Examining Risk and Resilience through Multiple Lenses: An Integrated Approach

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Abstract

The current article presents a multifaceted model of risk and resilience that employs selected lenses to reveal insights from a variety of disciplines. This enhanced model, originally based on Bronfenbrenner's (1989) ecological framework, was developed to interpret the results of an ongoing study, conducted by the first two authors, of students' resilience in the face of adverse circumstances. The model that we developed allowed us to consider the following aspects: how the combination of school, family, and community supports can function as protective factors for students who face considerable adversity; the way that epigenetics can explain the powerful influence particularly of schools and families on child outcomes even as late as adolescence; how schools can mobilize social and cultural capital for students' benefit; the cascading positive effects of small gains that can ripple and expand over several years; and the way that socio-economic gradients can assess the effectiveness of policy interventions. The proposed model incorporates multiple informative perspectives including the biogenetic basis of resilience; developmental cascades; economic, social and cultural capital; and socio-economic status (SES) gradients that, taken together, address the limitations of Bronfenbrenner's original framework.

***Keywords*:** At-risk youth; resilience; ecological model; "success despite the odds".

We wanted to find out what factors serve as buffers to adversity or protective factors for these resilient children and youth. We felt that such an understanding could better guide educators, health and social service agencies, and government officials to design policies and programs to serve students' needs more effectively. Participants in our study were drawn from five inner-city schools in western Canada. We interviewed 50 students who had faced difficulties in their lives but who had demonstrated their resilience by their positive academic performance in school. We also interviewed 20 school personnel (principals, counsellors, and teachers) for their perspectives on the success of at-risk students. This design allowed us to focus on the role that schools play in supporting students who are facing adversity. In analyzing the interviews, key themes were identified which informed an emergent ecological model of resilience.

The emergent model in the current exploration delineates how vulnerable individuals can be supported, particularly by schools, to achieve academic and life success despite the forces arrayed against them. Our study reflects a paradigm shift, one that moves away from focusing on problems and deficits to one that identifies strengths and assets. Such a shift, ultimately, helps us understand why some children are successful despite the odds and shows the way to mobilize forces to strengthen the factors that are protective.

This emergent multidisciplinary model grew out of our involvement in a larger research project that examined the impact of specific variables (e.g., poverty, teen parenthood, and child welfare involvement) on high-school graduation rates (Roos & Brownell, 2009). While this broader, population-based project used the unique Manitoba Population Health Research Data Repository, which combines information from the education, healthcare, justice system, and family services data systems on over 100,000 children from birth to 20 years old, our study was qualitative in nature, examining the "outliers" in the larger study—those youth who are vulnerable but manage to thrive. These are sometimes referred to as "dandelion" children: those who have resilient genes, which make

them hardy and able to take root and survive almost anywhere, whether in the equivalent of a sidewalk crack or fertile ground (Boyce, 2008; Dobbs, 2009). In contrast, "orchid" children are more fragile and sensitive. They wilt if maltreated or abandoned, but bloom spectacularly if given greenhouse care. The focus of our original study was on what serves as protection for the vulnerable students (family, school, and community) and, in particular, what role schools play in reducing risk and fostering resilience. Our concern was to go beyond risk factors and explore protective elements that mitigate the multiple negative effects of poverty and disadvantage.

Highlights of our Study

In the initial analysis of our interviews (Polyzoi et al., 2013), the degree of harshness that students had experienced in their young lives was striking. It was evident that, for many students, the protective layers within the home and family had been stripped or lost. Students had struggled with addictions, abuse, neglect, parental absence, suicide, and maternal depression. As one school counselor, Kala - this and all subsequent first names are pseudonyms assigned to interviewees- expressed it: "Students have experienced loss of protection by going into care; loss of innocence from abuse situations; loss of security due to addicted parents; loss of a childhood [due to teenage pregnancy]; loss of family members and friends who have committed suicide; loss due to medical complications brought on by diabetes, renal failure, amputations, and the list goes on and on. …they see school as their last hope..."

The apparent casualness with which students commented on their fragmented home lives, parental alcoholism, and mental health challenges was disarming. Kendra, for example, was a victim of sexual abuse at age four years. She grew up with a mother who struggled with alcoholism. In her early teen years, she moved in with a friend, where she was soon drawn into drugs and alcohol. At one point, when "things got out of control," she asked her parents if she could return home, but they refused. This landed Kendra, now 15 years old, in a series of group homes with a shifting cast of other troubled youth. The loss of family and home left Kendra clearly vulnerable. She admits, "I don't make good friends, so the ones …who have not hurt me are the ones I [value].... It takes time for me to 'let new ones in.'"

Some students, as refugees, had witnessed the atrocities of war, lost extended family, and had become separated from siblings and even parents. Many, at the time of the interview, were still struggling with the trauma of violence experienced many years earlier.

Leslie was kidnapped by drug lords from her home in a South American country when she was 15 years old. She was forcibly confined and mistreated for two years and coerced to work in the cultivation and processing of cocaine. During this time, her stepfather was murdered. When Leslie was eventually rescued and reunited with her mother, they fled the country and managed to gain entrance into Canada.

