 75%, indicates significant heterogeneity (Higgins, Thompson, Deeks, & Altman, 2003). Moderators were coded as dichotomous groups (0, 1) which allows for a subgroup analyses (Borenstein & Higgins, 2013) and omnibus tests of between-groups differences (Q_B ; Hedges & Pigott, 2004).

Moderators

For OCC studies that measured affective learning, we coded the following moderators: (a) unpublished studies (0) vs published studies (1), (b) studies published in the education/development discipline (0) vs studies published in the communication studies discipline (1), and (c) the use of Knapp and Martin’s (2002) measure of OCC (1) vs the use of other measures of OCC (0). We coded for the Knapp and Martin measure as a moderator because instructional communication scholars commonly use this scale to operationalize frequency of OCC episodes. For OCC studies that measured cognitive learning, we coded the same moderators as affective learning, plus we coded for studies using Frymier and Houser’s (1999) revised learning indicators scale to measure cognitive learning (1) vs other measures of perceived cognitive learning (0). These particular moderators were chosen for two general reasons. First, we wanted to determine if the measurement choices for OCC and learning significantly influenced the relationship between the two variables. For example, Knapp and Martin’s (2002) instrument is based solely on the frequency of OCC, whereas other measures (Fox, 1984; French & Oakes, 2004; Fusani, 1994) assess the valence, content, and/or value of out-of-class interactions, which may alter the magnitude of the OCC-learning relationship. We also considered the measurement of cognitive learning using Frymier and Houser’s (1999) learning indicators measure, which examines behaviors that students use that reflect learning experiences (e.g., volunteering opinions in class). Since the Frymier and Houser (1999) measure is a self-report behavioral proxy of perceived cognitive learning, it is

reasonable to assume that it might produce different effects than other learning measures (e.g., intellectual growth).

Second, we wanted to determine if the publication status of the manuscript significantly moderated the effects of OCC on student learning. It is common practice in meta-analysis research to uncover stronger effects for studies that are published versus studies that are unpublished (see Levine, Asada, & Carpenter, 2009; Witt et al., 2004). Additionally, fields such as education differ from communication studies in their research designs and overall approach toward studying OCC (e.g., treatment as an independent vs. criterion variable, measurement differences), which in turn may influence learning effects. Thus, these moderators were examined as part of the current meta-analysis. The codes for all moderators are presented in Tables 1 and 2.

Results

The random effects meta-analysis¹ for affective learning ($k = 7$, $N = 1,478$) yielded an average summary effect (r) of 0.32 (95% CI = 0.24 to 0.40). Statistics for this summary effect are presented in Table 1.

Tests of heterogeneity revealed variations in effect sizes (i.e., the studies do not share a common effect size) across the affective learning studies ($Q = 20.31$, $df = 6$, $p < 0.001$, $I^2 = 70.46$). Our estimate of tau-squared (i.e., estimation of the variance of the true effect size, T^2) was 0.01 and tau (i.e., the distribution of the effect size around the summary effect, T) was 0.10.

Next, we tested for moderation using subgroup analyses (Borenstein & Higgins, 2013). The results revealed no significant differences between the groups based on whether they were published or not ($Q_B = 0.324$, $p = 0.57$). Both unpublished ($k = 3$, $r = 0.35$, 95% CI = 0.22 to 0.47) and published ($k = 4$, $r = 0.30$, 95% CI = 0.19 to 0.41) studies had a positive and significant association between OCC and affective learning. Results also showed a non-significant difference between groups based on the discipline in which they were studied ($Q_B = 2.13$, $p = 0.14$). However, the study in education ($k = 1$, $r = 0.19$, 95% CI = -0.02 to 0.38) reported a non-significant association between OCC and affective learning. Studies in communication ($k = 6$, $r = 0.34$, 95% CI = 0.26 to 0.42) reported a positive and significant association between OCC and affective learning. Finally, results revealed a significant difference between the groups based on the measure used to operationalize OCC ($Q_B = 5.22$, $p < 0.02$). Studies using Knapp and Martin's (2002) OCC measure ($k = 3$, $r = 0.41$, 95% CI = 0.31 to 0.50) produced a stronger positive average affect than studies employing other measures of OCC ($k = 4$, $r = 0.26$, 95% CI = 0.17 to 0.34).

