Psychobiological Models of Adolescent Risk: Implications for Prevention and Intervention

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Abstract:

Psychobiological models of risk have much to contribute to the prevention of and intervention with risky behavior among adolescents. Emerging research is beginning to provide better information about mechanisms underlying individual differences in risky behavior (e.g., differences in self-regulation) and providing insight into unique vulnerabilities that occur during adolescence (e.g., increases in reward seeking). This work suggests ways in which prevention programming can be designed to be sensitive to both individual differences and developmental timing. Psychobiological models of risk also have practical implications for the manner and methods of conducting prevention and intervention work. Future work in both the etiology and prevention of risky behavior can benefit from ongoing dialogue and has the potential to result in a more sophisticated understanding of the mechanisms of change related to risky behavior.

Article:

Adolescence has long been understood to be a period of transition during which multiple areas of growth and change are intertwined, leading to increased vulnerability for risk. This risk is manifested through a variety of internalizing and externalizing behaviors that jeopardize adolescents' well-being, and as a result there is an extensive literature on prevention and intervention of risky behaviors during adolescence. Existing prevention programming is characterized by multiple approaches, reflecting variety in the scope (e.g., universal vs indicated), populations (e.g., adolescents and/or parents), level of analysis (e.g., individual, family, school, community), and mediating mechanisms (e.g., normative beliefs, life skills, parenting skills) that are targeted. Several bodies of literature have guided prevention and intervention work related to risky behavior, and evaluation research has yielded evidence that has led to the creation of multiple lists of 'promising' or 'model' programs that reduce risk for a variety of behaviors (e.g., The Office of Juvenile Justice and Delinquency Prevention Model Programs Guide; the Substance Abuse and Mental Health Administration's National Registry of Evidence-Based Programs and Practices).

The studies presented in this special issue represent important recent advances in research on the psychobiological phenomena that underlie many of the growth processes that occur during adolescence, and hence they hold promise for furthering both the understanding and prevention of adolescent risky behavior. Despite the fact that there are prevention approaches for which there is robust evidence of effectiveness, the mechanisms of change underlying these approaches are not well understood. Research based on a psychobiological model of risky behavior, such as

the papers presented here, may lead to better understanding of the complexity of the normative processes that occur during this time and, in turn, the key points of vulnerability that occur during adolescence. As suggested by Steinberg, incorporating a biobehavioral perspective into the prevention and intervention of risky behavior is a needed next step in this area. The papers in this issue raise multiple examples of the implications for prevention that arise from psychobiological studies models of adolescent risk.

An oft asked question is why some adolescents avoid engaging in risky behavior, while others engage in risky behavior but experience no long term consequences, and still others move through their adolescent years in a tangled web of troublesome behaviors and negative outcomes. Research examining individual differences in risky behavior is not new, but several of the articles in this issue highlight the ways in which psychobiological research can provide a more nuanced understanding of how individual differences arise, with resulting implications for more effective tailoring of prevention efforts. For instance, Casey and Romeo's work on animal models suggests that future studies should address the link between individual differences in emotional and stress reactivity and risky behavior. Romer's paper discusses the links between individual differences in impulsivity and risky behavior, suggesting that adolescents who exhibit higher levels of impulsivity may benefit from prevention efforts that seek to mitigate the risk associated with impulsive behaviors. Graber, Nichols and Brooks-Gunn suggest that the impact of pubertal status on risky behavior may vary by individual differences in pubertal timing, and both Graber and Steinberg discuss possible gender differences in this relationship.

Individual differences can emanate from both genetic and environmental factors and the interaction between the two, and examples of each in relation to risky behavior are presented in this issue. For example, Casey et al. explore the possible link between genetically-related differences in emotion regulation and individual differences in risky behavior. In addition, the role of environmental factors in adolescent risky behavior is highlighted in multiple papers in this issue. Whether adolescents' impulsivity and sensation seeking place them at greater risk because of underdeveloped cognitive functioning (Casey, Steinberg) or lack of experience and wisdom (Romer), this work suggests that creating safer and more closely monitored environments for adolescents can reduce negative outcomes. Romer and Spear and Varlinskaya further suggest that contexts that provide adolescents opportunities for ''safer'' risk-taking may be beneficial during this developmental period. Turrisi and Ray, in their description of a parenting intervention to prevent harmful drinking among college students, provide an example of how this approach can be effective outside of directly intervening to reshape the physical environment. Finally, an illustration of the implications of the interaction between genetics and environment for risky behavior is found in Dodge's work, which describes a prevention program tailored for children who exhibit both genetic and environmental risk for the development of conduct disorder.