Meghan, whose mother had a violent history and whose father was a drug dealer, went to live with her grandmother at age 12 years. At age 14, she went from a detention centre to a series of group homes where her peers were other adolescents with serious life and adjustment issues, including petty crime, drug and gang involvement, and suicidal depression.

Sharon had lived almost her entire life in a West African refugee camp. Her cousin had been murdered during a period of civil unrest; their grandmother tried to save him but was shot as she fell on his attacker. The family escaped by making the long trek to a border crossing. Make-shift homes at the refugee camp were easy targets for marauding thieves. There were scarce resources and cramped conditions, lawlessness, and violence, which Sharon witnessed.

These are among the most dramatic examples, but all of the students whom we interviewed had experienced difficulty and disruption in their lives, and all of their experience was coloured by the

multiple effects of poverty and, for many of them, the effects of historical disadvantage (e.g., Aboriginal or immigrant identity). Despite these multiple risk factors, we found students were able to cope and create positive personal outcomes—a testament to their capacity to rebound in spite of setbacks. In the face of challenges, the students displayed varying levels of resilience. Some showed insight into the changes that they had been able to make in their lives. Many were optimistic about the future, willing to work hard, and showed a level of responsibility and wisdom beyond their years. For the students whom we interviewed, establishing meaningful connections with teachers and school counsellors had been critical in fostering this capacity for resilience. Schonert-Reichl argues that caring relationships are the most important protective factors that can be provided for children in order for them to reach their potential. In her research, children who had relationships with two or more caring adults did better in school than those with fewer (The Learning Partnership, 2009). It is what makes "dandelions" (robust children who survive under any condition) able to thrive and "orchids" (sensitive children who have extraordinary potential) more likely to survive and grow. When students know they are cared for, when schools provide numerous opportunities for developing skills, when students feel a sense of belonging to the learning community created within their classrooms, they are able to flourish.

Theoretical Point of Departure: Bronfenbrenner's Ecological Model

Bronfenbrenner's ecological model (1989) was our point of departure because we wanted to look at at-risk students within the context of their family, school, and community supports. Bronfenbrenner's model is schematized as a series of concentric circles representing different layers of the child's surrounding environment. Each layer is seen as having a powerful impact on the child's development. The farther away the ring is from the hub, the less direct the impact on the student. The child is at the centre of this model, nested within the various environmental influences, including the microsystem (e.g., the home, school, and community), the exosystem (e.g., the justice system, health services, school divisions, and government), and the macrosystem (e.g., the nation's broader cultural values, political philosophies, economic resources, and social conditions). Risk and protective factors, which affect a child's healthy development, may be found in any one of Bronfebrenner's subsystems.

Risk Factors

In our study, we considered previously identified risk factors, such as child abuse and neglect, family breakdown, maternal depression, parental alcoholism and poverty (Bernadini & Jenkins, 2002; Bernard-Bonnin, 2004; Brown, Cohen, & Johnson, 1998; Brownell et al., 2006; Flora & Chassin, 2005; Santos, 2007; Winslow, Wolchik, & Sander, 2004). Exposure to trauma was also included as a risk factor (Copeland, Keller, Angold, & Costello, 2007; Overstreet & Mathews, 2011).

According to Finkelhor, Turner, Ormrod, Hamby, and Kracke (2009), approximately 60% of American youth aged 2 to 17 years have been exposed to violence either as a witness or as a victim within the past year. Exposure to violent trauma is especially ubiquitous among low-income immigrant youth living in urban environments (Stein, Jaycox, Kataoka, Rhodes, & Vestal, 2003).

We also recognized that risk factors usually exist in clusters (Bernardini & Jenkins, 2002). Children who are abused or neglected tend to be in poor families, with single parents living in disadvantaged neighbourhoods fraught with violence, drug use, and crime (U.S. Department of Health and Human Services, Office of the Surgeon General, 2001). The greater the number of risk factors, the more likely the child is to experience poor school, health, and adjustment outcomes. These, in turn, may predispose the child to further trouble, making it harder for him or her to secure a positive foothold to reverse the process.

Protective Factors

To balance the formidable list of factors that predispose students to risk, we also examined protective factors, which promote healthy development and school success. Such factors include both internal student characteristics (e.g., social competency, self-efficacy, hopefulness, and intrinsic motivation) and external, context-bound factors (e.g., a caring and supportive family; a positive school climate; and a safe, crime-free community) (Downey, 2008; Kitano & Lewis, 2005; Martin

& Marsh, 2006; Morrison, Brown, D'Incau, O'Farrell, & Furlong, 2006; Stepp, Pardini, Loeber, & Morris, 2011; Wright & Masten, 2005). Internal and external factors do not exert their effects in isolation; they interact with one another. Academic resilience is thought to result from "a dynamic set of interactions between the student and resources in his or her environment that work together to interrupt a negative trajectory and support academic success" (Downey, 2008, p.56).

