



Featured Research

Centre for Lifespan Development Research

Dr. Elizabeth Shulman

Risky decision-making in adolescence

What's the bottom line?

Everyone takes risks at some point, but research suggests that risk-taking is particularly common during adolescence and early adulthood. In her work, Dr. Shulman investigates why risk-taking increases in adolescence and decreases in adulthood. She also considers how society does and should respond to specific types of adolescent risk-taking (e.g., crime).

Risky Business – What is this research about?

Epidemiological data indicate that risk-taking behaviours increase during adolescence and into early adulthood, with youth in this age range engaging in behaviours such as risky driving, alcohol and drug use, self-harm, unsafe sexual practices, and crime at high rates. These dangerous activities pose significant threats to the mental and physical well being of adolescents (e.g., injury, illness, or death) and impose substantial costs on society. Dr. Shulman and colleagues have made several discoveries around how various developmental processes may relate to adolescent risk-taking—providing strong evidence that adolescents may be subject to unique motivational processes that predispose them to risky decision-making.

Youthful ignorance and irrationality?

Some may think that adolescents' increased involvement in risk-taking is due to youthful ignorance, delusions of invincibility, irrationality, or a misunderstanding of risks. However, research has indicated that adolescents do not differ consistently from adults in their assessment and understanding of risky behaviours; that is, adolescent risk-taking does not appear to be due to a failure to identify the potential consequences of such behaviour. Recognizing this, Dr. Shulman and colleagues have looked to developmental changes in reward sensitivity and sensation-seeking to help explain why adolescents may be prone to engage in risky behaviours. The findings of their work are relevant to other developmental researchers and to individuals who interact with adolescents.

Specifically, Dr. Shulman's research has contributed to a growing literature showing that age differences in risky behaviour may result from differences in affective decision-making (e.g., decisions driven largely by emotional cues rather than rational deliberation). Her work has contributed to an emerging theory, known as the *Dual-Systems theory*, which attributes heightened risk-taking in adolescence to a gap between the maturation of two complex brain systems that play important roles in decision-making. This theory posits that the brain's *socioemotional system*, which is involved in reward-seeking, undergoes

Brock University



Dr. Shulman ...

is a Developmental Psychologist and Assistant Professor at Brock University, where she examines development during the transition from childhood to adulthood. Dr. Shulman obtained her Master's degree and Ph.D. from the University of California and a Postdoctoral Fellowship at Temple University and the Positive Psychology Centre at the University of Pennsylvania.

rapid development and "activation" around the time of puberty. In contrast the brain's *cognitive control system*, which serves to modulate emotional and behavioural impulses, matures gradually throughout adolescence. The combination of a "revved-up" socioemotional system with an underdeveloped cognitive control system is thought to explain adolescents' predisposition to risky-behaviour, especially in emotionally arousing situations.

Reward-bias in adolescent decision-making

The literature on this topic has outlined these developmental patterns in various other ways—for example, youth are described as being *approach oriented* where they engage in reward seeking (e.g., risk-taking) in response to potential benefits, whereas adults tend to be *avoidance oriented* where they engage in harm avoidance in response to potential losses. Again, the brain systems associated with approach behaviours are thought to reach peak sensitivity during middle adolescence, which may promote risky behaviour, whereas the neural systems involved in harm avoidance are thought to slowly mature between childhood and early adulthood.

Dr. Shulman's research has expanded the literature on how these developmental processes may relate to risk-taking, shedding light on potential age differences in decision-making. For example, Dr. Shulman uses a modified version of the Iowa



Gambling Task, a game in which participants choose to play or pass on four different decks of cards in an effort to earn money. Only through playing can individuals learn which decks are advantageous (result in net gains in repeated play) and which are disadvantageous (result in net losses in repeated play). Participants learn to discriminate between advantageous and disadvantageous decks, but do so subconsciously. Through this work, Dr. Shulman has demonstrated that adolescents tend to be more reward-biased (e.g., approach oriented), than adults, at least when decision-

making is affect-driven and not fully conscious or deliberative.

This inclination among adolescents toward approach behaviours may help to explain why they tend to engage in a high amount of novelty seeking, as their underlying motivations may bias them toward seeking potential rewards, even if there are potential costs.

How does this work in the real world?

