**A developmental perspective of healthy and unhealthy development through the lifespan: The role of social relationships, emotion regulation, and self-control**

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**Introduction**

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**Social relationships**

Social relationships are an integral part of human life, and the way individuals develop their social relations is crucial for their well-being. Adolescence and early adulthood are critical stages of development when individuals form and maintain social connections that can affect their future life outcomes. Research has shown that the quality of social relationships during these developmental stages can be an indicator of psychological well-being or psychopathology.

Adolescents and young adults who develop healthy social relationships often show better outcomes in terms of academic achievement, mental health, and overall life satisfaction. For example, studies have found that adolescents with high-quality friendships are more likely to experience a sense of belonging, self-worth, and emotional support, which can lead to better academic performance and mental health outcomes (Ladd & Troop-Gordon, 2003; Cillessen & Bukowski, 2018). Additionally, adolescents with strong parental relationships are more likely to develop healthy social relationships with peers, leading to higher levels of social competence and prosocial behavior (Rueger et al., 2010).

Furthermore, positive social relationships during adolescence and early adulthood can also promote resilience and buffer against the negative effects of stressors. For example, adolescents who have close friendships with peers or positive relationships with parents are less likely to experience depression or anxiety in response to stressful life events (Furman & Rose, 2015). Thus, healthy social relationships can serve as protective factors that enhance individuals' psychological well-being and buffer against negative life outcomes.

On the other hand, individuals who develop unhealthy social relationships during adolescence and early adulthood may experience negative outcomes, including poor mental health and social functioning. Research has shown that adolescents who experience social rejection or exclusion from peer groups are more likely to experience depression, anxiety, and other mental health problems (G. L. Cohen & Prinstein, 2006). Furthermore, adolescents who engage in antisocial behavior or have poor relationships with parents are at risk for developing maladaptive social behaviors, including substance use and delinquency (Rueger et al., 2010).

Unhealthy social relationships can also be a risk factor for the development of psychopathology, such as borderline personality disorder (BPD). BPD is characterized by unstable relationships with others, intense fear of abandonment, and impulsive behavior. Research has shown that individuals with BPD often have a history of unstable or traumatic relationships during adolescence and early adulthood, which may contribute to the development of the disorder (Becker & Zayfert, 2001; Paris, 2019). Thus, unhealthy social relationships can have lasting effects on individuals' mental health and well-being.

Various factors can influence the development of healthy and unhealthy social relationships during adolescence and early adulthood. One of the most critical factors is the quality of the parent-child relationship. Research has consistently shown that adolescents who have warm, supportive, and authoritative parents are more likely to develop positive social relationships with peers and show better mental health outcomes (Maccoby & Martin, 1983; Steinberg, 2001). Moreover, parenting style can affect adolescents' ability to regulate their emotions, communicate effectively with others, and develop prosocial behavior (Eisenberg et al., 2001).

Another critical factor that can influence social relationship development is peer influence. Adolescents are highly influenced by their peers' behavior, and as such, the nature of peer relationships can significantly impact their social development. Adolescents who associate with deviant peers are at a higher risk for engaging in antisocial behavior and substance use (Dishion & Patterson, 2015).Conversely, adolescents who associate with prosocial peers are more likely to develop positive social relationships and engage in healthy behaviors (Kiesner et al., 2010).

Still another factor that contributes to healthy social relationships is social support. Social support refers to the emotional, informational, and instrumental assistance that individuals receive from their social networks (Cohen & Wills, 1985). Social support has been found to buffer the negative effects of stress, and individuals who perceive that they have social support experience lower levels of anxiety and depression (Cohen & Wills, 1985). Friends, family members, and romantic partners can all provide social support, but the quality of the support matters. For example, individuals who perceive that they receive more emotional support from their social networks report higher levels of well-being (Cohen & Wills, 1985). Furthermore, individuals who have more supportive relationships during adolescence are more likely to develop healthy social relationships during early adulthood (Allen et al., 2007).

Another factor that contributes to healthy social relationships is the ability to form close relationships with others. Individuals who are able to form close relationships with others are more likely to experience positive outcomes such as higher self-esteem, better mental health, and improved academic performance (Bukowski et al., 2019). According to Bowlby's attachment theory (2008), the ability to form close relationships is linked to an individual's attachment style. Individuals with a secure attachment style are more likely to form close relationships, whereas individuals with an insecure attachment style may struggle to form close relationships (Mikulincer & Shaver, 2017).