The following examples serve to illustrate this dynamic interaction more effectively. Social competence, an individual's ability to interact effectively with others, has a positive effect on educational attainment in at-risk youth (Elias & Haynes, 2008; Stepp et al., 2011). This trait allows the adolescent to better navigate the social pitfalls that may act as a detriment to their schooling, such as associating with delinquent peers and engaging in risky behavior (Stepp et al., 2011). Self-efficacy or sense of agency is another protective attribute (Wright & Masten, 2005). It is the belief that individuals are in control of their environment and capable of attaining desired goals. This has been linked to perseverance in education and academic resilience (Cavazos et al., 2010; Martin & Marsh, 2006).

Hopefulness, or the belief that the future holds positive possibilities, is central to one's motivation to set goals, energetically pursue them, and (like self-efficacy) believe that they are personally attainable (Helland & Winston, 2005; Worrell & Hale, 2001). Hope has been related to engagement in learning, and serves as a protective factor against dropping out of school (Van Ryzin, 2011; Worrell & Hale, 2001). High-hope people not only energetically pursue goals; they also generate *more* goals (Helland & Winston, 2005).

Linked to hope's motivational significance is the construct of intrinsic motivation, the inherent tendency to seek out challenges, to extend and exercise one's capabilities, and to explore and learn (Faye & Sharpe, 2008; Ryan & Deci, 2000). Intrinsically motivated students are more likely to continue with their education, and demonstrate better school performance (Cavazos et al. 2010; Hayenga & Corpus, 2010). The control dimension in motivation is of particular significance to vulnerable youth because it is an important determinant of students' responses to setback, pressure, and fear of failure (Martin, Marsh, & Debus, 2001).

Internal factors influence academic success; however, the ecological context, including the institutions and communities with which the student interacts, plays an equally important role in promoting positive outcomes in the child's health, education, and well-being. For example, school climate has an impact on students' academic success. Positive interactions with teachers and staff are related to school engagement, which can mitigate risk, protect students from dropping out, and improve school achievement (Van Ryzin, 2011; Worrell & Hale, 2001) (see Figure 1).

The school's influence operates in a fashion similar to family supports where parental encouragement, positive expectations, and responsive involvement can moderate the deleterious effects of an aggressive school environment and negative peer influences (Cavazos, et al., 2010; Farrell, Henry, Mays, & Schoeny, 2011).

Both internal and external protective factors have a marked influence on resilience. However, to gain a better understanding of their effects on academic motivation and achievement, one cannot ignore a discussion of their interactions with one another. For example, we have noted that school engagement functions as a protective influence for students, as it promotes a sense of belonging (Morrison et al., 2006).

School engagement is influenced by numerous factors, both internal and external to the child. For example, students may receive strong support through caring relationships with teachers, staff, or peers within the school (Van Ryzin, 2011).

However, a child's social competence affects the development of those relationships (Stepp et al., 2011). Simultaneously, school engagement can be influenced by a child's sense of self-efficacy, motivation, and hope for the future. If a child believes he or she is competent and is motivated to learn, the student will be engaged in the classroom and elicit positive attention from teachers.

However, if the student has a less optimistic perspective or believes he or she is academically incapable, the student may elicit negative attention from school staff, less attuned to student needs, which may lead to further disengagement.

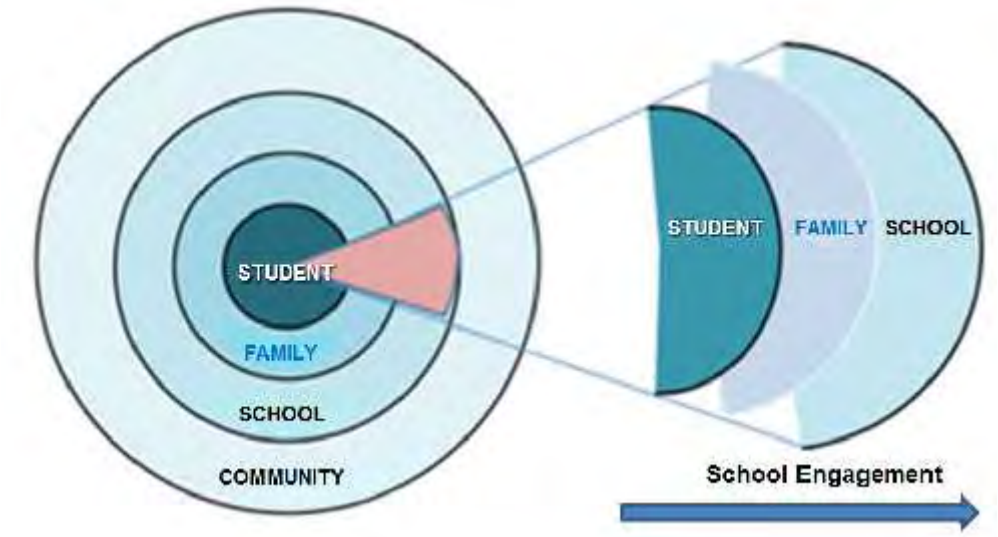


Figure 1: Bronfenbrenner's Ecological Model

The Importance of Family

Any discussion of how schools support at-risk students has to be grounded in an understanding of how families function to support the emotional development of children, from infancy to adolescence. Clearly, the family provides the most important emotional and social comforts in its network of caring relationships and material support, for growing children. Even a dysfunctional family provides an important place of belonging for the child in its expanded parental structure, which includes the proxy parenting of uncles, aunts, and grandparents. Children's early attachment to parents and other caregivers in the family have profound effects on the child's developing emotional and mental health. In fact, early interactions are said to form the architecture of the developing brain (Healthy Child Manitoba, 2012).

