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The choice is yours: the effects of autonomy-supportive instruction on students' learning and communication

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ABSTRACT
Guided by self-determination theory, we conducted a live lecture experiment in two 50-min college courses to manipulate autonomy-supportive instruction (i.e., the amount of choices and rationales offered to students). Participants were 201 undergraduate students who either attended a lecture where the instructor gave students choices over the material learned and emphasized the relevance of the lecture and activities (experimental condition), or attended another lecture where the instructor taught without student choices and refrained from mentioning the relevance (control condition). During the lectures, students completed learning activities, and after the lectures, students reported on their intrinsic motivation toward their learning activities, along with their sustained attention to the lecture, and their likelihood of participating and communicating negative word-of-mouth. Results revealed that autonomy-supportive instruction caused students to (a) become more intrinsically motivated, which in turn, caused them to (b) put more effort into completing a learning packet, (c) sustain their attention, and report they would (d) participate in future classes with that instructor, and (e) refrain from spreading negative comments.

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self-determination theory; intrinsic motivation; cognitive learning; sustained attention; oral participation; negative word-of-mouth

Millennial students, typically referred to as students born between 1982 and 2004 (Howe & Strauss, 2000), want autonomy and to be integrated into the learning process (Conklin, 2013). These students do not want to be controlled by their parents (i.e., helicopter parenting) nor do they want to be controlled in the classroom (Conklin, 2013). Instead, millennials want choices over their educational experiences as active learners (Wilson, 2004) and may benefit from structured flexibility in the classroom (Hosek & Titsworth, 2016). However, Reeve (2009) suggested that several external constraints in higher education, such as the power differential among teachers and students, often perpetuates a controlling style of instruction that limits students' choices in the classroom. Though these constraints are pervasive in higher education, instructors must find new ways to augment straightforward lectures (Wilson, 2004) to meet the autonomy needs of millennial students.

Self-determination theory (SDT; Deci & Ryan, 1985) provides a framework for further exploring these desires; positing that students enter the classroom with three universal and basic psychological needs (i.e., autonomy, competence, and relatedness), one of which is

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their need for autonomy. That is, every student has an innate need to feel in control over his/her behaviors and educational experience (Ryan & Deci, 2017). Central to SDT is the claim that the educational environment, particularly how instructors behave in the classroom, can foster or impede students' basic psychological need fulfillment. When students' basic psychological needs are supported, their motivation to learn is guided by a feeling of personal fulfillment (Ryan & Deci, 2000) and they tend to flourish in education (Reeve, 2002).

Decades of SDT research have been dedicated to examining the impact of autonomy-supportive instruction on students' quality of motivation, learning, and other learning-related outcomes such as engagement, effort, persistence, and psychological well-being, to name a few (Ryan & Deci, 2017). Autonomy-supportive instruction includes several instructor behaviors, such as providing students opportunities for choice and meaningful rationales, that attempt to facilitate students' internal motivational resources (Reeve, 2009). Mirroring several conclusions from a recent forum focused on pedagogy and millennials (i.e., Buckner & Strawser, 2016; Goldman & Martin, 2016; Hosek & Titsworth, 2016), autonomy-supportive instruction offers instructors an empirically tested list (see Ryan & Deci, 2017) of instructor behaviors that develop a flexible classroom environment, demonstrate the relevance of course material, and promote students' internal sense of control over their learning.

SDT provides instructional scholars a robust framework to examine the classroom conditions that foster students' basic psychological needs, under which (millennial) students will motivate themselves to learn and communicate in ways that benefit their course success. However, instructional scholars have been slow to incorporate SDT and the autonomy-supportive literature into teaching and learning scholarship despite its potential to explain how teaching decisions aid in students' motivation toward, and learning of, the course material. Therefore, to extend instructional research, the primary aim of this live lecture experiment was to explore how two complimentary autonomy-supportive teaching behaviors (i.e., offering students meaningful choices and providing rationales) would influence students' intrinsic motivation, learning, and communication in and outside the college classroom.

Review of literature

SDT

In the context of education, SDT posits that the classroom environment significantly impacts the type and quality of motivation students experience (Ryan & Deci, 2017). SDT distinguishes among three different types of student motivation that are based on the degree to which students perceive their behaviors as self-determined. Ryan and Deci (2000) identified *amotivation* as the lack of self-determination; that is, a student who does not act at all or acts without any specific intent. These scholars also identified *extrinsic (controlled) motivation* as student behaviors that are determined by external regulations, such as grades, deadlines, and punishments; whereas *intrinsic motivation* refers to self-determined student behaviors that are driven by personal fulfillment and a natural inclination to learn and develop. Moreover, SDT claims students will experience intrinsic motivation if three basic psychological needs are fulfilled (Deci & Ryan, 1985). Students'

needs for (a) *autonomy* refers to the desire to have volitional control over their own behavior, (b) *competence* refers to the desire to demonstrate their efficacy and abilities, and (c) *relatedness* refers to their desire to connect with others (Deci & Ryan, 2002). Taken together, SDT posits that classroom environments that support (or thwart) students' needs for autonomy, competence, and relatedness will promote (or stifle) students' intrinsic motivation.

Autonomy-supportive instruction

One prominent line of SDT research has examined a cluster of instructor behaviors (i.e., autonomy-supportive instruction versus controlling instruction) that support students' basic psychological needs and their quality of motivation. Autonomy-supportive instruction is the "interpersonal sentiment and behaviors teachers provide during instruction to identify, nurture, and develop students' inner motivational resources" (Reeve, 2009, p. 160). In other words, autonomy-supportive instruction is a cluster of instructor behaviors that communicate validation and support for students' experiences to make them feel they are in control of their learning. In contrast, controlling instruction uses teaching behaviors to pressure students to think or behave in a specific and desired way (Reeve, 2009). Past SDT research has found evidence for several instructor behaviors that provide an autonomy-supportive style of teaching (for a recent review, see Ryan & Deci, 2017) such as offering opportunities for choice (Katz & Assor, 2007), teaching in students' preferred ways (Jang, Reeve, & Halusic, 2016) acknowledging students' negative experiences, listening to students, using noncontrolling language, displaying patience (Reeve, 2009), and providing meaningful rationales (Reeve, Jang, Hardre, & Omura, 2002), to name a few.

