

Facilitating Adolescent Well-Being: A Review of the Challenges and Opportunities and the Beneficial Roles of Parents, Schools, Neighborhoods, and Policymakers

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Abstract

Adolescents face exceptional challenges and opportunities that may have a lifelong impact on their consumption and personal and societal well-being. Parents, community members (schools, and neighborhoods), and policymakers play major roles in shaping adolescents and influencing their engagement in consumption behaviors that are either developmentally problematic (e.g., drug use and unhealthy eating) or developmentally constructive (e.g., academic pursuits and extracurricular activities). In this paper, we discuss two main topics: (1) the challenges and opportunities that characterize adolescence, based primarily on research in epidemiology and neuroscience, and (2) the ways that parents, community members, and policymakers can facilitate positive adolescent development, based on research from many disciplines including marketing, psychology, sociology, communications, public health and education. Our goal is to summarize the latest scientific findings that can be used by various stakeholders to help adolescents navigate this turbulent period and become well-adjusted, thriving adults.

Key words: Adolescent consumption, adolescent epidemiology, neurological development, psychosocial development, drug and alcohol use, premature sex, unhealthy eating, academic pursuits, extracurricular activities

This paper provides a multidisciplinary review of research on the challenges that adolescents face, and the valuable opportunities that adolescents are afforded, during this critically important developmental period (Hollenstein & Loughheed, 2013). In addition, we review the extensive research on how parents, community members (schools and neighborhoods), and policymakers can fruitfully guide adolescents to enhance their well-being. Adolescents are generally defined as teenagers, 13-19 year olds, although these age boundaries are influenced by both individual difference and environmental factors (Hollenstein & Loughheed, 2013; Pechmann, Levine, Loughlin, & Leslie, 2005). In the U.S., 13-19 year olds make up about 10.4% of the population or 25 million people (U.S. Census Bureau, 2016a). While adolescence only lasts for about seven years, the consumption habits that develop may last a lifetime.

In the first part of this paper, we provide a detailed description of the period of adolescence based primarily on the extensive research of epidemiologists and neuroscientists. The epidemiological research identifies the major risks and rewards facing adolescents and the major categories of products and services that they consume. The work of neuroscientists yields insights into the processes that explain why adolescence is an exceptionally difficult and yet promising developmental period. In the second part of this paper, we discuss the roles of parents, schools, neighborhoods and policymakers in guiding and shaping adolescents. While parents greatly influence adolescents, these other stakeholders are also critical, so we

discuss what practices they should utilize or avoid. Overall, our goal is to provide a rich description of adolescence, and then explain what parents and other stakeholders can do to help ensure that adolescents become thriving and well-adjusted adults, based on the latest scientific findings.

Assessing the Challenges of Adolescence: Epidemiological and Neuroscience Profiles

An Epidemiological Profile of Adolescence

We begin by discussing the primary metrics used by epidemiological researchers to monitor adolescent behaviors, and the resulting profile of adolescent consumption that they provide. Governmental and nongovernmental organizations worldwide invest considerable time and money to monitor adolescent behaviors, both positive and negative, assessing each new cohort's status, comparing to historic levels, and detecting trends. These same behavioral metrics are also used to evaluate parent, community, and policy actions that may impact adolescents. Table 1 lists the main epidemiological metrics and provides a profile of today's U.S. adolescents. To begin, nearly one in four (23%) of U.S. adolescents live in households below the poverty line (National Survey on Drug Use and Health, 2015). Slightly more adolescents live with a single parent (27%), and 4% live with no biological parent (U.S. Census Bureau, 2016b).

For generations, U.S. high school students have used drugs illegally. The current drug use prevalences are 60% for alcohol, 42% for vaping or e-cigarettes, 36% for marijuana, 29% for cigarettes, and 14% for unprescribed pain medications (Kann et al., 2018). Additionally, 17% of adolescents report riding in cars with drivers under the influence of alcohol (Kann et al., 2018). These statistics indicate that adolescents are at a high risk for using drugs, and for being targeted by marketers of these products. For example, the rise of adolescent vaping is attributed in part to flavored nicotine products like Juuls, which have become a recent focal point for policymakers (Patrick et al., 2016).

Roughly 40% of U.S. high school students have engaged in sexual intercourse at least once, with 29% sexually active in the past three months, and just 54% using condoms (Kann et al., 2018). While 86% of adolescents are heterosexual, sizeable segments are bisexual (8.0%), gay or lesbian (2%), or unsure (4%) (Kann et al., 2018). The U.S. pregnancy rate for females aged 15-19 is 4%, with 3% experiencing a live birth (Kost, Maddow-Zimet, & Arpaia, 2017). Being an adolescent parent often has lifelong negative ramifications (Dworsky & Meehan, 2012; Williams & Sadler, 2001).

Weapon use is monitored, and about 16% of U.S. adolescents carried a weapon within the past month (Kann et al., 2018). Also about 15% of high school students report shoplifting in a typical week (Grant, Potenza, Krishnan-Sarin, Cavallo, & Desai, 2011). Suicide attempts among adolescents are tracked as a fundamental barometer of their well-being, with as many as

7% of U.S. adolescents (nearly 2 million) attempting suicide annually (Kann et al., 2018). Only about .03% of U.S. adolescents die annually, but suicide accounts for 22% of these deaths, with unintentional injury at 32%, and homicide at 12% (National Center for Health Statistics, 2016).

Other indicators of adolescent health are body mass index (BMI) and nutritional intake. Based on body mass index, about 15% of U.S. high school students are obese and another 16% are overweight, for a total of 31% overall (Kann et al., 2018). An estimated 3% of U.S. adolescents have had an eating disorder at some point in their lives and this is more common among adolescent females (4%) than males (2%) (Merikangas et al., 2010). Only about 19% (14%) of adolescents consume the recommended three servings of fruits (vegetables) per day (Kann et al., 2018). Roughly 34% of youths (ages 2-19) consume fast food on a given day, accounting for about 17% of the calories they consume (Vikraman, Fryar, & Ogden, 2015). Hence, adolescents are a major target for fast food marketing (Grier & Davis, 2013).

Epidemiologists monitor positive adolescent behaviors as well, finding that about 87% of U.S. adolescents participate in two or more extracurricular activities per year (National Survey on Drug Use and Health, 2015). In addition, 54% of U.S. adolescents play team sports (Kann et al., 2018), and 61% participate in religious activities (National Survey on Drug Use and Health, 2015). Roughly half of them of driving age hold a drivers' license (Sivak & Schoettle, 2016). About 35% of U.S. adolescents who are ages 16-19 hold a summer job, with 29% working during non-summer months (Pew

Research Center, 2018a). Adolescents' high workforce participation indicates substantial discretionary income of their own.

The average U.S. teenager spends about \$2,600 annually or \$50 per week, with 21% of this money spent on clothing and 20% on food (Piper Jaffray 2019). About 95% of US teenagers own a smartphone, 88% own a computer, and 84% own a videogame console (Pew Research Center, 2018b). Moreover, 43% use electronic devices for non-academic purposes for three or more hours a day (Kann et al., 2018), and 19% do so for five or more hours a day (Lee, Sung, Lee, & Lee, 2017). In addition, 21% of U.S. high school students watch television for three or more hours daily, increasingly on computers or other mobile devices rather than on television sets.

Adolescents in the U.S. extensively utilize social media including YouTube (85%), Instagram (72%), Snapchat (69%), Facebook (51%), and Twitter (32%) (Pew Research Center, 2018b). Adolescents frequently shop and buy online (Piper Jaffray 2019) and many are online marketing mavens, having a substantial influence on their family purchases (Belch, Krentler, & Willis-Flurry, 2005). In sum, adolescents are heavy consumers of technology, and from it they receive extensive exposure to marketing and other influences.

Among US adolescents, 80% like school and 86% earn passing grades; but this means 14% are failing in school (National Survey on Drug Use and Health, 2015). The adolescent truancy rate, defined as missing 15 or more days of school a year, is 13% (U.S. Department of Education, 2014). The adolescent school suspension rate is 10%, with African Americans at 23%,

Hispanics/Latinos at 11%, Caucasians at 7%, and Asians at 2% (Losen, Hodson, Keith, Morrison, & Belway, 2015). Among 3-17 year olds, 9% have been diagnosed with ADHD and 7% with other learning difficulties (Child and Adolescent Health Measurement Initiative, 2016).

A Neuroscience Profile of Adolescence

Neuroscience research explains why many of these specific behaviors, such as drug use, tend to be especially prevalent during adolescence. Figure 1 presents a multidimensional profile of adolescents based on both epidemiology and neuroscience.

A major challenge facing adolescents is that, as their brains develop, the striatal system, which receives input from the amygdala and is associated with exploratory behavior, impulsivity and reward-seeking, matures before the prefrontal cortex, which is associated with top-down executive control (Hollenstein & Loughheed, 2013; Pechmann et al., 2005). This asynchronous brain development is associated with adolescent preference for immediate rewards, discounting of long-term losses, and their risk-taking and impulsivity (Kilford, Garrett, & Blakemore, 2016; Dick, Adkins, & Kuo, 2016). Because adolescent exploratory behavior surges before the maturation of cortical control, the situation has been likened to starting a car with an unskilled driver (Dahl, 2004). While it is adaptive for adolescents to seek out rewards and take chances so they leave their homes and become independent from their parents, their relatively unbridled reward-seeking

and impulsive tendencies increase risky behaviors like drug use, developmentally inappropriate sexual activities, and illegal and delinquent behaviors (Leslie et al., 2004; Reyna & Farley, 2006; Spear, 2000).

