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Some context for understanding the place of the general educational development degree in the relationship between educational attainment and smoking prevalence

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ABSTRACT

Introduction. Individuals with a General Educational Development (GED) degree have the highest smoking prevalence of any education level, including high school dropouts without a GED. Yet little research has been reported providing a context for understanding the exception that the GED represents in the otherwise graded inverse relationship between educational attainment and smoking prevalence. We investigated whether the GED may be associated with a general riskier profile that includes but is not limited to increased smoking prevalence.

Method. Data were obtained from three years (2011–2013) of the National Survey on Drug Use and Health ([NSDUH], $N = 55{,}940$]). Prevalence of risky repertoire indicators (e.g., ever arrested, seldom/never wears a seatbelt), indicators of social instability (e.g., frequent relocations), and risky demographic characteristics (e.g., male gender) were compared among high school dropouts, GED holders, and high school graduates using Rao–Scott chi square goodness-of-fit tests and multiple logistic regression.

Results. Those with GEDs differed significantly between both high school dropouts and high school graduates across 19 of 27 (70.4%) risk indicators. Controlling for risky profile characteristics accounted for a significant but limited (25–30%) proportion of the variance in smoking prevalence across these three education levels.

Conclusion. GED holders exhibit a broad high-risk profile of which smoking is just one component. Future research evaluating additional risk indicators and mechanisms that may underpin this generalized risky repertoire are likely needed for a more complete understanding of GED's place in the important relationship between educational attainment and smoking prevalence.

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1. Introduction

The inverse relationship between educational attainment and the prevalence of cigarette smoking can be observed in many U.S. nationally representative samples (e.g., the National Adult Tobacco Survey (NATS; Agaku et al., 2014; King et al., 2012), National Epidemiologic Survey on Alcohol and Related Conditions (NESARC; Reingle Gonalez et al., 2016), National Health Interview Survey (NHIS; Jamal et al., 2014), and the National Survey on Drug Use and Health (NSDUH; Garrett et al., 2013). Recent prevalence estimates derived from the NATS (2014), for example, reveals a graded inverse relationship between educational attainment and smoking prevalence in which prevalence decreases across increasing levels of education (i.e., less than high school: 24.7%; high school graduate: 23.1%; some college: 20.9%; college degree: 9.1%). Interestingly, the General Educational Development (GED) degree is an outlier in this otherwise strikingly graded relationship. Specifically, GED recipients smoke at substantially higher rates (41.9%) than those in all other educational categories, most notably including the category that falls directly below the GED (i.e., high school dropouts without a GED), and the category immediately above (i.e., high school graduates) into which GED holders are sometimes included under the assumption that the two degrees are academically equivalent. While tobacco researchers have undoubtedly noted this exception, to our knowledge, there has been little research reported examining the place of the GED in the relationship between educational attainment and smoking risk, which was the purpose of the present study.

Although a comprehensive characterization of GED recipients is absent from the tobacco literature, tobacco researchers have identified

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that cigarette smoking is associated with a variety of other problems (e.g., employment and legal issues (Lee et al., 1991; Leino-Arjas et al., 1999; Roll et al., 1996), thus the high smoking prevalence among GED holders may be a marker of a broader high-risk profile. Reports published outside the tobacco literature support this possibility. For example, economists have noted that GED holders have a higher likelihood of engaging in various deviant or delinquent behaviors (e.g., shoplifting, illegal drug use, being stopped by police (Leino-Arjas et al., 1999) relative to both high school dropouts and high school graduates. These data may suggest the presence of a generally high-risk profile that is more common among GED holders than high school dropouts without a GED or high school graduates.

The strikingly high smoking prevalence among those with GEDs, combined with the observations made by economists, suggests that it may be worthwhile to investigate whether the increased smoking prevalence among GED holders generalizes to a broader array of risk-related characteristics. We used the National Survey on Drug Use and Health (NSDUH) to examine this question because it is a nationally representative survey that assesses cigarette smoking along with other risk behaviors and socio-demographic characteristics. Thus the primary purpose of this report was to examine whether the disproportionately high smoking prevalence among GED holders compared to high school dropouts without a GED and high school graduates is also observed across other characteristics indicative of a generally high-risk profile. We also examined the degree to which these other risky characteristics might account for the increased smoking prevalence among GED holders or are instead themselves in similar need of explanation.

