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Current Methods in Health Behavior Research Among U.S. Community College Students: A Review of the Literature

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Abstract

The majority of health behavior research involving college students in the United States has focused on 4-year college students. Two-year or community college students have been less studied, although a significant proportion of U.S. undergraduates, primarily those from disadvantaged socioeconomic and/or racial/ethnic background, are enrolled in community colleges. Thus, there is a need to enhance health behavior and health promotion research among community college students. This study systematically reviewed 42 published, peer-reviewed health behavior studies conducted among U.S. community college students in order to determine the current state of research in the area with regard to behaviors studied, research designs used, recruitment and data collection strategies practiced, rates of student participation, and characteristics of the participants represented. Findings identified the methodological limitations of current research and suggested optimal recruitment and data collection methods suitable for various research needs. Findings are discussed in the context of enhancing health behavior research among U.S. community college students.

Keywords

community college; health behavior; online; recruitment; data collection

Introduction

The college student population in the United States is on the rise (National Center for Education Statistics, 2013) and forms an increasingly important segment of the U.S. society. Hence, the research focused on understanding or changing health risk behaviors of college students, such as tobacco, alcohol and other substance use, poor diet, lack of physical activity, risky sexual behavior, and violence, is of importance. However, health behavior research involving college students seems to have been conducted mostly among 4-year college students and relatively less among students attending community or 2-year colleges. Overlooking community college students in health behavior research is of concern because

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45% of all U.S. undergraduates are enrolled in community colleges (American Association of Community Colleges, 2013).

Community colleges are also of interest because of the demographics of the students they attract. Community colleges are less expensive than 4-year colleges and tend to have less stringent admission requirements and offer curricular flexibility that suits part-time students or full-time workers (Bragg, 2001). In addition, students not ready to transition into 4-year colleges for reasons such as poor high school performance may use community colleges as stepping stones to 4-year colleges. Thus, compared to 4-year college students, community college students are more likely to represent students from lower socioeconomic background, ethnic minorities, part- or full-time workers, individuals with dependents, and individuals pursuing “blue-collar” professions (Bailey, Jenkins, & Leinbach, 2005). According to the *American Association of Community Colleges* (2013), ethnic minorities make 48% of the community college demographics. Of the total Hispanic, African American, Asian/Pacific Islander, and Native American undergraduate student populations in the United States, 56%, 49%, 44%, and 42% are community college students, respectively. Of all community college students nationwide, 40% are first-generation college students. Further, 40% community college students tend to be employed full time, most likely in low-wage professions (Laanan, 2000). Thus, community college students tend to represent demographic groups that are at high risk of poor health outcomes (e.g., ethnic minorities) and those that are not widely represented in health behavior research (e.g., full-time workers).

Also, on average, community college students tend to be older than 4-year college students (American Association of Community Colleges, 2013). This may, to some extent, explain the higher prevalence of cigarette smoking among community college students compared to 4-year college students across studies (Berg, An, Thomas, et al., 2011; James, Chen, & Sheu, 2007; Lenk et al., 2012; Sanem, Berg, An, Kirch, & Lust, 2009; Vankim, Laska, Ehlinger, Lust, & Story, 2010). The average age of community college students is 28 years (American Association of Community Colleges, 2013), and the highest prevalence of current cigarette smoking in the United States is among 25- to 44-year-olds (Centers for Disease Control & Prevention, 2012).

Not much is known regarding how health risk behaviors other than tobacco use differ between community and 4-year college students. Although 4-year college students tend to report higher binge drinking (Paschall, Bersamin, & Flewelling, 2005) problem, alcohol use is known to be prevalent among community college students as well (Arliss, 2006; Sheffield, Drakes, Del Boca, & Goldman, 2005; Vankim et al., 2010). Research has highlighted the need and importance of studying dietary behavior (Arliss, 2007; Nelson, Larson, Barr-Anderson, & Neumark-Sztainer, 2009; Shive & Morris, 2006), physical activity (Sullivan et al., 2008; Vankim et al., 2010), and sexual behavior (Rich, Holmes, & Hodges, 1996; Trieu, Bratton, & Marshak, 2011) among community college students. Despite the needs, however, community college students remain understudied and underserved with regard to health behavior research and health promotion interventions, respectively (Chiauzzi et al., 2011).

Clearly, more studies focused on the health behaviors of community college students are needed. However, research methods used to study 4-year college students may not readily apply to the community college context because community college students generally commute to campus (Bailey et al., 2005) and, unlike students from 4-year colleges, cannot be accessed easily in dorms or residence halls for study recruitment or data collection. Further, community college students tend not to spend much time on campus after they are done with classes.