Adolescents do not perceive themselves as immune to behavioral risks, in fact, they overestimate certain risks; but they are often unable to exhibit the behavioral inhibition that is required for safe outcomes (Reyna & Farley, 2006).

Another difficulty facing adolescents is that, when they encounter rewarding stimuli, there is excessive release or overshoot of the neurotransmitter dopamine into the ventral striatum of their brains (Donohue, Urgelles & Fayeghi, 2013; Kelley, 2004; Wise, 2004). As a result, adolescents show increased sensitivity to rewards relative to other age groups, as evidenced by greater activation in the ventral striatum, insula, and posterior cingulate cortex (Leany, 2013; van Duijvenvoorde, Peters, Braams, & Crone, 2016). In particular, adolescents are more sensitive to the rewarding effects of drugs like nicotine and alcohol (Leslie et al., 2004; Philpot, Badanich, & Kirstein, 2003). Unfortunately, their brains are also especially vulnerable to the toxic effects of drug use, for instance, drug use during adolescence can substantially harm the hippocampus, which is involved in memory formation and does not fully develop until late adolescence (Durstun et al., 2001; Slotkin, 2002)

Also during adolescence, the overshoot of dopamine which occurs upon exposure to rewards or other sensory stimulation causes a premature

shut-down of cortical or executive control (Goldman-Rakic, Muly, & Williams, 2000). This premature shut-down contributes to adolescents acting impulsively, inadequately self-regulating, and making poor decisions about engaging in risky behaviors (Donohue et al., 2013; Leany, 2013; Steinberg, 2002; Steinberg, 2008). In particular, when adolescents are with peers, they often experience high levels of sensory stimulation, accelerating the shutdown of cortical control, and making them even more prone to engaging in risky acts (Kilford et al., 2016), e.g., adolescents make risky driving decisions in the presence of peers which adults are not prone to make (Gardner & Steinberg, 2005).

Adolescence is also when gonadal puberty occurs, and the newly released hormones including androgens, estrogens, and progesterones produce dramatic changes in the adolescent body as well as a cognitive awareness of their sexuality (Best & Fortenberry, 2013; Rowe, Maughan, Worthman, Costello, & Angold, 2004). These pubescent hormones elicit excitatory drive and exploratory behavior, often resulting in developmentally inappropriate sexual behavior (Hamann, Herman, Nolan, & Wallen, 2004). However, adolescents' raging hormones are estimated to directly account for only about 6% of their risky behavior, with their behavior more strongly influenced by the environment and by individual difference factors (Hollenstein & Loughheed, 2013).

Yet another factor that influences adolescents' risky consumption behaviors and other behaviors is that they feel more stress and negative

emotions, and more volatile emotions, than any other age group (Larson, Moneta, Richards, & Wilson, 2002). Stress and negativity are elevated because with adolescence comes major life transitions, including awkward bodily changes, moves to larger and more demanding schools, and disruptive alterations in peer and family relationships (Larson et al., 2002). Moreover, adolescents' capability for abstract thinking often causes them to envision severe social threats and to generate negative self-images (Clark & McManus, 2002; Pine, 2001; Spurr & Stopa, 2002).

Adolescents are less able to employ useful cognitive strategies such as distraction or reappraisal to regulate their negative images and emotions, relative to adults (Folkman, Lazarus, Pimley, & Novacek, 1987; Gross et al., 1997). When adolescents experience stress and negative emotions, they often cope by engaging in risky consumption behaviors such as drug use (Whalen, Jamner, Henker, & Delfino, 2001). Excessive stress in adolescence also disrupts development of limbic structures in the brain, which helps to explain why stress-induced psychopathologies such as depression, bipolar disorder, and suicidal tendencies often emerge in adolescence (Andersen, 2003; Walker, Sabuwalla, & Huot, 2004).

Genetic predispositions and other individual differences cause some adolescents to be more vulnerable to risky behaviors than others (Best & Fortenberry, 2013). Studies suggest correlations between certain genes and adolescent nicotine use (Dick et al., 2016), alcohol use (Sales & Irwin, 2013; Young-Wolff, Enoch, & Prescott, 2011), risky sexual behavior (Harden, 2014;

Kotchick, Shaffer, Miller, & Forehand, 2001; Sales & Irwin, 2013; Susman, Dorn, & Schiefelbein, 2003), overeating (Faith, Carnell, & Kral, 2013; Moore, Wilkie, & Desrochers, 2017) and serious eating disorders including anorexia and bulimia (Hoste & Grange, 2013). Genetic mutations or alleles also correlate with adolescent premature sexual behavior, drug use, homosexuality and delinquency (Best & Fortenberry, 2013; Bentley et al., 2013; Sales & Irwin, 2013). Thus, it appears that some adolescent behavioral tendencies may be genetically inherited.

In addition, adolescents who engage in risky behaviors tend to differ neurologically from those who do not, though it is difficult to tell if these differences caused the risky behaviors or resulted from them. Adolescents who use drugs exhibit poorer executive functioning (Chassin, Hussong, & Beltran, 2009) and show clear differences in the brain's frontal lobe (Silveri, Dager, Cohen-Gilbert, & Sneider, 2016), relative to drug non-users. Adolescents who drink alcohol heavily show increased activation in the ventral striatum, and decreased connectivity between amygdala and orbitofrontal cortex, indicating greater reward sensitivity and risk-seeking (van Duijvenvoorde et al., 2016). Adolescents who engage in delinquent behaviors tend to have difficulty coordinating the prefrontal (planning) and limbic (emotional) regions of the brain and to be hyper-sensitive to rewards (Gatzke-Kopp, DuPuis, & Nix, 2013).

While this is a challenging period, adolescence is also a period of intense physical and intellectual growth, self-development, and

achievement. Many cognitive skills are mastered in adolescence, raising performance to levels that meet or exceed adults (Leslie et al., 2004). Adolescents manifest an increased capacity to think abstractly, consider future consequences, form self-identities, empathize with others, and engage in high-level motor coordination (Eccles, Wigfield & Byrnes, 2003; Wentzel, Filisetti, & Looney, 2007). In late adolescence, many other critical milestones are reached, with late developing brain regions including the hippocampus which facilitates memory formation (Durston et al., 2001), and the cerebellum which regulates the timing of motor and cognitive sequences (Diamond, 2000).

A hallmark of adolescence is experience-dependent plasticity, meaning that commonly used brain synapses are strengthened while unused brain synapses are pruned, which serves to stamp in learning (Giedd, 2004). There is massive pruning of unused synapses, with myelination of the remaining synapses occurring to increase nerve conduction efficiency, as evidenced by dramatic increases in white matter relative to gray matter in the adolescent brain (Durston et al., 2001; Giedd, 2004; Gogtay et al., 2004). It is estimated that, during early adolescence, synaptic pruning in the frontal cortex occurs at a rate of about 30,000 synapses per second, with up to 40% of synapses being affected in some brain areas (Brenhouse & Andersen, 2011).

In other words, adolescents are strongly predisposed to adapt to their environment, and to forego developing certain specialized abilities, while becoming highly adept at others (Hollenstein & Loughheed, 2013). Hence, an

adolescent who spends five hours a day playing videogames is crystallizing into a very different adult than one who spends five hours a day playing sports, due to the type of learning that is stamped in. The facility with which adolescents adapt to and become efficient in whatever environment they find themselves in explains their often passionate interest and participation in extracurricular activities. The vast majority (90%) of adolescents are passionate about a political or social cause, with climate change and border control currently being top of mind (Piper Jaffray 2019).

How Parents Can Facilitate Adolescent Well-being

We will now review the extensive research across social science disciplines about how parents, schools, neighborhoods, and policymakers can help adolescents successfully navigate this developmental period. Figure 2 summarizes the main research findings about how each stakeholder group can foster adolescent development. First, we will discuss parents.

Parents: Provide Support and Stability

A hallmark of adolescence is conflict with parents, which becomes frequent in early adolescence but peaks in intensity in later adolescence (Hollenstein & Loughheed, 2013). Parents must stay the course and continue to be emotionally supportive of their adolescents throughout this challenging period. Parents who frequently praise their adolescents, rather than criticize

them, help to deter them from using drugs and engaging in other risky behaviors (Perkins & Borden, 2003). Adolescents' relationships with their parents more strongly influence their drug use than their relationships with peers or siblings (Chassin et al., 2009; Miller, Alberts, Hecht, Trost, & Krizek, 2014). Adolescents who spend more time with their parents, especially fathers, are less prone to using drugs like nicotine (Soldz & Cui, 2002). When mothers talk to their adolescents about managing negative emotions and anger, this also reduces a host of risky and deviant adolescent behaviors (Miller, 2001; Shortt, Stoolmiller, Smith-Shine, Mark Eddy, & Sheeber, 2010). Likewise, engaging in regular family activities such as dinners together correlates with lower adolescent drug use (Coley, Votruba-Drzal, & Schindler, 2008). However, just 32% of U.S. adolescents eat with their families daily (Child and Adolescent Health Measurement Initiative, 2016).

Strong relationships with parents also help to deter risky adolescent sexual behavior (Perrino, González-Soldevilla, Pantin, & Szapocznik, 2000). Adolescents whose parents support them emotionally and communicate with them on a regular basis tend to engage in less risky sexual behavior (Darling, Palmer, & Kipke, 2005; Perkins & Borden, 2003). Moreover, adolescents who communicate with their parents directly about sex tend to initiate sex later and have fewer sexual partners; and this direct parent-adolescent communication about sex counteracts the negative effects of deviant peers (Best & Fortenberry, 2013).