Some researchers have not been able to find age trends in risky decision-making when testing in laboratory settings. Dr. Shulman and colleagues have suggested that this may be an issue with methodology, with a great deal of risk-taking research utilizing methods that tap into rational/conscious decision-making (e.g., decisions where individuals have time to weigh options and consider possibilities). Dr. Shulman has recognized the fact that real life risky choices often do not happen within controlled environments (i.e., lab settings), instead they occur in the 'real world' where individuals are experiencing emotional arousal and input—i.e., in contexts that are not conducive to reasoned deliberation. As such, her work has attempted to target intuitive/unconscious decision-making processes (e.g., decisions where

information is processed quickly and outside of attention). Additionally, peer influence needs to be incorporated into risk-taking research, as peers often act as strong "sources and multipliers" of emotional arousal (e.g., a friend egging someone on) — understanding this, Dr. Shulman has

designed paradigms that assess peer influence on risky decisions.

Overall, risky decisions are often made quickly without a great deal of prior deliberation. The neuro-developmental processes outlined in the Dual-Systems Theory may be particularly relevant to these emotionally driven decisions, and less so to the rational decisions captured within many lab-based studies, which makes Dr. Shulman's body of research unique and highly applicable to how risk-taking tends to occur in real life settings.

Males and females

Dr. Shulman also has looked at sex differences in the development of two traits related to risky behaviour – sensation-seeking and impulse control. *Sensation-seeking* refers to seeking out experiences and feelings that are novel and/or thrilling (and which often entail risk), whereas *impulse control* refers to the ability to resist temptations and delay gratification. The psychological traits of sensation-seeking and impulse control are thought to reflect the “functional status” of the socioemotional and cognitive control systems, respectively, with high sensation-seeking and low impulse control contributing to risky behaviours.

In their work, Dr. Shulman and colleagues have uncovered sex differences in the development of these two traits, which may contribute to sex differences in risk-taking behaviour. Specifically, this work has indicated that females tend to exhibit peak levels of sensation-seeking earlier than males (e.g., between the ages of 16 and 17 versus 18 and 19) and that females tend to experience a more rapid decline in sensation-seeking than males. In terms of impulse control, Dr. Shulman has demonstrated that male and female patterns of growth are fairly similar, but that females’ rates of growth in impulse control tend to be a bit faster than males. Both findings may help to explain why females tend to “grow out” of risk-taking faster than males.

Dr. Shulman has theoretically linked these sex differences in sensation-seeking and impulse control to sex differences in pubertal timing and to the distinct evolutionary pressures placed on males and females. For example, she points towards pressures on males to attain high social status through risk-taking and pressures on females to move into adult social spheres and constrain their impulses as potential areas of evolutionary influence. In order to further the work on sex differences and risk-taking, Dr. Shulman is currently pursuing work that investigates the extent to which cultural factors may influence sensation-seeking and impulse control.

What about criminal behaviour?

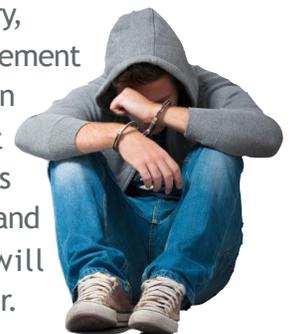
The increase in reward sensitivity in adolescence combined with relatively low levels of impulse control raises an important question—if adolescents’ brains are ‘hardwired’ to seek out new and exciting situations, then how responsible are they for their criminal behaviour (a common form of risk-taking)? Also, if engagement in crime is partly due to immaturity, then crimes committed during adolescence may be less informative about an individual’s nature than crimes committed during adulthood. These sorts of questions have important implications for how adolescent offenders should be treated within the justice system, i.e., whether they should be handled more like children in need of rehabilitation or more like adults deserving of punishment.

Dr. Shulman’s work explores these issues in depth, considering the evidence of adolescents’ developmental immaturity with respect to decision-making. This evidence includes her own empirical work, which finds that adolescents, from both community and court-involved samples, tend to be more reward-biased in their risk appraisals than adults and pre-adolescents. Moreover, this reward-bias tends to be correlated with adolescents’ law-breaking behaviours.