2. Method

2.1. Data source

Data were obtained from the three most recent years (2011–2013) of the National Survey on Drug Use and Health (NSDUH) at the time this study was initiated ($N = 168{,}825$; SAMSHA, 2011–2013). The NSDUH is a nationally representative cross-sectional survey of the U.S. non-institutionalized population that is conducted each year to assess the prevalence and correlates of tobacco, alcohol and illicit drug use. In addition to substance use, the survey also includes questions about risk behaviors other than drug use (e.g., ever arrested, on probation or parole) as well as indicators of social instability that may influence the likelihood of engaging in risk behaviors (e.g., frequent relocations, religious involvement), thus it was appropriate for our current purposes. Collapsing data across the 2011–2013 survey administrations permitted us to conduct our analyses among a larger number of GED holders (i.e., approximately 1% or 500 individuals per year report holding a GED).

Data from all civilian non-institutionalized respondents, including those in group homes, shelters, and college dormitories, were included. Respondents on active military duty, in drug treatment programs, jail or homeless were excluded. The weighted interview response rates were 74.4%, 73.0% and 71.7% in 2011, 2012 and 2013, respectively. A detailed description of the survey procedures is provided by SAMHSA (2013).

The survey includes individuals aged 12 years and older but the current sample was comprised of adults aged 18–25 years ($N = 55{,}940$), as only individuals ≤25 years old are asked whether they have a GED and only individuals ≥18 years are included in the other educational categories. Thus restricting the age range to 18–25 years was necessary to hold age constant across level of educational attainment. Although it is conceivable that some individuals aged 18–25 years have not yet had the opportunity to achieve their highest level of educational attainment, we focus primarily on comparisons between GED holders and the categories directly below (<high school) and above them (high school graduates) in the present report. Whether individuals will receive a high school diploma is typically determined by age 18. Moreover, the use of a young adult sample is consistent with prior research in this area (Johnson and Novak, 2009; Kenkel et al., 2006). Using young adults may also increase the likelihood of observing differences in risky profile indicators associated with educational attainment as engagement in risk behaviors is more common among young adults relative to middle-aged or older adults (SAMHSA, 2013; Ulmer and Steffensmeier, 2014).

2.2. Statistical methods

Sample adjusted frequencies were generated across all respondents between the ages of 18 and 25 years, as well as by education and by current smoking status. Prior to examining the prevalence of risky profile indicators across categories of educational attainment, we verified that the exception that GED recipients typically pose to the inverse relationship between educational attainment and smoking prevalence was discernible in the present sample. More specifically, we determined the prevalence of current smoking across the five educational categories of high school dropouts, GED, high school graduate, some college, and college graduate. For the purposes of presenting a more comprehensive picture of associations between smoking prevalence and educational attainment, we also determined the prevalence of never and former smoking across these categories. “Current smoker” was defined as smoking at least 100 lifetime cigarettes plus past month smoking. “Never smoker” was defined as smoking less than 100 lifetime cigarettes with no past month smoking. “Former smoker” was defined by smoking at least 100 lifetime cigarettes with no past month smoking. Because the substantially higher smoking prevalence among GED holders permits a greater proportion of these respondents with opportunities to quit smoking, thereby potentially inflating estimates of former smoking prevalence artificially, we determined the proportion of former quitters in each educational category from the pool of respondents who had smoked at least 100 lifetime cigarettes as opposed to all respondents in that category. Tests of equal proportions by education level were conducted using Rao–Scott chi-square goodness-of-fit tests to evaluate whether the prevalence of current, never, and former smoking differed across educational categories, with variances estimated using Taylor series linearization.

A modified Delphi method was used to select outcomes indicative of a general high-risk profile (Dalkey and Helmer, 1963). More specifically, three authors (AK, EK, IZ) independently reviewed all items in the NSDUH database and selected (a) both criminal and non-criminal risky or deviant behaviors, where risk could be either to oneself (e.g., not wearing a seatbelt) or others (e.g., attacking someone); (b) outcomes pertaining to the domains of drug use, health, or crime that indicated previous engagement in risky behavior (e.g., past year alcohol abuse/dependence, having an STD, and being arrested, respectively); and (c) characteristics of one's social environment that may modulate the likelihood of engaging in risk behaviors (e.g., religiosity (McCullough and Willoughby, 2009; Walker et al., 2007). Items that authors unanimously agreed reflected one of these three criteria were automatically selected for inclusion. Items for which there were discrepancies were discussed until a resolution was reached.

The final set of high-risk profile indicators was compared across high school dropouts, GED holders, and high school graduates ($N = 29{,}379$). Those who completed some college or graduated college were excluded from this analysis. We focus on comparisons between dropouts, GED holders, and high school graduates because doing so is sufficient to observe deviations from an otherwise orderly graded relationship between education and the outcome of interest that would support the presence of a general high-risk profile among GED holders. We looked for patterns where prevalence of risk indicators were significantly higher among those with GEDs compared to high school dropouts and high school graduates, or where prevalence of protective factors were significantly lower among those with GEDs compared to the other two groups. Tests of equal proportions by education level were conducted using Rao-Scott chi-square goodness-of-fit tests to evaluate

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