Accessing students in the classroom appears to be the best means of obtaining data from a large number of community college students (James et al., 2007). However, collecting data or implementing health interventions in community college classrooms may be challenging because instructors are often reluctant to give up entire class periods for study implementation (Arliss, 2007; Quintiliani, De Jesus, & Wallington, 2011). This contrasts with research universities where, because of well-established culture of research, it is relatively easy to access undergraduate students in the classroom for research purposes, especially within investigators' own departments. Thus, although class-room data collection appears to be a straightforward method of obtaining data from a large number of community college students, administering a relatively lengthy survey during a class period may not be feasible. Also, acquiring a representative sample may be difficult due to possible refusal of cooperation from a large number of instructors.

The online methods offer an alternative to classroom recruitment and data collection. Example of an online recruitment and data collection method includes recruiting students for web survey through e-mail invitations (e.g., Berg et al., 2010). An online recruitment method such as this may be used in anonymous, cross-sectional studies. An advantage of the e-mail recruitment method is that mass e-mail invitations can be sent to a large number of students (e.g., the entire student body of a college). However, the e-mail recruitment method is likely to result in low-response rates (James et al., 2007), eliciting responses from only those students who are highly motivated to participate in the study. Further, online recruitment strategies that depend on sending mass e-mails to students can work only if the administration of a college is willing to share students' e-mail addresses with the researchers. Many colleges may regard students' contact information strictly confidential. Thus, although online surveys may be used to administer relatively detailed surveys among students highly motivated to participate in the study, online recruitment has its shortcomings.

Apart from the classroom-only and online-only methods, there are likely to be other methods of recruitment and data collection currently in use among research with community college students. However, the methods have not been systematically identified. Further, student participation rates across different methods of recruitment and data collection have not been estimated. In general, at present, not much is known about the health behavior research studies that have been conducted among U.S. community college students. For example, little is known about the types of health behaviors researched across studies and the demographic characteristics of community college students represented across studies. It is important to address these gaps in knowledge in order to enhance research in the population by helping researchers assess the limitations of current research and choose methodological approaches that best suit their research purposes. Hence, the purpose of the

present study was to systematically review published, peer-reviewed health behavior studies conducted among U.S. community college students since 1990 with a focus on examining the strengths and weaknesses of the current methodological approaches used in the area. Our goal is to help future health promotion and disease prevention research by helping researchers adopt effective strategies of conducting health behavior research among community college students.

Methods

Selection of Studies

We searched Ovid MEDLINE (1990 to April, 2013), PubMed (1990 to April, 2013), PsycINFO (1990 to 2013), ERIC (1990 to 2013), and Google Scholar databases to identify health behavior studies involving U.S. community college students published in peer-reviewed journals between January 1990 and April 2013. Searches were performed using key words “community college,” “technical college” or “2-year college” and “students” crossed with “health,” “health behavior,” “substance use,” “drug use,” “tobacco,” “alcohol,” “risky sex,” “sexual,” “diet,” “physical activity,” “obesity,” “aggression,” “violence.” Only studies that met the following criteria were included in the review: (1) Studies were published in English peer-reviewed journals. (2) Studies included U.S. community or 2-year college students as participants. (3) The primary focus of the studies was one or more health behaviors: tobacco use, alcohol use, other substance use, sexual behavior, diet, physical activity, and aggressive behavior.

Review

Selected studies were reviewed independently by the first and second authors in terms of study design (i.e., cross-sectional or longitudinal), recruitment and data collection methods, types of incentives provided to increase participation rates, participant response rates, participant characteristics, U.S. region where the study was conducted, and the type of health behaviors assessed. In cases where studies included both community college and 4-year college subsamples, only the community college subsamples were reviewed. The review results independently compiled by the two authors were compared and aggregated after differences were sorted out and a consensus was reached.

Results

Study and Participant Characteristics

Database searches resulted in 57 studies that appeared to meet the inclusion criteria. However, 10 of these studies were excluded because three studies (Chiauzzi et al., 2011; Quintiliani et al., 2011; Spatz, Thombs, Byrne, & Page, 2003) involved college personnel as participants rather than students; two studies were conducted in Canada (Wells, Graham, Tremblay, & Magyarody, 2011; Wells, Neighbors, Tremblay, & Graham, 2011); one study did not assess students' health behavior or health indicator (Hanauer, Dibble, Fortin, & Col, 2004); two studies did not provide information separately for the community college subsample (Loukas, Garcia, & Gottlieb, 2006; Timberlake et al., 2007); one study involved a commuter college which did not match the definition of a community college (Prince &

Bernard, 1998); and one study compared 4-year college students with noncollege students but the latter did not include community college students (Quinn & Fromme, 2011). Hence, 47 studies were selected to be included in the present review, of which four tobacco use studies (Berg, An et al., 2011; Berg, Lessard et al., 2011; Berg, Schauer et al., 2012; Berg, Sutfin et al., 2012) were based on the same data set and three studies on dietary behavior (Graham & Laska, 2012; Pelletier, Laska, Neumark-Sztainer, & Story, 2013; VanKim & Laska, 2012) were based on the same data set. Two studies (Anders, Frazier, & Shall cross, 2012; Ahren & Norriss, 2011) that focused on mental and physical health were included in the review even though they did not study health behavior per se because they were thematically similar to health behavior studies. We performed additional searches to see whether there were more mental or physical health studies using the search criteria used previously but did not find similar additional studies. Thus, total of 42 studies based on unique data sets were included in the review.