Much of the prevention literature is informed by a developmental framework, but as illustrated in this special issue, a biobehavioral perspective of risky behavior highlights crucial developmental considerations in the design, implementation, and evaluation of risky behavior prevention and intervention programs. The association between the period of adolescence and problematic alcohol use is widely documented and often attributed to social factors or to adolescents' needs for individuation. Spear and Varlinskaya's paper suggests, however, that this increased risk for

problem drinking is partly due to a developmentally-based increased sensitivity to alcohol that results from a confluence of developmental processes among multiple brain-based systems. The uniqueness of this sensitivity to this developmental period has important implications for decisions about public policies that directly impact prevention efforts (e.g., setting the legal age for alcohol consumption). Similarly, psychobiological research on another marker of adolescence — puberty — may have important implications for the prevention of risky behavior. Graber, Nichols, and Brooks-Gunn suggest that pubertal timing may be a salient issue to consider in the context of prevention, especially for girls who undergo this transition earlier than the norm. Though puberty is a normative developmental experience, the timing of this experience relative to the norm can put adolescents at risk. Steinberg also discusses the role of puberty and suggests that future studies should seek to better understand the links between pubertal development and the development of brain-based systems related to cognition and self-regulation; these studies could have important implications for the timing of prevention and intervention efforts, and also provide more information about the mechanisms that link pubertal timing to increased risk. Dodge and McCourt highlight another way in which developmental timing has implications for prevention. A key principle in the field of prevention is that early intervention—acting to change or shape behaviors, attitudes, or environments — is most effective in terms of outcomes and resources. That is, timing plays a central role in the development of prevention programs, not just in terms of deciding when to begin an intervention, but also in determining the precise mechanisms of change that are targeted in prevention work. Their work illustrates the cascading risk that can occur as a result of the interplay of individual and contextual characteristics moving together over time, and also suggests that these processes are malleable for at least some individuals.

One tenet of parenting often recommended to parents of young children is to reserve the use of ‘No’ for relatively few situations, and instead to find other ways to redirect children’s negative behaviors. The premise behind this advice is that young children, in their search for independence and journey to establish self-regulation, need to feel they have freedom of choice to choose between appealing options. Several papers in this issue suggest that the salience of reward seeking remains equally important during adolescence, given that adolescents are developmentally predisposed to seek novel, rewarding, and exciting situations (Casey et al.; Romer, Spears & Varlinskaya). These findings add more weight to what we already know from research: ‘Just saying no’ is not likely to be effective if adolescents are primed to ‘just say yes’. This research does not imply, however, that prevention efforts are destined to be ineffective. In addition to providing safer opportunities for ‘risky’ behavior, Romer suggests that psychobiological research can contribute to prevention by providing better understanding of the characteristics of behaviors and contexts that adolescents are likely to perceive as rewarding. Providing adolescents with greater availability of rewarding opportunities could satiate their drive for reward seeking in less risky, and even developmentally beneficial, ways.

The research presented in this issue not only raises substantive and conceptual implications for prevention and intervention work, but also raises several practical points about the way in which prevention and intervention research is conducted. For example, psychobiological models of risk imply some specific ways in which interdisciplinary work could inform prevention and intervention. Similar to the profile of papers presented in this issue, collaborative relationships need to be established so that those in the prevention field can dialogue with researchers studying

brain-based mechanisms. These teams can work together to ensure state-of-the-art prevention programs that are continually informed by advances in psychobiological work. One challenge for these teams will be to disseminate new information to parents, teachers, and adolescents in ways that are meaningful and motivating to these key stakeholders. The dialogue between psychobiological and prevention researchers can also work in the other direction; that is, the 'applied' research can inform the 'basic' research. It is often said that the best test of a theory is to test an intervention based on that theory, and successes and failures in prevention and intervention can inform questions about new directions for research informing psychobiological models of risk. Romer presents an example of this in his discussion of the manner in which cognitive training programs can inform psychobiological models about whether increased risk is due to underdeveloped cognitive processes or lack of experience.

As research into psychobiological models of risk advances, implications for the prevention and intervention of risky behavior will continue to be informed by a more sophisticated understanding of the underlying processes pertinent to risky behavior and identification of malleable mechanisms of change. This work raises important issues for the development and testing of prevention and intervention programs, which have tended to address adolescents as a universal common group (i.e. universal prevention) and not provide clear mechanisms for adaptation of timing or programmatic elements in response to individual differences. The papers presented here also speak to the need for prevention to be embedded within the larger developmental context. Psychobiological models of risk will likely challenge the prevention field to continue to develop developmentally-appropriate, effective methods of identifying at-risk adolescents and of tailoring programs to address differences in risk factors emanating both from within and outside the individual.

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