SDT scholars have consistently shown that autonomy-supportive instruction facilitates students' persistence (Bonneville-Roussy, Vallerand, & Bouffard, 2013), engagement (Assor, Kaplan, & Roth, 2002; Jang et al., 2016; Jang, Reeve, & Deci, 2010), metacognitive strategies (Gonzalez & Paoloni, 2015), and self-regulation (Sierens, Vansteenkiste, Goossens, Soenens, & Dochy, 2009; Vansteenkiste et al., 2012). In particular, Jang et al. (2010) examined autonomy-supportive instruction and student engagement, and found that students reported working harder during class and attempted to learn as much as they could with an autonomy-supportive instructor. Using objective raters to observe students' engagement behaviors (i.e., level of attention, effort, verbal participation, persistence, positive emotion, and frequency of students' versus instructors' voice), this study also found that engagement behaviors increased with autonomy-supportive instruction. Clearly, this type of instruction facilitates students' in-class engagement; however, Reeve (2009) argued that scholarship investigating autonomy-supportive instruction has relied on teacher self-reports, student reports, or observer reports rather than experimentally manipulating this type of instruction or testing the various clusters of autonomy-supportive behaviors.

In line with Reeve's (2009) observation, we aimed to extend the SDT research by experimentally testing the impact of offering students' relevant choices in the content they learned during instruction. In regard to offering choice during instruction, previous research (e.g., Deci, Eghrari, Patrick, & Leone, 1994) has typically relied on manipulating the absence or presence of controlling language (i.e., "should," "must," "have to") and

emphasizing the word choice. However recently, Jang et al. (2016) introduced a new autonomy-supportive behavior (i.e., teaching in students' preferred ways) that focused on soliciting students' preferences and adapting instruction to align with those preferences. Specifically, they had students rank their preferred methods of teaching and compared instruction that included the preferred methods to instruction that students' identified as not preferred. Jang et al. (2016) found that the autonomy-supportive behavior of teaching in students' preferred ways increased students' self-reports of in-class engagement and observer ratings of engagement behaviors. Though Jang et al. (2016) demonstrated that allowing students to choose their methods of instruction increases their engagement, the present study sought to allow students the opportunity to choose the actual material taught during lecture.[1] In other words, instead of allowing students to choose their preferred way of teaching or strictly refraining from using controlling language, the present study examined the impact of offering students choices over the material and the direction of the lecture with meaningful rationales for the content they chose to learn.

Furthermore, a wealth of research has found that autonomy-supportive instruction leads to students' basic psychological need fulfillment and intrinsic motivation (Ryan & Deci, 2017). For example, Katz and Assor (2007) argued that instructors who offer choices that are relevant to students' interests, that are not too numerous or complex, and that align with students' values support their basic psychological needs for autonomy, competence, and relatedness, respectively (see also Deci et al., 1994). Moreover, Reeve et al. (2002) found that instruction augmented with meaningful rationales fostered students' internalization of uninteresting classroom activities. Previous research (see Ryan & Deci, 2017) has established that students with an autonomy-supportive instructor are more likely to find personal fulfillment toward their learning experiences. Therefore, in line with SDT, autonomy-supportive instruction should foster students' intrinsic motivation, which in turn, should contribute to the degree to which students are engaged in the classroom. Thus, in order to complement the autonomy-supportive literature and potentially extend previously studied autonomy-supportive behaviors (i.e., choice over the direction of the lecture and providing students with meaningful rationales) we offer the following hypotheses to test the mediation claim of SDT:

> H1: Students' intrinsic motivation will mediate the effect of autonomy-supportive instruction (i.e., allowing students to choose the direction of the lecture and providing students with meaningful rationales) on students' effort to complete a learning packet.

> H2: Students' intrinsic motivation will mediate the effect of autonomy-supportive instruction (i.e., allowing students to choose the direction of the lecture and providing students with meaningful rationales) on students' effort to remember more concepts from the lecture.

In addition to students' engagement, previous research (Jang et al., 2010, 2016; Reeve, Jang, Carrell, Jeon, & Barch, 2004) has demonstrated that autonomy-supportive instruction sustains students' attention and keeps them on task during class. For instance, Reeve et al. (2004) had students report on the degree to which their instructors engaged in autonomy-supportive behaviors and found that students self-reported more concentration in classes with an autonomy-supportive instructor. In line with SDT, autonomy-supportive instruction should foster more student intrinsic motivation and subsequently sustain their

attention in the classroom. In order to test this mediation prediction, the following hypothesis is presented:

> H3: Students' intrinsic motivation will mediate the effect of autonomy-supportive instruction (i.e., allowing students to choose the direction of the lecture and providing students with meaningful rationales) on students' ability to sustain attention during a classroom lecture.

SDT researchers have also examined the influence of autonomy-supportive instruction on students' academic performance. Black and Deci (2000) conducted a semester long experiment and found that students who perceived an instructor to be autonomy-supportive received higher grades in their organic chemistry course. Sheldon and Krieger (2007) found that law school students who received autonomy-supportive instruction earned higher grades and performed better on the bar exam. As mentioned above, Jang et al. (2016) added another instructor behavior (i.e., teaching in students' preferred ways) to the repertoire of autonomy-supportive instruction and found that instructors who take students' perspectives by soliciting their input and then adjusting the lesson plan to incorporate that input, increased students' conceptual learning. According to SDT, students' inner motivational resources (i.e., intrinsic motivation) may be the mechanism through which autonomy-supportive instruction fosters an increase in students' academic performance. Therefore, to add to the autonomy-supportive literature we attempted to test the mediation claim of SDT. We hypothesized that autonomy-supportive instruction would foster more student intrinsic motivation, which in turn would increase students' ability to recall more information from the lecture:

> H4: Students' intrinsic motivation will mediate the effect of autonomy-supportive instruction (i.e., allowing students to choose the direction of the lecture and providing students with meaningful rationales) on students' scores on a test of recall.

Student communication

Beyond learning effects, we were interested in how students believed they would communicate with and about an autonomy-supportive instructor. Similar to previous live-lecture studies (e.g., Goodboy & Myers, 2008), we considered two student hypothetical communication variables as possible consequences of autonomy-supportive instruction: oral participation and negative word-of-mouth occurrences. Oral participation is considered by most instructors to be a constructive student behavior that indicates in-class engagement (Frymier & Houser, 2016), whereas students' negative word-of-mouth may be considered a destructive out of class student behavior, such as peer-to-peer complaints about the course or instructor. Thus, these hypothetical student communication outcomes were selected to capture both constructive and destructive communication, in response to autonomy-supportive instruction, which takes place inside and outside of the classroom.

Student oral participation refers to "any student comments offered or questions raised in class" (Fassinger, 1995, p. 86). SDT literature (e.g., Jang et al., 2010; Reeve et al., 2004) has revealed that autonomy-supportive instruction increases students' verbal participation in the form of asking questions and discussion in groups. Similarly, Reeve et al. (2004) examined the ratio of teacher influence to student influence, which is the degree to which either the teacher or student, verbally or nonverbally impact the behavior of the other in a positive way (e.g., students speaking up in class to offer suggestions to the

instructor on how to structure the remaining class time); results indicated that autonomy-supportive instruction positively predicted students' influence attempts. Thus, the following mediation hypothesis is presented:

> H5: Students' intrinsic motivation will mediate the effect of autonomy-supportive instruction (i.e., allowing students to choose the direction of the lecture and providing students with meaningful rationales) on students' intent to participate.