Table 1 summarizes the selected studies in terms of study design, recruitment and data collection methods, and participant characteristics. The majority of the studies ($n = 18$; 43%) assessed cigarette or tobacco use, 9 (21.4%) studies dealt with alcohol use, 10 (23.8%) studies with dietary behavior, and 8 (19%) studies with sexual behavior. Six (14.3%) studies assessed physical activity, two (4.8%) studies dealt with mental or physical health indicators, and four (9.5%) studies with aggressive behavior. The majority of the studies were conducted in the Midwestern United States ($n = 14$; 33.3%). Other regions represented across studies were Western United States ($n = 8$; 19.4%), Southeastern United States ($n = 6$; 14.2%), Northeastern United States ($n = 6$; 14.3%), and Southern United States ($n = 5$; 11.9%). Twenty-four (57.1%) studies included more than 50% White participants, and 32 studies (81%) included more than 50% female participants. Across studies, the sample size varied between $N = 23$ and $N = 7965$. Participants tended to range between 17 and 64 years in age.

Methodological Approaches Across Studies

The majority of the studies ($n = 29$; 73.8%) were cross-sectional in design, five (11.9%) studies involved longitudinal surveys, four (9.5%) were qualitative studies that used focus groups or face-to-face interviews, and three (7.1%) studies involved interventions. The most common method of data collection used across studies was classroom based. Nineteen (45.2%) studies accessed students in the classroom where students completed paper-and-pencil surveys. Other studies used various combinations of recruitment and data collection methods. Outside the classroom, a common recruitment method used was to approach potential participants in person on campus (e.g., in cafeteria, campus quad) and/or to advertise the opportunity for study participation through use of fliers, online or print ads, and classroom announcements. Four (9.5%) studies combined this method of recruitment with online survey method of data collection, five (11.9%) studies with paper-and-pencil or computer-based survey outside the classroom, and three (7.1%) studies with focus groups or face-to-face interviews. Four (9.5%) studies recruited students through e-mail invitations and surveyed students online. Four (9.5%) studies recruited participants through mail (e.g., postcard) and involved mail-based data collection. One (2.4%) study used online recruitment for focus groups. Three (7.1%) studies used data from state or national-level, community-

based cohort studies where community college students were distinguished from 4-year college students or noncollege young adults based on students' self-report on college attendance.

Twenty-two (52.4%) studies did not report whether or not any form of incentive or compensation was provided in order to encourage study participation. Three types of incentives were found to be used across remaining studies: extra course credits ($n = 1$ study; 2.4%), free gifts or monetary incentives ($n = 13$ studies; 31%), and entry into prize draws ($n = 8$ studies; 19%). Two (4.8%) studies combined monetary incentive with entry into a prize draw and 1 (2.4%) study reported that no incentive was provided for study participation. Monetary incentives varied between US\$5 and US\$50. Of the 38 empirical studies, 22 (58%) studies did not report participation or response rates. The 16 studies that reported participation rates showed that participation rates varied between 25% and 41.6% among studies that used online recruitment and survey ($n = 5$; $M = 32.8\%$, standard deviation [SD] = 6.1%) and between 66% and 100% among studies that recruited and surveyed students in the classroom ($n = 8$; $M = 87.5\%$; $SD = 11.9\%$). The mean participation rate was 42% across the two studies ($SD = 25.5$) that used mail-based recruitment and survey, and the participant rate was 58.5% for a study that surveyed households.

Discussion

We completed a systematic review of the published, peer-reviewed health behavior studies conducted among U.S. community college students in order to identify the current methodological practices in the domain. Specifically, we compared research methods across studies, including study design, recruitment and data collection strategies, participant characteristics, participation rates, and the use of incentives.

Current State of Health Behavior Research Among Community College Students

To our knowledge, this is the first study to systematically review the health behavior studies conducted among U.S. community college students. We found that such studies are severely limited compared to similar research among 4-year college students: only 42 studies met the inclusion criteria in the present review, although the review encompassed multiple health behaviors, including cigarette and alcohol use, sexual behavior, diet, physical activity, and aggressive behavior. Thus, this review further stresses the need for increased health behavior research among community college students.