Parents who are involved with their adolescents, communicate with them, and ensure strong family cohesion are more likely to ensure their adolescents engage in vigorous physical activity; and this in turn helps their adolescents maintain a proper weight (Delamater, Pulgaron & Daigre, 2013; Kitzman-Ulrich et al., 2010). Overall, adolescents who perceive their parents care a lot about them have a lower chance of being overweight (Delamater et al., 2013). To promote academics, it is highly beneficial for parents to be involved in their adolescents' schools (e.g., attend school meetings and volunteer), and to engage in discussions with their adolescents about school and academics (Stewart, 2008). Moreover, parents should express aspirations of higher education for their adolescents, because this relates positively to adolescent academic self-efficacy, and engagement with and motivation to work hard at school (Fan & Williams, 2010).

Parents should also support their adolescents' extracurricular activities to capitalize on their emerging skills, interests, or even passions, e.g., in the arts, sports, technology, leadership and/or volunteering (Eccles et al., 2003; Feldman & Matjasko, 2005). Extracurricular activities also allow adolescents to try out different self-identities (Luyckx, Goossens, Soenens, & Beyers, 2006). Adolescents who perceive their parents are supportive of their extracurricular activities tend to spend more time on such activities (Fletcher, Elder & Mekos, 2000). However, adolescents who feel intense pressure to participate in sports experience less pleasure from doing so,

which in the long-run reduces their participation (Anderson, Funk, Elliott, & Smith, 2003).

When parents are not emotionally supportive of and/or involved with their adolescents, the adolescents face greater odds of manifesting problem behaviors (Chassin et al., 2009; Forman & Davies, 2003). Similarly, when parents are psychologically controlling of their adolescents, e.g., blaming, manipulating, revengeful, unaffectionate, or unresponsive, this increases the likelihood that their adolescents will engage in drug use and other risky behaviors and also suffer from depression (Cui, Morris, Criss, Houlberg, & Silk, 2014). Having an unstable or broken family, e.g., living with one parent, or a stepparent, also places adolescents at risk (Perkins & Borden, 2003). Adolescents who live with just one parent or no biological parent are more likely to engage in risky sexual behavior (Best & Fortenberry, 2013; Kotchick et al., 2001). Moreover, adolescents who live with only one parent are less likely to engage in extracurricular or volunteer activities (Lichter, Shanahan, & Gardner, 2002). When families are unstable or broken, adolescents tend to act out, rather than engaging in developmentally beneficial activities (Forman & Davies, 2003).

Parents: Model Good and Avoid Bad Behavior

It is important for parents to model good behavior. When parents avoid using tobacco and/or alcohol, their adolescents tend to do likewise (Brook, Pahl, Brook, & Brown, 2013; Cranford, Zucker, Jester, Puttler, & Fitzgerald,

2010; Perkins & Borden, 2003). In addition, parents who abstain from using drugs like alcohol foster anti-drug norms, beliefs and attitudes among their adolescents (Williams & Hine, 2002). Modeling good habits also matters when it comes to eating and weight. If an adolescent's parent is of a healthy weight, the adolescent is more likely to have a healthy weight too, even as an adult (Delamater et al., 2013; Crossman, Sullivan, & Benin, 2006).

Moreover, parents who consume more fruits and vegetables decrease their adolescents' likelihood of being overweight (Alia, Wilson, George, Schneider, & Kitzman-Ulrich, 2013). Parents who routinely eat breakfast, which is generally considered to be the most important meal of the day, encourage their adolescents to eat breakfast (Delamater et al., 2013). Home-cooked meals also help to keep adolescents' weight under control, as opposed to fast-food meals (Martinasek et al., 2010).

In contrast, parents who regularly engage in risky behaviors are likely to adversely affect their adolescents' health and well-being. When mothers drink excessively during pregnancy and retard fetal growth, their adolescent offspring tend to suffer from lower IQs and math deficits (Howell, Lynch, Platzman, Smith, & Coles, 2006). If mothers smoke during pregnancy, their adolescents are more likely to smoke (Brook et al., 2013). When parents abuse alcohol or drugs, their adolescents are more likely to do so, and to manifest developmentally inappropriate sexual behaviors (Darling et al., 2005). If parents have children at an early age, their adolescents are more likely to have children prematurely (Harden, 2014; Kotchick et al., 2001).

Sexual or physical abuse by parents is associated with adolescent risky sexual behaviors, including having multiple sexual partners and using drugs during sex (Perkins & Borden, 2003; Rodgers & McGuire, 2012). Physical violence by parents is associated with violent and aggressive behaviors in their adolescents, including dating violence (Ferguson, San Miguel, Garza, & Jerabeck, 2012; Perkins & Borden, 2003).

Parents: Monitor and Restrict Risky Behavior

Parents deter adolescent drug use when they set clear rules for their adolescents, monitor their adolescents' behavior, reward appropriate behavior, and provide measured discipline for inappropriate behavior (Chassin et al., 2009; Kelder, Maibach, Worden, Biglan, & Levitt, 2000; Perkins & Borden, 2003). One of the most important parental behaviors is monitoring; in fact, monitoring seems to have a greater magnitude of an effect on adolescent drug use than genetic predispositions to using drugs (Dick et al., 2016; Perkins & Borden, 2003). Parents who monitor their adolescents and engage in purposeful surveillance of their activities deter a multitude of adolescent risky behaviors (Perkins & Borden, 2003). For example, adolescents who are monitored by their parents exhibit lower rates of sexual behavior, and the sexual behavior they do manifest is less risky (Perrino et al., 2000; Best & Fortenberry, 2013; Perkins & Borden, 2003; Kotchick et al., 2001)

Overall, the most effective parenting styles for discouraging adolescent drug use and other risky behaviors are authoritative, meaning restrictive but warm; or authoritarian, meaning restrictive and not warm (Paiva, Bastos, & Ronzani, 2012). The less effective parenting styles are indulgent, meaning warm and not restrictive; and neglectful, meaning neither warm nor restrictive (Mikeska, Harrison, & Carlson, 2017). In other words, restricting adolescents' behavior by setting and enforcing clear rules is highly beneficial. The mother's parenting style is especially important because mothers are still generally more involved with their adolescents than fathers (Paiva et al., 2012).

The same parenting styles listed above are effective for helping adolescents eat and exercise appropriately and maintain a healthy weight. Either an authoritative or authoritarian parenting style is efficacious, while indulgence and negligence are non-efficacious (Olvera & Power, 2010). However, parents who try to excessively curb their adolescents' food intake may be counterproductive; their adolescents may furtively indulge in high-fat food, developing bad habits that lead them to be overweight as adults (Delamater et al., 2013).

Parental restrictions on sedentary behavior are also important for controlling adolescents' weight. Parents who limit their adolescents' time spend viewing television, playing videogames, and/or engaging in social media can help to ensure that their adolescents maintain an appropriate weight (Alia et al., 2013). Adolescents who are excessively sedentary are

more likely to be overweight or obese, even as adults (Delamater et al., 2013). Also, when parental rules successfully limit television watching and other sedentary activities, this has a positive impact on adolescents' engagement in academics and their motivation to work hard in school (Fan & Williams, 2010). Furthermore, when parents support adolescents in playing high school sports, their adolescents tend to perform better academically, both in high school and later in college; in part because student athletes must perform scholastically to play (Marsh & Kleitman, 2003).

Parents: Discuss Behavioral Risks

Adolescents are less likely to use drugs if their parents explicitly discuss the risks and convey their disapproval (Cerezo, Méndez, & Ato, 2013). Since parents tend to express more disapproval of drug use among adolescent males, this decreases their odds of drug use relative to adolescent females, so parents should make a conscious effort to have conversations about drugs with female adolescents too (Cerezo et al., 2013). Parents should also communicate their disapproval of risky sexual behaviors to adolescents, provide accurate information about the risks of sexually transmitted diseases, and discuss various risk reduction strategies because these kinds of communications lower adolescents' odds of engaging in risky sexual activities (Kotchick et al., 2001). Likewise, parents should talk to their adolescents about the risks of risky social media behaviors because this will help to deter behaviors such as posting suggestive photos or meeting

strangers encountered online in face-to-face settings (Berson, Berson, & Ferron, 2002).

Parents: Provide Guidance on Peers

Parents can reduce also risky adolescent behaviors by promoting positive, high quality peer friendships and discouraging relationships with deviant peers (Tu, Erath, Pettit, & El-Sheikh, 2014). In addition, negative or conflict-ridden peer relationships increase the likelihood that adolescents will engage in risky behaviors, while warm and supportive peer relationships have the opposite effect (Guyer, Silk & Nelson, 2016; Telzer, Fuligni, Lieberman, Miernicki, & Galván, 2015). Parental guidance on peer friendships is especially important for adolescents who are less attuned to social cues (Tu et al., 2014).

Parents who allow their adolescents to spend time with deviant peers may inadvertently encourage imitative behaviors; in fact, much deviant behavior among adolescents is carried out with peers (Perkins & Borden, 2003). If adolescents' friends use drugs, they are more likely to use drugs (Brook et al., 2013; Perkins & Borden, 2003; Vitaro, Brendgen, & Lacourse, 2015), though having non-using friends can offset this impact (Chassin et al., 2009; Gilvarry, 2000). If adolescents' friends agree to oral sex or to forgo condoms, the adolescents are likely to follow suit (Kotchick et al., 2001; Prinstein, Meade, & Cohen, 2003); but if their friends use condoms they will tend to do so (Best & Fortenberry, 2013). In addition, if adolescents have

deviant friends that pressure them into having sex, they are more likely to end up with multiple sexual partners, and to use alcohol and drugs during sex (Rodgers & McGuire, 2012).

