Pursued for Their Prescription: Exposure to Compliance-Gaining Strategies Predicts Stimulant Diversion in Emerging Adults [post-print]

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Abstract

Researchers have begun to identify predictors of who will divert their stimulant prescriptions, as most emerging adults (EAs) who use prescription stimulants non-medically procure these drugs from a friend or acquaintance with a prescription. Far less research has examined how EAs with attention-deficit hyperactivity disorder (ADHD) are approached for these medications, and their affective and behavioral responses to these requests. We hypothesized that EAs with a stimulant prescription who reported greater exposure to compliance-gaining attempts from peers, particularly rational appeals for academic work, would be more likely to divert, as would EAs who reported lower resistance to peer influence (RPI). We recruited EAs diagnosed with ADHD (N = 149) through flyers, in-class presentations, campus-wide e-mails, and Psychology subject pools at two demographically dissimilar college campuses. As predicted, a logistic regression showed that greater exposure to compliance-gaining strategies, Greek involvement, Northeast college attendance, and less guilt and worry about diversion predicted diversion (n=53, 36%). Diverters were no less resistant to peer influence; however, a continuous measure assessing willingness to divert was inversely correlated with RPI. An ANOVA showed that rational appeals for academic work and guilt-inducing strategies for not complying with diversion requests were associated with the greatest likelihood of diversion. Further, negative affective responses (e.g., feeling manipulated, used) among students with a prescription following diversion were relatively common. Interventions to reduce diversion should inoculate EAs with ADHD against a range of compliance-gaining strategies and should help EAs who are experiencing dissonance about diversion to resist their peers’ requests more effectively.

**Keywords:** diversion; prescription stimulants; resistance to peer influence; ADHD; college students, compliance-gaining strategies
Pursued for Their Prescription:

Exposure to Compliance-Gaining Strategies Predicts Stimulant Diversion in Emerging Adults

Non-medical prescription stimulant use (NMPSU), which involves using stimulant drugs such as Adderall®, Ritalin®, or Vyvanse® without a prescription, has become increasingly common on college campuses over the last decade, with some studies reporting prevalence rates as high as 34-35% (DeSantis, Webb, & Noar, 2008; Looby, Beyer, Zimmerman, 2015; Low & Gendaszek, 2002). Of concern is the fact that students who engage in NMPSU are at greater risk for physical and psychological problems, academic difficulties, and other illicit substance use (see Schultz, Silvestri, & Correia, in press, for a review). Although prescription stimulants often are regarded as “smart pills” (Partridge, Bell, Lucke, Yeates, & Hall, 2011), a recent longitudinal study showed that students who engaged in NMPSU did not have higher grade point averages compared to those who abstained (Arria et al., 2017), suggesting that the risks posed by NMPSU outweigh the perceived benefits.

It is notable that most students who engage in NMPSU report obtaining these drugs from a friend, peer, or acquaintance with a legitimate prescription (Aikens, 2011; Bavarian, Flay, Ketcham, & Smith, 2013a; DeSantis et al., 2008; DeSantis, Noar, & Webb, 2010; deSouza, Peterson, & Brakke, 2015; Garnier-Dykstra et al., 2012; McCabe, Teter, & Boyd, 2006; Vreeco, 2015). Indeed, studies of college students who have prescriptions for stimulant medication have shown that half or nearly half of students engaged in lifetime diversion (i.e., selling or giving away medication) (DeSantis, Anthony, & Cohen, 2013; Gallucci et al. 2015; Jardin et al. 2011; Schultz et al., in press). Further, a large-scale study by McCabe, West, Teter, and Boyd (2014) showed that between 2003-2013, there was a significant increase in prescriptions for stimulants, which paralleled increases in NMPSU reported by college students, and the frequency with
which students were approached to divert their stimulant medication. Taken together, these findings suggest that a better understanding of diversion and how to prevent its occurrence is critical to preventing NMPSU and its negative sequelae.

Surprisingly, in spite of the prevalence of stimulant diversion, few studies have explored the dynamics of student-to-student interactions and how they are related to diversion, which is concerning given that stimulant diversion may lead students with a prescription to go without a needed medication. A review of the literature on ADHD in college students suggests symptoms of the disorder can significantly impair academic performance and daily functioning, and pharmacological treatments are one key method of mitigating challenges faced by these students in the college environment (Nugent & Smart, 2014). Further, stimulant diversion is estimated to cost private insurers 83-204 million USD annually (Aldridge et al., 2011), and the nonmedical use of these drugs ultimately may make it more challenging for providers to prescribe stimulants for legitimate reasons (Arria & Dupont, 2010). Additionally, recipients of diverted medication are at risk for adverse physical and psychological effects of non-medical use, of which the most severe include cardiovascular problems and psychotic-like symptoms (National Institute on Drug Abuse, 2011).

To address this gap in the literature, we recruited EAs with ADHD from two demographically dissimilar colleges in different regions of the US (i.e., northeastern, southwestern) to examine the ways in which they were approached for their stimulant medications, whether some approaches were more persuasive than others, whether certain characteristics of EAs (e.g., lower resistance to peer influence) were associated with a greater likelihood of being approached and/or diverting, and the extent to which EAs experienced negative affect (e.g., feel used) after diverting their medication. To understand how EAs were
being approached for their medication, we drew on the theoretical framework of *compliance-gaining*, which examines how people attempt to persuade others to perform a desired behavior (Checton & Greene, 2010; Wilson, 2015). Critically, this information may inform the development of effective diversion prevention strategies for students with prescriptions (Checton & Greene, 2010).