Many students who are dissatisfied with their learning experiences do not complain to their instructor and instead do nothing at all, especially when they feel uncomfortable complaining or believe it will do them no good in the course. When students choose not to complain to their instructor, but still do complain, they prefer to vent their frustrations to others to cope with their dissatisfaction (Bolkan & Goodboy, 2013). Though scholars have investigated this type of complaint behavior (i.e., expressive dissent; Goodboy, 2011), the triggering agent of instructional dissent is course-related issues or disagreements (Goodboy & Bolkan, 2018). However, the consumer literature has considered negative word-of-mouth as telling others (i.e., relatives or friends) about one's dissatisfaction about a particular product or service (Oh, 2004). Although relatively unexplored by instructional scholars (with the exception of Edwards & Edwards, 2013; Edwards, Edwards, Qing, & Wahl, 2007; Edwards, Edwards, Shaver, & Oaks, 2009), we considered students' negative word-of-mouth as the informal (dissatisfied) communication that students share with their friends and/or relatives to warn them about a particular instructor or a particular class. Thus, instead of students voicing their dissatisfaction to others as a way to cope (i.e., expressive dissent), students' may share their negative experiences to caution others about an instructor.[2]

The consumer literature has demonstrated that one way to restore dissatisfied customers and protect against negative word-of-mouth is to offer fair settlement and to demonstrate to the consumer their complaint has made a difference (i.e., justice has been done; Blodgett, Wakefield, & Barnes, 1995). In fact, previous research has consistently found that customers' perceptions of distributive, procedural, and interactional justice during service recovery contributes to customers' satisfaction and can even result in positive word-of-mouth (e.g., Kim, Kim, & Kim, 2009; Maxham & Netemeyer, 2002). Thus, it seems that companies who elicit feedback from consumers and then make adjustments based on that feedback, restore dissatisfied consumers and prevent further negative word-of-mouth. In the context of the classroom, Holmgren and Bolkan (2014) examined the relationship between students' perceptions of justice and their instructors' responses to their rhetorical dissent, and found a positive association between students' satisfaction with instructors' responses and students' perceptions of distributive, procedural, and interactional justice.

Additionally, SDT literature has demonstrated that autonomy-supportive instruction includes a variety of behaviors that support students' learning experiences, but more importantly, make students feel in control of their learning (Reeve, 2009; Ryan & Deci, 2017). Because an autonomy-supportive instructor demonstrates to students their input is valued and facilitates students' sense of volition over their learning, students should avoid bad mouthing this instructor. Similarly, SDT literature has suggested that students find autonomy-supportive instruction conducive toward their inner motivational resources (Deci et al., 1994); that is, students find class activities more personally fulfilling

with an autonomy-supportive instructor. However, relatively unexplored in the SDT literature is how autonomy-supportive instruction can protect against students' negative communication. Therefore, in order to extend the SDT literature and integrate more research on negative word-of-mouth into the instructional context, we hypothesize that autonomy-supportive instruction would increase students' intrinsic motivation, which in turn would work against their intentions to spread negative word-of-mouth to others:

> H6: Students' intrinsic motivation will mediate the effect of autonomy-supportive instruction (i.e., allowing students to choose the direction of the lecture and providing students with meaningful rationales) on students' likelihood to spread negative word-of-mouth about their instructor.

Method

This study was conducted in two segments over the timespan of six weeks. Part one of this study focused on developing and pilot testing lecture materials and teaching scripts for use in an interpersonal communication course. Part two of this study focused on training a confederate instructor and conducting a live-lecture experiment across two sections of the same introductory interpersonal communication course.

Participants

The first set of participants were used to pilot test the teaching scripts developed for this study. Participants were 39 students enrolled in an undergraduate communication research methods course at a large Mid-Atlantic university. The second set of participants were 201 students (37 men, 120 women, 1 nonbinary, and 43 did not answer) enrolled in one of two sections of an introductory interpersonal communication course. Participants' ages ranged from 18 to 29 years ($M = 19.31$, $SD = 1.89$). A majority of participants ($n = 96$, 47.8%) were first-year students, followed by sophomores ($n = 20$, 10.0%), juniors ($n = 18$, 9.0%), seniors ($n = 14$, 7.0%), four participants (2.0%) reported other, and 49 participants (24.4%) did not report their class rank. The most common ethnicity was Caucasian ($n = 133$, 66.2%), followed by African American ($n = 7$, 3.5%), Middle Eastern ($n = 7$, 3.5%), Asian ($n = 4$, 2.0%), and Hispanic ($n = 4$, 2.0%), four participants (2.0%) reported other, and 42 participants (20.9%) did not report their ethnicity. No other demographic data were collected.

Procedures

Part one of this study included developing live lecture teaching materials and scripts. The first author worked closely with an interpersonal communication course instructor to develop lecture materials that aligned with the learning objectives of the course and that were relevant to the topics students were previously learning in class. After consultation, two lecture scripts were developed on the topic of nonverbal deception. Specifically, the lecture scripts focused on teaching the following topics: (a) deception in nature, (b) types of deception, (c) basics of deception, and (d) the nonverbal cues related to deception (see Note 1). These topics were selected because students were not exposed to this material in the course, but the information aligned with previous week's lectures on

nonverbal communication. The lecture content taught within the two scripts remained exactly the same, except for the autonomy-supportive manipulations of providing students choices and explaining the relevance of the material. Although there are many autonomy-supportive instructor behaviors, Katz and Assor (2007) argued that instructors who offer choices that are relevant to students' lives support students' basic psychological needs (see also Deci et al., 1994). Likewise, Reeve et al. (2002) found that providing students with meaningful rationales facilitated students' internalization of uninteresting classroom activities and subsequently increased students' efforts toward learning. Thus, we operationalized autonomy-supportive instruction as offering students with meaningful choices and rationales during the lecture.[3]

After Institutional Review Board approval, these lecture scripts were pilot tested to confirm that the autonomy-supportive manipulations were adequate. The first author visited an introductory communication research methods course and had 39 students read one of the two scripts. After reading the scripts, participants completed a short survey that contained a modified version of the choice (5-item) and relevance (5-item) subscale of the Teacher as Social Context Questionnaire—Student Report (Belmont, Skinner, Wellborn, & Connell, 1988). This measure included items such as "This instructor gave me a lot of choices about how to do activities" (Choice) and "This instructor explained why we learned certain things during the lecture" (Relevance). On a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), participants were instructed to indicate their level of agreement that the instructor in the scripts offered choice and relevance. Results from a Welch's *t*-test revealed that the lecture script manipulations were successful for choice, $t(34.70) = -4.63$, $p < .001$, $d = 1.48$, $U_3 = 93.06\%$; and relevance, $t(36.29) = -2.32$, $p = .03$, $d = .74$, $U_3 = 77.04\%$. Students who read the high autonomy-supportive lecture scripts perceived the instructor to offer significantly more choices ($M = 3.74$, $SD = .59$) and provide more rationales ($M = 4.08$, $SD = .56$) than students who read the low autonomy-supportive lecture scripts with significantly less choices ($M = 2.69$, $SD = .81$) and rationales provided ($M = 3.62$, $SD = .68$).