Effective parenting serves to both protect children from exposure to stressors and co-regulate young children's experiences until they develop the self-regulation needed for social competence and effective learning (Sapienza & Masten, 2011). The powerful effects of family on child development are underlined by an examination of the corollary effects of adverse conditions. Harvard University's Center on the Developing Child has compiled an extensive overview of the ways in which early experiences affect neurobiological processes that wire the brain for future outcomes (Shonkoff & Garner, 2012). Their findings suggest that toxic stressors such as child abuse or neglect can cause changes in the brain by altering the size and neuronal architecture of the amygdala, hippocampus, and prefrontal cortex. These changes cause functional impairments in executive functioning , which affects the child's ability to problem solve, persist on a task, to exhibit self-control, and engage in appropriate social interactions (Center on the Developing Child at Harvard University, 2011).

Understanding Resilience through Other Lenses

The initial goal of our study was to look at the characteristics of students who were enrolled in school and performing successfully despite the risk factors in their background. We felt that this perspective would provide insight into how schools are able to mediate the negative impact of early experiences that place students at risk. The development of all children is enabled by the effects of good parenting and positive family dynamics. As the child matures into adolescence and young adulthood and moves out of the immediate orbit of the family, neighborhood and community resources often provide important supports. However, the students in our study, despite their high

level of need, were rarely involved in their neighborhood or community or took advantage of available resources for sports, recreation or youth activities. The minimal community involvement that we did find had been facilitated by the school.

In the course of designing our research, carrying it out, and analyzing results, we searched the literature to build our understanding of how it is possible for students who are at extreme risk for academic failure to be encouraged to stay in school and to successfully complete secondary education. We looked at extant theories of risk and resilience; theories of the exercise of economic, social, and cultural capital; theories of how individual success is attained; and also theories about how individuals are supported in social contexts that contribute to success. In order to expand our theoretical framework, we looked for some of the mechanisms for these processes in neurobiology and epigenetics. Finally, we considered the use of socio-economic gradients as a way of measuring the impact of policy decisions that fund interventions for the largest number of students.

Neurobiology

Advances in the science of epigenetics, increasingly, are being recognized for their explanatory potential in early childhood education research (Sapienza & Masten, 2011). Epigenetics refers to the process in which normal gene expression is modified by environmental factors. This lens helps us better understand the relationship between genes and experience within the individual's environment, as it relates to resilience (Cloud, 2010). Rutter (1987) indicates that there are specific genetic variations that influence the individual's ability to resist adversity. These can serve to protect or buffer against exposure to stressful conditions. The expression of these genes is influenced by environmental factors.

Caspi et al. (2003), for example, studied the relationship between the 5-HTT gene and childhood abuse or trauma in triggering depression. When a child is *not* exposed to adversity, the gene does not express itself; only stressful experiences seem to turn the gene on. The fact that these effects have been observed and verified is evidence that interventions can be effective to improve the lot of children in difficult circumstances.

What is fascinating, however, is that "experiences that alter genetic structure can actually pass those changes on to offspring…" (The Learning Partnership, 2009, p.7). A child's genetic endowment, therefore, serves as a predisposition so that a child's eventual outcomes may be dependent on the presence of certain factors in the family or social environment that affect the expression or suppression of these genetic characteristics.

For educators, the understanding that epigenomes can be manipulated through the creation of a positive teaching and learning environment devolves significant responsibility to teachers. A positive school climate and strong, intuitive teachers can have a substantial impact not only on their student's capacity to withstand the stresses of life but on that of the student's offspring as well. Responsive changes may be encoded in the student's epigenome and passed on to their children. In this way, protection may be projected into future generations. Concepts from the field of epigenetics, thus, can serve as an important overlay to Bronfenbrenner's ecological framework, showing how changes effected in one sphere can connect to and activate nascent capacities in another.

Moving these broadened notions of vulnerability and neurobiological potential into Bronfenbrenner's model adds to the layers of interactions already present within the framework and demonstrates that an individual's genetic make-up, combined with early experiences, may be critical to understanding reasons for ultimate success. These insights lead us to examine the experiences of at-risk youth in the context of what is provided by families and communities to see how resources are provided, shared, and accessed (Sapienza & Masten, 2011). Further, they underscore the need for supportive families and, failing those, the need for supportive social and educational institutions.