Next, the random effects meta-analysis for cognitive learning ($k = 11$, $N = 5,635$) yielded an average summary effect (r) of 0.26 (95% CI = 0.19 to 0.33). Statistics for this summary effect are presented in Table 2.

Tests of heterogeneity revealed variations in effect across the cognitive learning studies ($Q = 61.22$, $df = 10$, $p < 0.001$, $I^2 = 83.67$). Our estimate of tau-squared (T^2)

was 0.01 and tau (T) was 0.11. We also tested for moderation among studies with cognitive learning as an outcome using subgroup analyses. The results revealed a no significant differences between groups based on whether they were published or not ($Q_B = 0.10, p = 0.75$). Both unpublished ($k = 3, r = 0.28, 95\% \text{ CI} = 0.14 \text{ to } 0.42$) and published ($k = 8, r = 0.26, 95\% \text{ CI} = 0.17 \text{ to } 0.34$) studies had a positive and significant association between OCC and cognitive learning. However, results revealed a significant difference between the groups based on the discipline in which they were studied ($Q_B = 19.48, p < 0.001$). Studies in education ($k = 5, r = 0.17, 95\% \text{ CI} = 0.12 \text{ to } 0.22$) reported a significant positive association between OCC and cognitive learning; studies in communication ($k = 6, r = 0.35, 95\% \text{ CI} = 0.29 \text{ to } 0.40$) reported a stronger positive and significant association between OCC and cognitive learning. In addition, results revealed a significant difference between the groups based on the measure used to study OCC ($Q_B = 8.50, p < 0.01$). Studies using the Knapp and Martin measure produced a stronger positive relationship ($k = 4, r = 0.36, 95\% \text{ CI} = 0.28 \text{ to } 0.44$) than studies using other OCC measures ($k = 7, r = 0.21, 95\% \text{ CI} = 0.15 \text{ to } 0.27$). Finally, we tested for differences between studies using Frymier and Houser's (1999) revised learning indicators measure to operationalize cognitive learning versus other measures of learning. A significant difference existed between the groups comparing learning measurements ($Q_B = 15.00, p < 0.001$). Studies that used Frymier and Houser's learning indicators ($k = 4, r = 0.36, 95\% \text{ CI} = 0.29 \text{ to } 0.43$) reported a stronger positive association between OCC and cognitive learning than studies using other measures of learning ($k = 7, r = 0.19, 95\% \text{ CI} = 0.14 \text{ to } 0.24$).

Discussion

The results of this meta-analysis revealed weak to moderate summary effects for OCC on students' affective learning ($r = 0.32$) and cognitive learning ($r = 0.26$). Significant moderators were identified for affective learning (i.e., using Knapp and Martin measure of OCC versus other measures of OCC) and cognitive learning (i.e., using the Knapp and Martin measure of OCC versus other measures of OCC, publishing in the communication studies discipline or education/development discipline, and using the Frymier and Houser measure of cognitive learning versus other measures of learning). These moderators explained differences in the magnitude of effects between OCC and learning and reduced heterogeneity in the average effects found across subgroups. The identification of these moderators points to attributable measurement differences of perceived cognitive learning that are often found between the two fields (c.f., King & Witt, 2009). Communication researchers (e.g., Frisby & Martin, 2010; Frymier & Houser, 1999; Richmond, McCroskey, Kearney, & Plax, 1987) have relied on self-report measures of perceived cognitive learning within individual courses for decades. These measures have been criticized for numerous reasons, notably for "measuring a halo effect [i.e., associated with the targeted instructor/course] instead of a comparative gain in cognitive learning" (Hess, Smythe, & Communication 451,

2001, p. 203). On the other hand, education and development researchers typically operationalize perceived cognitive learning as intellectual growth, or the overall development of cognitive capacities and skills as a result of collegiate experiences (King & Kitchener, 1994). These measures have also received significant criticism, particularly for reflecting “not only the relative influence of the...[college] experience, but also the influence of individual student characteristics (e.g., ability, motivation, or prior level of intellectual development) that may be linked in systematic ways” (Pascarella, 2006, p. 509). Nonetheless, our findings suggest that OCC has a stronger association on course-specific learning (i.e., studied in communication) than overall cognitive growth (i.e., studied in education), which makes sense because the latter is regarded as a gradual process that occurs slowly over several years in college (Pascarella, 1980). Moreover, our findings suggest that measuring the frequency of OCC (Knapp & Martin, 2002) produces stronger effects than measuring a valence or value tied to OCC. Overall, however, these results indicate that OCC is a positive experience that contributes to college students’ learning outcomes and thus should be encouraged by instructors.

