

Topical Review: Adolescent Self-Regulation as a Foundation for Chronic Illness Self-Management

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Objective To illustrate adolescent self-regulation as a foundation for both individual and interpersonal processes in adolescent chronic illness self-management. **Method** Literature review. **Results** Research has identified multiple individual (e.g., self-efficacy, coping, and adherence) and interpersonal factors (parental monitoring and friend support) that are sources of risk and resilience to adolescent chronic illness self-management. In this article, we highlight literature consistent with the idea that self-regulation (including cognitive, emotional, and behavioral regulation) underlies both individual and interpersonal sources of risk and resilience across development. **Conclusions** This self-regulation approach has multiple benefits: A parsimonious construct for explaining both individual and interpersonal processes that contribute to risk and resilience for chronic illness self-management, the incorporation of methods used in developmental and health psychology research, including performance-based, physiological, daily, and ecological momentary assessment, and a new look to interventions that target self-regulation as a way to improve individual and interpersonal processes in chronic illness self-management.

Key words adherence; adolescents; chronic illness; developmental perspectives.

Management of chronic illnesses requires completion of complex and challenging adherence behaviors for adolescents and their families (Sawyer, Drew, Yeo, & Britto, 2007). Chronic illness self-management involves a self-regulatory process of completing adherence behaviors in the context of competing emotions, cognitions, and behaviors (e.g., testing blood glucose despite feeling hopeless and planning when to take medications during the school day). Research supports that self-regulation and chronic illness self-management are associated in adolescence. For example, in adolescents with type 1 diabetes, better self-control, emotional processing, and fewer daily self-regulatory failures are associated with better adherence and metabolic control (Berg et al., 2014; Hughes, Berg, & Wiebe, 2012).

Though the importance of self-regulation to managing a chronic illness in adolescence may appear obvious, research has typically examined self-regulatory processes

separately (e.g., coping, mood, or externalizing behaviors) and in isolation from interpersonal processes (e.g., family conflict and peer relationships). In this article, we illustrate how self-regulation may serve as a foundation for both individual and interpersonal sources of risk and resilience for chronic illness self-management and health. Also, we discuss the benefits of this self-regulation approach to studying adolescent chronic illness self-management and make recommendations for future research and intervention.

Self-Regulation as a Foundation for Individual and Interpersonal Processes in A Chronic Illness Self-Management

Across the life span, the effects of self-regulation on health and well-being are far reaching (Moffitt et al., 2011). Self-regulation is defined as the adolescent's ability to modulate cognition, emotion, and behavior toward a goal

(Baumeister, Vohs, & Tice, 2007). This includes both individual (e.g., I will test my blood glucose during class today) and interpersonal goals (e.g., I will not get into a battle with my mother over my blood glucose values at dinner tonight; Coan, 2011; Vohs, Ciarocco, & Baumeister, 2004). In healthy individuals, self-regulation has been linked to health behaviors, self-efficacy, stress and coping skills, health beliefs, and family processes, many of the same sources of risk and resilience that are associated with chronic illness self-management (Blair & Diamond, 2008; Brody & Ge, 2001). Further, better self-regulation is associated with better academic achievement, interpersonal success, physical health and adjustment, and fewer behavioral and emotional problems (Blair & Diamond, 2008; Finkenauer, Engels, & Baumeister, 2005; Tangney, Baumeister, & Boone, 2004). These far-reaching effects of self-regulation on the health and well-being in healthy individuals are theorized to occur because of the role of self-regulation as a foundation for both individual and interpersonal processes.

Chronic illness self-management is similarly facilitated by a variety of individual and interpersonal processes (Modi et al., 2012), and we argue that these draw on self-regulation (see Figure 1). In adolescence, chronic illness self-management is defined, according to Modi et al. (2012), as “the interaction of health behaviors and related processes that patients and families engage in to care for a chronic condition” (p. e476). Across chronic illness diagnoses, tasks associated with efficacious chronic illness self-management are diverse, yet consistently complex and disruptive to daily living (Sawyer et al., 2007). Adolescents may engage in such tasks with their family and within other close relationships (friends, siblings, and romantic partners), as well as with individuals in their community (e.g., school teachers and coaches) and those within the health-care system for a collaborative, interpersonal management process (Martinez, Jocelyn, & Legato, 2011; Modi et al., 2012).