We found that the majority of the health behavior studies conducted among community college students have focused on cigarette or tobacco use behavior. The lack of research with regard to other health behaviors emphasizes the relative lack of depth and breadth of prevention research involving community college students. Recent research has especially stressed the importance of studying obesity-prone behaviors among community college students (Quintiliani et al., 2011). Further, few longitudinal or intervention research seems to have been conducted among community college students, although community colleges seem to provide a favorable channel to reach vulnerable populations for interventions (Chiauzzi et al., 2011; Lipkus & Prokhorov, 2007; Prokhorov et al., 2008; Quintiliani et al., 2011).

Although the reviewed studies represented diverse U.S. regions, the majority was set in the Midwestern and Western United States; North-western and Southwestern regions were not represented. Across studies, the minority group most represented was African American. Relatively fewer studies included 20% or more Hispanic participants, although Hispanics are the largest minority group in the United States (U.S. Census, 2010) and 56% of all Hispanic undergraduates in the United States are likely to be enrolled in community colleges (American Association of Community Colleges, 2013). Only three of the reviewed studies (Arliss, 2007; Graham & Laska, 2012; Shapiro, Radecki, Charchian, & Josephson, 1999) included 20% or more Asian Americans. The Asian American subsample in one of these three studies (Shapiro et al., 1999) represented 50% Vietnamese Americans. Apart from this information, the studies did not provide information on the Asian American subgroups represented across the three studies. Only one study (Arliss, 2007) appears to have included Pacific Islanders, although the proportion of Pacific Islanders who participated in the study is not clear. Clearly, more research is needed on Hispanic and Asian American/Pacific Islander community college students and the subgroups commonly subsumed under these ethnic/racial categories.

Consistent with the *American Association of Community Colleges* (2013) statistics, participants across the reviewed studies tended to represent students older in age compared to 4-year college students and more females than males. Clearly, community colleges seem to provide unique opportunities to conduct health behavior research among adults of a wide age range and women, especially those from ethnically and socioeconomically disadvantaged groups. Especially, community college students seem to provide unique opportunities to study students older than 35 years of age, which have been rarely utilized in health behavior research. It is likely that most community college students who are 35 or older are pursuing “blue-collar” careers (Laanan, 2000) and show different risky behavior patterns than younger community college students or 4-year college students. The wide range of age among community college students would enable comparisons of health behavior patterns across age groups. Clearly, researchers may need to pay greater attention to community college students in order to understand the health promotion needs of older students pursuing lower wage earning professions.

Current Methods of Recruitment and Data Collection

The review findings were informative in terms of elucidating the range of methodological approaches that have been used in health behavior research involving community college students. Mainly, three types of methods were used across studies to recruit and collect data from students, with the classroom-based recruitment and paper-and-pencil survey being the most common one. This method involved researchers accessing students in the classroom where students were present for a scheduled class. The studies that used this method were more likely to report participation rates and tended to report higher participation rates than studies that used other methods. Higher participation rate in classroom-based method is not surprising because students in the classroom essentially function as a captive audience.

However, the studies using the classroom-based method tended to use convenience samples. In addition, the time constraint involved in classroom data collection seemed to require that

the survey questionnaire be kept relatively short. Among the reviewed studies that used classroom-based paper-and-pencil data collection, the number of items contained in the survey questionnaire tended to range between 42 and 124 (Arliss, 2007; Feigenbaum & Weinstein, 1995; Horton & Loukas, 2011; Loukas et al., 2008; Shapiro et al., 1999) and the time needed to administer the survey tended to range between 10 to 30 min (Ahren & Norriss, 2011; Feigenbaum & Weinstein, 1995; Horton & Loukas, 2011; Horton & Loukas, 2013). Thus in research where paper-and-pencil data collection is methodologically suitable, the survey questionnaire is relatively short and instructor cooperation is not difficult to attain, classroom-based recruitment and data collection method is likely to ensure maximum participation rate. The importance of incentives in increasing participation rate in classroom-based data collection seems unclear. Among studies reviewed, only one study (Chen, Miller, Grube, & Waiters, 2006) that used this method appeared to have used monetary incentive. Provided instructor cooperation, participation rate may be high in classroom-based survey despite the absence of monetary incentives.

Another common method of data collection included combining on-campus outside-the-classroom recruitment of students with paper-and-pencil survey (e.g., Lipkus & Prokhorov, 2007), computer-based survey (e.g., Prokhorov et al., 2008), or online survey (e.g., Graham & Laska, 2012). Students were recruited outside the classroom by means of on-campus advertisements (e.g., fliers, newspapers) (e.g., Anders et al., 2012; Lipkus & Shepperd, 2009) or by approaching potential participants in person (e.g., Graham & Laska, 2012). Because students self-select into this type of studies, participation rates are difficult to assess for them. Although more prone to selection bias, this method seems useful in recruiting targeted samples (e.g., smokers) (e.g., Prokhorov et al., 2008). Further, because data collection takes place outside the classroom, instructor cooperation is not essential and relatively longer survey questionnaires may be administered. Outside the classroom, providing monetary incentives may enhance study participation (e.g., Graham & Laska, 2012; Marchand, Glenn, & Bastani, 2012).