There are limitations in this meta-analysis. Although we coded for a variety of possible moderators, other variables may exist that influence the inconsistency in findings between OCC and affective/cognitive learning. For example, Witt et al.’s (2004) meta-analysis of immediacy and student learning suggested that significant differences exist between *perceived* cognitive learning and *real* cognitive learning or performance-based assessments (e.g., recall on a quiz). However, due to the lack of investigations that have examined OCC and actual cognitive learning, we were unable to determine if these differences account for any of the heterogeneity in our investigation. Moreover, the lack of OCC studies in general (i.e., those deemed usable for this study) remains a broader limitation of this meta-analysis and is reflective of the weaknesses associated with the overall body of OCC research. Because of our relatively small k , we did not have the ability to code for various types of communication that are shared in OCC. Arguably, the biggest reason for this limitation is the variety of incompatible measures that exist to assess OCC throughout the education and communication literature (e.g., Fox, 1984; Knapp & Martin, 2002; Nadler & Nadler, 2000). These instruments vary in their designated focus, making it difficult to interpret the relationship between specific types of OCC and student learning. Considering different outcomes may be expected based on the nature of the conversations students have with instructors out of class, it may be beneficial for future researchers to examine what students talk about to determine if conversational topics moderate the OCC-learning relationship. These unobserved moderators are likely a reflection of the shortcomings found within the OCC literature; thus, we offer four recommendations to guide future investigations.

First, OCC researchers should begin to develop and/or incorporate previously existing theoretical models to explain *why* out-of-class experiences relate positively to student learning and development outcomes (Kuh & Hu, 2001). As Cotten and Wilson (2006) noted, “we know little about the dynamic processes that underpin the

statistical associations that exist between student-faculty interactions and student outcomes” (p. 490). Despite decades of OCC research, scholars have not yet answered why out-of-class experiences are associated with student achievement and how these relationships function on both a theoretical and applied level (Cotten & Wilson, 2006). Terenzini, Springer, Pascarella, and Nora (1995) noted that numerous quantitative studies make it clear that out-of-class interactions with faculty play a significant role in the student learning process, yet the majority of these studies do not specify circumstances or contextual factors that influence the magnitude of these relationships. It would be important, then, for researchers to explain the mechanisms through which OCC enhances students’ learning.

Though largely speculative in nature, few attempts have been made by education and communication researchers to advance a theoretical explanation that explains the OCC-learning relationship. Notably, education researchers have attempted to use the frameworks of Tinto (1975, 1987) and, to a lesser extent, Astin (1984) to explain the relationship between out-of-class experiences and student outcomes. Researchers who incorporate these perspectives generally adopt a developmental approach to conclude that out-of-class experiences promote holistic student growth and maturation through greater academic and social integration (Pascarella & Terenzini, 2005). However, in their review of over 400 empirical studies that incorporated Tinto’s (1975) model of student persistence, Braxton, Sullivan, and Johnson (1997) concluded that only 5 of Tinto’s 13 propositions are supported in the literature, which prompted Braxton et al. to question the causal assumptions in Tinto’s model (i.e., including the relationship between out-of-class experiences and student outcomes).

On the other hand, the field of communication has offered two general explanations of the OCC-learning relationship. First, communication researchers have suggested that OCC provides students with chances to receive personalized attention, participate in one-on-one interactions with faculty members, and develop interpersonal relationships with their instructors, which in turn allots students with better opportunities to comprehend course content (i.e., cognitive learning) and develop a positive attitude (i.e., affective learning) toward their courses overall (e.g., Dobransky & Frymier, 2004; Frymier & Houser, 2000). Second, communication scholars have also inferred that OCC helps students become active contributors and involve themselves in the educational process, as they use these opportunities (i.e., out-of-class interactions) to pursue additional information, clarity, or reinforcement about course content and/or course proceedings (e.g., Frymier, 2005; Norton, 2010; Shimotsu-Dariol et al., 2012). However, similar to the field of education, these explanations have remained primarily speculative, as researchers have failed to provide any substantial empirical or causal evidence to validate such theoretical mechanisms (Cotten & Wilson, 2006). Thus, theoretical explanations of OCC are still needed in education research and are especially needed in communication studies research to understand the underlying processes behind the OCC-learning relationship.

