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Editorial

## COVID-19 Pandemic and Developmental Outcomes in Adolescents and Young Adults: In Search of the Missing Links



In the literature on trauma and adversity, many theorists propose that trauma (such as COVID-19 stress) would lead to impairment of well-being. However, although studies generally show that trauma stress and well-being are negatively related, the magnitude of the relationship is low to moderate only [1–4]. Obviously, there are other factors and processes influencing the relationship between COVID-19 exposure and developmental outcomes in adolescents and young adults. These are “missing links” in the relationship between COVID-19 stress and well-being.

Theoretically, scientists should search for several “missing links” on the relationship between COVID-19 exposure and developmental outcomes. The first missing link concerns the mediating processes in the influence of COVID-19 stress on developmental outcomes. In other words, COVID-19 exposure influences well-being through the effect of other factors (i.e., mediators). In the study by Li, Li, and Fan [5], they proposed that social support and emotional intelligence are mediators and found that emotional intelligence partially mediated the impact of COVID-19 exposure on psychological distress. Their findings are consistent with the theoretical propositions that COVID-19 stress may trigger other psychological processes, such as irrational beliefs, hopelessness, reduced self-efficacy, meaninglessness, confused self-identity, and/or interpersonal conflict, which would further lead to the impairment of well-being. Nevertheless, there are mediating processes that may be beneficial in nature. Based on the resilience literature, COVID-19 stress and related traumatic experience may contribute to the development of problem-solving skills, emotional management competence, life meaning, bonding, self-efficacy, and optimism in adolescents. In fact, as clinical studies show that traumatic experience may lead to personal growth in people experiencing trauma, it would be theoretically and practically important to see how COVID-19 experience would lead to personal growth and transcendence. Besides, cultural beliefs such as those in the Chinese culture also suggest that adversity is an opportunity to promote thriving in human development [6].

The second missing link is on the possible factors “moderating” the strength of relationship between COVID-19 stress and well-being. For example, the negative impact of trauma on well-being would be greater under unhealthy coping (e.g., alcohol consumption) relative to healthy coping (e.g., maintaining optimism and seeking help). In the study by Shek et al. [7], we found that positive youth development (PYD) attributes such as cognitive-behavioral competencies and positive identity moderated the influence of trauma on well-being (i.e., protective factors). With reference to the ecological perspective, there are factors in different ecological domains that may protect adolescents and young adults from the negative effect of stress, such as COVID-19 exposure. Based on this approach, the recipe for the prevention of psychological morbidity under COVID-19 is to strengthen protective factors such as promotion of life meaning [8] and family life quality [9] in adolescents and young adults.

The final missing link is that theorists may propose different paths from COVID-19 stress to psychological morbidity involving different mediators and moderators. Primarily, mediators and moderators may interact to shape the impact of COVID-19 stressors on developmental outcomes [10,11]. For example, COVID-19 trauma may lead to hopelessness that in turn contributes to depression, but the relationship may be stronger in those with a higher sense of meaninglessness than those with a lower sense of life meaninglessness. Besides, different models can be proposed on the relationships between antecedents and mediators. With reference to the model proposed and tested by Li, Li, and Fan [5], it is equally possible that emotional intelligence shapes perceived COVID-19 stress, which further contributes to depression. Finally, consistent with the spirit of the ecological approach, there may be bidirectional influences among the constructs in a model [12], such as mutual influences between COVID-19 stress and psychological morbidity.

There are several future research directions regarding the “missing links” in the influence of COVID-19 stress on developmental outcomes. First, we should carry out more work to refine

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conceptual models on the relationship between COVID-19 and developmental outcomes. In particular, researchers should examine how COVID-19 exposure may help promote thriving and growth in people with COVID-19 exposure. It is also important to ask how the pandemic has promoted or impaired spiritual well-being within the context of COVID-19 [13].

Second, to understand the causal relationships between COVID-19 and developmental outcomes with reference to mediator and moderators, longitudinal designs involving multiple waves of data are indispensable. It is noteworthy that longitudinal studies in COVID-19 are rare in the field. Third, it would be helpful to conduct studies in different societies to ascertain the generalizability of research findings. As many theories on stress and coping are developed in Western societies with individualistic values, replication of such models in non-Western societies with collectivistic values is needed. In many cultures, theorists regard adversity as a trial and an opportunity for growth. Finally, it would be helpful if researchers can use advanced statistical analyses such as structural equation modeling and growth curve modeling to uncover the mediating and moderating effects in the relationship between COVID-19 exposure and developmental outcomes. Such statistical models can help researchers test competing models and assess how well the data collected in reality fit the abstract conceptual models [14].

Practically speaking, research findings on the mediating and moderating mechanisms in the COVID-19 stress and developmental outcome relationship offer some insights for prevention and intervention strategies. For example, if we know COVID-19 stress lowers emotional intelligence, we should develop programs to promote emotional intelligence before and during the pandemic. Similarly, if life meaning moderates the negative impact of COVID-19 stress on developmental outcomes, we should help people find meaning in the pandemic, such as treating it as an opportunity to reflect on one's life values and find ways to help others. In the PYD literature, a core belief is that strengthening of inner strengths (e.g., hope and meaning) and psychosocial competencies (e.g., emotional competence) can help to "protect" adolescents from the negative impact of life challenges. In fact, there are evidence-based PYD programs in the West and China [15], showing the value of promoting PYD attributes in adolescents and young adults, which eventually can help them cope with the COVID-19 challenges.

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