**Background**

A primary goal of compliance-gaining is to obtain material resources, such as prescription stimulants, from another person. A secondary goal, though, relates to *how* one makes a request (Clark, 1993). That is, to maintain a valued relationship and to act consistently with one’s beliefs and values, one must deliver his/her request for stimulants in a way that reduces the potential for discord in a relationship (deSouza et al., 2015). Several studies have shown that students who seek stimulants for non-medical purposes refrain from making direct requests; instead, they engage in “scrounging practices,” which are actions “directed towards individuals known to have supplies that might be shared, and performed in hopes of yielding an offer of medication” (Vrecko, 2015, p. 299). Students elicited offers from friends with prescriptions, who had previously offered them a pill or two as a “gift,” without the student initially expecting or expressing interest. After this initial exchange, students looked for ways in which they might be able to precipitate this situation again. Students also described “emphasizing stresses or worries about difficult workloads” in hopes of motivating friends to offer them stimulant medication as a study aid (Vrecko, 2015, p. 300). This strategy may be particularly effective, since many students who give away their prescription stimulants report doing so to help a friend under academic stress (Gallucci et al., 2015). Students seeking medication even noted the importance of maintaining or deepening friendships with students
who had a prescription so that requests for medication seemed more socially acceptable (deSouza et al., 2015). Together, these findings suggest that students without prescriptions who are seeking prescription stimulants are more likely to make indirect, rather than direct, requests for their peers’ medication. Further, given that some students may be friendly with students who have prescriptions largely to obtain their medication, it is plausible that students who divert are left feeling taken advantage of, or manipulated for their medication.

Checton and Greene (2010) evaluated the applicability of a compliance-gaining framework to prescription stimulant diversion by examining which compliance-gaining strategies college students would employ if they were seeking stimulant medication. In response to hypothetical scenarios, students reported being most likely to use rationality, whereby an individual explains to the target of their persuasive attempt the reasons they need the target to comply with the request (e.g., “I need the substance to pull an all-nighter for an exam tomorrow”), which is consistent with Vrecko’s (2015) findings. After rationality, students were most likely to use the promise strategy, which involved promising a friend they would return the favor in the future. Consistent with Vrecko (2015) and deSouza et al.’s (2015) qualitative findings, students were less likely to make direct requests. However, Checton and Greene (2010) did not ask students with prescriptions which compliance-gaining strategies they were exposed to, nor did they examine how students would respond to these strategies.

Research also has not explored whether psychosocial variables, such as resistance to peer influence (RPI), and anticipated consequences of diversion, are associated with risk of diversion. The literature on drug abuse has identified social resistance skills training as one key component of prevention, whereby adolescents are taught how they might be pressured to use substances by their peers and how they can resist without compromising their social relationships (Dusenbury
& Falco, 1995). Although we focused on diversion and the social contexts in which it occurred, it is plausible that EAs who are perceived to have lower RPI may be approached more often and/or may be more likely to divert. From a developmental standpoint, adolescents’ RPI increases as they transition into emerging adulthood; however, longitudinal research suggests that a subset of adolescents and EAs do not develop these resistance skills as readily and thus, are at increased risk of delinquent behavior when their peer group is engaged in such behavior (Monahan, Steinberg, & Cauffman, 2009). It also is plausible that anticipated guilt about diversion and concerns about getting caught may serve as protective factors. Higher anticipated guilt about rule-breaking in adolescence was associated with lower risk of drug use in EAs (Brook, Whiteman, Cohen, Shapiro, & Balka, 1995) and higher perceived risk of NMPSU was associated with lower rates of use in a sample of college students (Arria, Caldeira, Vincent, O’Grady, & Wish, 2008).

The Current Study

In the current study, we first sought to replicate previous predictors of prescription stimulant diversion, namely male gender, Greek-life involvement, identifying as Caucasian (see Harstad & Levy, 2014 for a review), misuse of one’s own prescription (DeSantis et al., 2013; Rabiner et al., 2009; Sepulveda et al., 2011), and greater perceived prevalence of NMPSU on campus (DeSantis et al., 2013). We hypothesized that several variables, not yet reported on in the literature, also would emerge as predictors of diversion. Specifically, we expected that diversion would be more prevalent at the private northeastern site compared to the public southwestern university based on the findings that NMPSU was more prevalent in competitive northeastern US colleges (McCabe, Knight, Teter, & Wechsler, 2005) and among students with higher family incomes (Teter, McCabe, Boyd, & Guthrie, 2003). Given that NMPSU was nearly twice as
common in the peer groups of those who diverted (Desantis et al., 2013), we also expected that higher RPI would serve as a protective factor against being approached and diverting. Finally, we hypothesized that greater anticipated guilt about diversion and worry about being caught also would be associated with lower rates of diversion.

With respect to compliance-gaining strategies, we hypothesized that diverters would report significantly more exposure to, and willingness to divert in response to the compliance-gaining strategies. Based on the findings of Checton and Greene (2010) we expected that students would be most likely to be exposed to rational appeals for academic work and that they would be most likely to divert in response to this strategy. We anticipated that participants would report feeling manipulated and/or used following diversion, although due to a lack of previous research, we did not speculate about the pervasiveness of these reactions.

**Method**

**Participants and Procedure**

Participants were recruited from two college campuses in the northeastern and southwestern United States. The northeastern campus was a small, private, liberal arts college (64% Caucasian; 52% male; 91% reside on campus). The southwestern campus was a large, ethnically diverse public university (48% Caucasian; 42% male; 20% reside on campus). The study was approved by the Institutional Review Boards at both institutions. To be eligible, participants had to be 18 years or older and have a self-reported diagnosis of ADHD for which they had been prescribed stimulant medication at some point in college. Prescriptions for Adderall® were endorsed most frequently (43%), followed by Vyvanse® (38%) and Adderall XR® (20%) (participants could endorse multiple stimulant drugs). Although some students (n=23; 15%) reported not having a prescription in the previous year, we retained these students
in the current study since recent research showed that nearly a third of college students had leftover prescription medication, and a third of those with medication either still had the medication or gave it to a friend or family member (Vatovec, VanWogoner, & Evans, 2017).