Since the pilot test was successful, part two of this study consisted of training a confederate instructor to be the guest lecturer to teach in a live lecture experiment. The trained confederate was a female (age 22) master's student in the same department and institution as the authors. The trained confederate practiced the lecture scripts several times and delivered the lecture multiple times with the first author (who followed along and timed the lecture with a printed lecture script). The live lecture took place during one of two 50-min sections of an introductory interpersonal communication course. In each section, students were given a packet of learning materials to coincide with the lecture, containing a cover letter, deception cues learning activity, thought-listing prompt, and postlecture feedback survey. The procedures for each class session included the following: (1) the course instructor introduced the trained confederate as a guest lecturer; (2) students were given a learning packet that aligned with the lecture which included two in-class learning activities and a feedback survey; (3) the trained confederate taught a 25-minute lecture; (4) students were asked to submit their learning packets in a sealed box in the front of the classroom at the end of class. After the teaching experiment was completed, students were debriefed through an email from the course instructor to inform them they participated in research, and their participation would in no way affect their class standing or affect their grades.

Instrumentation

Intrinsic Motivation. The 7-item interest/enjoyment subscale of the Intrinsic Motivation Inventory (Ryan, 1982) was used to assess participants' intrinsic motivation. Sample items included "I thought the activities today were enjoyable," "I would describe these activities as very interesting," and "I enjoyed doing these activities very much." Participants used a 7-point Likert-type scale to respond to these items that ranged from 1 (*not at all true of me*) to 7 (*very true of me*).

Oral Participation. The 7-item Oral Participation Scale (Frymier & Houser, 2016) was used to assess students' likelihood of participating in a particular course. Participants read the following stem "If Margaret was my regular instructor I would … " and responded on a 5-point Likert scale that ranged from 1 (*strongly disagree*) to 5 (*strongly agree*). Sample items included "express my opinion in class," "ask follow-up questions until I fully understand someone," and "ask questions that solicit the teacher's opinions about the content."

Negative Word-Of-Mouth. The modified 3-item Negative Word-of-Mouth Intention scale (Blodgett, Hill, & Tax, 1997) was used to assess participants' likelihood of warning others to avoid this particular course. Participants read the following stem "If Margaret was my regular instructor I would … " and responded on a 5-point Likert scale that ranged from 1 (*strongly disagree*) to 5 (*strongly agree*). Sample items included "complain to my friends and relatives about this class," "warn my friends and relatives not to take this instructor," and "make sure to tell my friends and relatives *not* to take this class."

Sustained Attention. Students' sustained attention was measured using Wei, Wang, and Klausner's (2012) 6-item Sustained Attention Scale. However, similar with previous research (Bolkan, Goodboy, & Myers, 2017) one item ("I pay my full attention to classroom discussion in this class") was removed because it pertained to class discussions which were not present during this experiment. Sample items included "I never shifted my attention to other nontask-oriented learning activities during today's lecture" and "I paid full attention to the lecture." Participants responded to these statements using a 7-point Likert-type scale that ranged from 1 (*not at all true of me*) to 7 (*very true of me*).

Cognitive Learning.[4] Students' recall of the lecture material was measured using two methods disguised to students as in-class activities. First, students completed a deception cues learning activity, which required them to recall nonverbal behaviors that people tend to believe (stereotypically) relate to deception and nonverbal behaviors that research has demonstrated an (actual) relationship with deception. This learning activity represents eight true/false test questions, which were coded as (0) for an incorrect answer and (1) for a correct answer. These eight items were combined into a composite variable and then converted into a percentage (KR-20 = .76, $M = 74.47$, $SD = 20.10$). Second, students were offered a thought-listing prompt and 20 spaces to write in any concepts remembered from the lecture. The first author examined the concepts students listed for the prompt and discarded any irrelevant concepts that were not mentioned in the lecture. To ensure the first author coded the surveys correctly, a second coder (i.e., the trained guest lecturer) examined the concepts students listed and coded relevant and irrelevant concepts taught in the lecture. Intercoder reliability was calculated with a Cohen's kappa of .95. Additionally, if any student offered an irrelevant concept, it was not included in their total score for the prompt. After this initial relevance check, the concepts offered by students were summed ($M = 5.48$, $SD = 4.33$).

Effort to Complete the Learning Packet. Students' effort was measured by coding the completion of the learning packet that was given to them during the lecture. This learning packet included a cover letter, deception cues learning activity, thought-listing prompt, and postlecture feedback survey. As mentioned above, the deception cues learning activity and thought-listing prompt were used to measure students' cognitive learning, whereas, the instructor feedback survey was used to measure students' perceptions of the instructor and their own hypothetical communication. Thus, to measure students' overall effort, the learning packet was coded for students' attempts to complete the deception cues activity and the thought-listing prompt, as well as, fully complete the instructor feedback survey. For a student to have a "complete" score for the learning packet he or she must have: (a) attempted the deceptions cues activity, (b) attempted the thought-listing prompt, and (c) fully completed the feedback survey. Even if a student provided all incorrect answers or only answered part of the deceptions cues activity (e.g., 6 of the 8 parts of the deception cues activity) this student was coded as attempting the activity. A student was also coded as attempting the thought-listing prompt if at least one thought was provided. If a student failed to complete the survey, but attempted the learning activities they were coded as "incomplete." Additionally, if a student fully completed the feedback survey, but failed to attempt the learning activities they were coded as "incomplete." Thus, the overall learning packet was coded as (0) for incomplete and (1) for fully complete to measure students' effort.