Developmental Cascades

The concept of "developmental cascades" provides an ancillary lens that emphasizes the importance of interactions between numerous levels of influence over the course of a child's development. This perspective focuses on (1) cumulative consequences of these interactions, and (2) places particular importance on the child's developmental level and timing of these experiences (Masten & Cicchetti, 2010). Additionally, the attention to changes in levels of influence *across time* offers a more dynamic view of how resilience develops.

Developmental cascades are the chain reactions that result from changes and transactions between levels within the individual (e.g., psychological, biological, and behavioural), between systems (e.g., microsystems, exosystems, and macrosystems), and between generations (Masten & Cichetti, 2010). That is, a change in one factor may initiate later changes and cause spreading effects to other domains of behaviour or systems. Epigenetic processes can also contribute to developmental cascades. For example, positive maternal caregiving behaviours affect increased protective gene expression that results in lowered stress responsivity (Weaver et al., 2004). This cascade already involves an interaction between three different levels of influence (e.g., parental, genetic, and behavioural). Additionally, the child's stress responsivity has the potential to affect many more subsequent reactions.

Stress responsivity has been linked to a number of behavioural domains in children. Those with low versus high stress responsivity tend to perform better under conditions of adversity on measures of school engagement, externalizing behaviours, and pro-social behaviors (Obradovic, Bush, Stamperdahl, Adler, & Boyce, 2010). However, when adversity is not present, the reverse tends to be true: children who are highly responsive to stress thrive under positive environmental conditions. Thus, the later effects of adverse factors such as financial stress and negative parenting characteristics interact with the child's stress responsivity to continue the developmental cascade into behavioural characteristics that are important for school readiness. In the context of Bronfenbrenner's ecological model, these developmental cascades could be conceptualized as occurring across any number of subsystems.

A major benefit of identifying developmental cascades is their implication for improving developmental trajectories. By examining the chain of effects that occurs throughout development, appropriate points of intervention become more salient. For example, by changing the earliest factor in the cascade, subsequent reactions are prevented and positive cascades may be initiated. However, later links in the chain of relationships between factors may also provide opportunities for intervention if prevention is not possible. Such prospects are encouraging, as this suggests that multiple pathways to resilience exist (Masten & Obradovic, 2006). Early intervention may be most effective, but resilience can also develop with the help of later positive influences.

The notion of developmental cascades also has the ability to unify a great number of factors that influence resilience. However, little research has yet to examine cascades across systems. Methodological issues make direct study of developmental cascades difficult, as most research relies on cumbersome longitudinal studies and correlational analyses that make causative inferences difficult (for an in-depth review of the methodological difficulties involved, see Masten & Cicchetti, 2010). Despite these shortcomings, developmental cascades capture the complex and dynamic nature of resilience well, and their incorporation into Bronfenbrenner's original ecological model creates an informative picture of the development of resilience.

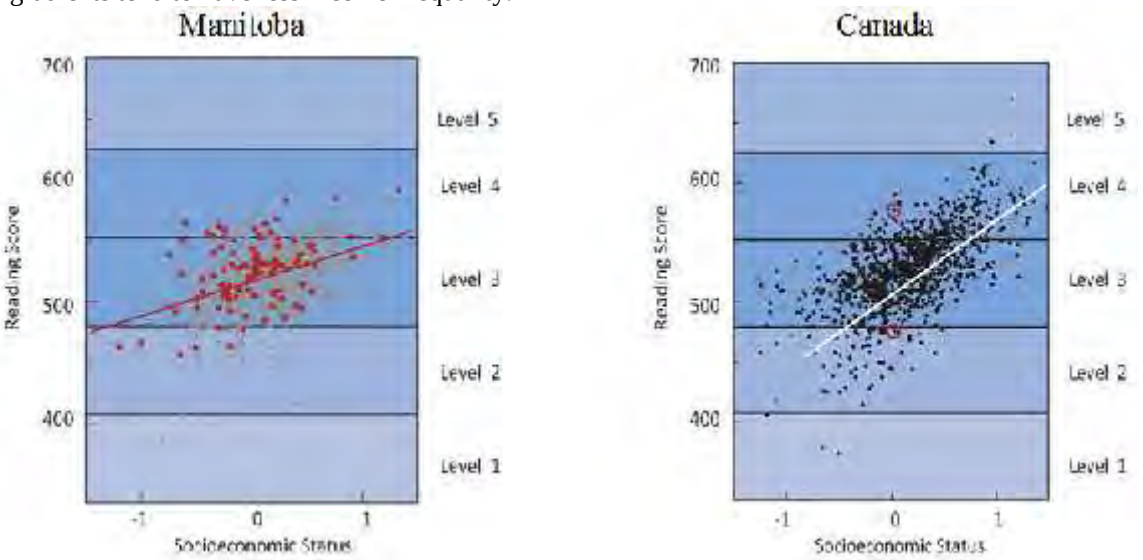
Economic, Social, and Cultural Capital

Investment theory, developed by Nobel Laureate Gary Becker (Becker, 1993; Becker & Tomes, 1986), provides yet another interactive overlay to Bronfenbrenner's model that explains the important supportive role that parents can play in providing opportunities for access to resources. Sociologist Pierre Bourdieu (1977) uses the term *capital* as a metaphor for the economic, social, and cultural assets of families that lead to improved educational and socioeconomic outcomes for their children. Social capital refers to how parents can provide their children access to unique opportunities and rich

