Journal of Adolescent Health xxx (2017) 1–6

ELSEVIER

JOURNAL OF ADOLESCENT HEALTH

www.jahonline.org

Original article

Health-Risk Behavior Profiles and Reciprocal Relations With Depressive Symptoms From Adolescence to Young Adulthood

Jing Yu, Ph.D. *, Diane L. Putnick, Ph.D., Charlene Hendricks, Ph.D., and Marc H. Bornstein, Ph.D.

Child and Family Research, Eunice Kennedy Shriver, National Institute of Child Health and Human Development, National Institutes of Health, Bethesda, Maryland

Article history: Received March 9, 2017; Accepted July 11, 2017
Keywords: Depressive symptoms; Risk behavior profiles; Latent transition analysis

A B S T R A C T

Purpose: We examined co-occurrences of multiple health-risk behaviors among adolescents in a 5-year longitudinal design as well as their associations with mental health outcomes.
Methods: Latent transition analyses explored subgroups of adolescents (N = 229; 51% males) who engaged in distinct patterns of health-risk behaviors and transitions over time. Moreover, longitudinal relations between risk behavior profiles and depressive symptoms were also explored.
Results: We identified four latent profiles based on risk levels of safety and violence, sexual behavior, alcohol use, and marijuana and other drug use at both 18 years and 23 years: low risk, modest risk, medium risk, and high risk. Some adolescents maintained their latent profile membership over time, but more transitioned between risk profiles. Adolescents with more depressive symptoms had a higher probability of developing into the high-risk versus low-risk and modest risk profiles at 23 years. Adolescents in the high-risk, low-risk, and modest risk profiles at 18 years developed more depressive symptoms in young adulthood compared with medium risk adolescents.
Conclusions: This study provides a better understanding of the prevalence, distribution, and change patterns of health-risk profiles across adolescence and young adulthood in a European American sample. Reciprocal relations between high-risk profiles and depressive symptoms suggest the need for integrated but tailored prevention and intervention programs.

IMPLICATIONS AND CONTRIBUTION

This study identified four latent profiles of adolescents with different levels of risk behavior and found reciprocal associations between a high-risk profile and depressive symptoms over time. Findings suggest that mental health and behavioral risks are intertwined and targeting one of the two aspects may be effective in treating the other.

Many adolescents display risk behaviors that may persist into adulthood and contribute to an enormous public health and social financial burden [1]. Young people (20%–40%) may engage in adverse, aggressive, and otherwise reckless behaviors, including driving without a seatbelt and bullying [2], which can threaten their own and others' physical health and safety. Moreover, adolescents and young adults have the highest age-specific diagnosis rates for many sexually transmitted diseases compared with other age groups [3]. Age-specific rates of alcohol indulgence and illicit drug use (with marijuana being the most popular drug of choice) also peak among adolescents and young adults (15%–45%) [3], which can lead to serious health consequences, such as cardiovascular disease and psychiatric disorders [4,5].

Risk behaviors have been widely studied among adolescents and young adults. However, most studies have focused on individual risk behaviors or a relatively small range of behaviors. According to Jessor's problem behavior theory, risk behaviors tend to co-occur in youth [6] perhaps because they share a common motivation of thrill seeking. Researchers have also proposed specific mechanisms to explain the covariation among risk behaviors. For instance, alcohol and marijuana use may

Conflicts of Interest: The authors have no conflicts of interest to disclose.

* Address correspondence to: Jing Yu, Ph.D., Child and Family Research, Eunice Kennedy Shriver, National Institute of Child Health and Human Development, 6705 Rockledge Drive, Suite 8030, Bethesda, MD 20892-7971.
E-mail address: jing.yu2@nih.gov (J. Yu).

1054-139X/Published by Elsevier Inc. on behalf of Society for Adolescent Health and Medicine.
http://dx.doi.org/10.1016/j.jadohealth.2017.07.002

increase the likelihood of sexual risk, reckless behavior, and violence by lowering inhibitions or diminishing an individual's ability to assess risk [3]. Given the possible co-occurrence of different risk behaviors, a better understanding of health risk among adolescents requires a more holistic approach where a broader range of risk behaviors is considered simultaneously. It is also important to investigate the clustering of health-risk behaviors because individuals engaging in multiple health-risk behaviors are at the greatest risk of developing health problems [7]. Therefore, identifying profiles of co-occurring risk behaviors among adolescents can help inform the design of targeted and effective prevention and intervention strategies to promote adolescent health.