Students were recruited through in-class presentations, e-mail messages, and flyers. After consenting, 149 students (64% female, 78% Caucasian, \( M_{\text{age}} = 19.91, SD = 2.47 \)) completed a web-based survey. There were slightly more participants from the southwestern campus \( (n=82, 55\%) \) compared to the northeastern campus \( (n=67, 45\%) \), likely due to the larger student body at the southwestern site. Participants received course credit, extra credit, or were entered in a drawing for a $50 gift card to an online merchant if they were not eligible for credit.

Table 1 displays demographic information on the overall sample, as well as by institution. At the northeast site, there was a greater percentage of males, upperclassmen, participants whose fathers had more education, and participants who misused their prescription stimulant medication. We compared characteristics of our sample with those of the student bodies at each institution and found that at the southwestern site, study participants were more likely to be female and white, compared to the general population of students at this site. At the northeast site, the distribution of gender and race/ethnicity in the sample was similar to the demographics of the larger student body. Further, our combined sample was nearly identical to a sample of college students with ADHD and a stimulant prescription described previously in the literature (Advokat, Lane, & Luo, 2011) with respect to gender, race/ethnicity, and Greek-life involvement, although our participants were, on average, one year younger than those in Advokat et al.’s (2011) study.

Measures

Demographics, prescription history, and medical misuse. Participants responded to
questions about demographic characteristics (e.g., class year, parents’ educational background). Prescription status was assessed with items modified from previous questionnaires (Gallucci et al., 2014; Sepulveda et al., 2011) inquiring about the participant’s prescription history (e.g., medications prescribed, age of first prescription). Participants indicated with a yes or no response whether they had ever been approached for their medication in college (Schultz et al., in press), and whether they had engaged in medical misuse, which was defined as taking one’s prescription stimulant in excess or for reasons other than the medication was prescribed, in the past year (Rabiner et al., 2009).

**ADHD symptom severity.** Symptoms were assessed using the Adult ADHD Self-Report Scale Symptom Checklist (ASRS-v1.1) (Adler et al., 2006). This measure has been previously validated for use with college students with ADHD (Gray, Woltering, Mawjee, & Tannock, 2014). Participants rated themselves using a 5-point scale (0=never, 4=very often) for 17 items regarding how they conducted themselves over the past 6 months (e.g., “How often do you have problems remembering appointments or obligations?”). The 17 items (α=.88) were averaged so that higher scores denoted greater symptomatology.

**Exposure and responses to compliance-gaining strategies.** We presented five compliance-gaining scenarios designed by Checton and Greene (2010) to measure how often students with a prescription were exposed to compliance-gaining strategies and how they would expect to respond. Each hypothetical situation was introduced by: “Imagine a student (friend, classmate, or friend of a friend) has approached you.” Then, one of five statements followed: (1) “They tell you they have two exams the following day and have to have to pull an all-nighter to finish studying. They tell you it would be great if you could give or sell them some of your medication to help them stay awake” (rational-academic), (2) “The person who has approached
you tells you they want to go out and party later, but they're exhausted from being in class all
day. They tell you it would be great if you could give or sell them some of your medication to
help them stay awake” (rational-recreational), (3) “They tell you how, if you give or sell them
some of your medication, they promise to return the favor in the future” (promise), (4)
“Immediately, they ask ”Can I have some of your medication?” (direct request), and (5) “They
tell you they can't find anyone on campus with extra study drugs and you're their last hope. They
ask if you'll give or sell them some of your medication, because there's no way they'll finish all
their assignments on time without them” (negative feelings). Following each scenario,
participants responded to the following questions using a 5-point scale (1=definitely not,
5=definitely yes): (a) I have experienced a situation like this one, and (b) In this situation, I
would give or sell the person my medication.

**Strategy exposure.** To obtain an overall exposure score, we averaged participants’
responses to the first question (i.e., I have experienced a situation like this one) across the five
compliance-gaining scenarios. The five items were significantly correlated ($r_s = .56-.81$, all $p < .001$) and the internal consistency reliability for this scale was excellent ($\alpha=.91$). We also
examined the five exposure items separately in an ANOVA (described below) to determine if
diversers were more likely to be exposed to some, or all situations compared to non-diversers.

**Willingness to divert.** We created an overall willingness to divert score by averaging
participants’ responses to the second question (i.e., I would give or sell my medication) across
the five scenarios. The five items were significantly correlated ($r_s=.57-.74$, all $p < .001$) and the
internal consistency reliability for this scale was excellent ($\alpha=.90$). We also examined the five
willingness to divert items separately in an ANOVA (described below) to determine if diversers
were more likely to divert across some, or all situations compared to non-diversers.
**Diversion and its consequences.** To assess diversion, we used two questions adapted from Gallucci et al. (2015): “In the past 12 months, have you given away your prescribed ADHD medication for free (or sold your medication)?” Participants who answered “yes” to either question rated three statements designed for the current study on a 5-point scale (1=strongly disagree, 5=strongly agree) about the (a) extent to which they felt manipulated into diverting their ADHD medication, (b) felt used, and (c) whether they ran out of their medication early because they diverted. The first two items were averaged to create a diversion-related negative affect score ($r = .87, p < .001$).