From their work on adolescent crime, Dr. Shulman and colleagues have concluded that a certain amount of adolescent criminality may be uniquely related to the developmental factors that incline youth toward risky behaviour—indicating that adolescent crime may be distinct from adult crime and should be treated as such within the justice system.

So what – Where is this research being used?

Justice System – Don’t worry, they’ll grow out of it! This statement may be overused when referring to adolescents, but Dr. Shulman’s research has indicated that it may be true and that many adolescents will “mature out” of risky behaviour.



Dr. Shulman has been a strong proponent of developmental science being used to inform juvenile court cases. Specifically, Dr. Shulman has suggested that judicial decision makers ought to consider the role of developmental immaturity in adolescents' behaviours when handing down punishments for adolescent crime. Specifically, this research has demonstrated that adolescence itself may be a "mitigating circumstance" in cases of youth criminality. For example, Dr. Shulman has pointed to the importance of rehabilitation for young offenders, encouraging the justice system to capitalize on adolescents' responsiveness to reward by offering and focusing on incentives for youths to achieve goals rather than punishments for failures.

In order to demonstrate the importance of including science in legal proceedings, Dr. Shulman and colleagues have conducted large-scale historical reviews of juvenile justice in the United States, revealing numerous recent cases where developmental science was utilized to inform legal proceedings. Having such a holistic view of adolescence incorporated into legal proceedings would likely benefit not only adolescent offenders, but also their communities and taxpayers.

Practitioners, Policymakers & Parents –

Anyone who lives with or works with adolescents may sometimes feel that getting through to them is

Referred Works

- Cauffman, E., Shulman, E. P., Steinberg, L., Claus, E., Banich, M. T., Graham, S., & Woolard, J. (2010). Age differences in affective decision making as indexed by performance on the Iowa Gambling Task. *Developmental Psychology, 46*, 193-207. doi: 10.1037/a0016128
- Shulman, E. P., & Cauffman, E. (2013). Reward-biased risk appraisal and its relation to juvenile vs. adult crime. *Law and Human Behavior, 37*, 412-423. doi: 10.1037/lhb0000033
- Shulman, E. P., & Cauffman, E. (2014). Deciding in the dark: Age differences in intuitive risk judgment. *Developmental Psychology, 50*, 167-177. doi: 10.1037/a0032778
- Shulman, E. P., Harden, K. P., Chein, J. & Steinberg, L. (in press). Sex differences in the developmental trajectories of impulse control and sensation-seeking from early adolescence to early adulthood. *Journal of Youth and Adolescence*. doi: 10.1007/s10964-014-0116-9
- Shulman, E. & Steinberg, L. (in press). Human development and juvenile justice. In K. Heilbrun (Ed.), *Handbook of psychology and juvenile justice*. Washington: APA Books.

a never-ending battle, especially when it comes to telling them to not take risks. However, Dr. Shulman's work has revealed that individuals who live or work with youth need remember that adolescents are sensitive to rewards. As such, efforts to help youth make healthier choices will be more successful if, rather than using scare tactics to highlight the costs of risky behaviour, they focus on the rewards of responsible behaviour, present safe methods for indulging in sensation-seeking, and restrict opportunities to engage in risk-taking.

How do they do it?

Dr. Shulman employs multiple methods to address her research questions, including administering decision-making tasks and questionnaires to cross-sectional samples, and analyzing large-scale longitudinal data sets.

What's next? Dr. Shulman is looking for students

Dr. Shulman began her position at Brock University in July 2014 and is building her research lab. As such, Dr. Shulman is looking to recruit potential students and volunteers who are interested in her body of research. If you would like to be involved in Dr. Shulman's exciting and groundbreaking work, please contact her – eshulman@brocku.ca

Want More Information?

Are you a student, researcher or parent who would like to be involved in Dr. Shulman's work?

Contact: Dr. Elizabeth Shulman, eshulman@brocku.ca (905) 688-5550 ext.4084

Website: <http://www.brocku.ca/psychology/people/shulman.htm>



Or scan
this!

For more information on the Jack and Nora Walker Canadian Centre for Lifespan Development Research, please contact:

Jayne Morrish, jmorrish@brocku.ca (905) 688-5550 ext. 4566

Website: <https://www.brocku.ca/lifespan-development-research>



Or scan
this!