Parents should guide their adolescents towards friends who have healthy and positive lifestyles. When adolescents have friends with college aspirations, they tend to do better academically (Stewart 2008). Moreover, adolescents whose friends exhibit prosocial behaviors such as sharing, cooperating and helping tend to model those same behaviors (Wentzel et al., 2007). Even what adolescents eat is influenced by friends, e.g., if adolescents perceive their friends eat fruit they are more likely to do so (Stok, Ridder, Vet, & Wit, 2014); but likewise they will drink sugared beverages if their friends do so (Perkins, Perkins, & Craig, 2010). It has been estimated that 20% of the variance in adolescents' dietary intake can be explained by perceptions of friends' intake (Lally, Bartle, & Wardle, 2011).

Parents: Provide Guidance on Media Use

Parents should provide guidance to their adolescents on television viewing, social media use, and videogame use to try to ensure these activities do not interfere with their physical activity, sleep or healthy eating (Eggermont & Van den Bulck, 2006; Marshall, Biddle, Gorely, Cameron, & Murdey, 2004; Wells & Cruess, 2006). Parents should focus on ensuring their adolescents do not become heavy users of electronic devices, which is

typically defined as five or more hours daily (Romer, Bagdasarov, & More, 2013).

Heavy use of any media, traditional or online, limits adolescents' physical activity (Marshall et al., 2004) and disrupts their sleep and healthy eating habits (Eggermont & Van den Bulck, 2006; Wells & Cruess, 2006). For example, watching television for five or more hours daily increases by five-fold adolescents' odds of being overweight (Jordan, Kramer-Golinkoff, & Strasburger, 2008). Extensive television viewing also relates negatively to adolescents' academic performance, while extensive book reading relates positively to this (Romer et al., 2013). Heavy social media or internet use relates negatively to adolescents' club and sports participation, and to their academic performance unless the heavy use is for online research or studying (Junco, 2012; Tsitsika et al., 2014). Heavy use of videogames correlates with depression, suicidal tendencies and bullying by peers, although the direction of causality is unclear (Lee et al., 2017).

In contrast, moderate use of television, social media and videogames by adolescents does not seem to be problematic. For instance, watching a moderate amount of television has not been found to affect adolescents' weight (Jordan et al., 2008). Likewise, moderate videogame use has generally been found to be uncorrelated with adolescents' extracurricular activities, parental and peer relationships, and mental health profile (Durkin & Barber, 2002; Lee et al., 2017). Moderate internet use actually relates

positively to adolescents' club participation, but it is unrelated to their sports participation and academic performance (Romer et al., 2013).

Parents: Offer a Religious or Spiritual Upbringing

Research indicates that parents should consider offering their adolescents a religious or spiritual upbringing. Adolescents who have such an upbringing are less likely to manifest conduct disorders such as school truancy, and are also less likely to have suicidal thoughts (Johnson, De Li, Larson, & McCullough, 2000; Sinha, Cnaan, & Gelles, 2007; Smith, 2003). Furthermore, a spiritual or religious upbringing relates positively to academic engagement (Sinha et al., 2007) and to standardized test scores (Regnerus, 2003), especially if the adolescents live in lower income neighborhoods (Regnerus, 2003). Moreover, adolescents who engage in religious activities tend to manifest better identity formation, emotional regulation, and interpersonal development (Larson, Hansen, & Moneta, 2006).

Adolescents who view religion as important in their lives or participate in religious or spiritual activities are, in addition, less likely to use drugs (Dent, Sussman, & Stacey, 2001; Perkins & Borden, 2003; Sinha et al., 2007; Smith, 2003). A spiritual or religious upbringing is associated with more negative norms related to drug use which, in turn, can weaken individual-level drug-use predispositions (Young-Wolff et al., 2011). Similarly, adolescents who view themselves as spiritual or religious or attend church tend to delay their initiation of sexual behaviors (Best & Fortenberry, 2013;

Cotton et al., 2006; Rostosky, Wilcox, Wright, & Randall, 2004; Perkins & Borden, 2003) and they engage in less risky sexual behaviors (Rostosky et al., 2004; Sinha et al., 2007), especially among females (Rostosky et al., 2004).

Parents: Invest in Adolescent Development, Avoiding Excess

Parents can also benefit their adolescents by investing in their adolescents' intellectual, social and physical development. In the U.S., there has been a dramatic increase in the time parents spend with their offspring, with mothers now spending nearly 20 hours and fathers 10 hours per week, on average, on activities primarily to help their offspring become successful (Ramey and Ramey 2010). The money spent has also escalated, and about 50% of the money spent on adolescents is related to education (Kornrich & Furstenberg, 2013). During adolescence, most money is spent on tutoring, private schools, or other lessons (Schneider, Hastings, & LaBriola, 2018); and individual tutoring by parents or professionals has been shown to improve adolescents' standardized test scores (Jeynes, 2012; Ma, Adesope, Nesbit, & Liu, 2014).

However, parents should avoid over-parenting, also called helicopter parenting. Parenting behaviors that are considered developmentally appropriate for adolescents include asking about, advising on, and helping with school, peers and future plans and teaching self-advocacy. Over-parenting, on the other hand, includes interfering with school, peers or future

plans, or being highly controlling or smothering (Bradley-Geist & Olson-Buchanan, 2014; Lareau & Goyette, 2014). Over-parenting has been linked to adolescent dependency, low self-efficacy, low life satisfaction, depression, reduced self-control, and maladaptive workplace attitudes (Bradley-Geist & Olson-Buchanan, 2014; Cui, Allen, Fincham, May, & Love, 2019; Odenweller, Booth-Butterfield, & Weber, 2014). Over-parenting may also cause adolescents to feel entitled or envious, lack gratitude, or underperform academically (Segrin, Woszidlo, Givertz, Bauer, & Murphy, 2012).

Parents: Avoid Overreliance on Material Rewards and Foster Gratitude

Parents should avoid an overreliance on material rewards, also called material parenting, because this may encourage materialism in their adolescents (Richins & Chaplin, 2015; Richins, 2017). Parents who engage in material parenting are often warm and loving, but nonetheless they tend to rely on the provision of material rewards to promote good behavior, and on the withdrawal of material rewards to discourage bad behavior. Fathers may tend to focus on larger delayed rewards and mothers smaller immediate rewards because of their relative focus on the future versus the present (Li, Haws & Griskevicius, 2019). Nevertheless, material parenting is a main pathway that can lead to adolescent materialism (Richins & Chaplin, 2015). The other main pathway is parental neglect and disapproval, which elicits insecurity and low self-esteem among adolescents, and the pursuit of

material possessions to try to bolster their self-perceptions (Chaplin & John, 2010; Richins & Chaplin, 2015).

Materialistic adolescents view the acquisition of possessions as instrumental to attaining happiness and other desirable end states, and so they rely on their possessions rather than on their personal skills or characteristics to shape their identities and relationships (Richins, 2017). Materialism among adolescents is related to numerous undesirable outcomes including making impulsive and compulsive purchases that exceed financial resources (Goldberg, Gorn, Peracchio, & Bamossy, 2003; Niu, 2017), using drugs and alcohol (Williams, Cox, Hedberg, & Deci, 2000), performing poorly at school and having negative attitudes toward school (Goldberg et al., 2003), less life satisfaction (Piko, 2006), and less pro-social behavior (Yang, Fu, Yu and Lv, 2018).

Instead of promoting materialism, parents should engage in practices that promote gratitude (Chaplin, John, Rindfleisch, & Froh, 2019). Higher gratitude among adolescents is associated with better academic performance, higher social integration, and improved life satisfaction (Froh, Emmons, Card, Bono, & Wilson, 2011). Parents can foster gratitude in their adolescents by, for example, encouraging them to express their appreciation of others in words or actions, and/or suggesting that they maintain a gratitude journal (Froh & Bono, 2011).

How Schools Can Facilitate Adolescent Well-being

Although parents play a critical role in guiding their adolescents, due to their substantial and often daunting responsibilities, they require assistance from the broader community including schools, neighborhoods and policymakers. We will begin by discussing schools.

Schools: Encourage Academic Achievement

Schools should first and foremost facilitate their adolescent students' academic achievement by providing caring and competent teachers and administrators, appropriate class sizes and offerings, academic and personal counseling, on-site nurses and emergency health care, adequate school security, special needs accommodations, homework assistance, and other related activities (Perkins & Borden, 2003). Adolescents also do better academically when the school staff is cohesive, meaning that staff members trust each other, share expectations, and interact positively with each other (Stewart, 2008).

Schools should seek to enable their adolescent students to earn good grades and advance to the next grade level, because this helps to prevent risky behaviors such as drug and alcohol use, in part by elevating adolescents' educational aspirations (Perkins & Borden, 2003). Adolescents who perform well academically also tend to initiate sexual behavior later (Perkins & Borden, 2003), and are less likely to experience or cause a pregnancy (Kotchick et al., 2001). When adolescents do better academically,

they tend to feel more emotionally committed to their schools (Stewart, 2008), which enhances their behavioral commitment, e.g., homework completion, and perceived and actual competence in school (Li, Lerner, & Lerner, 2010). In contrast, low emotional commitment to school correlates with adolescent risk behaviors including fighting and weapon use (Brookmeyer, Fanti, & Henrich, 2006), and affiliations with deviant peers (Li et al., 2013).