While social relations can influence the development of psychological disorders, psychological disorders, too, can also have a significant impact on social relations during development. In other words, social relations and psychopathology have a bidirectional effect on one another. Adolescents and young adults with certain disorders may struggle to form and maintain healthy social relationships, which can exacerbate symptoms and lead to a cycle of negative outcomes. For example, individuals with social anxiety disorder may avoid social situations altogether, which can lead to social isolation and a lack of social support (American Psychiatric Association (Ed.), 2022). This, in turn, can worsen symptoms of anxiety and make it even harder to form social relationships in the future.

Similarly, individuals with depression may struggle to form and maintain close relationships with others. This is in part due to negative beliefs about the self and others that are characteristic of depression (Joiner & Metalsky, 2001). These negative beliefs can make it difficult to trust others and form healthy attachments. Additionally, depression can cause individuals to withdraw from social interactions and feel less motivated to engage with others, further exacerbating feelings of loneliness and social isolation (Cacioppo & Hawkley, 2009).

In PTSD, individuals may avoid social situations that remind them of the traumatic event they experienced, such as crowded places or places that resemble the scene of the trauma. This avoidance can lead to social isolation and a lack of social support, which can exacerbate symptoms of PTSD (Bryant et al., 2011).

Individuals with agoraphobia may avoid social situations due to a fear of having a panic attack in public. This fear can lead to avoidance of places such as shopping malls, movie theaters, or public transportation, which can limit social interactions and lead to feelings of isolation (American Psychiatric Association (Ed.), 2022). Over time, this avoidance can become more severe and lead to social phobia, further limiting social interactions and worsening symptoms.

Schizophrenia is also associated with social avoidance, though the reasons for this avoidance may be different from those in PTSD and agoraphobia. Individuals with schizophrenia may avoid social situations due to negative symptoms such as apathy, lack of motivation, or flattened affect (Correll & Schooler, 2020). These symptoms can make it difficult to engage with others and form meaningful relationships, leading to social isolation and loneliness. Additionally, individuals with schizophrenia may experience positive symptoms such as paranoia or hallucinations, which can lead to a fear of being judged or persecuted by others and may further exacerbate social avoidance.

Cultural and societal factors can also play a role in social relationship development. For example, collectivistic cultures emphasize the importance of social harmony and interdependence, while individualistic cultures prioritize individual goals and autonomy. These cultural differences can influence the way individuals develop and maintain social relationships, as well as the expectations and norms surrounding social behavior (Chen & French, 2008).

Race and ethnicity can impact social relationships during adolescence and early adulthood. Individuals from minority groups may experience discrimination and prejudice, which can impact their ability to form close relationships (Brondolo et al., 2009). Furthermore, minority individuals may experience social isolation due to the lack of representation in their social networks (Lardier et al., 2019). On the other hand, individuals from minority groups may also have strong cultural ties that provide social support (Umaña-Taylor et al., 2015). For example, Latino individuals may rely on their extended family as a source of social support, which can buffer the negative effects of stress and promote positive outcomes (Umaña-Taylor et al., 2015). Therefore, it is important to consider the role of race and ethnicity when examining social relationships during adolescence and early adulthood. More research is needed to fully understand the impact of race and ethnicity on social relationships and to develop interventions to address any potential disparities.

In conclusion, social relationships play a crucial role in the development of individuals during adolescence and early adulthood. Healthy social relationships can promote positive outcomes, such as academic achievement, mental health, and overall life satisfaction, while unhealthy social relationships can lead to negative outcomes, such as poor mental health and social functioning. Various factors, including the quality of parent-child relationships, peer influence, and cultural and societal factors, can impact the development of healthy and unhealthy social relationships. Understanding these factors can help professionals develop interventions and strategies to promote healthy social relationship development during these critical stages of development.

**Emotion regulation**

Emotions are an undeniable part of the human experience and are central to wellbeing. Although there is a general consensus regarding the importance of emotions (across the arts and social sciences alike), the field of psychology still lacks a scientific consensus on an exact definition of emotions. Emotions have been researched, in psychology, for years and years.