Effective Teaching Behaviors. To ensure that the quality of teaching was held constant between the two lecture conditions, we measured three effective instructor behaviors (i.e., humor, nonverbal immediacy, and clarity). We used the 3-item Instructor Humorousness Scale (Wanzer, Frymier, & Irwin, 2010) to assess students' perceptions of the instructor's overall humor. Sample items included: the instructor is "humorous," "not a funny instructor," and "one of the funniest instructors I know." We used a 4-item shortened version of the Revised Nonverbal Immediacy Measure (McCroskey, Richmond, Sallinen, Fayer, & Barraclough, 1995). The items included: the instructor "looked at the class while talking," "used a monotone/dull voice when talking to the class," "gestured while talking to the class," "moved around the classroom while teaching." We used Bolkan, Goodboy, and Kelsey's (2016) 5-item shortened version of the Teacher Clarity Short Inventory (Chesebro & McCroskey, 1998). Sample items included: the lesson today "made sense," "was easy to understand," "was clear," and "was easy to follow." Participant responses to these scales ranged from 1 (*strongly disagree*) to 5 (*strongly agree*).

Data analysis

To test all six hypotheses (see Figure 1), we used Mplus Version 8.0 (Muthén & Muthén, 2017) to specify mediation models with maximum likelihood estimation and listwise deletion for missing data. We conducted causal mediation analyses by estimating counterfactually defined causal direct and indirect effects (Muthén, Muthén, & Asparouhov, 2016). Causally defined effects based on counterfactuals have some advantages over classic regression-based approaches to testing mediation, including the flexibility to model binary outcomes when the outcome is common (VanderWeele, 2015). To test H1, which included a binary outcome that commonly occurred (i.e., 20.4% of student did not fully complete the learning packet; 79.6% fully completed it), we estimated a probit

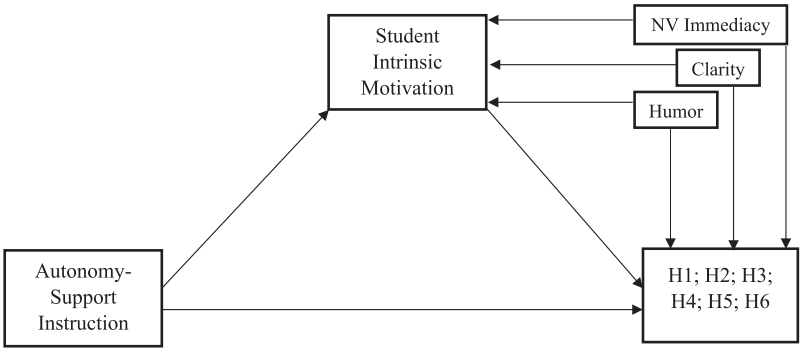

Figure 1. Conceptual mediation models for hypotheses.

Note: Autonomy-supportive instruction is indicator coded (0 = control, 1 = treatment) to reflect the mean difference between the two lecture conditions. H1 = learning activity completion. H2 = recall of concepts. H3 = attention. H4 = % on learning activity. H5 = participation. H6 = negative word-of-mouth. For H1, a probit link was required in the model for the binary outcome as a common occurrence. For H2–H6, continuous outcomes were modeled. See Table 2 for estimates.

model to create a continuous latent response variable and threshold parameter ($\tau = -1.174$). To test H2-H6, we used the counterfactual approach to causal mediation analysis with continuous outcomes (VanderWeele, 2015). For all models, 95% confidence intervals from 10,000 bootstrapped samples were calculated for the pure natural direct effect (PNDE) and total natural indirect effect (TNIE).

Results

Table 1 contains a correlation matrix of all the variables along with the mean, the standard deviation, and the Cronbach alpha reliability coefficient of each variable.

Manipulation check

To assess the manipulation of the teaching conditions and ascertain any possible differences in teaching effectiveness between conditions, we used the following measures to capture students' perceptions of the instructor offering choices and providing rationales during the lecture. First, we used modified versions of the choice and relevance subscale of the Teacher as Social Context Questionnaire—Student Report (Belmont et al., 1988). We also added 2 items from the Teacher Controllingness Scale (Jang et al., 2010) to create a 7-item choice scale, whereas the relevance scale was 5-items. Sample items include "I feel the instructor tried to control everything in the lesson" (Choice) and "This instructor encouraged me to find out how the material could be useful" (Relevance). Participant responses ranged from 1 (*strongly disagree*) to 5 (*strongly agree*). A Cronbach alpha of .84 was obtained for choice ($M = 3.46$, $SD = .77$) and .86 for relevance ($M = 3.50$, $SD = .88$). The manipulations for both autonomy-supportive behaviors were successful. The results of a Welch's *t*-test revealed that the lecture manipulations were successful for choice, $t(134.63) = -7.61$, $p < .001$, $d = 1.18$, $U_3 = 88.1\%$; and relevance, $t(120.11) = -7.26$, $p < .001$, $d = 1.14$, $U_3 = 87.29\%$. Students perceived significantly more choices ($M = 3.77$, $SD = .65$) and relevance provided ($M = 3.85$, $SD = .70$) in the high autonomy-

Table 1. Correlation Matrix.

Variables	*M*	*SD*	*α*	1	2	3	4	5	6	7	8	9
1. Autonomy-Support	–	–	–	–								
2. NVI	3.53	.73	.66	.07	–							
3. Clarity	3.82	.93	.93	.02	.48***	–						
4. Humor	2.20	.82	.83	.16*	.48***	.33***	–					
5. Intrinsic Motivation	3.43	1.32	.92	.26***	.45***	.60***	.55***	–				
6. Recall of Concepts	5.48	4.33	–	.18**	.00	.02	.04	.03	–			
7. Sustained Attention	3.89	1.41	.83	.05	.32***	.28***	.41***	.54***	.25**	–		
8. Activity Percent	74.47	20.10	.76	−.17*	−.12	.08	−.07	−.06	.21**	−.04	–	
9. Oral Participation	3.12	.83	.86	.06	.43***	.45***	.45***	.56***	.07	.47***	−.10	–
10. Negative WOM	2.34	1.04	.92	−.23**	−.48***	−.55***	−.51***	−.65***	−.14	−.52***	.04	−.60***

Note: *$p < .05$; **$p < .01$; ***$p < .001$.
WOM = Word-of-Mouth. Variables correlated with Autonomy-Support reflect Point–Biserial correlations.

supportive lecture; and less choice ($M = 2.97$, $SD = .70$) and relevance ($M = 2.95$, $SD = .87$) in the low autonomy-supportive lecture.

Second, to ensure that the quality of teaching was held constant between lecture conditions, we compared three effective instructor behaviors between the two conditions. Results from the MANOVA revealed no overall differences among instructor humor, nonverbal immediacy, and clarity, Wilks' $\Lambda = .97$, $F(3,183) = 1.69$, $p = .171$, suggesting that the quality of teaching was held constant in both sections. However, these teaching effectiveness variables (clarity, nonverbal immediacy, humor) were included as covariates in the models to ensure that above and beyond the instructors' humor, nonverbal immediacy, and clarity, autonomy-supportive instruction contributed to students' attention, learning, and hypothetical communication. That is, we included these three teaching effectiveness variables as covariates to control for mediator-outcome confounding. As VanderWeele (2015) noted, "if there are confounders of the mediator-outcome relationship for which control has not been made, then direct and indirect effect estimates will not have a causal interpretation; they will be biased" (p. 26). All models, then, are controlling for students' individual differences in perceptions of teaching effectiveness.