Three items, designed for the current study, inquired about participants’ concerns around diversion and used a 5-point Likert response scale (1=strongly disagree, 5=strongly agree). The first two items assessed the extent to which participants’ would feel guilty for diverting their stimulant medication to someone for a) academic reasons, or for b) recreational reasons. These items were averaged to produce an index of anticipated diversion-related guilt ($r = .73, p < .001$). The third item inquired about the extent to which participants would be concerned about being caught if they diverted.

**Resistance to peer influence.** Participants responded to 10 pairs of statements from the Resistance to Peer Influence (RPI) Scale (Steinberg & Monahan, 2007), indicating which of the two statements best described them. To illustrate, for one item, a participant would be offered the choice “Some people hide their true opinion from their friends if they think their friends will make fun of them because of it BUT Other people will say their true opinion in front of their friends, even if they know their friends will make fun of them because of it”. The participant would either select the statement before the capitalized “BUT” or the statement after it as being

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$^1$Twelve participants did not respond to these three questions due to an initial error in the survey’s skip pattern.
more representative of his/her thoughts or behaviors. Following the selection, participants rated the chosen statement on a 2-point scale (1=sort of true for me, 2=really true for me) describing the degree to which it was true of them. To facilitate interpretation, we recoded the responses into a 4-point scale, such that 1=really true for me and 2=sort of true for me for statements indicative of less resistance to peer influence (e.g., “Some people hide their true opinion from their friends if they think their friends will make fun of them because of it”) and 3=sort of true for me and 4= really true for me for statements indicative of more resistance to peer influence (e.g., “Other people will say their true opinion in front of their friends, even if they know their friends will make fun of them because of it”). Thus, for the item above, four points would be scored if the participant selected the second statement and rated it as being “really true of me”. Three of the ten items were reverse scored so that higher mean scores denoted greater RPI. Reliability was fair (α=.73).

Perceived prevalence of NMPSU. Participants indicated the percentage (0-100) of students on their campus that they believed engaged in NMPSU, in addition to the percentage of students at other colleges (Bavarian Flay, Ketcham, & Smith, 2013b).²

Data Analysis

To assess which of our study variables predicted membership in the diversion group, we employed a multiple logistic regression model. We first examined residual statistics in order to identify outliers (Field, 2013). One case had a standardized residual >3, but the case was retained because one outlier was within an acceptable range for a sample of our size and its removal did not affect the interpretation of the results. No tolerance values were <.10 and no VIF values were

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²Twelve participants did not respond to the perceived prevalence of NMPSU questions. Since excluding the perceived campus norms variable ultimately did not change which variables were significant in the logistic regression, we retained this variable in the analysis so as to explain the greatest amount of variance in diversion.
EXPOSURE TO COMPLIANCE-GAINING STRATEGIES

>10, suggesting that multicollinearity was not a concern (Field, 2013). We also examined the chi-square value associated with the Hosmer and Lemeshow test to ensure adequate model fit. We tested the following predictors: gender, class year, type of high school attended, Greek involvement, medical misuse, site, guilt about diversion, worry about being caught, perceived campus norms for NMPSU, and overall exposure to compliance-gaining strategies. Three participants who endorsed attending a high school other than private or public (e.g., homeschool) were excluded from this analysis because they did not constitute a sufficiently large subgroup. We considered including race/ethnicity, ADHD symptom severity, perceived norms for NMPSU for students at other colleges, and RPI in the multiple logistic regression model, but since preliminary simple logistic regressions showed that these variables did not meet the criterion suggested by Hosmer, Lemeshow, and Sturdivant (2013) \((p < .25)\), they were not included in the final model. In exploratory analyses, we examined whether RPI was correlated with willingness to divert, since this continuous outcome captured behavioral intentions regarding diversion. And, for diverters only, we correlated RPI with diversion-related negative affect to determine whether lower resistance was associated with feeling manipulated or used following diversion.

To examine whether exposure to the five compliance-gaining strategies and willingness to divert in response to the five strategies differed by diversion group, we conducted two separate 2 (Group: Diverter/Non-Diverter) X 5 (Strategy type: Rational-academic/Rational-recreational/Direct request/Negative feelings/Promise) between-within subjects analyses of variance (ANOVA): one for exposure and one for willingness to divert. In cases where the assumption of sphericity was not met, we reported \(p\)-values associated with the Huynh-Feldt estimate (Field, 2013). We used simple contrasts in IBM SPSS Statistics v24 to assess whether exposure and willingness to divert differed by strategy type, respectively. Specifically, we
compared the first type of strategy (i.e., rational-academic strategy) to each of the four other strategies (e.g., direct request). Rather than examine all possible strategy combinations, we chose the rational-academic strategy as the reference group, both to limit our number of comparisons and because this strategy was endorsed most often in previous research on how students would procure prescription stimulants for non-medical use (Checton & Greene, 2010).

Finally, to assess for potential site differences, we employed chi-square tests for categorical variables (e.g., gender, Greek membership) and a t-tests for the continuous variables (e.g., ADHD symptom severity).