Second, OCC researchers need to explore if a *positive bias* exists within the out-of-class literature; specifically, scholars should investigate under what circumstances, if any, OCC

becomes a detriment to student learning. According to Terenzini et al. (1996), “most researchers have reported positive associations between the nature and frequency of students’ out-of-class contacts with faculty members and gains on one or another measure of academic or cognitive development” (p. 155). While the current meta-analysis revealed that OCC is related positively to learning, there are likely instances in which out-of-class interactions are counterproductive to students or teachers and their desired outcomes. For example, repeated office visits that fail to resolve an on-going grade dispute may likely cause students and instructors alike to experience a great deal of frustration (c.f., Bolkan & Goodboy, 2013). Similarly, Dunleavy and colleagues (Dunleavy & Martin, 2010; Dunleavy et al., 2008) studied nagging as a type of student communication behavior and suggested that students’ persistent (and often failed) requests occur outside the formal confines of the classroom. In other words, there are likely times when students communicate with their instructors outside of class and the interaction is perceived negatively; however, research has yet to investigate such instances, choosing instead to focus on the positive consequences of OCC.

Third, OCC researchers need to diversify their methodologies and approaches toward studying out-of-class interactions in order to address lingering questions that are associated with this area of research. Notably, the lack of OCC experiments has prompted scholars to question the directionality of a causal OCC-learning relationship (Clark et al., 2002). As Terenzini et al. (1996) noted, “The causal direction of all these influences remains problematic... Are students who gain more in their cognitive capacities more likely to seek contact with faculty members, or does the contact promote the development?” (p. 616). With the exception of two experiments on OCC (Clark et al., 2002; Jones, 2008), this question remains largely unanswerable because of the overreliance on self-report correlational studies. Clark and colleagues suggested that the lack of OCC experiments may be attributable to the on-going nature of OCC and its gradual, rather than instantaneous, effect on student learning. Thus, while single-case design experiments are ideal for proving causality, researchers should also consider adopting observational and longitudinal designs into the study of OCC to understand its on-going effect on students’ learning experiences. Terenzini et al. (1996) noted “the learning impacts of student’s out-of-class experiences are probably cumulative rather than catalytic. Few of the specific or formal out-of-class experiences studied thus far have a clearly powerful influence on student learning” (p. 159). Implementing methodologies such as experiments, observations, and longitudinal designs into future studies may help researchers to understand the directionally ambiguous relationship between OCC and student learning, as it is only through continuous investigation and diverse methodologies that scholars can provide evidence of a causal OCC-learning relationship (Clark et al., 2002).

Finally, OCC researchers should continue exploring how out-of-class interactions differ for students across grade levels, races, and ethnicities, and at different types of institutions. OCC research has predominately explored the out-of-class experiences of White, traditional-age college students who attend four-year residential institutions (Terenzini et al., 1996). Students’ experiences, particularly their interactions with faculty

members, can vary significantly depending on their race, sex, age, and nationality (Lundberg & Schreiner, 2004). OCC may also vary based on the type of institution that students attend, the culture that is established at each college or university, and the type of program in which students are enrolled (Kuh & Hu, 2001). For example, due to the increased rigor of coursework, traditionally smaller class sizes, and greater expectations of faculty-student collaboration, it is likely that OCC is different for graduate students than traditional undergraduates. However, researchers have yet to explore this possibility or other differences; thus, future studies should continue to expand their participants to understand how OCC affects a broader spectrum of students and their learning outcomes.

In conclusion, the interactions that students have with their instructors outside of the classroom have small to moderate effects on learning and development (Pascarella & Terenzini, 2005; Terenzini & Wright, 1987). Although the landscape of higher education has changed dramatically over the last several decades (e.g., increased tuition, changing expectations for instructors and students, online classes), the OCC-learning relationship has remained fairly consistent and stable (Kuh & Hu, 2001). The findings from this meta-analysis and the conclusions from this body of research suggest that OCC is a valuable component of the collegiate experience and a variable of interest for researchers across academic disciplines. As Terenzini et al. (1996) noted, because “student-faculty contact and student learning are positively related, it would seem that finding ways to promote such contact is in the best educational interests of both students and institutions” (p. 616). Indeed, scholarly interest in out-of-class communication has continued to grow over the last decade, providing researchers and instructors with a host of recommendations to increase student learning. Specifically, communication and education research continues to provide a better understanding of OCC and the topics discussed during these interactions, the frequency in which OCC occurs, the antecedents that predict OCC, and the related outcomes associated with OCC. Ideally, future researchers will build on these findings and further explore OCC by considering the four recommendations offered in this study. As Nadler and Nadler (2000) concluded, “Education does not stop at the classroom doors and neither should our scholarly exploration of communication in this environment” (p. 87).