Schools: Offer Extracurricular Activities

Schools should offer a variety of desirable and positive extracurricular activities for adolescents including student government, sports, esports (videogaming), clubs, band, chorale, drama, debate, and volunteer opportunities (Hill & den Dulk, 2013; Marsh & Kleitman, 2003; Wentzel et al., 2007). Participation in such school activities is associated with greater self-esteem and resiliency, stronger affiliations with pro-social peers, reduced risk behaviors, higher perceived value of school, better grades, and greater college aspirations (Barber, Eccles & Stone, 2001; Fredricks & Eccles, 2008). Although school extracurricular activities are arguably a distraction from academics, participants actually tend to do better academically, in part due to greater emotional commitment to school (Stewart, 2008). Even participation in competitive high school sports correlates with increased commitment to and achievement in school (Marsh & Kleitman, 2003). Moreover, school sports participation is negatively associated with tobacco

and drug use, although positively associated with both alcohol use (Lisha & Sussman, 2010) and fast food consumption (Bauer, Larson, Nelson, Story, & Neumark-Sztainer, 2009). Participation in high school clubs relates negatively with alcohol, tobacco and drug use (Elder, Leaver-Dunn, Wang, Nagy, & Green, 2000).

Schools: Offer Effective Health Education

Schools should offer their adolescent students effective and comprehensive health education. There are many evidence-based drug use prevention programs that schools can use, but most do not use them (Dent et al., 2001). Evidence-based anti-drug programs are listed in the Substance Abuse and Mental Health Services Administration National Registry of Effective Programs, and in the National Institute of Drug Abuse Guide to Effective Drug Prevention Programs (Gandhi, Murphy-Graham, Petrosino, Chrismer, & Weiss, 2007). A related problem is that only about 9% of U.S. high schools mandate that students who have been caught smoking attend a quit-smoking program (Curry et al., 2007).

Furthermore, schools should offer comprehensive evidence-based sexual education to help deter adolescent risky sexual behavior and accidental pregnancy, but often their sexual education is non-comprehensive or incomplete (Kotchick et al., 2001). Roughly 72% of U.S. high schools include sexual education as part of their required curriculum (Guttmacher Institute, 2017), but 76% of these programs focus primarily on abstinence,

with only about 35% teaching how to use a condom (Guttmacher Institute, 2017). Yet comprehensive programs that discuss condom use and other methods to prevent sexually transmitted diseases and pregnancy are more effective than programs that focus primarily on abstinence (Kirby, 2008). High schools should also offer anti-bullying programs, especially programs that train bystanders to intervene when they see bullying (Polanin, Espelage, & Pigott, 2012). General or non-specific anti-bullying programs, while possibly affecting knowledge and attitudes, do not seem to change actual bullying behavior or bystanders' reactions to it (Merrell, Gueldner, Ross, & Isava, 2008).

Schools: Provide Nutritious Meals

Roughly 38% of high school students' caloric intake occurs at schools (Story et al., 2002), and many U.S. schools continue to offer their students primarily high fat and high sugar options, although the situation is gradually improving (Story et al., 2002). For example, schools may offer fried potatoes as the only vegetable (Kubik, Lytle, Hannan, Perry, & Story, 2003). Also, roughly 76% of high schools and 55% of middle schools allow students to purchase food from traditionally stocked vending machines, which increases students' snack and fat consumption and reduces their fruit consumption (Kubik et al., 2003). Roughly 32% of high schools allow students to leave for lunch, which results in an average one fast food trip a week (Neumark-Sztainer, French, Hannan, Story, & Fulkerson, 2005).

Schools should also adopt comprehensive evidence-based programs to improve adolescents' diets, increase their physical activity, and reduce their sedentary behaviors (Sharma, 2006); but such programs have yet to be widely implemented (Frenn, Malin, & Bansal, 2003; Wiecha et al., 2004). Smarter Lunchrooms, one of the most widely implemented school nutrition programs in the U.S., focuses on improving school lunches by, for instance, increasing fruit and vegetable variety (Smarter Lunchrooms Movement, 2018). Schools should also consider partnering with non-profit organizations to offer after-school and/or summer camps that provide healthy meals and organized physical activities for adolescents (Jago & Baranowski, 2004). Such camps are especially popular during the summer months, but regardless they should be located near adolescents' residential neighborhoods because, at more distant locations (including school sites) the lack of trusted transportation lowers student attendance (Jago & Baranowski, 2004).

How Neighborhoods Can Facilitate Adolescent Well-being

Perhaps less obvious than the role of schools, but important nonetheless, is the role of neighborhoods in promoting adolescent well-being. Research indicates that local neighborhoods should assume certain specific responsibilities for the adolescents who live in their midst.

Neighborhoods: Offer Structured Activities

Neighborhoods should provide adolescents with highly structured activities, ideally through reputable organizations with high expertise like the Boys and Girls Clubs of America, because this helps to deter adolescent risky behaviors (Mahoney & Stattin, 2000). Adolescents have been found to benefit even more from extracurricular activities in their neighborhoods than in their schools; they show more improvement in teamwork skills, taking initiative, and building social relationships and social capital (Larson et al., 2006). However, it is important that the neighborhood activities be highly structured, meaning that they are led by an adult, occur at least weekly, and are skill-building and age-appropriate (Mahoney & Stattin, 2000).

Unstructured neighborhood activities, e.g., videogame facilities, activities or trips with little adult supervision or skill building may actually increase problem behaviors among adolescents, especially among males, by encouraging relationships with deviant peers and weakening relationships with parents (Mahoney & Stattin, 2000).

Neighborhoods: Combat Poverty

If a neighborhood is struggling with poverty, concerted attempts should be made to combat the situation by offering programs for adult job training and education, and housing and urban renewal, and by seeking to attract businesses and jobs to the area (Best & Fortenberry, 2013). When adolescents live in low socioeconomic status neighborhoods, they are more likely to use drugs and engage in other risky behaviors (Bacio et al., 2015;

Leventhal & Brooks-Gunn, 2000; McLoyd et al., 2009), especially if their neighborhoods also suffer from violence and adult nicotine use (Brook et al., 2013). Neighborhood poverty is especially likely to correlate with risky behavior among female adolescents, and adolescents who are native to the U.S., with immigrants being more immune to external neighborhood influences (Oberwittler, 2007).

When adolescents live in impoverished neighborhoods, they also tend to initiate sexual behavior earlier (Perkins & Borden, 2003), engage in riskier sexual behavior (Kotchick et al., 2001; Rodgers & McGuire, 2012), have higher rates of pregnancy (Kotchick et al., 2001), and become parents earlier (Scaramella, Neppl, Ontai, & Conger, 2008). These risks are elevated when the impoverished neighborhoods also lack community resources and suffer from high crime (Best & Fortenberry, 2013). Moreover, parents in low-income neighborhoods who have children at a very early age tend to exhibit harsher parenting styles which then tends to evoke angry, aggressive, and risky behavior on the part of their adolescents (Scaramella et al., 2008).

Adolescents who live in low socioeconomic status neighborhoods also face greater odds of experiencing peer conflict, social withdrawal, depression and anxiety (Leventhal & Brooks-Gunn, 2000; McLoyd et al., 2009). This is in part due to unsafe and inadequate housing (e.g., no locks, vermin), deteriorating physical conditions, crime, and violence which causes adolescents to experience stress and mental health problems, and to act out by engaging in risky behaviors (Elliott, Shuey, & Leventhal, 2016; Eamon,

2002). Living in disadvantaged neighborhoods even relates more strongly to adolescent risk behaviors than living in disadvantaged households (Perkins & Borden, 2003). Still, household disadvantage as an adolescent increases adult sensitivity to economic threats, as measured by perceived lack of control, high impulsivity and low task persistence when faced with a future economic threat (Mittal & Griskevicius, 2014). Relocating adolescents to escape the worst neighborhoods does not appear to alleviate their risk behaviors and, in fact, may aggravate such behaviors because of the stress of moving and the disruption of peer social support (Byck et al., 2015; Vernberg, Greenhoot & Biggs, 2006).

In contrast, living in high socioeconomic status neighborhoods enhances adolescents' odds of academic achievement, especially among males and Caucasians (Leventhal & Brooks-Gunn, 2000). Adolescents who live in high socioeconomic and more socially cohesive neighborhoods are also more likely to participate in extracurricular activities that facilitate their intellectual, psychosocial and physical development (McLoyd et al., 2009; Lichter et al., 2002). In addition, adolescents who live in more affluent and/or Caucasian neighborhoods are more likely to be of healthy weight (Moore et al., 2017), and are less susceptible to becoming overweight or obese when fast food restaurants are located close to their schools (Grier & Davis, 2013). On the other hand, adolescent alcohol use is elevated in economically advantaged, suburban, Caucasian schools (Botticello, 2009).

Neighborhoods: Combat Violence and Crime

Neighborhood organizations should make concerted attempts to combat violence by, for example, implementing common sense gun control policies, forming neighborhood watch groups, and working cooperatively with the police on patrolling and safety initiatives (Duke, Resnick, & Borowsky, 2005). In communities with lenient gun control policies, adolescents are more likely to be victims of gun violence, gain access to guns, and commit suicide with guns (Duke et al., 2005). Adolescents who experience gun violence, either directly as victims or indirectly by observing it in their community, are more likely to exhibit aggressive and risky behavior, use drugs, suffer from mental illness, and perform poorly in school (Duke et al., 2005). Violence in neighborhood schools is also highly problematic; schools that experience homicidal shootings suffer not only from the loss of life, but also from student and staff trauma and mental health problems, enrollment drops, and standardized test score declines (Beland & Kim, 2016). The majority of U.S. adolescents favor more stringent gun control, especially females, whereas support is lower among adolescents with guns in the home (Vittes, Sorenson, & Gilbert, 2003).