**Results**

**Prevalence and Predictors of Diversion**

Over one-third of our sample ($n = 53; 36\%$) endorsed diverting their medication in the previous year and 58% reported being approached in college. The logistic regression model predicting diversion ($0=\text{no}, 1=\text{yes}$) with the aforementioned predictors was significant ($\chi^2 = 87.502, df = 12, p < .001$). The overall accuracy of classification into diversion group was 87.1% and the Nagelkerke $R^2$ value estimated that 66.6% of the variance could be accounted for by the predictors. Consistent with our hypotheses, students who diverted were more likely to endorse Greek organization membership (Odds Ratio ($OR$) = 8.50; 95% Confidence intervals (CIs) [1.879, 38.817]), northeast college attendance ($OR = .079$, CIs [.014, .431]), greater exposure to compliance-gaining strategies ($OR = 1.888$, CIs [1.132, 3.148]), fewer concerns about being caught ($OR = .482$, CIs [.298, .780]), and less anticipated guilt about diversion ($OR = .453$, CIs [.260, .790]). Private high school attendance emerged as an additional predictor of diversion ($OR = 6.377$, CIs [1.089, 37.341]) (Table 2). Contrary to our hypotheses, being male, Caucasian, misusing one’s own medication, and perceiving more NMPSU among one’s peers at college did
not predict diversion. Also contrary to our hypothesis, RPI was not associated with a greater likelihood of being approached or diverting one’s medication. There was an inverse association between RPI and willingness to divert across the composite measure of the five compliance-gaining items \((r = -.21, p = .01)\). There also was an inverse correlation between RPI and diversion-related negative affect (i.e., feeling manipulated or used) \((r = -.31, p = .05)\).

**Exposure and Responses to Compliance-Gaining Strategies**

The first ANOVA predicting frequency of exposure to the compliance-gaining strategies showed a main effect of group. As hypothesized, diverters reported greater overall exposure \([\text{Estimated marginal mean (EMM)}=3.74, SE=.17]\) than non-diverters \([\text{EMM}=2.29, SE=.13; F (1, 146) = 46.53, p < .001, \eta^2_p = 0.24]\). There also was a main effect of strategy type on strategy exposure, \(F (4, 584) = 24.33, p < .001, \eta^2_p = 0.14\), but no interaction effect. Contrasts comparing exposure to the rational-academic strategy to the four other strategies showed that, overall, participants were exposed to the rational-academic strategy \((\text{EMM}=3.70, SE=.12)\) more often than to the rational-recreational strategy \([\text{EMM}=2.90, SE=.13; F (1, 146) = 50.05, p < .001, \eta^2_p = 0.26]\), the direct request strategy \([\text{EMM}=2.97, SE=.14; F (1, 146) = 32.29, p < .001, \eta^2_p = 0.18]\), the negative feelings strategy \([\text{EMM}=2.86, SE=.13; F (1, 146) = 54.38, p < .001, \eta^2_p = 0.27]\), and the promise strategy \([\text{EMM}=2.63, SE=.13; F (1, 146) = 83.16, p < .001, \eta^2_p = 0.36]\). Figure 1 depicts the estimated marginal means and standard errors for both groups by exposure to strategy type.

A second ANOVA predicting willingness to divert showed that there was a main effect of group. As hypothesized, diverters reported a greater overall willingness to divert in response to the compliance-gaining strategies \((\text{EMM}=2.80, SE=.10)\) compared to non-diverters \([\text{EMM}=1.58, SE=.08; F (1, 146) = 87.00, p < .001, \eta^2_p = 0.37]\). There also was a main effect of strategy type on...
willingness to divert, $F(4, 584) = 46.44, p < .001, \eta_p^2 = 0.24$. Contrasts showed that participants were most likely to divert in response to the rational-academic strategy ($EMM=2.67, SE=.09$), which was consistent with our hypothesis. However, participants reported a similar willingness to divert in response to the negative feelings strategy [$EMM=2.52, SE=.10; F(1, 146) = 2.73, p = .10$]. Compared to the rational-academic strategy, willingness to divert was lower in response to the three other strategies: rational-recreational [$EMM=1.82, SE=.07; F(1, 146) = 106.85, p < .001, \eta_p^2 = 0.42$]; direct request [$EMM=1.82, SE=.07; F(1, 146) = 100.32, p < .001, \eta_p^2 = 0.41$], and promise [$EMM=2.12, SE=.08; F(1, 146) = 44.82, p < .001, \eta_p^2 = 0.24$].

Further, there was an interaction between group and strategy type $F(4, 584) = 5.78, p < .001, \eta_p^2 = 0.04$ on willingness to divert, so contrasts between the strategy types also were examined in the context of the interaction. These contrasts allowed us to determine whether diverters and non-diverters endorsed a similar willingness to divert in response to the rational-academic strategy versus each of the four other strategies. Compared to non-diverters, the difference in willingness to divert was larger for diverters in all of the contrasts [rational-academic vs. rational-recreational: $F(1, 146) = 8.61, p = .004, \eta_p^2 = 0.06$; rational-academic vs. direct request: $F(1, 146) = 15.64, p < .001, \eta_p^2 = 0.10$; rational-academic vs. promise: $F(1, 146) = 4.26, p = .041, \eta_p^2 = 0.03$] with one exception. The magnitude of the difference in willingness to divert did not differ between diverters and non-diverters when the rational-academic and negative feelings strategies were compared: $F(1, 146) = 0.22, p = .64$. So, although diverters were more likely to divert in response to the rational-academic and negative feelings strategies, neither group made a distinction between rational-academic and negative feelings when their respective willingness levels were considered; both groups were more likely to divert in these situations compared to the other three situations. Figure 2 depicts the estimated marginal means and
standard errors for willingness to divert by strategy type and group.

**Negative Consequences of Diversion**

Among students who diverted, 39% agreed “somewhat” or “strongly” that they felt manipulated after diverting their medication and a similar percentage (34%) reported feeling used. Further, nearly a quarter of the sample (24%) agreed “somewhat” or “strongly” that they ran out of their medication because they diverted it.