For an adolescent and family to engage in efficacious chronic illness self-management, the adolescent needs a foundation of self-regulation skills. As adolescents set goals to manage their chronic illness, they must regulate their cognitions (e.g., thoughts about pain), emotions (e.g., embarrassment with managing disease around friends), and behaviors (e.g., checking blood glucose), toward the goal of achieving health. For example, adherence, or how closely a person follows and meets the guidelines of their prescribed health-care recommendations, is a commonly studied metric of chronic illness self-management, and an established mediator of health outcomes in adolescent chronic illness (Graves, Roberts, Rapoff, & Boyer, 2010).

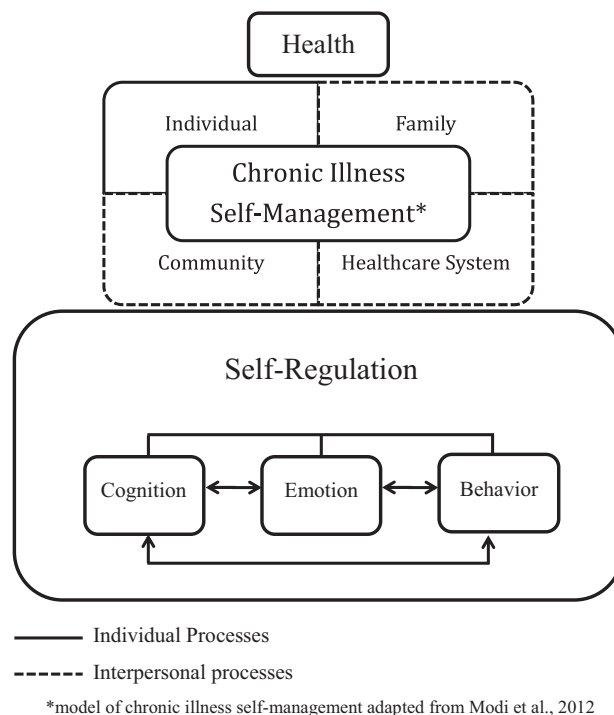


Figure 1. Adolescent self-regulation as a foundation of individual and interpersonal processes in chronic illness self-management.

Adhering to one's illness regimen requires an individual to have self-efficacy for disease management (i.e., beliefs about their capacity to produce a desired result), to manage stress via effective coping and problem-solving skills, to have healthier beliefs regarding the chronic illness, and to have fewer internalizing and externalizing symptoms (Compas, Jaser, Dunn, & Rodriguez, 2012; Hill-Briggs & Gemmell, 2007; Sawyer et al., 2007). In healthy children and adolescents, similar processes, such as internalizing and externalizing behaviors, health behaviors, and coping skills, are viewed as developing in conjunction with self-regulation (Blair & Diamond, 2008; Repetti, Taylor, & Seeman, 2002). Thus, the consistent relations of these processes with each other and chronic illness self-management can be viewed as all drawing on self-regulation.

In further support of the foundational nature of self-regulation for chronic illness self-management, there is a growing body of literature in pediatrics on the association of neurocognitive processes, such as executive function and attention, with chronic illness self-management. We define executive functions as “cognitive abilities that are important for organizing information, for planning and problem solving, and for orchestrating thought and action in goal-directed behavior” (Blair & Ursache, 2011, p. 300). Thus, executive functions undergird the volitional aspects of self-regulation. Research finds that deficits in

executive function are associated with poorer chronic illness self-management (McNally, Rohan, Pendley, Delamater, & Drotar, 2010; O'Hara & Holmbeck, 2013). Also, adolescent attention—for example, attention to physical changes in symptoms, in particular, those that cue adherence behaviors (e.g., wheezing in asthma)—is related to chronic illness self-management (Compas & Boyer, 2001). These findings support the notion that adolescent self-regulation, including underlying neurocognitive functioning, is a foundation for chronic illness self-management.