Another method of recruitment and data collection combined online recruitment with online data collection (Berg, An et al., 2011; Berg, Schauer et al., 2012; Trieu et al., 2010; VanKim et al., 2010). This method invited students, either all students enrolled in one or more colleges or a random sample of students from the student body, to participate in an online survey via e-mail. The invitation e-mail contained a link to the consent form which then directed the consenting students to the study survey (Berg et al., 2012). An advantage of this method is that a large number of students may be accessed and offered the opportunity to participate in the study. In addition, self-selected students may be motivated to complete longer surveys. But studies that used online recruitment and data collection reported low participation rates, suggesting that this method is susceptible to severe selection bias. Low-response rates in online surveys are not specific to community colleges but have been observed in studies conducted 4-year colleges as well (e.g., Berg et al., 2011). This method seems suitable to collect a quick preliminary data from a large number of college students, provided that researchers have access to students' college e-mail addresses. In studies using online recruitment and survey, providing incentives may motivate more students to participate in the study.

Limitations

This study has certain limitations which need to be considered while interpreting its findings. First, although we believe that the literature searches we completed were thorough, some eligible studies may not have been included in the review either because of the specific search terms used or because the articles were not listed on the databases we searched. Second, our search terms may not have included all possibly pertinent combinations which may have also resulted in some eligible studies being excluded from the review. The possibility that some eligible studies may have been excluded from the review implies that some of our conclusions may be inaccurate. Future studies are needed to point out and correct such inaccuracies.

Third, nonpeer-reviewed articles or book chapters were excluded from the review, even though they may have been based on community college students, as were research studies involving community college students that did not study health behaviors. Nonpeer-reviewed articles or book chapters were excluded in order to maintain the scientific rigor of the investigation. But, because of the exclusion some data pertinent to the review may have been overlooked. Reviewing non health-related empirical research conducted among community college students was beyond the scope of the current research. However, not reviewing such studies may have limited our understanding of the methods used to study community college students across disciplines. Fourth, the present review included several studies that did not report one or more type of data that were pertinent to the review. Because the objective of the present study was to conduct a systematic review and not a meta-analysis, persistent efforts were not made to obtain the unreported data (for example, by contacting authors). The missing data may have introduced biases in our conclusions and should be considered a limitation of the present study.

Conclusions

Despite limitations, this study is significant for increasing the understanding of current practices in health behavior research involving U.S. community college students and for attempting to attract the attention of health professionals towards research among community college students. We found that although community colleges offer a unique venue for health behavior research among adults of wide age range and diverse ethnic and socioeconomic backgrounds, community colleges are underutilized in health behavior research. Some health risk behaviors such as illicit drug use are not as frequently studied and well designed, large-scale studies studying multiple health risk behaviors are lacking. More studies have been conducted in certain geographical regions (e.g., Midwest) than other, ethnically for diverse, regions (e.g., Southwest). The samples studied do not reflect the ethnic diversity that community college student population represents nationwide. Further, most studies tend to use convenience samples, often of small sizes. Thus, the present review highlights the need to study multiple health risk behaviors among community college students, to conduct research in ethnically diverse colleges and colleges from understudied geographical regions.

We found that recruiting and collecting data from community college students in the classroom tend to result in higher participation rates; however, obtaining permission to

implement the research during class time may be challenging. Online data collection methods may be suitable for collecting comprehensive data without the need to seek instructor permission; however, online surveys tend to result in low-response rates. Future studies are needed to test various strategies that utilize the advantageous aspects of current methods. One such strategy may be to integrate classroom recruitment with online data collection. This method may help overcome disadvantages of the classroom-only and online-only methods. For example, students may be recruited in the classroom over 10–15 min and later invited to participate in an online survey or in an intervention study. The key to the success of this method would be to be able to collect students' contact information during classroom recruitment. Instructors might be more willing to comply if researchers were to spend very short time in the classroom. In the classroom, researchers get the opportunity to verbally present the study to the students which is not possible in any of the online methods. Further, a more representative sample of students may be obtained by accessing classrooms that are randomly selected. Online response rate is likely to be higher among students recruited in the classroom, because only those students are invited to participate in the online survey who provide consent to participate in the study and invitation to participate in the survey is sent to students' self-reported e-mail addresses. In addition, students may be more likely to participate in the study if they are told to expect being contacted by the research staff.

In conclusion, studying health behaviors of community college students is of importance and may be of particular significance for health professionals interested in health disparities research. Community colleges are likely to provide access to ethnic minorities, part-time workers, and individuals from lower socioeconomic background pursuing blue collar professions who may not be accessed elsewhere in large numbers. Moreover, community colleges may provide unique opportunities to research and implement behavior-change interventions designed to reduce health disparities.

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Summary of Health Behavior Studies Reviewed in Terms of Study Design, Recruitment and Data-collection Procedures, Participation Rates, and Participant Characteristics.