**Discussion**

The current study adds to the literature by highlighting additional predictors of diversion and characterizing how students with ADHD are approached for their medication, how they respond, and their subjective reactions to diversion. Our rate of diversion was similar to other researchers, most notably Sepulveda et al. (2011), who reported an identical rate of 36%. Similar to Harstad and Levy (2014), we found that Greek-life involvement was a predictor of diversion. However, we did not find support for other predictors identified in the literature, namely male gender (Harstad & Levy, 2014), identifying as Caucasian, misuse of one’s own prescription (DeSantis 2013; Rabiner et al., 2009; Sepulveda et al. 2011), and greater perceived prevalence of NMPSU on campus (DeSantis et al., 2013). Instead, our study pointed to different predictors not yet examined in the literature, namely private high school attendance, attendance at a northeast college, exposure to compliance-gaining strategies, less anticipated guilt about diversion, and fewer concerns about being caught. It is possible that factors such as demographic characteristics become less influential in predicting diversion when interpersonal dynamics (e.g., exposure to compliance-gaining strategies) and subjective evaluations about diversion (e.g., anticipated guilt) are examined concurrently with these other predictors.

Although our prediction that resistance to peer influence (RPI) would be lower among
those who diverted (or were approached for) their medication was not supported, our findings suggested that RPI still might influence diversion risk. Specifically, students with lower RPI reported a greater willingness to divert across the five compliance-gaining scenarios. Because our composite measure assessed willingness quantitatively, it likely captured more nuanced attitudes and behavioral intentions around diversion compared to the dichotomous measure of diversion. With 40% of our sample consisting of first-year students, it may be especially important to focus on the association between RPI and attitudinal precursors to diversion, since younger students may have had fewer opportunities to divert. An important next step will be to examine RPI and diversion prospectively to determine if lower RPI sets the stage for later diversion. Finally, our finding that lower RPI correlated with greater negative affect following diversion suggests that RPI may be implicated in interpersonal difficulties that can emerge post-diversion. If longitudinal research shows that students with lower RPI are at greater risk for diverting, resistance skills could be targeted as part of a preventive intervention. At a minimum, enhancing students’ resistance skills may help them to respond to peers’ requests more assertively so that they feel less victimized.

In this study, we also demonstrated that anticipated guilt about diversion and concern about being caught were significant predictors of diversion, even after controlling for factors that have been shown to predict diversion in previous research, such as medical misuse and gender. These findings suggest that perceived concerns about diversion may function in the same way that lower guilt about substance use in adolescence predicted more frequent substance use in emerging adulthood (Brook et al., 1995) and lower perceived risk of NMPSU predicted higher NMPSU in EAs (Arria et al., 2008). Our findings point to several avenues for interventions with students who have stimulant prescriptions. First, although it does not seem practical to increase
students’ feelings of guilt about diversion, it could be beneficial for students with prescriptions to engage in a decisional balance-type exercise, a strategy used in motivational interviewing, whereby they explore specific reasons they would feel guilty for diverting (e.g., concern about an adverse event in a friend) and the personal significance behind those reasons (Miller & Rollnick, 2013). LaBrie, Pedersen, Earleywine, and Olsen (2006) used a similar approach with college students and found a significant decline in risky drinking following engagement in a decisional balance exercise. Having students articulate specific and personal reasons not to divert may make those reasons more durable, which could better inoculate students against compliance-gaining strategies in the future. Similarly, having students elaborate on their concerns about being caught, especially concerns they might have about parents’ or prescribers’ reactions to this behavior, also might help to connect them to any dissonance they feel about diversion. Identifying personal reasons not to divert also might help students with prescriptions to formulate specific responses they could share with students who approach them for their medication.

Our finding that diverters were exposed to the compliance-gaining strategies more often than non-diverters suggests that diverters’ peer groups significantly influence diversion risk. As noted by DeSantis et al. (2013), students whose peers engage in NMPSU will be approached more often, and navigating a larger number of requests in the face of relational obligation places these students at greater risk for diversion. While diverters likely overestimated the prevalence of NMPSU among peers at their college (students at both sites reported mean prevalence rates of 50%), our finding that diverters were exposed to compliance-gaining strategies more often suggests that NMPSU likely is more common among diverters’ friends. And, although it may be beneficial for interventions to correct overestimations of peers’ NMPSU (Schultz et al., in press;
EXPOSURE TO COMPLIANCE-GAINING STRATEGIES

Silvestri & Correia, 2016), a comprehensive intervention also should provide students with specific strategies they can employ when faced with requests (Gallucci et al., 2015).

With respect to exposure and responses to specific compliance-gaining strategies, our findings were consistent with those of Checton and Greene (2010), who found that rational appeals for academic work were the strategy of choice for students requesting their peers’ medication. Given that students with prescriptions are most often approached for this reason, it may be beneficial to inform them that prescription stimulants did not markedly improve cognitive functioning among students without ADHD (Illevia, Boland, & Farah, 2013), and that NMPSU was not associated with improvements in grades (Arria et al., 2017); therefore, students with prescriptions likely are not helping their peers in the way they expect. Our findings also diverged from Checton and Greene (2010); their participants reported promising something in return as the next most common strategy they would employ. When our participants reflected on actual experiences of being approached, there were no differences in exposure to the four remaining strategies (e.g., promise). Because Checton and Greene utilized hypothetical vignettes with students who largely did not have prescriptions, it might have been easier for their participants to imagine returning the favor because they lacked direct experience navigating this type of situation. Or, college students on different campuses might employ compliance-gaining strategies with different frequencies.

It was notable that in our study, both rational appeals for academic work and negative feelings were associated with the greatest likelihood of diversion in both diverters and non-diverters. Despite endorsing less exposure to the negative feelings strategy (compared to rational-academic appeals), the negative feelings strategy appears equally difficult to resist. If these findings were replicated, it would be advisable for interventions to also focus on how
students with prescriptions can effectively navigate situations where requesters induce guilt for noncompliance.