Our conceptualization of self-regulation as a foundation for chronic illness self-management also includes interpersonal processes, such as an adolescent's ability to use interpersonal resources (Vohs et al., 2004). Typically, the interpersonal context in pediatrics is characterized by a broad array of ways that parents, peers, and health-care providers influence adolescents' disease management (support and monitoring). Evidence for the importance of adolescents' self-regulation skills to these interpersonal processes comes from work showing that features of parental involvement, such as parental knowledge, are actually reflective of how adolescents involve their parents in diabetes management (Osborn, Berg, Hughes, Pham, & Wiebe, 2013). Additionally, research in healthy adolescents suggests that many individual self-regulation skills can be recast as both individual and interpersonal in nature. For example, adolescents must regulate their cognitive, emotional, and behavioral responses to unrequested parental involvement in disease management, a common source of conflict (Dekovic, 1999). Consistent with this, healthy adolescents who experience poor self-regulation report increased conflict with their family and peers, along with deficits in psychosocial health (Hughes, Crowell, Uyeji, & Coan, 2012). From this perspective, interpersonal processes that affect chronic illness self-management, such as parental monitoring, adolescent disclosure, and family conflict, also draw on a foundation of adolescent self-regulatory skills.

Further, our perspective that adolescent self-regulation is an individual and interpersonal process, rather than a process existing only within the self, is supported by research that traces the development of self-regulation in adolescence and adulthood to early parent-child relationships (Hughes, Crowell et al., 2012). As depicted in Figure 2, self-regulation is theorized to develop dynamically in coordination with stress regulatory systems (i.e., stress reactivity and temperament) and the family social environment across development (Blair & Raver, 2012; Lewis, 2000; Repetti et al., 2002; Repetti, Robles, & Reynolds, 2011). Additionally, in a pediatric population,

the chronic illness also enters into this coordinated system and may alter the development of self-regulation or be affected by the preceding developmental history, depending on when in development the illness is diagnosed. Coordination implies that the intricate and transactional relations of self-regulation, stress regulatory systems, and the family social environment are best explained as moving in similar patterns across time, rather than by uni- or bidirectional effects. For example, analogous social and neurobiological processes have been found to underlie both early attachment and the subsequent emotion regulation later in development (Coan, 2011). At any given snapshot in time, an individual's capacity for self-regulation is an outcome of this coordinated process. Given this coordinative perspective, self-regulation may be a foundation, and a barometer, for understanding both individual and interpersonal sources of risk and resilience for chronic illness self-management and health in adolescence.

Conclusions and Recommendations

Using this self-regulation perspective toward understanding chronic illness self-management has benefits for pediatric research. Foremost, this perspective views self-regulation as underlying both individual and interpersonal sources of risk and resilience for chronic illness self-management. Research findings in adolescent chronic illness self-management often indicate analogous relations among multiple individual and interpersonal sources of risk and resilience for chronic illness self-management (e.g., King et al., 2012). For example, adolescents who have high negative affect, poor coping skills, as well as high family and peer conflict struggle to engage in effective chronic illness self-management. Our self-regulation perspective provides a rationale for consistency in these findings: Adolescents who have deficits in self-regulation will be more likely to have deficits in individual (e.g., self-efficacy, coping, adherence, and psychopathology) and interpersonal processes (parental monitoring and friend support) that affect chronic illness self-management. These self-regulatory deficits are likely the result of the coordination of developing self-regulation with the family social environment and biological stress regulatory systems across childhood and into adolescence.

A self-regulation perspective provides multiple new avenues for research and intervention to the field of chronic illness self-management.

1. *Self-regulation should be examined as both an individual and interpersonal phenomenon.* Individual