William James, in 1884, proposed a model of emotional processing in which he proposed that emotions likely stem from physiological reaction or arousal on response to the perception of an environmental stimulus. Some other seminal theories of emotion processing include Levenson’s (1999) model of two-system: the “processor” that is evolutionarily based and relatively stable, and “control mechanisms” which is more flexible and is sensitive to new learning, and Schachter & Singer’s (1962) model proposing that cognition (i.e., the cognitive interpretation on physiological sensations) precedes emotions. Although these were helpful models of emotions, these seminal theories lacked a developmental lens to how processing of emotions emerges across the lifespan.

Contemporary theories of emotion are more dynamic and propose models of emotion regulation. Gross (1998) proposed a highly impactful theory, *process model of emotion regulation,* in which he posited the concept of emotion regulation, i.e., the processes by which individuals influence the duration, intensity, and valence of their emotional experiences. This theory proposed that emotions dynamically unfold over time and are regulated through different strategies that have differential impact on consequences (Gross, 1998). Since then, a multitude of studies using the *process model of emotion regulation* have identified which emotion regulation strategies are associated with better mental health and which emotion regulation strategies are associated with negative outcomes (Aldao et al., 2010).

The strategies deployed by individuals to regulate their own emotions are known as emotion regulation strategies (e.g., acceptance, reappraisal, rumination, avoidance, problem solving, and suppression). Developing effective emotion regulation is an important skill for mental health and well-being, as difficulties in regulating emotions have been associated with a range of psychological disorders, including anxiety and depression (Schäfer et al., 2017), substance use disorders (Cheetham et al., 2010; Weiss et al., 2022), and eating disorders (Prefit et al., 2019). Although some seminal theories lacked a developmental lens to how processing of emotions emerges across the lifespan, recent research on emotion regulation has tried to address that gap. Below, we discuss healthy and unhealthy development of emotion regulation across the lifespan.

Starting from childhood, children learn to regulate their emotions. A child’s ability to appropriately regulate their emotions is a developmental skill that is linked to social competence, academic achievement, and mental health. Further, children's emotion regulation skills develop over time and become more mature with age (Eisenberg & Morris, 2002). Different factors, such as parenting, can impact emotion regulation during childhood and adolescence. Parenting practices can impact children's emotion regulation. One investigation found that parents' high levels of positive affect (e.g., smiling and demonstrating warmth) and low levels of negative affect (e.g., anger) were related to positive emotions in young children (ages 1-3 years) during free play and teaching tasks. Further, children who were maltreated exhibited more internalizing symptomatology, and less positive affect compared to children who were not maltreated (Robinson et al., 2009). Parenting and emotion regulation can play a role in development of childhood anxiety disorders. A review paper found associations between childhood anxiety disorders and negative emotion regulation abilities. Authors proposed that emotion dysregulation in children may stem from an insecure attachment style. They posited that an ineffective relationship between a child and their caretaker could lead to an insecure-ambivalent attachment style, which could in turn lead to the development of ineffective emotion regulation strategies and anxiety disorders (Esbjørn et al., 2012).

Parenting continues to influence emotion regulation though adolescence. Adolescence is a period of significant emotional development and change, and emotion regulation is a critical aspect of this developmental process. During adolescence, young people are learning to manage a wider range of emotions and learning to cope with more complex social and interpersonal challenges. Effective emotion regulation during adolescence is associated with a range of positive outcomes, including better mental health, higher levels of social competence, and improved academic achievement. Poor emotion regulation skills during adolescence, on the other hand, can lead to negative outcomes, such as anxiety, depression, and behavior problems (Schweizer et al., 2020).

Similar to childhood, parenting practices can play an important role in supporting adolescents' emotion regulation skills. Warm, responsive, and supportive parenting can help adolescents develop effective emotion regulation strategies, while harsh or neglectful parenting can lead to difficulties in emotion regulation in Western samples of adolescents (CITE). A similar relationship between parenting and emotion regulation in adolescents was found in a sample of Pakistani adolescents. Authoritative parenting style (i.e., high control and high responsiveness) predicted significant positive effect on emotion regulation whereas permissive parenting style (i.e., high warmth and low control) predicted significant negative effect on emotion regulation in a sample of Pakistani adolescents (Jabeen & Anis-ul-Haque, 2013). Interestingly, in a sample of low-income families, parental control significantly predicted greater internalizing and externalizing psychopathology in adolescents, which was moderated through the adolescents' anger regulation (Cui et al., 2014). Taken together, these findings may indicate that the relationship between adolescent emotion regulation and parental practices may vary by socio-economic status.