The higher prevalence of diversion at the northeastern site was expected given that several risk factors for diversion reported in the literature (e.g., medical misuse) were more prevalent there. The northeastern site also evidenced more risk factors for NMPSU, including more competitive admissions standards, higher family income, and a greater percentage of male participants. In more competitive academic environments, there may be more academic pressure, increasing the likelihood that students will approach peers with prescriptions for medication. Further, since youth with higher incomes may be more likely to receive consistent pharmacological treatment for ADHD (Froehlich et al., 2007), college students with higher incomes may fill their prescriptions more regularly, potentially resulting in surplus medication. Also, on smaller residential campuses, it may be easier for peers to become aware of a fellow student’s prescription through word-of-mouth, and/or because of on-campus communal living arrangements.

**Limitations and Future Directions**

Although recruiting from two sites increased the size and diversity of our sample, it is unclear whether our results would generalize to EAs with ADHD and prescription stimulants at our respective institutions, those attending other colleges, and/or to those who are not attending college. The cross-sectional nature of our study precluded us from determining whether diverters’ permissive attitudes (e.g., lack of concern about being caught) preceded their decision to divert or, alternatively, changed following their decision to divert. A better understanding of the temporal relations between students’ attitudes and behaviors is critical to inform the development of interventions. Given our modest sample size, it was not possible to determine
whether students who only gave away, only sold, or gave away and sold their medication had distinct profiles; future research should examine potential heterogeneity among students who divert so as to best tailor interventions. Finally, it is possible that our measure of compliance-gaining strategies did not capture all the ways in which students with prescriptions are approached. Moreover, when introducing the compliance-gaining scenarios, we left the level of intimacy between the requester and participant open-ended (i.e., friend, classmate, or friend of a friend), so as to assess any potential exposure to the scenarios and any willingness to divert. Additional research using open-ended questions, as well as research examining how students with prescriptions engage in decision-making about diversion and how different levels of intimacy with requesters affect EAs’ decision-making, would provide a more comprehensive understanding of diversion.

Conclusions

More than one-third of our EAs with ADHD and stimulant prescriptions reported diverting their medication in the past year. Diversion was most likely to occur when peers made rational appeals for academic help or made students with prescriptions feel guilty for non-compliance. Diverters were distinguished not only by private high school attendance, Greek involvement, and northeast college attendance, but also by more permissive attitudes about diversion, and greater exposure to peer pressure for their medication. Further, students who were less resistant to peer influence were more willing to divert and were more likely to experience negative affect following diversion. In summary, while it is tempting to assume that students with stimulant prescriptions bear primary responsibility for the rise in NMPSU on college campuses, this assumption downplays the influential role of peers who persuade students with prescriptions. Interventions for students with prescriptions that emphasize behavioral skills,
especially in the face of rational appeals for academic assistance, and validate the dilemma of students who are approached, may help to curb increasing rates of NMPSU in the most compassionate, effective manner.
References


[https://doi.org/http://dx.doi.org.ezproxy.trincoll.edu/10.2165/11584590-000000000-00000](https://doi.org/http://dx.doi.org.ezproxy.trincoll.edu/10.2165/11584590-000000000-00000)


nonmedical use of prescription medications among college students from 2003 to 2013:

Connecting the dots. Addictive Behaviors, 39(7), 1176–1182.