resources through the use of social connections and networks of influence. Families with greater economic capital can more easily afford to have a stay-at-home parent during the child's early years, afford high-quality childcare and private schools, and offer through private lessons and cultural events first-rate learning opportunities and materials. It is the social networks and prestige provided by private schools more than the teaching and learning that takes place within them that extends students the comparative advantage. Parents also provide their children with cultural capital by transmitting the attitudes and knowledge needed to succeed in the current educational system. Schools are largely middle-class institutions, which reflect middle-class language patterns, values, and authority structures. Thus, children raised in middle-class environments possess the cultural capital that allows them to understand the curriculum and adjust more readily to school life (Lareau, 1987). Students who have the benefit of economic, social, and cultural capital will have access to resources within their environments that support health, education, and well-being and, thereby, increase their chances of future success. In our own study, we found that schools can play an important role in providing social capital through access to relationships, events, and community links and opportunities for disadvantaged or marginalized students.

Socio-Economic Gradients

Finally, the study of socio-economic gradients (Willms, 2002) maps the relationship between socio-economic status and selected health and education outcomes. SES gradients extend our understanding of the sources of social outcomes in populations and are useful for policy making and planning purposes. As an illustration, reading scores for 15-year-old youth by SES in Manitoba, as determined by the OECD *Program for International Student Assessment* (PISA), are reflected in Figure 2 (Willms, 2004). Patterns confirm that, although there is a wide range of reading scores at all levels of SES, the lower the SES, the lower the reading score will tend to be. However, the Manitoba, Canada profile of students' reading performance in relation to their SES shows that, overall, children in this province score well in reading with less differentiation among socio-economic classes than when compared to the national average. This is reflected in Figure 2 with an SES gradient for children in Manitoba that is generally flatter than in Canada as a whole. Extending this approach to nations as a unit of analysis, one finds that those countries with relatively steep SES gradients when measuring, for example, graduation rates, tend to have greater income inequality and those with gradual SES gradients tend to have less income inequality.



Note: Reading achievement was divided into five levels, ranging from Level 1 (very low literacy skills) to Level 5 (complex literacy skills)

Source: Willms, J. D. (2004). *Variation in literacy skills among Canadian provinces: Findings from the OECD PISA*, Ottawa, ON: Statistics Canada.

Figure 2: Reading Scores for 15-year-old Youth by SES in Manitoba, as Determined by the OECD, PISA, 2003.

Willm's position is supported by social epidemiologists, Richard Wilkinson and Kate Picket (2007), who argue that increased societal well-being in a nation must be built *not* on absolute economic growth but on greater economic equality. They contend that inequality in a society can be a highly damaging force; the greater the inequality, the worse the country tends to fare on children's math and reading scores, school dropout rates, number of teenage births, and children's well-being and mental illness (Wilkinson & Pickett, 2009).

An analysis of gradients can provide a simple test of whether social policies or specific interventions, such as school literacy programs, are successful by examining whether the consequent slope has steepened or flattened (Willms, 2002). This approach attempts to show some of the possible mechanisms in the provision and sharing of resources that may contribute to the widely noted explanatory power of socioeconomic gradients in educational and other life outcomes.

Frempong and Willms (2002) examined whether school quality can compensate for socio-economic disadvantage, by studying the effects of "good" vs. "poor" schools on the academic achievement of vulnerable children. Results from their study "suggest that if one family who has a child entering Kindergarten chooses a school with above average Math performance [based on the 1995 *National Longitudinal Survey of Children and Youth* and the *Third International Mathematics and Science Study (TIMSS)*] and the other [family of similar socio-economic background and with a kindergarten child of similar ability] chooses a school with below average performance, by the time the children enter secondary school, the child in the better school will be at least one full grade level ahead of the other child in mathematics" (Frempong & Willms, 2002, p. 298). This is clear evidence that the quality of the school can make a difference in the grade-level attainment of vulnerable children. In other words, it is possible for a "good" school to compensate for a child's socio-economic disadvantage.

Based on Willms' work (2002), program changes considered from the macrosystem of influence in Bronfenbrenner's model should not simply consist of targeting one group but be inclusive of all since vulnerable children can be found throughout the SES spectrum, although in greater proportion at the lowest SES level (Santos, 2009). It is, thus, incumbent on government to introduce policies that support interventions (a) at all levels of education, (b) that are both universal and targeted, and (c) that are based on research outcomes.