How Policymakers Can Facilitate Adolescent Well-being

Policymakers bear responsibility to develop and implement evidence-based policies that enhance adolescent well-being. These policies can arise from government regulation, collaboration between government and industry, or self-regulatory guidelines or codes of conduct. These policies should govern marketers, social media companies, technology companies, and other entities whose actions have the potential to influence adolescents.

Policymakers: Limit Marketing of Risky Products

Policymakers should try to prevent marketers from promoting or distributing age-restricted products to adolescents. Substantial research indicates that ads for alcohol and nicotine including e-cigarettes and vaping devices currently target adolescents and encourage adolescent use (Biener & Siegel, 2000; Davis, Gilpin, Loken, Viswanath, & Wakefield, 2008; Gordon, Hastings, & Moodie 2010; Henriksen, Feighery, Schleicher, and Fortmann, 2008; Pechmann, Biglan, Grube, & Cody, 2012; Snyder, Milici, Slater, Sun, & Strizhakova, 2006). Ads for age-restricted products often persuade adolescents to use the products by conveying positive images of user groups (Pechmann & Knight, 2002; Seidenberg, Rodgers, Rees, & Connolly, 2012), with adolescents more susceptible to such influence than adults (Pollay et al., 1996; Seidenberg et al., 2012), and even very young adolescents affected (Harris, Gordon, MacKintosh, & Hastings, 2015; Stacy, Zogg, Unger, & Dent, 2004). Adolescents who desire to be older are especially vulnerable

to advertisements for age-restricted products (Pezzuti, Pirouz, & Pechmann, 2015).

Hence, policymakers should prohibit the use of promotional images and product features that appeal to adolescents, and should especially avoid cartoon characters and candy flavorings that appeal to young adolescents (Cohen, 2000). In addition, regulations should encourage the use of ad models that are middle aged or older, because many adolescents view young adult models as the ideal age to emulate (Pezzuti, Pirouz, & Pechmann, 2015). Policymakers should also ensure that ads for age-restricted products do not appear in media that adolescents are likely to see, including billboards and storefronts by schools or homes (Celebucki & Diskin, 2002).

Another policy concern is the portrayal of age-restricted products in television shows and movies. The depiction of drug use, especially alcohol and nicotine use, is pervasive in movies, and adolescent exposure to drug use in movies causally increases their own drug use (Dalton et al., 2009; Iannotti, Kogan, Janssen, & Boyce, 2009; Wils, Sargent, Gibbons, Gerrard, & Stoolmiller, 2009). Moreover, adolescents are more susceptible to drug portrayals in movies than are adults (Mekemson & Glantz, 2002; Polce-Lynch, Myers, Kliwer, & Kilmartin, 2001). One way to minimize youths' exposure to movies with drug use is to revise rating standards to ensure such movies are not granted PG-13, PG, or G ratings (Pechmann and Shih, 1999). Also, networks should disallow drug use in youth-oriented television

shows, except to portray negative consequences (Russell, Russell, & Grube, 2009).

In addition, policymakers should establish guidelines to minimize the glamorization of drug use and degrading sexual behavior in music, music videos, and videogames, if substantial numbers of adolescents will be exposed to these materials. Alcohol use is featured in roughly half of rap and hip-hop songs and music videos (Gruber, Than, Hill, Fisher, & Grube, 2005), and adolescents' exposure to alcohol-laden music genres correlates with their alcohol use (Van Den Bulck & Beullens, 2005; Wingood et al., 2003). Similarly, listening to music with sexually degrading lyrics correlates with risky sexual behavior among adolescents (Best & Fortenberry, 2013). And, listening to any rap music correlates with their participation in violence, street gangs, theft, and drug use, while listening to more prosocial forms of hip hop or soul music does not correlate with these risky behaviors (Miranda & Claes, 2004). Adolescents' use of violent videogames correlates with more aggressive behaviors, cognitions, and affect, and with less empathy and prosocial behaviors (Anderson et al., 2010). On the other hand, adolescents' use of violent videogames does not seem to correlate with their future delinquent behavior, whereas family violence does correlate (Ferguson et al., 2012).

Policymakers: De-market Risky Products and Behaviors

Regulators should work to actively de-market risky products to adolescents in certain situations. For example, if a television show depicts adolescent alcohol use, the show should also convey the health risks, e.g., drunk driving accidents (Russell, Russell, & Grube, 2009). While mandating specific content may be difficult to legislate, industry guidelines can be voluntarily adopted by content creators. Or, if a television show or movie depicts adolescent drug use, it can include an effective public service advertisement beforehand to nullify the impact (Golmier, Chebat, & G  linas-Chebat, 2007; Pechmann and Shih, 1999). Messages that have been shown to be especially effective at discouraging risky adolescent behaviors include depictions of social disapproval for engaging in a particular behavior, and social approval for avoidance of it (Zhao & Pechmann, 2007). Also, the risks that are described should be realistic, desired behaviors should be modeled, and adolescents should be offered choices, with these guidelines pertaining to sexually inappropriate behaviors and other risky behaviors as well (Evans, Silber-Ashley, & Gard, 2007). Messages that focus on long-term health risks tend to be ineffective with adolescents, because they often falsely believe they will stop their risky behaviors, e.g., stopping smoking before suffering any long-term negative consequences (Pechmann, Zhao, Goldberg, & Reibling, 2003).

In addition, policies with a highly localized geographic reach can be circumvented because people go to more permissive areas. Thus, it is preferable to enact policies with a broad regional, national or even

multinational geographic reach to deter adolescent risk behaviors. Broad de-marketing activities with proven efficacy include comprehensive bans on cigarette and alcohol ads, promotions, and sponsorships (Hollingworth et al., 2006; Saffer & Dave, 2002; Saffer & Chaloupka, 2000); high cigarette and alcohol prices through excise taxes (Hollingworth et al., 2006; Ponicki, Gruenewald, & LaScala, 2007; Slater, Chaloupka, Wakefield, Johnston, & O'Malley, 2007); smoking bans in public areas and restaurants (Siegel, Albers, Cheng, Hamilton, & Biener, 2008); large graphic warnings on cigarette packages (White, Webster, & Wakefield, 2008); and laws mandating zero-tolerance for underage drinking and driving (Carpenter, 2007).

Adolescents are also to receptive to health-related messages on social media (Guse et al., 2012; Uhrig, Bann, Williams, & Evans, 2010), e.g., to encourage condom use (Bull, Levine, Black, Schmiege, & Santelli, 2012; Jones, Eathington, Baldwin, & Sipsma, 2014). Not all messages and policies are equally effective, though. The small printed health warnings on alcoholic beverages in the U.S. do not seem to discourage adolescents from drinking alcohol (Wilkinson & Room, 2009). Also of questionable effectiveness are unenforced local bans on retail sales of nicotine and alcohol to adolescents, which are frequently circumvented (Stead & Lancaster, 2000; Wagenaar, Toomey, & Erickson, 2005). Large national ad campaigns to deter adolescent drug use have had mixed results, with some segments of adolescents reducing their drug use (Carpenter & Pechmann, 2011; Farrelly, Davis,

Haviland, Messeri, & Healton, 2005; Scheier & Grenard, 2010), but with other segments not responding or possibly even increasing their drug use (Hornik, Jacobsohn, Orwin, Piesse, & Kalton, 2008). These results underscore the importance of evidence-based interventions and continual monitoring of performance metrics.

Policymakers: Discourage Excessive Product Consumption

Policymakers should also seek to encourage adolescents to make healthy consumption choices and avoid excessive product consumption. For example, many adolescents use social media or play videogames for several hours per day, which can be problematic (Junco, 2012; Lee et al., 2017; Tsitsika et al. 2014). Hence, government regulators and the industry should work collaboratively towards encouraging moderation in adolescent technology use. For instance, devices can report screen times and provide warnings to parents when adolescents' screen times become excessive, and can provide easy-to-use parental monitoring and limit-setting.

Adolescents' excessive food consumption is another important issue for policymakers. It has been estimated that adolescents see 6,000 food ads per year on television alone, with just 5% promoting healthy foods (Gantz, Schwartz, Angelini, & Rideout, 2007). Adolescents' extensive exposure to food ads has been correlated with unhealthy eating and weight gain (Gantz, et al. 2007; Jordan et al., 2008; Wymer, 2010). Moreover, ads that promote high-fat and high-sugar foods, while simultaneously depicting thin attractive

models, convey conflicting and confusing messages to adolescents (Stevenson, Doherty, Barnett, Muldoon, & Trew, 2007) which could result in eating disorders (Hoste & Grange, 2013). On the other hand, ads about the benefits of a healthy diet can encourage healthy eating among adolescents (Dooley, Deshpande, & Adair, 2010), so public service ads can play a beneficial role. Fast food restaurants' unhealthy food items and often excessive portion sizes also contribute to adolescent weight gain (Grier & Davis, 2013; Wymer, 2010). Thus, policymakers should seek to offer and promote healthier food options and smaller serving sizes, which will benefit adolescents and others as well.

Policymakers: Ensure Safe Media Use

Regulators should seek to ensure that, in online and social media, the content of what adolescents view is safe, and adolescent behavior is safe as well. Social media exposes adolescents to extensive posts of drug use and other deviant behaviors by peers, and may encourage copycat behaviors, especially among those who do not observe drug use among their close friends (Huang et al., 2014; Yonker, Zan, Scirica, Jethwani, & Kinane, 2015). Over 50% of adolescents report seeing posts about drug use or sex on social media (Uhls, Ellison, & Subrahmanyam, 2017). Also an extensive number of websites are pro-drug, can be readily found by adolescents, and do not require age verification (Ribisl, Lee, Henriksen, & Haladjian, 2003).