Hypothesis testing

Table 2 contains the parameter estimates for all hypotheses.

Hypothesis 1 predicted that autonomy-supportive instruction would increase students' intrinsic motivation, which in turn, would increase students' efforts toward completing the learning packet. Because completion of the learning packet was a binary categorical variable (0 = did not fully complete the learning packet, 1 = fully completed the learning packet) a probit model was estimated to generate effects that were considered differences in probabilities. Controlling for teaching effectiveness (i.e., clarity, nonverbal immediacy, and humor), there was no pure natural direct effect of autonomy-supportive instruction on learning activity completion (PNDE = .000; CI: −.176, .141), but as predicted, results indicated a total natural indirect effect of .038 (CI: .001, .110), indicating that students were more likely to complete the learning activity (odds ratio = 1.283; CI: 1.025, 1.885) after receiving autonomy-supportive instruction because they were more intrinsically motivated. Hypothesis 1 was supported.

Hypothesis 2 predicted that autonomy-supportive instruction would increase students' intrinsic motivation, which in turn, would increase students' effort to remember more concepts from the lecture. Controlling for teaching effectiveness, results revealed no pure natural direct effect of autonomy-supportive instruction on students' ability to remember concepts (PNDE = 1.082; CI: −.445, 2.637), and no total natural indirect effect (TNIE = .038; CI: −.214, .430) through their intrinsic motivation. Hypothesis 2 was not supported.

Hypothesis 3 predicted that autonomy-supportive instruction would increase students' intrinsic motivation, which in turn, would increase students' sustained attention. Controlling for teaching effectiveness, there was no pure natural direct effect of autonomy-supportive instruction on students' sustained attention (PNDE = −.230; CI: −.706, .212), but as predicted, results indicated a total natural indirect effect (TNIE = .192; CI: .009, .422); autonomy-supportive instruction increased students' sustained attention because they were more intrinsically motivated. Hypothesis 3 was supported.

Table 2. Unstandardized Model Estimates using Maximum Likelihood Estimation (H1–H6).

	Consequent					
H1						
	Intrinsic Motivation			Completion of Learning Packet		
Antecedent	Estimate	*SE*	*p*	Estimate	*SE*	*p*
Autonomy-Support	.414	.167	.013	$.002_p$	.292	.995
Intrinsic Motivation	–	–	–	$.358_p$	.154	.020
Clarity	.637	.093	<.001	$-.504_p$	.212	.018
Nonverbal Immediacy	.136	.133	.307	$.287_p$	.256	.263
Humor	.521	.108	<.001	$-.267_p$	.221	.227
H2						
	Intrinsic Motivation			Number of Concepts		
Antecedent	Estimate	*SE*	*p*	Estimate	*SE*	*p*
Autonomy-Support	.414	.167	.013	1.082	.793	.172
Intrinsic Motivation	–	–	–	.222	.349	.524
Clarity	.637	.093	<.001	−.340	.479	.478
Nonverbal Immediacy	.136	.133	.307	.020	.580	.972
Humor	.521	.108	<.001	−.404	.595	.497
H3						
	Intrinsic Motivation			Sustained Attention		
Antecedent	Estimate	*SE*	*p*	Estimate	*SE*	*p*
Autonomy-Support	.361	.173	.037	−.230	.234	.327
Intrinsic Motivation	–	–	–	.532	.120	<.001
Clarity	.634	.096	<.001	−.155	.165	.346
Nonverbal Immediacy	.139	.139	.227	.143	.202	.479
Humor	.539	.108	<.001	.200	.139	.150
H4						
	Intrinsic Motivation			Cognitive Learning		
Antecedent	Estimate	*SE*	*p*	Estimate	*SE*	*p*
Autonomy-Support	.358	.172	.037	−5.165	2.911	.076
Intrinsic Motivation	–	–	–	−1.082	1.670	.517
Clarity	.668	.098	<.001	3.996	2.900	.168
Nonverbal Immediacy	.093	.144	.518	−3.142	2.468	.203
Humor	.501	.114	<.001	−.566	1.937	.774
H5						
	Intrinsic Motivation			Oral Participation		
Antecedent	Estimate	*SE*	*p*	Estimate	*SE*	*p*
Autonomy-Support	.370	.167	.027	−.140	.129	.279
Intrinsic Motivation	–	–	–	.221	.062	<.001
Clarity	.632	.094	<.001	.105	.103	.307
Nonverbal Immediacy	.138	.139	.319	.149	.088	.092
Humor	.533	.108	<.001	.141	.086	.100
H6						
	Intrinsic Motivation			Negative Word-of-Mouth		
Antecedent	Estimate	*SE*	*p*	Estimate	*SE*	*p*
Autonomy-Support	.370	.167	.027	−.178	.142	.209
Intrinsic Motivation	–	–	–	−.280	.071	<.001
Clarity	.632	.094	<.001	−.220	.114	.053
Nonverbal Immediacy	.138	.139	.319	−.199	.107	.063
Humor	.533	.108	<.001	−.171	.101	.090

Notes: Although counterfactually defined causal effect models were run, all estimates can be interpreted as traditional regression slopes. Subscript p: probit model and estimates are not traditional slopes, as they are estimated probabilities for the change in log odds for each one unit change in the predictor, but are not simple functions of each slope (Muthén et al., 2016).

Hypothesis 4 predicted that autonomy-supportive instruction would increase students' intrinsic motivation, which in turn, would increase students' performance on a learning activity (i.e., true-false learning activity on deception cues). Controlling for teaching effectiveness, results revealed no pure natural direct effect of autonomy-supportive instruction on students' learning (PNDE = −5.165; CI: −10.963, .554), and no total natural indirect effect (TNIE = −.387; CI: −2.101, .810) through their intrinsic motivation. Hypothesis 4 was not supported.

Hypothesis 5 predicted that autonomy-supportive instruction would increase students' intrinsic motivation, which in turn, would increase their likelihood of participating in a future course with the instructor. Controlling for teaching effectiveness, results revealed no pure natural direct effect of autonomy-supportive instruction on students' oral participation (PNDE = −.140; CI: −.393, .117), but as predicted, results indicated a total natural indirect effect (TNIE = .082; CI: .007, .175); autonomy-supportive instruction increased students' likelihood of participating because they were more intrinsically motivated. Hypothesis 5 was supported.