The Emergence of a Multi-Lens Model of Resilience

In reflecting on the different lenses through which risk and resilience can be studied, we return to Bronfenbrenner's ecological framework. Although the strength of this model lies in its focus on a more contextually embedded ecology of resilience, there are a number of ways it can be enhanced. First, the model does not place enough importance on the interaction between the child's genetic endowment and his or her environment and how that interplay "affects gene expression, changes neural pathways, shapes emotion, molds temperament, impacts social development, and influences the child's physical and mental health" (The Learning Partnership, 2009, p. 7). An enhanced portrayal of the child's dynamic pathway within the various spheres of influence of the model would provide a more nuanced and contemporary image of developmental change. Second, the model does not effectively address how the impact of factors changes over the course of an individual's development, from infancy, through childhood, to adulthood, nor does it reflect the impact of intergenerational trauma or health issues on the child.

While the model has been modified by Bronfenbrenner to include the chronosystem, which addresses changes to the individual or environment over time, the multi-faceted changes resulting from the interaction of the components in all of the subsystems cannot be reflected adequately in the present model. Such complex, fluctuating changes, could, however, be illustrated by representing the model three-dimensionally, with overlaid, concentric rings, allowing for dynamic interchange of any or all of the identified components at any given time (personal communication, C. Froese-Klassen, October 15, 2011). Finally, at the more distal sphere of influence, the model could be strengthened by

placing equal importance on social policy implications for interventions that move concerns of equity and justice to the forefront. Although schools are key when protective layers are stripped within the family, one needs to look at broader public policy interventions that would provide the mandate and resources for schools to adequately address issues of equity for children at-risk. This manner of mobilizing the exercise of social capital through the public policy sphere can become a reality. In this way, schools may be able to tip the balance for these vulnerable youth so that the SES gradient, using Willm's (2002) concept, is flattened and success is within reach for all students.

Our enhanced model for risk and resilience incorporates a number of important elements that provide additional explanatory power to Bronfenbrenner's model (Figure 3). Risk and protective factors form a network of influences that surround the developing child. Schools function as important protective factors in the pre-teen and adolescent years by buttressing the positive effects of family dynamics, thereby providing the groundwork for ongoing and later cognitive development. The epigenetic perspective provides an appreciation for the impact that epigenetic markers, as influenced by environmental factors, can have on students' resilience by suppressing children's harmful genes or expressing protective ones. Brain development, as affected by gene-environment interactions, lays the groundwork for subsequent learning and has a long-term impact on the child's achievement and mental health (Heckman, 2006; Weaver et al., 2004). It also explains how it is possible for schools and/or families to have the kinds of powerful effects seen on child outcomes even in adolescence (Brody et al., 2009).

The inclusion of economic, social, and cultural capital in the emergent framework shows how schools can play a significant role, similar to extended family influences, by connecting students with community resources and organizations that promote academic and life-course success. Developmental cascades show how early experiences can cause developmental changes that have wide-spread influence, affecting multiple domains of functioning (Masten & Cicchetti, 2010). Positive effects of small gains in student achievement and confidence in a school setting can multiply and ripple outward into comprehensive life-effecting outcomes in students' motivation, optimism, and hope for the future. Finally, the inclusion of the concept of socio-economic gradients provides a measure of the effectiveness of broad policy-based interventions, including the provision of nation-wide quality child care, the development of public health initiatives, and the implementation of targeted school programs, designed to achieve equity in education, health, and well-being.

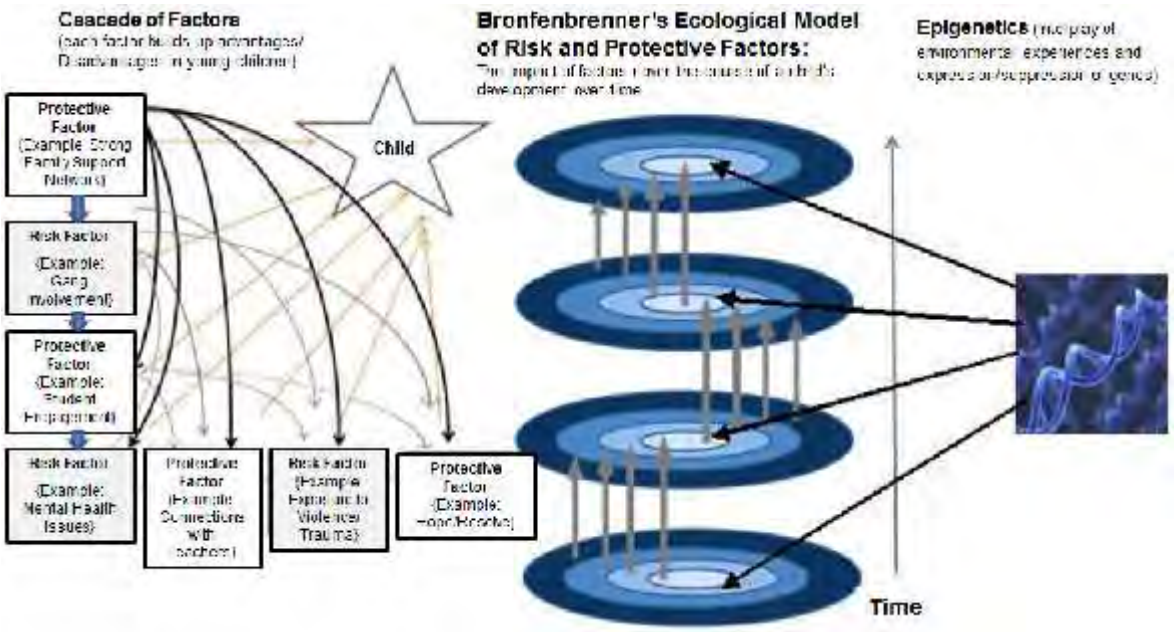


Figure 3: Enhanced Ecological Model of Risk and Resilience.