Table 1

Study	Design	Method	Incentive	Response Rate	Participants	Region	Health Behaviors or Health Indicators
Ahren and Norris (2011)	Cross-sectional	Classroom recruitment, classroom paper-and-pencil survey; 1 college	NR	NR	N = 166; age = 18–20; 40% F; 78% W, 9% B, 5% H, 3% AA, 5% O	West	Mental health Physical health
Anders et al. (2012)	Longitudinal	Recruitment through on-campus advertisements and presentations, online survey; 1 college	Extra credit	NR	N = 242; age = 18–40; 75% F; 70% W, 9% B, 11% AA, 10% O	Midwest	Mental health Physical health
Arliss (2007)	Cross-sectional	Classroom survey, classroom recruitment, 1 college	NR	NR	N = 466; age = majority below 30; 56% F; 29% AA, 24% B, 11% H, 29% W	Northeast	Cigarette use Binge drinking Physical activity Diet
Berg et al. (2009)	Cross-sectional	Online recruitment, online survey; # of colleges NR	NR	41.6%	N = 815; age = (M) 23.8 (SD = 6.48); 56% F; 88% W, 12% O	Midwest	Cigarette use
Berg et al. (2010)	One time focus groups	Online recruitment, focus group discussions; 1 college	\$50	NA	N = 36; age = (M) 20.6 (SD = 1.8); 56% F; 89% W; 11% O	Midwest	Cigarette use
Berg, Lessard et al. (2011)	Cross-sectional	Online recruitment, online survey; 1 college	Entry into lottery for US\$2500, US\$250, US\$100	30%	N = 748; age = (M) 20.2 (SD = 1.9); 67% F; 94% W, 6% O	Midwest	Cigarette use
Berg, An et al. (2011)							
Berg, Sutfin, et al. (2012)							
Berg, Schauer, et al. (2012)							
Bryan & Freed (1993)	Cross-sectional	Classroom recruitment, students submitted completed paper-and-pencil survey in next class; 1 college	NR	92%	N = 150; Age = 18–49; 53% F; 95% W, 2% B, 1% H, 1% AA, 1% O	Northeast	Sexual behavior
Carbone, Campbell, and Honess-Morreale (2002)	One-time interview	Recruitment through on-campus advertisement, face-to-face interview; 1 college	\$10	NA	N = 23; Age = 18 or over; 65% F; 50% B	Southeast	Diet
Chen, Paschall, and Grube (2006)	One-time focus group and survey	Recruitment through on-campus advertisements (e.g., fliers), focus group and survey; 5 colleges	\$40	NA	N = 29; age = 18–25; 31% F; 45% B, 34% W, 10% AA, 11% O	West	Alcohol use
Chen, Miller et al. (2006)	Cross-sectional	Classroom recruitment, classroom paper-and-pencil survey; 1 college	\$20	87%	N = 1056; age = 18–25; 57% F; 38% W, 27% H, 21% AA, 5% B, 9% O	West	Alcohol use Drug use Aggressive behavior

Study	Design	Method	Incentive	Response Rate	Participants	Region	Health Behaviors or Health Indicators
Clemens, Thombs, Olds, and Gordon (2008)	Cross-sectional	Not clear how participants were recruited or whether data were collected during class; 1 college	NR	NR	$N = 308$; age = 18–26; 57% F; 74% W, 19% B, 7% O	Midwest	Weight control behavior
Douglas et al. (1997)	Cross-sectional	Mail recruitment, mail survey as part of National College Health Risk Behavior Survey (NCHRBRS); 66 colleges	\$100 US Savings Bonds for a randomly selected student per college	60%	$N = 2206$; age = majority (64%) 25 or older; gender or ethnicity breakdown for community colleges not reported, for entire sample: 56% F, 73% W, 10% B, 7% H, and 10% O	Nationwide	Violent behavior Tobacco use Alcohol use Other drug use Sexual behavior Dietary behavior Physical activity
Feigenbaum & Weinstein (1995)	Longitudinal	Classroom recruitment, classroom paper-and-pencil survey; 1 college	NR	91%	N (baseline) = 1825; age = mostly 18–20; 55% F; 84% W, 9% B, 4% H, 2% AA, 1% O	Northeast	Sexual behavior
Fish and Nies (1996)	Cross-sectional	Mail recruitment, mail survey; 1 college	NR	24%	$N = 59$; age = 18–21; 71% F; 83% W, 17% B	South	Health risk behaviors, including substance use, diet, and physical fitness
Graham and Laska (2012)	Cross-sectional	Potential participants approached in person on campus, outside classroom; online survey; 1 college	\$50 Entry into prize drawing	NR	$N = 598$; age = mostly 18–24; 53% F; 41% W, 34% B, 22% AA, 12% O	Midwest	Diet
VanKim & Laska (2012)	Cross-sectional	Classroom recruitment, classroom paper-and-pencil survey; 2 colleges	NR	NR	$N = 984$; age = (M) 25 ($SD = NA$); 47% F; 42% W, 28% B, 30% H	South	Cigarette use
Pelletier et al. (2013)	Cross-sectional	Classroom recruitment, classroom paper-and-pencil survey; 2 colleges	NR	78%	$N = 1120$; age = (M) 25.30 ($SD = 8.6$); 46.8% F; 38.5% W, 23.9% B, 32.8% H, 4.8% O	South	Cigarette use
Horton and Loukas (2013)	Cross-sectional	Classroom recruitment, classroom paper-and-pencil survey; 2 colleges	Movie passes Phone cards Coupons	66%	$N = 1644$; age = (M) 24.4 ($SD = 8.67$); 61% F; 56.7% W, 19.8% W, 15.1% H, 8.4% O	Southeast	Tobacco use
James et al. (2007)	Cross-sectional	Classroom recruitment, classroom paper-and-pencil survey as part of the Florida Annual College Tobacco Survey (FACTS); 8 colleges					
Lenk et al. (2012)	Cross-sectional	Household telephone survey as part of the Minnesota Adolescent Community Cohort (MACC), participants self-reported community college enrollment	\$10–\$15	58.5%	$N = 519$; age = 18–24; 53% F; Ethnicity NR	Midwest	Cigarette use
Lesley (2007)	Intervention study	Potential participants approached in person on campus, in or outside classroom; paper-and-pencil	\$15 and a phone-card of unspecified amount	NR	$N = 78$; age = 18–64; 59% F; 100% B	Midwest	Diet