Hypothesis 6 predicted that autonomy-supportive instruction would increase students' intrinsic motivation, which in turn would decrease their likelihood of engaging in negative word-of-mouth. Controlling for teaching effectiveness, results revealed no pure natural direct effect of autonomy-supportive instruction on students' negative word-of-mouth (PNDE = −.178; CI: −.455, .099), but as predicted, results indicated a total natural indirect effect (TNIE = −.103; CI: −.223, −.009); autonomy-supportive instruction decreased students' likelihood of negative word-of-mouth, because they were more intrinsically motivated. Hypothesis 6 was supported.

Discussion

Guided by SDT, this experiment examined autonomy-supportive instruction by offering college students meaningful choices in their learning and rationales during teaching, to examine effects on student effort, learning, attention, and hypothetical communication responses. Our findings revealed that, above and beyond typical effective teaching behaviors (i.e., clarity, nonverbal immediacy, and humor), autonomy-supportive instruction caused students to be more intrinsically motivated, which in turn, encouraged them to (a) fully complete a learning packet, (b) pay attention in class, and (c) participate in a future course, while discouraging them to (d) spread negative word-of-mouth about the instructor. However, our results did not find evidence for autonomy-supportive instruction increasing students' cognitive learning because of students' intrinsic motivation. To some degree, our results provided support for incorporating autonomy-supportive instruction in lectures.

Importance of student intrinsic motivation

Ultimately, the results revealed the importance of the internalization process outlined by SDT, which occurs on a continuum from amotivation to intrinsic motivation (Ryan & Deci, 2000). According to SDT, internalization is the process through which students integrate extrinsic motivators (e.g., graded activities, homework, exams, etc.) into their sense of self and align these tasks with their goals for personal growth (Ryan & Deci, 2017). Ryan

and Deci (2000) argued that intrinsic motivation is the most autonomous type of motivation and represents doing activities for the inherent purpose to grow and learn. In line with previous research (e.g., Deci et al., 1994; Reeve et al., 2002), our findings demonstrated that offering students choices over how the lecture unfolded and giving them rationales regarding the utility of the lecture material facilitated this internalization process (i.e., increased students' intrinsic motivation). Therefore it seems the autonomy-supportive style of teaching allows students to see the value of doing classroom activities based on the choices they made. This argument aligns with the decades of SDT research (see Ryan & Deci, 2017) demonstrating that students who experience more autonomous forms of motivation (i.e., intrinsic motivation) also experience higher quality learning. Moreover, our findings echo much of the autonomy-supportive literature revealing that this style of instruction not only fosters students' basic psychological needs and internalization, but also demonstrates to students their input is valued.

Additionally, our findings indicated that because the autonomy-supportive teaching style caused students to be more intrinsically motivated, these students were more engaged and intended to communicate in prosocial ways. This may be because as Ryan and Deci (2017) noted:

> results consistently show that the more fully internalized an extrinsic motivation, the greater the behavioral persistence in the absence of external controls, the higher the quality of performance, and the more positive the psychological experience and affective accompaniments of the behavior. (p. 208)

In other words, the more that external regulations are internalized to be congruent with students' sense of self, the more students will flourish in the classroom and do so for reasons that are innate to their internal growth. Thus, it is not surprising that this intrinsic motivation (i.e., interest/enjoyment) that students had toward the classroom activities curtailed their intentions to spread negative comments about the instructor and increased their likelihood of fully completing the learning packet, sustaining their attention, and being more willing to offer comments during future classes. As previous research has noted, (millennial) students want to be active learners (Wilson, 2004) and need to be involved in the learning process (Conklin, 2013). Thus, autonomy-supportive instruction seems to provide instructors with a style of teaching that creates a classroom climate that meets the needs of their current students.

In contrast to previous research (e.g., Black & Deci, 2000), the results did not reveal an indirect effect between autonomy-supportive instruction and students' learning and efforts to remember more concepts from the lecture. Admittedly, cognitive learning was measured with a true/false quiz and may not have provided as much variability as would a multiple choice quiz, and this type of measure may contribute to more student guessing (Burton, 2004). We chose to use a true/false quiz because it allowed us to disguise the quiz to students as a learning activity, instead of a test that aligned with the lecture. Another possible reason for autonomy-supportive instruction having no influence on learning is that students were informed that their performance on all the learning activities would in no way influence their course standing, which may have alerted students to the low-stakes nature of the true/false quiz. But, if we were to offer an extrinsic incentive (i.e., extra credit or bonus points) to motivate students to perform better on the learning activity or remember more concepts, we would be going against the theoretical claims

of SDT, because offering performance-contingent rewards significantly undermines free-choice intrinsic motivation (Deci, Koestner, & Ryan, 1999). This finding may also suggest that providing meaningful choices and rationales for students may not contribute to their learning or their ability to recall concepts from the lecture; however, the results of one study cannot make definitive claims, and thus future research is necessary.

Implications for teaching and learning

Importantly, our results provide instructors with practical implications regarding their teaching. As much as instructors would like to believe so, it is entirely possible that not all lectures are inherently interesting for students. Simply providing a meaningful rationale regarding the value and utility of the lecture material, and demonstrating to students that in-class activities are relevant and worth doing can promote internalization (Deci et al., 1994) and spark students' interest and self-determination (Reeve et al., 2002). To do so, instructors can frame class requests and activities in the context of self-development (intrinsic) rather than positive self-image (extrinsic); positively contributing to students' internalization of those requests (e.g., Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004).

In addition to meaningful rationales, this study suggests that instructors should offer their students meaningful choices in class in a structured manner, as a sort of "choose your own adventure" as long as the learning objectives are being met. Specifically, Katz and Assor (2007) suggested that offering students' choices relevant to their interests and goals, that are not too complex, and that align with their values, facilitates students' basic psychological needs for autonomy, competence, and relatedness, respectively. Likewise, our study demonstrated that simply allowing students to "choose their own adventure" facilitated more intrinsic motivation toward in-class activities, which in turn resulted in more student engagement, sustained attention, and prosocial communication.

This study has important implications for students' oral participation and negative word-of-mouth. First, one consistent finding in the oral participation literature is that class size significantly impacts students' amount of participation (Rocca, 2010). That is, larger classes tend to have significantly less participation than smaller classes (Fassinger, 1995, 2000). Our experiment took place in a class with approximately 100 students in each section and found that students reported that they would participate during future classes with the guest lecturer in the autonomy-supportive condition. Instructors in larger classes should consider this style of teaching to counteract the issue of class size hindering students' willingness to participate. Additionally, students' negative word-of-mouth can significantly hurt an instructor's evaluations and enrollment. Our study suggests that adopting an autonomy-supportive style of instruction can potentially safeguard against this type of communication and may even lead to positive word-of-mouth behavior among students.