Note

- [1] We opted for a random-effect model over a fixed-effect model because as Borenstein et al. (2009) summarized, “in the vast majority of cases, especially when the studies are performed by different researchers and then culled from the literature, it is more plausible that the impact of the covariates captures some, *but not all*, of the true variation among effects. In this case, it is the random-effects model that reflects the nature of the distribution of true effects, and should therefore be used in the analyses” (p. 195). Anker et al. (2010) would agree, as they discourage the use of the fixed-effect model in communication studies research unless a strong case can be made. They added that, “scholars selecting the fixed

effect approach are cautioned that the fixed effect model assumes a homogenous study population, and thus, findings cannot be generalized” (p. 271).

References

*denotes that the manuscript was included in the meta-analysis

- Anker, A. E., Reinhart, A. M., & Feeley, T. H. (2010). Meta-analysis of meta-analyses in communication: Comparing fixed effects and random effects analysis models. *Communication Quarterly*, 58, 257–278. doi:10.1080/01463373.2010.503154
- Astin, A. W. (1984). Student involvement: A developmental theory for higher education. *Journal of College Student Personnel*, 25, 297–308.
- Aylor, B., & Oppliger, P. (2003). Out-of-class communication and student perceptions of instructor humor orientation and socio-communicative style. *Communication Education*, 52, 122–134. doi:10.1080/03634520302469
- Berger, J. B., & Milem, J. F. (1999). The role of student involvement and perceptions of integration in a causal model of student persistence. *Research in Higher Education*, 40, 641–664. doi:10.1023/A:1018708813711
- Bippus, A. M., Kearney, P., Plax, T. G., & Brooks, C. F. (2003). Teacher access and mentoring abilities: Predicting the outcome value of extra class communication. *Journal of Applied Communication Research*, 31, 260–275. doi:10.1080/00909880305379
- Bolkan, S., & Goodboy, A. K. (2013). No complain, no gain: Students’ organizational, relational, and personal reasons for withholding rhetorical dissent from their college instructors. *Communication Education*, 62, 278–300. doi:10.1080/03634523.2013.788198
- Bolkan, S., & Holmgren, J. L. (2012). “You are such a great teacher and I hate to bother you but...”: Instructors’ perceptions of students and their use of email messages with varying politeness strategies. *Communication Education*, 61, 253–270. doi:10.1080/03634523.2012.667135
- Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2006). *Comprehensive meta-analysis (Version 2.2)* [Computer software]. Englewood, NJ: Biotstat.
- Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2009). *Introduction to meta-analysis*. Chichester, UK: Wiley.
- Borenstein, M., & Higgins, J. P. T. (2013). Meta-analysis and subgroups. *Preventative Science*, 14, 134–143. doi:10.1007/s11121-013-0377-7
- Braxton, J. M., Sullivan, A. S., & Johnson, R. M. (1997). Appraising Tinto’s theory of college student departure. In J. C. Smart (Ed.), *Higher education: Handbook of theory and research* (vol. 12, pp. 107–164). New York: NY: Agathon.
- *Clark, R. K., Walker, M., & Keith, S. (2002). Experimentally assessing the student impacts of out-of-class communication: Office visits and the student experience. *Journal of College Student Development*, 43, 824–837.
- *Claus, C. J. (2013). *The effects of student behavior alteration techniques on student motives to communicate, student talk, and student learning* (Unpublished doctoral dissertation). West Virginia University, Morgantown, WV.
- Cotten, S. R., & Wilson, B. (2006). Student–faculty interactions: Dynamics and determinants. *Higher Education*, 51, 487–519. doi:10.1007/s10734-004-1705-4
- *Dobransky, N. D., & Frymier, A. B. (2004). Developing teacher-student relationships through out of class communication. *Communication Quarterly*, 52, 211–223. doi:10.1080/01463370409370193
- Dunleavy, K. N., & Martin, M. M. (2010). Instructors’ and students’ perspectives of student nagging: Frequency, appropriateness, and effectiveness. *Communication Research Reports*, 27, 310–319. doi:10.1080/08824096.2010.518908
- Dunleavy, K. N., Martin, M. M., Brann, M., Booth-Butterfield, M., Myers, S. A., & Weber, K. (2008). Student nagging behavior in the college classroom. *Communication Education*, 57, 1–19. doi:10.1080/03634520701678679