Study	Design	Method	Incentive	Response Rate	Participants	Region	Health Behaviors or Health Indicators
Lipkus and Prokhorov (2007)	Intervention study	Potential participants approached in person on campus, outside classroom, or recruited through on-campus advertisements; paper-and-pencil survey outside classroom; # of colleges NR	\$30	NR	N = 112; age = 18–24; 42% F; 73.5% W, 15.5% B; 2% AA; 6% O	Southeast	Cigarette use
Lipkus and Shepperd (2009)	Longitudinal	Potential participants approached in person on campus, outside classroom, or recruited through on-campus advertisements; paper-and-pencil survey outside classroom; 5 colleges NR	NR	NR	N = 305; age = 18–24; 52% F; 57% W, 32% B, 4% H, 1% AA, 6% O	Southeast	Cigarette use
Loukas, Murphy, and Gottlieb (2008)	Cross-sectional	Classroom recruitment, classroom paper-and-pencil survey; 2 colleges	NR	NR	N = 617; age = mostly 24 or under; 53% F; 51% W, 28% B, 9% H, 4% AA; 8% O	Midwest	Cigarette use
Marchand et al. (2012)	Cross-sectional	Recruitment through on-campus advertisements (e.g., fliers), online survey; 1 college	\$10	NR	N = 251; age = 18–26; 100% F; 59% H, 31.5% B, 2.2% AA, 1.1% W, 5.6% O	West	Human papillomavirus (HPV) vaccination
Nelson et al. (2009)	Cross-sectional	Participants from a cohort originally recruited and surveyed in high-school classrooms part of Project Eating Among Teens II (EAT-II); participants self-reported community college student status; mail survey	NR	NR	N = 428; age = (M) 20.4 (SD = NA); 62% F; 50% W, 23% B, 15% AA, 12% O	Midwest	Diet
Noland et al. (2004)	Cross-sectional	Classroom recruitment, classroom paper-and-pencil survey; 1 college	None	NR	N = 371; age = 16–30; 50% F; 50% W, 22% H, 14% B, 14% O	Southeast	Aggressive behavior
Paschall et al. (2005)	Longitudinal	Computer-assisted interview part of National Longitudinal Study of Adolescent Health (Add Health); self-reported community college student status	NR	NR	N = 1558; age = (M) 21.8 (SD = 1.9); 58.6% F; 48.6% W, 20.2% B, 20.5% H, 7.8% AA, 4.6% O	Nationwide	Alcohol use
Prokhorov et al. (2003)	Cross-sectional	Potential participants approached in person on campus, in or outside classroom; paper-and-pencil survey in or outside classroom; 10 colleges	Highlighters, pens, or candy	NR	N = 1283; 76% F; age = 18–35; 39% W, 22% B, 24% H, 14% O	South	Cigarette use