Building on a developmental lens to emotion regulation, multiple studies have demonstrated a strong relationship between difficulties in emotion regulation and the subsequent development of psychopathology later in life (Aldao et al., 2010; Sloan et al., 2017). If healthy emotion regulation is not developed during youth, it is possible that it would lead to unhealthy development later in life. One study investigated the role of negative emotion regulation in depression and anxiety in adolescents (aged 11–14) and adults (aged 25-75). Rumination (i.e., repetitive negative cognition) is a putatively maladaptive emotion regulation strategy; the role of rumination in the longitudinal relationship between anxiety and depression was tested. The results indicated that in both adolescents and adults, baseline depression predicted high anxiety 3- and 6- months later, and that this relationship was fully mediated by rumination (McLaughlin & Nolen-Hoeksema, 2011). This finding implied that if an individual does not successfully learn to regulate emotion in early life, they could proceed to have negative mental health outcomes.

Another investigation assessed a longitudinal bidirectional relationship between baseline emotion regulation and future psychopathology - including anxiety, depression, and substance use - over the course of 7 years in an adolescent sample (baseline mean age was 16.04 years). This investigation found that better emotion regulation ability at baseline predicted less relative risk for developing future psychopathology 7-years later (Klein et al., 2022). In other words, adolescents with better emotion regulation skills had lower risk of developing anxiety, depression, and/or substance use as adults.

Considering biomarkers of emotion regulation in adults, cardiac vagal control (CVC) has been shown to be a physiological marker of emotion regulation in healthy adults. CVC is the regulation of the heart rate by the vagus nerve, a part of the parasympathetic nervous system. Interestingly, resting CVC is associated with habitual use of adaptive emotion regulatory and decreases in phasic CVC is associated with greater stress and use of putatively maladaptive emotion regulation strategies (Balzarotti et al., 2017).

Considering a young-adulthood developmental stage, one investigation analyzed the relationship between emotion regulation and impulsivity in a sample of healthy young adults (mean age 21.3 years). Findings showed that in young adults with no psychopathology, individuals with high emotion dysregulation had higher self-reported impulsivity (Schreiber et al., 2012). The results from this study are interesting because they indicate that emotion dysregulation, even in a sample of healthy young adults with no mental illnesses, may be a potential risk factor in the development of psychopathology. Considering emotion regulation in older adults, one investigation examined age-variant associations (between younger adults and older community adults) in how emotion regulation strategies (specifically, cognitive reappraisal, experiential suppression, and thought avoidance) mediate the relationship between dispositional mindfulness and emotion dysregulation. The mean age for younger adults was 23.60 years and the mean age for older adults was 65.34 years. This study found that thought avoidance (a putatively negative emotion regulation strategy) explained the negative relationship between dispositional mindfulness and emotion dysregulation; this relationship was stronger in the young adult group. Further, the results indicated that the young adult group has higher levels of emotion dysregulation and used negative emotion regulation strategies more frequently, compared to the older adult group (Prakash et al., 2017). This finding adds to the vast body of research suggesting that older adults typically have more positive affect and less negative affect compared to younger adults.

It is important to note that subjective emotions vary in cross-cultural studies (Scollon et al. 2004). Emotions are subjective experiences that are influenced by cultural factors, such as beliefs, values, and norms. As such, culture can influence how individuals learn to regulate their emotions, what emotions are considered appropriate to express in certain situations, and what strategies are considered effective in regulating emotions.

**Self-Control & Value**

Cognitive control refers to the ability to regulate behaviors in accordance with goals (Badre, 2011). It includes a set of executive functions such as inhibitory control, working, memory, and cognitive flexibility, which enable individuals to override automatic responses and facilitates proper behavioral responses to changing environments. Well-developed cognitive control is associated with various positive health and well-being outcomes including emotional regulation, social relationships, academic achievement, and mental health (Duckworth et al., 2019; Joormann & Vanderlind, 2014; McTeague et al., 2016).