- Egger, M., Smith, G. D., & Phillips, A. N. (1997). Meta-analysis: Principles and procedures. *British Medical Journal*, *315*, 1533–1537. doi:10.1136/bmj.315.7121.1533
- Fox, R. N. (1984). Reliability and discriminant validity of institutional integration scales for disadvantaged college students. *Educational and Psychological Measurement*, *44*, 1051–1057. doi:10.1177/0013164484444030
- French, B. F., & Oakes, W. (2004). Reliability and validity evidence for the institutional integration scale. *Educational and Psychological Measurement*, *64*, 88–98. doi:10.1177/0013164403258458
- *Frisby, B. N., Mansson, D. H., & Kaufmann, R. (2014). The cognitive learning measure: A three-study examination of validity. *Communication Methods and Measures*, *8*, 163–176. doi:10.1080/19312458.2014.903389
- Frisby, B. N., & Martin, M. M. (2010). Instructor–student and student–student rapport in the classroom. *Communication Education*, *59*, 146–164. doi:10.1080/03634520903564362
- *Frymier, A. B. (2005). Students' classroom communication effectiveness. *Communication Quarterly*, *53*, 197–212. doi:10.1080/01463370500089896
- Frymier, A. B., & Houser, M. L. (1999). The revised learning indicators scale. *Communication Studies*, *50*, 1–12. doi:10.1080/10510979909388466
- Frymier, A. B., & Houser, M. L. (2000). The teacher-student relationship as an interpersonal relationship. *Communication Education*, *49*, 207–219. doi:10.1080/03634520009379209
- Frymier, A. B., Shulman, G. M., & Houser, M. (1996). The development of a learner empowerment measure. *Communication Education*, *45*, 181–199. doi:10.1080/03634529609379048
- Fusani, D. S. (1994). "Extra-class" communication: Frequency, immediacy, self-disclosure, and satisfaction in student-faculty interaction outside the classroom. *Journal of Applied Communication Research*, *22*, 232–255. doi:10.1080/00909889409365400
- *Goodboy, A. K., Booth-Butterfield, M., Bolkan, S., & Griffin, D. J. (2015). The role of instructor humor and students' educational orientations in student learning, extra effort, participation, and out-of-class communication. *Communication Quarterly*, *63*, 44–61. doi:10.1080/01463373.2014.965840
- *Goodboy, A. K., Martin, M. M., & Bolkan, S. (2009). The development and validation of the student communication satisfaction scale. *Communication Education*, *58*, 372–396. doi:10.1080/03634520902755441
- Hedges, L. V., & Pigott, T. D. (2004). The power of statistical tests for moderators in meta-analysis. *Psychological Methods*, *9*, 426–445. doi:10.1037/1082-989X.9.4.426
- Hedges, L. V., & Vevea, J. L. (1998). Fixed- and random-effects models in meta-analysis. *Psychological Methods*, *3*, 486–504. doi:10.1037/1082-989X.3.4.486
- Hess, J. A., & Smythe, M. J., & Communication 451. (2001). Is teacher immediacy actually related to student cognitive learning? *Communication Studies*, *52*, 197–219. doi:10.1080/10510970109388554
- Higgins, J. P. T., Thompson, S. G., Deeks, J. J., & Altman, D. G. (2003). Measuring inconsistency in meta-analyses. *British Medical Journal*, *327*, 557–560. doi:10.1136/bmj.327.7414.557
- *Ibtesam, H. (2006). The impact of student-faculty informal interpersonal relationships on intellectual and personal development. *College Student Journal*, *40*, 670–680.
- Jaasma, M. A., & Koper, R. J. (1999). The relationship of student-faculty out-of-class communication to instructor immediacy and trust and to student motivation. *Communication Education*, *48*, 41–47. doi:10.1080/03634529909379151
- Jaasma, M. A., & Koper, R. J. (2002). Out-of-class communication between female and male students and faculty: The relationship to student perceptions of instructor immediacy. *Women's Studies in Communication*, *25*, 119–137. doi:10.1080/07491409.2002.10162443
- Jones, A. C. (2008). The effects of out-of-class support on student satisfaction and motivation to learn. *Communication Education*, *57*, 373–388. doi:10.1080/03634520801968830
- Kelly, L., Duran, R. L., & Zolten, J. J. (2001). The effect of reticence on college students' use of electronic mail to communicate with faculty. *Communication Education*, *50*, 170–176. doi:10.1080/03634520109379242