Study	Design	Method	Incentive	Response Rate	Participants	Region	Health Behaviors or Health Indicators
Prokhorov et al. (2008)	Intervention study	Participants recruited outside classroom through on-campus advertisements; computerized survey outside classroom; 15 colleges	NR	NR	$N = 426$; age = (M) 22.9 ($SD = 4.6$); 59% F; 55.3% W, 12.3% B, 16.9% H, 15.5% O	South	Cigarette use
Quintiliani, Campbell, Haines, and Webber (2008)	One-time focus group	Potential participants approached in person on campus, outside classroom, or recruited through on-campus advertisements; focus group data collection; 2 colleges	\$15	NA	$N = 28$; age = mostly 18–35; 100% F; 46.5% W, 39.5% B, 14% O	Southeast	Diet Physical activity
Rich et al. (1996)	Cross-sectional	Classroom recruitment, classroom paper-and-pencil survey; 1 college	NR	100%	$N = 102$; age = (M) 27 ($SD = \text{NR}$); 64% F; 25% B, 7% H, 67% W	Northeast	Sexual behavior
Sanem et al. (2009)	Cross-sectional	Mail and online recruitment, mail and online survey, 6 colleges	\$5 Entry into prize drawings	33.6%	$N = 2790$; age = (M) 26.1 ($SD = \text{NR}$); 68% F; 91% W, 4% B, 3% AA, 2% O	Midwest	Cigarette use
Shapiro et al. (1999)	Cross-sectional	Classroom recruitment, classroom paper-and-pencil survey; 4 colleges	NR	74%	$N = 319$; age = 18–26; 55% F; 44% W, 35% AA, 14% H, 7% O	West	Sexual behavior
Sheffield et al. (2005)	Cross-sectional	Classroom recruitment, classroom paper-and-pencil survey; 1 college	Entry into prize drawings	100%	$N = 762$; age = (M) 26.2 ($SD = 7.8$); 61% F; 65% W, 20% H, 9% B, 6% O	Southeast	Alcohol use
Shive and Morris (2006)	Cross-sectional	Classroom recruitment, classroom paper-and-pencil survey; 2 colleges	Entry into prize drawings	NR	$N = 1367$; age = (M) 24.8 ($SD = 9.5$); 71% F; 74% W, 1.8% B, 9.5% H, 5.5% AA; 4.5% AI; 4.6% O	West	Diet
Smith (2003)	Cross-sectional	Classroom recruitment, classroom paper-and-pencil survey; 3 colleges	NR	NR	$N = 247$; age = 18–28; 57% F; 42.5% H, 27.5% B, 19% W, 11% O	West	Sexual behavior
Sullivan et al. (2008)	Cross-sectional	Classroom recruitment, paper-and-pencil survey; 1 college	NR	NR	$N = 291$; age = (M) 26 ($SD = 9.7$); 62% F; 64% H, 30% B, 5% AA	NR	Physical activity
Thomas et al. (2010)	Longitudinal	Participants recruited outside classroom through on-campus advertisements, e-mail and postal announcements; paper-and-pencil survey outside classroom plus online survey; 2 colleges	Entry into prize drawings	NR	$N = 67$; age = (M) 24.7 ($SD = 6.1$); 59.7% F; 89.6% W, 10.4% O	Midwest	Cigarette use
Trieu et al. (2011)	Cross-sectional	Classroom and online recruitment as part of American College Health Association's National College Health Assessment	NA	Paper-and-pencil survey = 90% Online survey =	$N = 4487$; age = 18–24; 54.3% F; 52.7% W, 2.8% B, 25.3% H, 17.1% AA, 1.8% AI, 7% O	West	Sexual behavior

Study	Design	Method	Incentive	Response Rate	Participants	Region	Health Behaviors or Health Indicators
		(ACHA-NCHA): Classroom paper-and-pencil survey (12 colleges) plus online survey (1 college); 13 colleges		25%			
Tsamis, Rebok, and Montague (2009)	Cross-sectional	Classroom recruitment, classroom paper-and-pencil survey	NR	NR	N = 55; age = 17–41; 60% F; 22% B, 64% W, 2% H, 4% AA, 9% O	Northeast	Aggressive behavior
Vankim et al. (2010)	Cross-sectional	Participants recruited via postcard or e-mail; online or paper-and-pencil survey; 6 colleges	Unspecified monetary reward plus entry into prize drawing	Across paper-and-pencil and online surveys: 33.6%	N = 863; age = mostly 18–30; 67.7% F; 88.7% W, 2.4% B, 2.4% AA, 0.8% H, 1.8% AI, 3.9% O	Midwest	Tobacco use Alcohol use Physical activity
Wall, BaileyShea, and McIntosh (2012)	Cross-sectional	Classroom recruitment, classroom paper-and-pencil survey; 19 colleges	NR	NR	N = 7965; age = mostly 17–24; 57% F; 81% W, 7.5% B, 3.8% H, 1.6% AA, 6.1% O	Midwest	Alcohol use

Note. (M) = mean and (SD) = standard deviation (mean age and standard deviations are provided only for studies that did not provide age range); NA = not applicable, NR = not reported; F = female; W = white, B = African American, H = Hispanic, AA = Asian American, AI = American Indian, O = other ethnicity.