Conclusions

The use of a multi-lens perspective in the examination of resilience demonstrates a convergence of evidence for the importance of intervention strategies at different levels in promoting a resilient population. For example, McCain, Mustard, and Shanker (2007) argue for early intervention. They maintain that a high-quality, universal, early-childhood development program in Canada is not just a moral imperative; it makes economic sense. The cost of poor early-child development to Canadian society is estimated to be $120 billion per year in crime and violence and an additional $100 billion in mental health, behavioral problems, and substance abuse (McCain et al., 2007). In contrast, a high-quality, universal, early-childhood education program across Canada would cost $18 billion per year and serve 2.1 million children from birth to six years of age. Compared to other industrialized nations, Canada spends relatively little on early childhood education and care (Organisation for Economic Co-operation and Development [OECD], 2006)—only .25 percent of its Gross Domestic Product (GDP). Mustard urges that we invest at least 1.5 percent.

Using similar arguments, the RAND Corporation estimates that for every $1 invested in high-quality, early-learning programs, there is a $1.26 to $17 return (The Learning Partnership, 2009). A well-known longitudinal study on early childhood intervention conducted in Ypsilanti, Michigan, the Perry Preschool Program, demonstrates how spending on early child care can have large investment returns in crime savings, and also substantial returns in education savings, welfare savings, and taxes from job earnings (Schweinhart et al., 2005). Children enrolled in the program at the ages of three or four years old received specialized educational programing during mornings and home visits from the teacher in the afternoon. Forty years later, children enrolled in the program had higher salaries, high school graduation rates, and percentages of home ownership in comparison to a matched control group (Schweinhart et al., 2005). Moreover, the economic returns totaled $16.14 USD for every dollar invested into the program. Based on this and similar studies, some of the world's leading economists, such as Nobel Prize winning James Heckman, urge for early "investment in human capabilities" that will provide the largest returns to society (Heckman, 2008, p. 33).

Advocates like McCain et al. and Heckman make a strong case for the importance of early intervention. However, we believe that this focus should not be at the expense of society's equally important ethical obligation to address the needs of struggling pre-teens and adolescents in the school system (Babb, Saboruin, Andruchuk, & Polyzoi, 2013). In fact, schools, as "universal" institutions, are in an ideal position to provide the organizational mechanism needed to deliver effective school success programs for all students. In our study, we found where families had been unable to provide protection and safety, and where communities failed to support struggling families, schools emerged as important mediators of the effects of adversity and stress for youth. The more vulnerable the students, the more important the role assumed by the school in helping to buffer them against the challenges of difficult homes, families, and neighbourhoods (Polyzoi et al., 2013).

Our model outlines how youth, in the course of their lives, are affected by various factors, including the way that schools, as lead institutions, can enable individuals to achieve their potential. We believe that schools are a vital component of the efforts of society to ensure that these life-course achievements are within their grasp. Schools can function to create and mobilize supports for students by creating opportunities to empower them to act in their own interest and develop skills, knowledge, and connections through the school into the wider community. The establishment of a meaningful connection with a teacher or counselor can be the beginning of a process of empowerment. Early nurturing experiences help shape an individual's life trajectory and bolster his or her potential for achieving important measures of success, such as academic achievement, stable employment, positive family dynamics, healthy life styles, civic engagement, and social responsibility. In other words, education has the potential to exercise social and cultural capital on behalf of those under their charge, students who are vulnerable and whose life path, without protective factors, exposes them to significant risk of later negative outcomes in health, education and well-being.

The enhanced ecological model presented in this paper was developed to better understand the various forces impacting the development of vulnerable children and is unique in a number of ways. First, it changes the discourse by focusing on student strengths and assets versus problems and deficits. Second, it moves away from an exclusive focus on explaining vulnerability through identifying individual characteristics and recognizes the importance of building the family's capacity for accessed resources (Ungar, Brown, Liebenberg, Cheung, & Levine, 2008, p. 2). Third, it addresses the ongoing and often neglected developmental needs of adolescents during a time of critical cognitive development; the literature tends to focus on the early years. Fourth, it examines the role that schools can play in buffering students against adversity, an area for which there is a dearth of research. Fifth, it provides additional explanatory power to Bronfenbrenner's model by detailing some of the mechanisms of such influence. Sixth, it integrates other informative perspectives, including the biogenetic basis of resilience; developmental cascades; economic, social and cultural capital; and socio-economic status (SES) gradients. Finally, it links the study's findings with social policy implications for both universal and targeted intervention approaches that move concerns of equity and justice to the political forefront.

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