Latent transition analyses of health-risk behaviors

In many research studies, individual or correlated risk behaviors are examined in multivariate variable-centered approaches where interactions are rarely examined due to a lack of statistical power [8]. Furthermore, high levels of multicollinearity often exist in multiple regression analyses that can mask the predictive role of important factors [8]. Applications of person-centered approaches have the potential to provide new insights into health risks to complement traditional variable-centered methods (e.g., regression). For example, higher-order interactions among multiple risk behaviors can be examined and subgroups of individuals with distinct patterns of risk behaviors can be identified, using person-centered techniques such as latent transition analysis (LTA) used here [9].

Emerging research has applied LTA to study latent classes and transitions of risk behaviors [10,11], but most LTA studies have focused on individual risk behaviors. For example, Auerbach and Collins [12], who examined the transition in alcohol use among individuals age 18.5 years–22.5 years, found that alcohol use class memberships were largely stable, although a proportion of individuals transitioned into and out of the latent profiles between these age periods. Chuang and Martin [13] utilized LTA to analyze the structure of diagnostic symptoms related to substance use disorders among adolescents, and identified few or no symptoms, mild, and severe latent statuses. To date, little research has examined multiple risk behaviors (e.g., alcohol use, drug use, sexual behavior, and violence) in longitudinal contexts as we do here. Using person-centered analysis to examine a wider range of health-risk behaviors can offer a more nuanced and dynamic portrait of adolescents' risk profiles over time.

Health-risk behaviors and depressive symptoms

Although some risk behaviors have been shown to co-occur with mental health problems, there is no consistent theoretical argument to explain or clear-cut empirical support for the relation [14]. Some studies report that greater alcohol or drug use during adolescence might undermine adolescents' neurobiological development involving reward and self-regulation thus predicting more depression in young adulthood [15]. Other studies report that alcohol use is associated with enhanced psychological well-being, perhaps due to the instrumental use of alcohol to establish social networks [16]. Similarly, for the prediction of mental health on risk behavior, self-medication theory posits that depressed or anxious individuals use alcohol or drugs to reduce their negative emotions [17], whereas risk-avoidance theory predicts that depressed or anxious individuals are more likely to be overcontrolled and isolated, and less likely to take risks [18].

Previous research has provided cross-sectional evidence for the association between depressive symptoms and individual risk behaviors. For example, depression appears to be positively associated with sexual risk taking, physical violence, wearing seatbelts and bike-helmets less often, and alcohol and drug use [19,20]. With respect to longitudinal evidence, extant studies have not consistently confirmed that depressive symptoms predict risk behaviors [15,21]. Instead, many studies report that behavioral risk led to later increased levels of depressive symptoms. In one study on adolescents, having tried drugs or engaged in two or more health-risk behaviors (smoking, alcohol, or drug use) at baseline predicted depressive symptoms 2 years later [22]. Therefore, depression may be a result of adolescent risk behaviors, but it is inconclusive whether depression causes engagement of risk behaviors. Moreover, evidence for relations between depressive symptoms and clusters of risk behaviors is scarce. Some cross-sectional evidence supports an association between depressive symptoms and the clustering of risk behaviors [23], but little research disentangles the direction of links between depression and risk behavior clustering [21]. Here, we extended previous research by including a wider range of risk behaviors, and we examined predictive relations between depressive symptoms and risk behavior profiles to illuminate the temporal ordering between mental and behavioral health.

The present study

We used LTA to identify latent subgroups of adolescents who engaged in different levels of four categories of risk behaviors, including safety and violent behavior, sexual behavior, alcohol use, and illicit drug use across late adolescence and young adulthood. In addition, we examined longitudinal associations between the risk profile memberships and development of depressive symptoms. The LTA technique and the longitudinal design allowed us to investigate the prevalence of latent profiles across a 5-year period and associated mental health outcomes. Given the lack of research or less than coherent findings in the literature, we did not have specific hypotheses for the number of latent profiles in LTA or relations between depressive symptoms and latent profiles. Therefore, this study is exploratory in nature.

Method

Participants

European American families with healthy firstborn children were recruited through newspaper advertisements and mass mailings from the mid-Atlantic region of the United States. All data used in the current study were collected via a secure online Web site. The first assessment for this study was administered when participants were 18 years old (M_{age} = 18.21, standard deviation [SD] = .35, range: 17–19), and the second was administered 5 years later when participants were 23 years old (M_{age} = 23.62, SD = .58, range: 22–25). The sample consisted of 229 adolescents (51% males). Education levels for the mothers/fathers were master's degree or above (39%/42%), bachelor's degree (35%/31%), some college (22%/16%), and high school diploma or below (5%/11%). Combined gross family incomes were less than $74,999 (14%), $75,000 to $124,999 (27%), $125,000 to $199,999 (32%), and $200,000 or more (28%).