Adolescents may also be exposed to sexual solicitations through social media, chat rooms, or other online venues (Chang et al., 2016) which can put adolescents at risk for victimization, such as agreeing to requests to meet offline (Mitchell, Finkelhor, & Wolak, 2007). Hence policymakers, law enforcement officials, and operators of online platforms should work together to combat online sexual solicitations of adolescents, by removing the adolescents and/or the solicitations. Regulators should also work with online platforms to find ways to discourage sexting, that is, the sharing or posting of suggestive, seminude or nude photos on mobile devices or computers, which has an estimated prevalence of 20% among adolescents (O'Keeffe and Clarke-Pearson, 2011). Adolescents who engage in sexting-type behaviors online are prone to even riskier behaviors offline, e.g., to meeting with adults who will solicit sex from them (Berson et al., 2002). Thus online content should be monitored for sexual content, unsafe content should be removed, and law enforcement should be alerted if the behavior is seriously problematic, e.g., sexual solicitations or pornography involving adolescents (Chang et al., 2016).

Policymaking efforts should also extend to detecting and stopping serious cyberbullying. Roughly 25% of adolescents report having been cyberbullied on social media (Uhls et al., 2017), and this correlates with adolescent anxiety, depression, social isolation, and even suicidal thoughts and behaviors (O'Keeffe & Clarke-Pearson, 2011). Yet cyberbullied adolescents generally continue to use social media because they view it as

essential to their social lives (Shakir et al., 2018). Adolescents who are victims of cyberbullying often retaliate with similar behavior, making a bad problem even worse (Shakir et al., 2018).

Online and social media platforms should promulgate clear guidelines for behavior and ensure users who violate the guidelines suffer consequences such as removal of problematic content and/or withdrawal of user privileges. These platforms should also permit users to report inappropriate conduct, and should take prompt remedial action whenever necessary. Algorithms can be installed that detect problematic content and remove it, using artificial intelligence tools (e.g., SafeToNet) that identify potentially harmful patterns of communication. Educational efforts by government or private entities, such as Google's "Be Internet Awesome" program, can also be used to teach adolescents best practices for using the internet safely and productively.

Policymakers should also encourage adolescents to use online and social media for developmentally appropriate and positive purposes, including research and information gathering (Michikyan, Subrahmanyam, & Dennis, 2015; Sánchez, Cortijo, & Javed, 2014), building and maintaining supportive social networks (Romer et al., 2013), increasing social capital (Uhls et al., 2017), and improving socializing and communication skills (O'Keeffe and Clarke-Pearson 2011; Tsitsika et al., 2014). The vast majority (90%) of adolescents report that social media helps them strengthen current friendships, and two thirds report making new friends online (Uhls et al.,

2017). Social media also allows many adolescents who are racial or gender minorities to obtain social support for their non-mainstream identities (Shapiro & Margolin, 2014); in part because sensitive self-disclosures tend to be facilitated on social media (Uhls et al., 2017). Adolescents also utilize online and social media to improve their academic connections, promote scholarly discussions and information exchange, and share their academic achievements (Michikyan, Subrahmanyam, & Dennis, 2015; Sánchez, Cortijo, & Javed, 2014).

Policymakers: Encourage Vigilance and Empowerment

Another beneficial policy action is promote evidence-based educational programs that encourage adolescents to be vigilant about the behavioral risks they face, and that empower adolescents to take actions to protect themselves. One example of this is media literacy which teaches adolescents to be vigilant about the persuasive tactics used by marketers of risky products and empowered to resist those tactics; which in turn can reduce adolescents' intent to use the risky products (Goldberg, Niedermeier, & Gorn, 2006). Media literacy can also be used to teach adolescents to be skeptical of media messages that glorify thinness, reject such messages, and accept their own body shapes (Stice, Marti, Spoor, Presnell, & Shaw, 2008). The national antismoking campaign in the U.S. called "Truth" extensively utilized media literacy; it informed adolescents that tobacco companies were addicting them to nicotine to make money, and it sought to empower

adolescents to resist (Holden, Messeri, Evans, Crankshaw, & Ben-Davies, 2004). Adolescents should also be encouraged to speak out or seek help when they need it. For instance, Colorado currently runs a public service campaign called “Start by Believing” to encourage adolescent victims of sexual assault to report the assaults and persuade others to believe their reports.

Concluding Comments

Adolescent Challenges and Opportunities

It is clear from the extensive research in epidemiology, neuroscience and numerous other disciplines that adolescence, which has a short window consisting of about seven teenage years, is both a uniquely challenging and a promising period of human development. What happens during these formative years can have a lifetime impact on adolescents’ consumption and well-being, their families and communities, and the marketplace and society. Adolescents must walk a tightrope between pursuing positive academic and extracurricular activities that will enhance their development and well-being, while avoiding risky and impulsive behaviors that are promoted or glorified by marketers and peers, and will offer them immediate and enticing rewards, but can derail their long-term goals and advancement. Because adolescents’ higher-level executive processes are underdeveloped and sometimes even offline, adolescents strongly benefit from guidance and nudging by parents,

the local community including schools and neighborhood organizations, and policy makers.

Research clearly suggests that parents should not underestimate the considerable influence of their own actions on their adolescents. Parents can exert a substantial positive influence by setting good examples with their own behaviors, being involved and providing emotional support and stability, monitoring their adolescents' behaviors, and discussing behavioral risks. Parents can also guide their adolescents to form supportive relationships with aspirational peers and discourage associations with deviant peers. Parental guidance on social media and videogame use is increasingly important, because many adolescents engage in excessive and harmful use. In other positive moves, parents should consider offering a religious or spiritual upbringing, investing in their adolescents' development while avoiding excess, and fostering gratitude while avoiding an overreliance on material rewards.

The literature also highlights how community members also bear responsibility for adolescent outcomes and well-being, including schools, neighborhoods and policymakers. In other words, adolescent well-being should be viewed as a joint responsibility that goes beyond parents, and also includes the community at large. For instance, schools and neighborhoods can offer structured extracurricular activities and healthy meals while policy makers can deter unscrupulous marketers and online users. It is our hope that this paper will assist parents, communities, and policymakers in

understanding the importance of their roles and the specific behaviors they can exhibit to facilitate adolescent well-being. We also hope that this review will serve as a foundation for future research in these areas.

Future Research

While the existing literatures across numerous disciplines have identified many important factors that influence adolescent development and well-being, there are numerous opportunities for future research. Of particular note are emerging problems such as new drug forms and new drug delivery devices. While the two standard drugs of choice among adolescents, cigarettes and alcohol, remain problematic, alternative drugs and drug delivery devices warrant investigation including nicotine vaping, dietary supplements, and unauthorized prescription drugs. For instance, it may be useful to study how adolescents' risk perceptions may vary based on the drug delivery device. In addition, research is needed to understand how the legalization of recreational and medical marijuana and the wide availability of marijuana edibles and vaping devices may impact adolescent perceptions of risk and marijuana consumption.

Researchers should also examine new types of interventions aimed at adolescents. For instance, past research suggests that parental monitoring and limit setting are beneficial for adolescents, so future research should examine how these findings apply to digitized forms of monitoring and limit-setting (e.g., parental controls, screen time limit settings), including those

which have the capability to allow nearly constant contact and communication (e.g., tracking devices and software, and cameras). Further, growing scrutiny about online and social media content, sexting and cyber bullying have spurred efforts to create content filtering based on algorithms that employ artificial intelligence but work must be done on the efficacy of these tools. Broader educational efforts are also under development, such as Google's "Be Internet Awesome" program which aims to educate adolescents about how to be safe and savvy online consumers. Future research should test these new innovative interventions to promote adolescent well-being.

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Table 1. Primary Adolescent Epidemiological Metrics and Current Profile of US

Adolescents

	Overall	Males	Females
Population and Deaths			
Total adolescent population (count) ¹	25,010,208	12,767,347	12,242,861
Total adolescent deaths (% of population) ²	0.03%	0.04%	0.02%
• Unintentional injury (as % of total deaths)	32%	33%	31%
• Suicide	22%	22%	21%
• Homicide	12%	15%	7%
• Cancer	9%	8%	11%
• Congenital anomalies	3%	3%	3%
Suicide attempt (in past year) ³	7%	5%	9%
Family Characteristics			
Living in single parent household ⁴	27%	-	-
Living without parent in household ⁴	4%	-	-
Living in poverty ⁵	23%	22%	24%
Drugs Ever Used³			
Alcohol	60%	58%	63%
Vaping/e-cigarettes	42%	45%	40%
Marijuana	36%	35%	36%
Cigarettes	29%	31%	27%
Unprescribed pain medications	14%	13%	14%
Hallucinogenics (LSD, acid, mushrooms)	7%	8%	6%
Methamphetamines (speed, crank)	3%	3%	1%
Heroin	2%	2%	1%
Rode in a car with someone under the influence of alcohol (past month)	17%	16%	17%
Sexual Orientation³			
Heterosexual	85%	92%	80%
Bisexual	8%	3%	13%
Gay/Lesbian	2%	2%	2%
Unsure	4%	3%	5%
Sexual Behavior and Outcomes			
Sexual intercourse (at least once) ³	40%	41%	38%
Sexually active (past 3 months) ³	29%	29%	29%
Condom use during last sexual intercourse	54%	61%	47%