- King, P., & Witt, P. (2009). Teacher immediacy, confidence testing, and the measurement of cognitive learning. *Communication Education*, 58, 110–123. doi:10.1080/03634520802511233
- King, P. M., & Kitchener, K. S. (1994). *Developing reflective judgment: Understanding and promoting intellectual growth and critical thinking in adolescents and adults*. San Francisco, CA: Jossey-Bass.
- *Knapp, J. L. (2001). *Exploring out-of-class communication: The development and testing of a measure* (Unpublished master's thesis). West Virginia University, Morgantown, WV.
- Knapp, J. L., & Martin, M. M. (2002). *Out-of-class communication: The development and testing of a measure*. Paper presented at the National Communication Association Convention, New York City, NY.
- Kuh, G. D. (1994). *Student learning outside of the classroom: Transcending artificial boundaries*. Washington, DC: George Washington University.
- Kuh, G. D. (1995). The other curriculum: Out-of-class experiences associated with student learning and personal development. *The Journal of Higher Education*, 66, 123–155. doi:10.2307/2943909
- Kuh, G. D., & Hu, S. (2001). The effects of student-faculty interaction in the 1990s. *The Review of Higher Education*, 24, 309–332. doi:10.1353/rhe.2001.0005
- Levine, T., Asada, K. J., & Carpenter, C. (2009). Sample sizes and effect sizes are negatively correlated in meta-analyses: Evidence and implications of a publication bias against nonsignificant findings. *Communication Monographs*, 76, 286–302. doi:10.1080/03637750903074685
- Lundberg, C. A., & Schreiner, L. A. (2004). Quality and frequency of faculty-student interaction as predictors of learning: An analysis by student race/ethnicity. *Journal of College Student Development*, 45, 549–565. doi:10.1353/csd.2004.0061
- *Maestas, R. T. (2000). *Out-of-class interactions with faculty and selected education outcomes among Hispanic and Black undergraduates* (Unpublished doctoral dissertation). University of Michigan, Ann Arbor, MI.
- *McNally, J. S. (2005). *Teacher-student relationships: The effects of student motives, relationship development, and communication on student learning* (Unpublished doctoral dissertation). Kent State University, Kent, OH.
- Milem, J. F., & Berger, J. B. (1997). A modified model of college student persistence: Exploring the relationship between Astin's theory of involvement and Tinto's theory of student departure. *Journal of College Student Development*, 38, 387–400. doi:10.2307/2649260
- Mottet, T. P., Frymier, A. B., & Beebe, S. A. (2006). Theorizing about instructional communication. In T. P. Mottet, V. P. Richmond, & J. C. McCroskey (Eds.), *Handbook of instructional communication: Rhetorical and relational perspectives* (pp. 255–282). Boston, MA: Allyn and Bacon.
- Myers, S. A. (2004). The relationship between perceived instructor credibility and college student in-class and out-of-class communication. *Communication Reports*, 17, 129–137. doi:10.1080/08934210409389382
- Myers, S. A., Martin, M. M., & Knapp, J. L. (2005). Perceived instructor in-class communicative behaviors as a predictor of student participation in out of class communication. *Communication Quarterly*, 53, 437–450. doi:10.1080/01463370500102046
- Nadler, M. K., & Nadler, L. B. (2000). Out of class communication between faculty and students: A faculty perspective. *Communication Studies*, 51, 176–188. doi:10.1080/10510970009388517
- Nadler, M. K., & Nadler, L. B. (2001). The roles of sex, empathy, and credibility in out-of-class communication between faculty and students. *Women's Studies in Communication*, 24, 241–261. doi:10.1080/07491409.2001.10162436
- Norton, H. E. (2010). *Involvement of nontraditional students and communication variables predictive of academic success and persistence* (Unpublished master's thesis). Macomb, IL: Western Illinois University.
- Pace, C. R. (1990). *College student experiences questionnaire* (3rd ed.). Los Angeles, CA: University of California Los Angeles, Center for the Study of Evaluation, Graduate School.