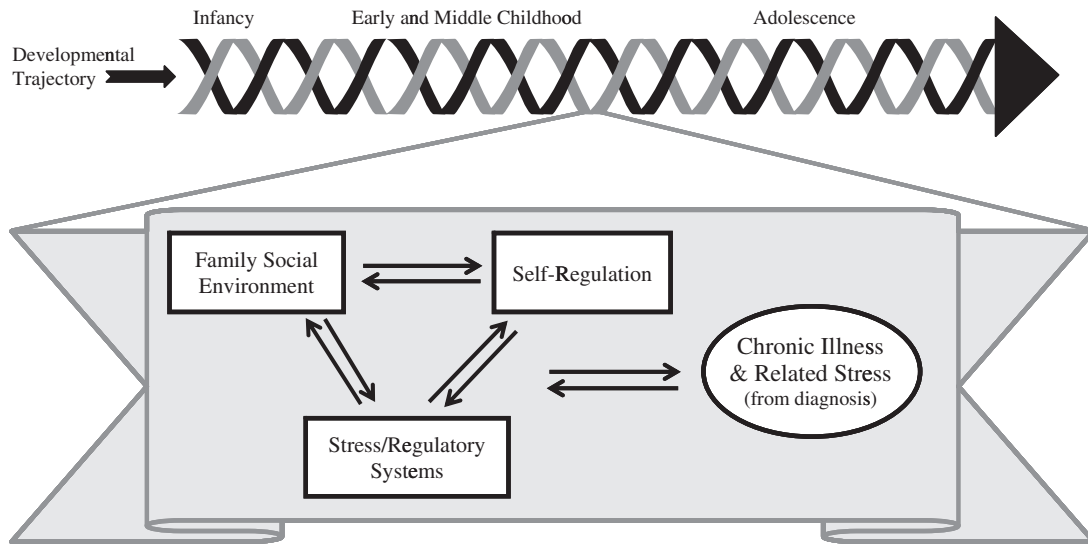


Figure 2. The dynamic coordination of family social environment, self-regulation, stress/regulatory systems, and the chronic illness across development.

self-regulatory processes (e.g., coping and mood) should be examined together with how individuals regulate and are regulated by others (e.g., disclosure vs. secrecy to parents; Osborn et al., 2013).

2. *Self-regulation research can be conducted in many pediatric populations.* Research using this self-regulation perspective would benefit not only the study of chronic illness self-management but also the study of health behaviors (e.g., sexual health and eating), acute illnesses, and accident/injury prevention.

3. *Expansion of measurement of self-regulation.*

Drawing on research on self-regulation from developmental and health psychology, the measurement of self-regulation can expand beyond individual difference metrics that rely heavily on self-report. A multimethod approach incorporating self-report as well as physiology and performance measures of self-regulation may clarify the associations of self-regulation, stress regulatory systems, and family/social environments in chronic illness self-management. This multimethod approach should also be used in longitudinal studies that examine these same associations over time. Also, inclusion of daily and ecological momentary assessments would illuminate potential differences between adolescents' trait self-regulatory capacity and actualized daily self-regulation. Such methods may reveal that in addition to individual differences in self-regulation, there are day-to-day fluctuations that arise in daily life (see Berg et al., 2014).

4. *Extension of self-regulatory challenges in chronically ill adolescents to other domains.* Given the link between self-regulation and a broad array of youth outcomes, it is likely that adolescents who struggle with self-regulation skills surrounding managing their chronic illness also struggle to regulate a variety of life domains (Moffitt et al., 2011). Poor self-regulation in the context of chronic illness may extend to other important domains, including academic achievement and social functioning.
5. *Assessment of self-regulation.* Given the broad influence of adolescent self-regulation in chronic illness self-management, clinicians would benefit from assessing self-regulation in the clinic. Brief self-report assessments such as the Brief Self-Control Scale (Finkenauer et al., 2005; Hughes, Berg et al., 2012), which is used to examine self-regulation in both healthy and chronic illness samples, may be useful in conjunction with performance-based measures (O'Hara & Holmbeck, 2013).
6. *Interventions for self-regulation could include both individual and interpersonal components.* As interventions are developed for self-regulation, targeting specific self-regulatory skills (e.g., scaffolding effective emotion regulation through cognitive-behavioral or stress-reduction interventions) may have an effect on not only individual but also interpersonal outcomes. Given the developmental course of self-regulation, interventions for self-regulation targeted toward early prevention for young children diagnosed with a chronic illness may be

most beneficial (Blair & Diamond, 2008; Romer, Duckworth, Sznitman, & Park, 2010). Further, interventions that target developing neurocognitive processes that undergird self-regulation (e.g., computerized or aerobic interventions for executive function development) will also be important to consider (Diamond & Lee, 2011).

The field of pediatric psychology has examined many sources of individual and interpersonal risk and resilience for chronic illness self-management. The construct of self-regulation has the potential to integrate these various factors and provide parsimony in understanding how to assess and intervene to improve chronic illness self-management throughout development.

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