In terms of brain development, core components of cognitive control (e.g., response inhibition, working memory) is available even during early developmental stage, adolescence and young adulthood are crucial developmental stages where maturation and sophistication of cognitive control occurs and stabilize in adulthood (Luna, 2009). During adolescence and young adulthood, cognitive control is developed alongside the major hallmark of brain development such as pruning and myelination across brain regions, which enhances connectivity between different brain regions (Crone & Steinbeis, 2017).

Traditionally, development of cognitive control was associated with maturation of specific brain region, especially prefrontal cortex (Rougier et al., 2005). Recently, more attention has been given to functional interactions between brain networks to fully understand complicated functional brain activities (Power et al., 2011). In this regard, Marek et al (2015) found important neurological features of cognitive control development. The results suggested that network organization, affiliation of each brain region, was stable, however, network integration continued to increase during adolescence. Especially, the salience network integration that detects and responses to salient stimuli in the environment increased with age, moderating the effects of age on inhibitory control response. This empirical evidence may indicate that cognitive control is developed in parallel with the ability to integrate what stimuli is salient and rewarding in the environment.

If integration between salience network and executive functioning is crucial developmental task throughout young adulthood, the next question to be explored is what the unique developmental feature of value formulation is, and how value formulation is associated with successful cognitive control. In this regard, reward sensitivity and value-based decision-making model may provide useful insight to understand the question. Lastly, development of psychopathology during adolescence and young adulthood will be explored from the perspective of failure at self-control.

Reward sensitivity refers to heightened reactivity to rewards and increased behavioral motivation to obtain rewards including social acknowledgement, peer acceptance, and novelty seeking (Galván, 2010). During adolescence, there are significant changes in the brain’s reward system that can lead to increased sensitivity to rewarding stimuli. Specifically, the brain regions involved in reward processing such as ventral striatum, nucleus accumbens undergo significant changes (i.e., increased D1/D2 receptors) during this developmental period (Galván, 2010). A large number of empirical studies suggested that reactivity to receipt of a reward in nucleus accumbens was peak around mid-adolescences, around age 16 years (Braams et al., 2015; Galvan et al., 2006; Silverman et al., 2015).

As adolescence is a period of exploration and adjustment in new environments, reward sensitivity can be understood as a neurological underpinning for changes in motivated behaviors. In other words, reward sensitivity can lead to novelty seeking, which can contributes to positive outcomes such as new learning and seeking out new friends (Telzer, 2016). Importantly, during this period, social stimuli such as peer approval and positive social feedback have been suggested to have heightened reward value (Foulkes & Blakemore, 2016). For example, adolescents showed greater responsivity in ventral striatum than children and adults when seeing happy faces compared to calm (neutral) faces (Somerville et al., 2011). Another study found similar results that participants displayed greater activity in ventral striatum when seeing both happy and sad faces (Pfeifer et al., 2011). These results indicate that social rewards may be particularly salient and rewarding for adolescents. This may explain why adolescents are more likely to engage in risky behaviors (e.g., substance use, delinquency) in the presence of peers who approve of such behaviors, which increased potential reward value of risky behaviors (Chein et al., 2011).

Given increased risky behaviors during adolescence, it is still remained unclear whether risky behaviors are resulted from failure of cognitive control or represent different type of cognitive control to achieve rewarding stimuli. In order to understand how value or reward influences cognitive control, it may be useful to incorporate cognitive control into self-control that includes a more complicated process of decision making. With this regard, value-based decision-making model was developed by Berkman et al (2017). This model conceptualizes self-control as value-based choice in which people perceive potential value of options based on how they align with their personal values, goals, or identity. This process of evaluating options and regulating one’s behavior to obtain valuable goals requires high level of cognitive control. According to this model, individuals may show enhanced self-regulation to value-aligning choices.