https://doi.org/10.1177/1087054709342212

https://doi.org/10.1002/9781118540190.wbeic156
Table 1

Descriptive Statistics and Site Comparisons

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Northeast site (n=67)</th>
<th>Southwest site (n=82)</th>
<th>Total (N=149)</th>
<th>( \chi^2 ) (or t)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>34 (52%)</td>
<td>61 (75%)</td>
<td>95 (64%)</td>
<td>9.01</td>
<td>.003</td>
</tr>
<tr>
<td>Male</td>
<td>32 (48%)</td>
<td>20 (25%)</td>
<td>52 (35%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did not identify as male, female, transgender</td>
<td>1 (1%)</td>
<td>0 (0%)</td>
<td>1 (1%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race/ethnicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White/non-Hispanic</td>
<td>55 (83%)</td>
<td>60 (73%)</td>
<td>115 (78%)</td>
<td>8.62</td>
<td>.196</td>
</tr>
<tr>
<td>African American/Black</td>
<td>2 (3%)</td>
<td>4 (5%)</td>
<td>6 (4%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Indian/Alaskan/Native Hawaiian</td>
<td>0 (0%)</td>
<td>1 (1%)</td>
<td>1 (1%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>3 (5%)</td>
<td>3 (4%)</td>
<td>6 (4%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic/Latino/a</td>
<td>1 (2%)</td>
<td>10 (12%)</td>
<td>11 (7%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bi/Multiracial or Other</td>
<td>5 (7%)</td>
<td>4 (5%)</td>
<td>9 (6%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class year*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freshman</td>
<td>19 (28%)</td>
<td>40 (49%)</td>
<td>59 (40%)</td>
<td>12.70</td>
<td>.005</td>
</tr>
<tr>
<td>Sophomore</td>
<td>17 (25%)</td>
<td>24 (29%)</td>
<td>41 (28%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Junior</td>
<td>14 (21%)</td>
<td>12 (15%)</td>
<td>26 (17%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senior</td>
<td>17 (25%)</td>
<td>6 (7%)</td>
<td>23 (15%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Greek-life participant</td>
<td>11 (16%)</td>
<td>21 (26%)</td>
<td>32 (22%)</td>
<td>1.85</td>
<td>.174</td>
</tr>
<tr>
<td>Father’s educational background</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school or less</td>
<td>3 (5%)</td>
<td>11 (14%)</td>
<td>14 (10%)</td>
<td>12.38</td>
<td>.002</td>
</tr>
<tr>
<td>College degree/some college</td>
<td>30 (45%)</td>
<td>51 (63%)</td>
<td>81 (55%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graduate degree/some graduate school</td>
<td>33 (50%)</td>
<td>19 (23%)</td>
<td>52 (35%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prescription obtained</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kindergarten-4th grade</td>
<td>8 (12%)</td>
<td>14 (17%)</td>
<td>22 (15%)</td>
<td>4.54</td>
<td>.474</td>
</tr>
<tr>
<td>5th-8th grade</td>
<td>16 (24%)</td>
<td>11 (13%)</td>
<td>27 (18%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9-12th grade</td>
<td>26 (39%)</td>
<td>39 (48%)</td>
<td>65 (44%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>College</td>
<td>17 (25%)</td>
<td>18 (22%)</td>
<td>35 (23%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived NMPSU at college (%) (M, SD)</td>
<td>50.96 (23.05)</td>
<td>50.31 (24.23)</td>
<td>50.63 (23.57)</td>
<td>.159</td>
<td>.874</td>
</tr>
<tr>
<td>Any medication diversion (previous year)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gave away</td>
<td>37 (55%)</td>
<td>16 (20%)</td>
<td>53 (36%)</td>
<td>20.52</td>
<td>&lt;.000</td>
</tr>
<tr>
<td>Sold</td>
<td>35 (52%)</td>
<td>10 (12%)</td>
<td>45 (30%)</td>
<td>28.05</td>
<td>&lt;.000</td>
</tr>
<tr>
<td>Past-year medical misuse</td>
<td>31 (46%)</td>
<td>16 (20%)</td>
<td>47 (32%)</td>
<td>12.23</td>
<td>&lt;.000</td>
</tr>
<tr>
<td>Resistance to peer influence (M, SD)</td>
<td>2.80(0.45)</td>
<td>2.92(0.55)</td>
<td>2.86(0.51)</td>
<td>-1.48</td>
<td>.142</td>
</tr>
<tr>
<td>ADHD symptom severity score (M, SD)</td>
<td>2.38(0.62)</td>
<td>2.32(0.65)</td>
<td>2.35(0.63)</td>
<td>.573</td>
<td>.568</td>
</tr>
</tbody>
</table>

Note. NMPSU=non-medical prescription stimulant use. *Because of rounding, percentages may not equal 100.
Table 2

*Logistic Regression Analysis Predicting Diversion from Demographic and Psychosocial Variables*

<table>
<thead>
<tr>
<th>Predictor</th>
<th>$B(\text{SE})$</th>
<th>$p$</th>
<th>Odds ratio</th>
<th>95% CIs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (0=male, 1=female)</td>
<td>.235 (.677)</td>
<td>.729</td>
<td>1.264</td>
<td>(.335, 4.770)</td>
</tr>
<tr>
<td><strong>Class Year</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freshman (reference)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sophomore</td>
<td>.758 (.740)</td>
<td>.306</td>
<td>2.135</td>
<td>(.500, 9.106)</td>
</tr>
<tr>
<td>Junior</td>
<td>-.276 (.861)</td>
<td>.749</td>
<td>.759</td>
<td>(.140, 4.106)</td>
</tr>
<tr>
<td>Senior</td>
<td>.523 (.911)</td>
<td>.566</td>
<td>1.687</td>
<td>(.283, 10.053)</td>
</tr>
<tr>
<td><strong>Type of High School Attended</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1=public, 2=private)</td>
<td>1.853 (.902)</td>
<td>.040</td>
<td>6.377</td>
<td>(1.089, 37.341)</td>
</tr>
<tr>
<td><strong>Site</strong> (1=northeast, 2=southwest)</td>
<td>-2.540 (.867)</td>
<td>.003</td>
<td>.079</td>
<td>(.014, .431)</td>
</tr>
<tr>
<td>Greek life (0=no, 1=yes)</td>
<td>2.145 (.773)</td>
<td>.005</td>
<td>8.540</td>
<td>(1.879, 38.817)</td>
</tr>
<tr>
<td>Past-year medical misuse (0=no, 1=yes)</td>
<td>.579 (.613)</td>
<td>.345</td>
<td>1.784</td>
<td>(.536, 5.936)</td>
</tr>
<tr>
<td>Exposure to compliance-gaining strategies</td>
<td>.635 (.261)</td>
<td>.015</td>
<td>1.888</td>
<td>(1.132, 3.148)</td>
</tr>
<tr>
<td>Worry about being caught if diverted</td>
<td>-.729 (.245)</td>
<td>.003</td>
<td>.482</td>
<td>(.298, .780)</td>
</tr>
<tr>
<td>Anticipated guilt about diversion</td>
<td>-.791 (.283)</td>
<td>.005</td>
<td>.453</td>
<td>(.260, .790)</td>
</tr>
<tr>
<td>Perceived NMPSU at college</td>
<td>.013 (.013)</td>
<td>.331</td>
<td>1.013</td>
<td>(.987, 1.039)</td>
</tr>
</tbody>
</table>

*Note.* SE = standard error, CI = confidence interval, NMPSU=Non-medical prescription stimulant use. $N = 132.$
Figure 1. Exposure to compliance-gaining strategies by diverter group. Estimated marginal means and standard errors are depicted. $N = 148$. 
Figure 2. Willingness to divert across the five compliance-gaining strategies by diverter group.

Estimated marginal means and standard errors are depicted. $N = 148$. 