(among sexually active in the past 3 months)³

Pregnancy⁶ - - 4%

Pregnancy leading to live birth⁶ - - 3%

Weapons and Theft

Carried weapon (past month)³ 16% 24% 7%

Petty theft (stole from store in typical week)⁷ 15% 18% 13%

Nutrition and Eating

Obese³ 15% 18% 12%

Overweight³ 16% 14% 17%

Eating disorder (lifetime prevalence)⁸ 3% 2% 4%

Eat meal with family (at least 4x per week)^{13a} 63% - -

Eat meal with family (daily)^{13a} 32% - -

Fast food consumption (given day)^{16a} 34% - -

Fast food calories as % of total calories^{16b} 17% 17% 17%

Fruit consumption (past week)³ 94% 93% 96%

Fruit consumption (3+ times daily)³ 19% 22% 16%

Vegetable consumption (past week)³ 93% 91% 95%

Vegetable consumption (3+ times daily)³ 14% 16% 12%

Extracurricular Activities

Participation in two or more sports, clubs, volunteering, or other activities⁵ 87% 84% 88%

Play on sports team³ 54% 60% 49%

Religious activity participation (past year)⁵ 61% 59% 63%

Summer job (ages 16-19)⁹ 35% - -

Job during non-summer months (ages 16-19)⁹ 29% - -

Driver's license (ages 16-19)¹⁰ 50% - -

Academics

Like school⁵ 80% 81% 79%

Earn passing grades⁵ 86% 85% 88%

Enrolled in gifted program¹¹ 7% 6% 7%

Suspension rate¹² 10% 13% 7%

Truancy (missed 15+ school days in a year)¹¹ 13% 13% 14%

Learning Disabilities^{13b}

ADHD	9%	12%	5%
Autism	3%	4%	1%
Other	7%	8%	5%
Technology Ownership and Use			
Smartphone ¹⁴	95%	93%	97%
Cellphone (not smartphone) ¹⁴	29%	27%	31%
Desktop/laptop computer ¹⁴	88%	89%	88%
Videogame console ¹⁴	84%	92%	75%
Non-academic computer, videogame, or other device usage (3+ hours daily) ³	43%	43%	43%
Non-academic computer, videogame, or other device usage (5+ hours daily) ¹⁵	19%	18%	21%
Watch television (3+ hours daily) ³	21%	21%	21%
Social Media Use¹⁴			
YouTube	85%	89%	81%
Instagram	72%	69%	75%
Snapchat	69%	67%	72%
Facebook	51%	49%	53%
Twitter	32%	33%	32%

Sources: ¹U.S. Census Bureau. (2016a). ACS Demographic and Housing Estimates: 2012-2016 American Community Survey 5-Year Estimates. Retrieved from https://factfinder.census.gov/bkmk/table/1.0/en/ACS/16_5YR/DP05 [Ages 12-17 in the United States] ²National Center for Health Statistics (2016). National Vital Statistics System: Leading Cause of Death Reports 2016. Retrieved from <https://webappa.cdc.gov/sasweb/ncipc/leadcause.html> [Ages 12-17 in the United States] ³Kann, L., McManus, T., Harris, W. A., Shanklin, S. L., Flint, K. H., Queen, B., & Ethier, K. A. (2018). Youth risk behavior surveillance: United States, 2017. *Morbidity and Mortality Weekly Report*, 67(8), 1-114. [High school students in the United States] ⁴U.S. Census Bureau. (2016b). Historical living arrangements of children. Retrieved from <https://www.census.gov/data/tables/time-series/demo/families/children.html> [Ages 18 and younger in the United States] ⁵National Survey on Drug Use and Health (2015). Retrieved from <http://pdas.samhsa.gov/#/survey/NSDUH-2015-DS0001> [Ages 12-17 in the United States] ⁶Kost, K., Maddow-Zimet, I., & Arpaia, A. (2017). Pregnancies, births, and abortions among adolescents and young women in the United States, 2013. Guttmacher Institute. Retrieved from <https://www.guttmacher.org/report/us-adolescent-pregnancy-trends-2013> [Females ages 15-19 in the United States] ⁷Grant, J. E., Potenza, M. N., Krishnan-Sarin, S., Cavallo, D. A., & Desai, R. A. (2011). Stealing among high school students: Prevalence and clinical correlates. *Journal of the American Academy of Psychiatry and the Law*, 39(1), 44-52. [High school students in Connecticut] ⁸Merikangas, K. R., He, J. P., Burstein, M., Swanson, S. A., Avenevoli, S., Cui, L., et al. (2010). Lifetime prevalence of mental disorders in U.S. adolescents: results from the National Comorbidity Survey Replication--Adolescent Supplement (NCS-A). *Journal of the American Academy of Child and Adolescent Psychiatry*, 49(10), 980-989. [Ages 13-18 years in the United States] ⁹Pew Research Center. (2018a). The share of teens with summer jobs has plunged since 2000, and the type the work they do has shifted. Retrieved from <http://www.pewresearch.org/fact-tank/2018/07/02/the-share-of-teens-with-summer-jobs-has-plunged-since-2000-and-the-type-of-work-they-do-has-shifted/> [Ages 16-19 in the United States] ¹⁰Sivak, M., & Schoettle (2016). Recent decreases in the proportion of persons with a driver's license across all age groups. The University of Michigan Transportation Institute. Report No. UMTRI-2016-4. Retrieved from <http://www.umich.edu/~umtriswt/PDF/UMTRI-2016-4.pdf> [Ages 16-19 in the United States] ¹¹U.S. Department of Education (2014). Civil Rights Data Collection: 2013-14 State and National Estimations. Retrieved from <https://ocrdata.ed.gov/StateNationalEstimations> [Public schools grades pre-K through 12 in the United States] ¹²Losen, D., Hodson, C., Keith II, M., Morrison, K. K., & Belway, S. (2015). Are we closing the school discipline gap? Report from the University of California. Los Angeles. Retrieved from <http://tinyurl.com/CCRRNationalReports> [Public secondary schools in the United States] ¹³Child and Adolescent Health Measurement Initiative (2016), 2016 National Survey of Children's Health (NSCH). Retrieved from <http://www.childhealthdata.org/browse/survey> [^a ages 12-17 in the United States; ^b ages 3-17 in the United States] ¹⁴Pew Research Center. (2018b). Teens social media and

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Figure 1. A Comprehensive Profile of Adolescents from Epidemiology and Neuroscience

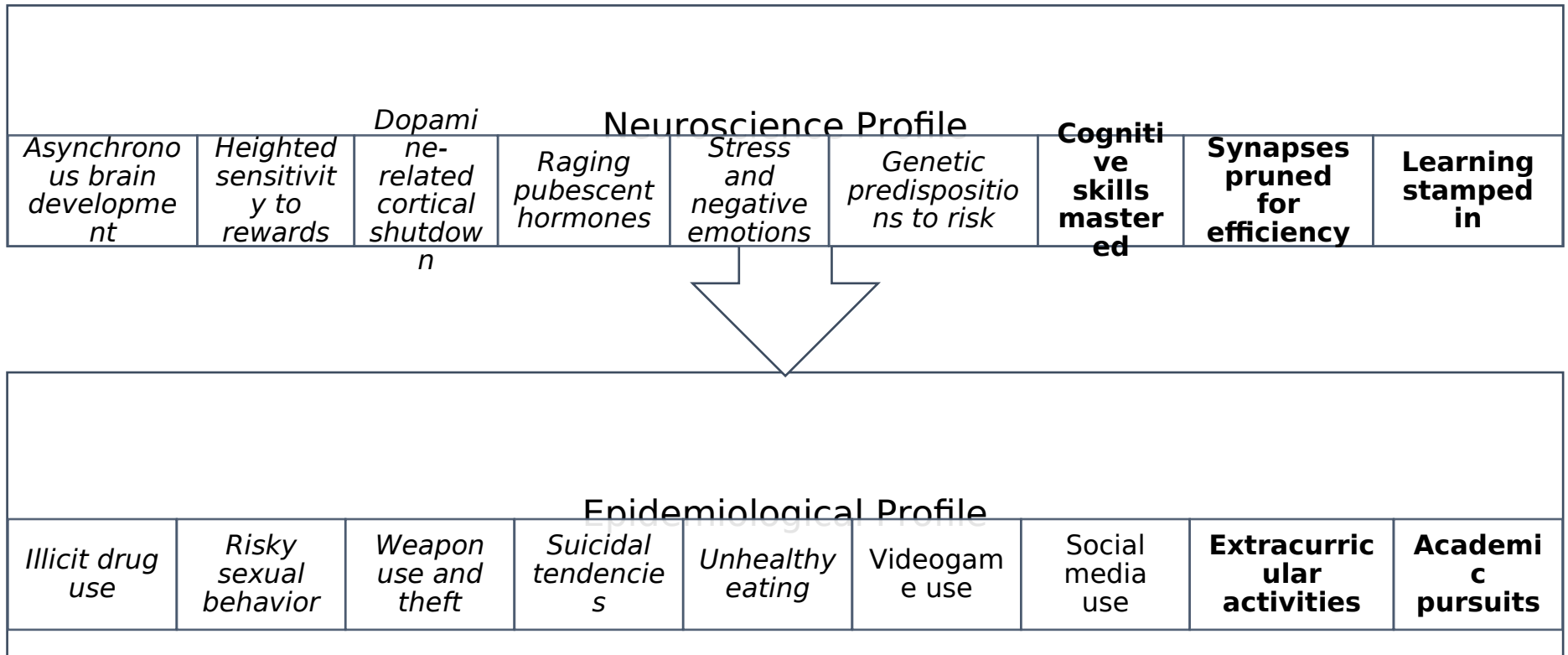


Figure 2. How Parents, Schools, Neighborhoods and Policymakers can Facilitate Adolescent Well-being