From this perspective, enhanced integration between salience network and cognitive control may be understood as a consequence of positive feedback loop between valuation and self-regulation to obtain rewards. It may indicate that risky behaviors during adolescence are not a consequence of cognitive control failure but value-based choices that are shaped by social or peer identity. Then, according to this conceptualization of self-control, it provides two facets of behaviors depending on healthy-unhealthy value and successful-poor self-control. In this paper, I focused on two types of behaviors: poor self-control despite of healthy value, and successful self-control but unhealthy value. Also, I attempted to explain how these types of self-regulation are associated with the development of psychopathology during adolescence. This distinction of self-regulation is also suggested by Baumeister (2022) as under-regulation, and mis-regulation. According to him, under-regulation is a deficit of self-control, and mis-regulation is using self-control maladaptively. Although various psychopathologies can be reviewed from this perspective, addiction was only addressed in this paper.

Deficit in self-control is regarded as a hall mark of addiction. In DSM-5 TR, this phenomenological feature is described in symptom criteria as unsuccessful efforts to cut down or control substance use, and continued substance use despite having negative consequences (*Diagnostic and Statistical Manual of Mental Disorders : DSM-5-TR*, 2022). Also, neurological evidence suggests impairment of cognitive function among people with substance use disorder (Gould, 2010). However, when considering involvement of value in substance use, paradoxically it may be possible that people exert self-regulation to keep using substances despite negative consequences. In this regard, Baumeister and Vonasch (2015) contended that self-regulation is used for both facilitating and resisting addictive behaviors but differently manifested at different stage of addictive behaviors. For example, the initial stage of substance use, self-control is required to obtain substance use despite situational and individual obstacles, whereas recovery stage, self-control is needed not to use substance. As self-control is involved in value-based choice, addictive behaviors can be understood as a consequence of pathological valuation process.

The conceptualization of addiction as maladaptive valuation is also echoed in reinforcer pathology model (Bickel et al., 2011, ). According to this model, risky substance use is explained by a) high valuation of substance; b) strong preference for immediate rewards; c) lack of alternative reinforcing activities. In other words, individuals who heavily endorse substances are those who pay more valuable resources for using substances, discount delayed rewards, and have few alternative sources of rewards to substance use. Thus, individuals who use substance as a primary source of rewards may have few alternative sources of reinforcement in their environment, which may result in a greater valuation of substance as a source of reward, which relatively gives immediate rewarding effects compared to alternatives (Bickel et al., 2014).

Relating this model to adolescence, it is not surprising that first drug use is mostly during adolescence (Johnson & Gerstein, 1998) when weaker future orientation and greater delayed discounting rates were manifested among younger adolescent (Steinberg et al., 2009). This developmental vulnerability is consistent with weaker integration of salience network in younger adolescents group described above. Salience network is not fully integrated during adolescence, which means subcortical (mesolimbic) and cortical (anterior cingulate cortex) regions have slower rate of connectivity. Broadly speaking, it means that adolescents may have more difficulties at cost analysis of substance use from future perspective that is involved in cortical regions. This developmental vulnerability is associated with increased risk of later substance use disorder among people whose first age of substance use is during adolescence (Dawson et al., 2008; Swift et al., 2009). Thus, considering vulnerable reward processing during adolescence, it is important to elucidate risk factors that may shape valuation of maladaptive choices.

One’s value structure is largely influenced by social context, and adolescents shape their value with dynamic interaction with surrounding social environments such as family, reference group, peer, and community (Dornbusch, 1989; Schriber & Guyer, 2016). Related to risk factor of substance use among adolescents, family history of substance use disorder is associated with heightened development of substance use (Cservenka, 2016), even though heritability also plays a major role. Also, community level factors are suggested to affect substance use among adolescents. For example, neighborhood disadvantage (e.g., substance use rates) was related to early substance use initiation (Fite et al., 2009). Similarly, neighborhood factors such as economic disadvantages were suggested to impact adolescent tobacco, alcohol, or marijuana use (Fagan et al., 2015). Importantly, peer influence is a dominant risk factor for adolescent substance use (Loke & Mak, 2013; Pandina et al., 2010). It indicates that adolescents who are surrounded by social context that favors substance use are more likely to engage in substance use. As described above, adolescents are more sensitive to rewards that are related to social acceptance. Thus, development of valuation among adolescents who are at greater social risk factors of substance use may more easily initiate substance use that is valued in their society.

**Conclusion**

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