Limitations and future research

Although this study contributes to the literature on autonomy-supportive instruction, it is not without its limitations. One primary limitation was the focus on manipulating two autonomy-supportive instructor behaviors together. That is, during the live-lecture

experiment the instructor allowed students to choose the direction of the lecture and provided the students with meaningful rationales. Thus, we cannot be sure which specific autonomy-supportive behavior (i.e., offering choices versus rationales) caused students to pay more attention and intend to communicate in prosocial ways. Instead, the findings revealed that these two autonomy-supportive behaviors together increased students' intrinsic motivation and subsequently their learning outcomes. Although past research (e.g., Deci et al., 1994; Katz & Assor, 2007) has suggested choice and rationales work in tandem, future research would benefit from examining these individual autonomy-supportive behaviors in isolation (e.g., Reeve et al., 2002). An additional limitation of this study was the use of an eight true/false question learning activity to capture students' cognitive learning. Future research would benefit from creating a quiz with more variability and questions that tap into different levels cognitive learning (e.g., Bolkan et al., 2017). Third, this live lecture experiment relied on students' reports of their hypothetical communication if the guest lecturer was going to be their regular instructor. Although this measurement does not capture students' actual communication behaviors, previous research (e.g., Babad, Bernieri, & Rosenthal, 1989; Goodboy & Myers, 2008; Ledbetter & Finn, 2018; Young, Kelsey, & Lancaster, 2011) has demonstrated that during brief interactions with an instructor students are able to make impressions of their instructor and predict what their communication outcomes will be like; these judgments in turn impact students' communication with the instructor. Moreover, our results revealed that even though students only had the guest lecturer for one 50-min class session they reported intentions to participate and avoid spreading negative comments. Thus, we can speculate that over the course of an entire semester with an instructor who uses an autonomy-supportive style of teaching will facilitate students' actual communication behaviors. Fourth, in order to remain ecologically valid, we conducted two live lectures during an actual college classroom. However, this live lecture was only during one 50-min class session and with a guest lecturer. Future research would benefit from employing a longitudinal design (e.g., Black & Deci, 2000) that takes advantage of an entire semester with learning assessments throughout.

Conclusion and contributions

Our study demonstrated that above and beyond typical effective teaching behaviors, autonomy-supportive instruction (i.e., meaningful choices and rationales) indirectly caused students to increase their amount of effort toward in-class activities, sustain their attention, be more willing to participate, and refrain from spreading negative comments. However, we did not find evidence that students recalled more information from the lecture as a result of this style of instruction. Yet, our findings suggest that this style of teaching (characterized as offering students meaningful choices and rationales) uniquely contributed to what students are doing inside and outside of the classroom.

To explain, instructional scholars have been devoted to examining the instructor behaviors that promote optimal student learning outcomes. For instance, we know that instructors who are clear (Titsworth, Mazer, Goodboy, Bolkan, & Myers, 2015), use appropriate and related humor (Wanzer et al., 2010), and are nonverbally immediate (Witt, Wheeless, & Allen, 2004) will benefit students in the classroom. What is less known is how instructors may use these strategies simultaneously and in an autonomy-supportive way. Rather

than focusing on a set of prescribed teaching strategies, Reeve (2006) argued that the autonomy-supportive style of teaching includes a set of beliefs and assumptions teachers have about their students' motivation that manifest in what teachers say and do in the classroom. Although this study did not provide evidence about student learning, the evidence for other positively oriented behaviors (e.g., effort, attention, participation) is promising.

Regarding the SDT literature, this study offers researchers who examine autonomy-supportive instruction an important consideration: when examining the determinants of students' type of motivation, basic psychological need fulfillment, and subsequent outcomes, scholars should consider and account for teaching effectiveness. For practitioners, the same consideration pertains, as well. Instructors may want to adopt a more autonomy-supportive style of instruction to meet the desires of millennial students, but identify external pressures and constraints that limit their ability to do so (e.g., the inherent power role teachers have and teachers confusing the controlling style with structure; Reeve, 2009). However, our results seem to suggest, that overall, the benefits of autonomy-supportive instruction outweigh the costs. Instructors in large lecture courses who want to motivate their students to learn and communicate in prosocial ways, might consider allowing students to choose how their lectures might unfold and understand why their choices are important.

Notes

1. To manipulate "choice," students in the experimental condition were given opportunities to guide the direction and content of the live lecture. The guest lecturer provided students several opportunities to pick one of two directions for how the lecture would unfold. For example, the first manipulation had the confederate instructor allow students to choose which species (i.e., sleeping sickness, angler fish, octopus, chimpanzee; they chose chimpanzee) to learn about for deception in nature. Second, the instructor offered students the choice to learn about either biases of deception or motives for deception (they selected motives). Third, students were able to choose which deception video to close the lecture with (either a video on nonverbal deception during an anxiety inducing interview or a video on clusters of deceptive nonverbal behaviors; they voted for the clusters video). Also, the instructor emphasized to students that they could complete the in-class activities using any method, and however they felt was necessary. In the control condition, students were not given choices over the lecture materials but received the same lecture information that students in the experimental condition were exposed to (i.e., chimpanzee, motives, and clusters video). Additionally, during the in-class activities, students in the control condition were instructed that there was only one correct answer and only one correct way to finish the activities. To manipulate "rationales," the experimental condition contained several comments by the instructor who emphasized the importance and value of the introductory interpersonal course and the topics of the lecture. For example, students in the experimental condition heard statements similar to the following:

   > The reason I chose to talk to you all about nonverbal deception today, is because this topic provides plenty of applicable and useful information for you. After today's lesson you should (a) be able to use various types of deception strategically and (b) recognize when someone is attempting to deceive you.

   Additionally, before having students complete the in-class activities, the instructor emphasized the value and importance of those activities. For example, students in the

experimental condition heard statements similar to the following before completing the in-class activities:

> The purpose of this activity is to allow you all the opportunity to apply this material into a real life situation. Imagine someone very close to you was going through a very tough time because they lost someone they loved, identifying the type of deception may allow you first recognize they are deceiving you, but also provide you the opportunity to choose the best way to help them.

In the control condition, the instructor refrained from providing rationales during the lecture and told students they *had* to complete the in-class activities if they wanted to learn (e.g., "Also, you have to complete this activity if you really want to learn the different types of deception").

2. This study measured students' NWOM to capture their intentions to complain about the guest lecturer. However, we recognize that the construct of NWOM shares conceptual and operational overlap with the construct of expressive dissent. Thus, these constructs may not be entirely different in that they measure students' intentions to share their dissatisfaction with others.
3. Lecture materials are available from the first author.
4. The deception cues learning activity was used as an indicator of students' lower levels of cognitive learning (see Anderson & Krathwohl, 2001), whereas students' responses to the thought-listing prompt were considered an indicator of their efforts to remember information from the lecture (i.e., a measure of effort).

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