- *Pascarella, E. T., & Terenzini, P. T. (1978). Student-faculty informal relationships and freshman year educational outcomes. *The Journal of Educational Research*, 71, 183–189. doi:10.1080/00220671.1978.10885067
- Pascarella, E. T. (1980). Student-faculty informal contact and college outcomes. *Review of Educational Research*, 50, 545–595. doi:10.3102/00346543050004545
- Pascarella, E. T. (2006). How college affects students: Ten directions for future research. *Journal of College Student Development*, 47, 508–520. doi:10.1353/csd.2006.0060
- Pascarella, E. T., Duby, P. B., Terenzini, P. T., & Iverson, B. K. (1983). A text and reconceptualization of a theoretical model of college withdrawal in a commuter institution setting. *Sociology of Education*, 56, 88–100. doi:10.2307/2112657
- Pascarella, E. T., & Terenzini, P. T. (2005). *How college affects students* (vol. 2). San Francisco, CA: Jossey-Bass.
- Richmond, V. P., McCroskey, J. C., Kearney, P., & Plax, T. G. (1987). Power in the classroom VII: Linking behavior alteration techniques to cognitive learning. *Communication Education*, 36, 1–12. doi:10.1080/03634528709378636
- Schmidt, F. L., & Hunter, J. E. (2015). *Methods of meta-analysis: Correcting error and bias in research findings* (3rd ed.). Thousand Oaks, CA: Sage.
- Shimotsu-Dariol, S., Mansson, D. H., & Myers, S. A. (2012). Students' academic competitiveness and their involvement in the learning process. *Communication Research Reports*, 29(4), 310–319. doi:10.1080/08824096.2012.723643
- Stephens, K. K., Houser, M. L., & Cowan, R. L. (2009). R u able to meat me: The impact of students' overly casual email messages to instructors. *Communication Education*, 58, 303–326. doi:10.1080/03634520802582598
- *Terenzini, P. T., Pascarella, E. T., & Lorang, W. G. (1982). An assessment of the academic and social influences on freshman year educational outcomes. *The Review of Higher Education*, 5, 86–109.
- Terenzini, P. T., & Pascarella, E. T. (1980). Toward the validation of Tinto's model of college student attrition: A review of recent studies. *Research in Higher Education*, 12, 271–282. doi:10.1007/BF00976097
- Terenzini, P. T., Pascarella, E. T., & Blimling, G. S. (1996). Students' out-of-class experiences and their influence in learning and cognitive development: A literature review. *Journal of College Student Development*, 37, 149–162.
- Terenzini, P. T., Springer, L., Pascarella, E. T., & Nora, A. (1995). Academic and out-of-class influences on students' intellectual orientations. *Review of Higher Education*, 19, 23–44. doi:10.1007/BF02207765
- Terenzini, P. T., & Wright, T. M. (1987). Influences on students' academic growth during four years of college. *Research in Higher Education*, 26, 161–179. doi:10.1007/BF00992027
- Tinto, V. (1975). Dropout from higher education: A theoretical synthesis of recent research. *Review of Educational Research*, 45, 89–125. doi:10.3102/00346543045001089
- Tinto, V. (1987). *Leaving college: Rethinking the causes and cures of student attrition*. Chicago, IL: University of Chicago Press.
- *Volkwein, J. F., & Carbone, D. A. (1994). The impact of departmental research and teaching climates on undergraduate growth and satisfaction. *The Journal of Higher Education*, 65, 147–167. doi:10.2307/2943921
- Wilson, R. C., Woods, L., & Gaff, J. G. (1974). Social-psychological accessibility and faculty-student interaction beyond the classroom. *Sociology of Education*, 47, 74–92. doi:10.2307/2112167
- Witt, P. L., Wheelless, L. R., & Allen, M. (2004). A meta-analytical review of the relationship between teacher immediacy and student learning. *Communication Monographs*, 71, 184–207. doi:10.1080/036452042000228054
- Zhang, Q. (2006). Immediacy and out-of-class communication: A cross-cultural comparison. *International Journal of Intercultural Relations*, 30, 33–50. doi:10.1016/j.ijintrel.2005.06.006