The Protective Effect of Shift-and-Persist on Health in Lower Social Class and Its Mechanisms

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Abstract

Low socioeconomic status is one of the most reliable social determinants of poor health outcomes. However, there is limited understanding of why some individuals in the same low-status position can maintain good health. Based on extensive empirical research, researchers have discovered that the psychological factor of "shift-and-persist" strategy can effectively protect the health of low-status individuals facing adversity, shielding them from disease. When individuals encounter persistent or frequent stress, the "shift-and-persist" strategy attenuates acute physiological activation of the hypothalamic-pituitary-adrenal axis, effectively suppressing the physiological stress response in low-status individuals confronting adversity, and over time, prevents the development of pathogenic processes. Simultaneously, this strategy also reduces unhealthy behaviors among low-status individuals, thereby exerting a protective effect on health. Future research should develop effective intervention programs based on in-depth exploration of the core mechanisms, providing a new pathway for addressing health poverty in the context of relative poverty issues in China.

Full Text

Preamble

The Protective Effects of the "Shift-and-Persist" Strategy on Lower-Class Health and Their Mechanisms

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Abstract

Lower socioeconomic status represents one of the most reliable social determinants of poor health outcomes. However, scant research has examined why some individuals from lower-class backgrounds nevertheless maintain good health despite facing persistent adversity. Building on extensive empirical research, investigators have identified the "shift-and-persist" strategy as a psychological factor that effectively protects the health of lower-class individuals confronting hardship, shielding them from disease onset. When individuals face chronic or frequent stressors, the shift-and-persist strategy attenuates acute physiological activation of the hypothalamic-pituitary-adrenal (HPA) axis, effectively suppressing physiological stress responses among lower-class individuals facing adversity. Over time, this prevents the development of pathogenic processes. Simultaneously, this strategy reduces unhealthy behaviors among lower-class individuals, thereby conferring protective effects on health. Future research should develop effective intervention programs based on deeper exploration of the core mechanisms, providing novel pathways for addressing health poverty within China' s relative poverty challenges.

Keywords: shift-and-persist, health, lower class, HPA axis

Socioeconomic status stands as one of the most powerful social determinants of health. Lower social class consistently predicts poorer personal health outcomes (Hu et al., 2019; Wang & Ma, 2020; You et al., 2018). Data from the *2020 China Health Statistics Yearbook* reveal that individuals at the bottom of the social hierarchy (unemployed, semi-employed) exhibit a two-week morbidity rate of 4.53%, compared to 2.75% among other employed classes. Illiteracy and semi-literacy correlate with a two-week morbidity rate of 4.98%, whereas individuals with university education or above show only 1.89%. International research further demonstrates that, compared to higher classes, lower-class individuals face 1.31 times greater prevalence of cardiovascular disease, 6.83 times higher cardiovascular mortality, and 5.47 times higher all-cause mortality (Rosengren et al., 2019). This relationship between social class and health persists across nations regardless of universal healthcare availability (Adler et al., 1993) and manifests across the entire lifespan, from childhood through older adulthood (Starfield et al., 2002). In the "post-poverty-alleviation era," health disparities across social classes constitute a significant factor contributing to relative poverty in China (Wu, 2021).

Addressing these health disparities and solving health poverty to prevent the vicious cycle of illness-induced poverty represents an urgent challenge. Although scholars across numerous fields have extensively explored health inequalities across social classes (Deng et al., 2020; Wang & Liu, 2019; McEwen & McEwen, 2017; Schreier & Chen, 2013), a critical question remains unanswered: Why do some individuals facing persistent and severe adversity not become ill? In one study, researchers exposed individuals from different social class backgrounds to a common cold virus, isolated them, and clinically tracked symptoms fol-

lowing infection. Results showed that lower-class individuals were three times more likely to develop colds than their higher-class counterparts. Yet despite this higher incidence, approximately 55% of lower-class participants remained illness-free (Cohen et al., 2004). In other words, even under disadvantaged circumstances, some lower-class individuals maintain relatively good health (Chen et al., 2015; Chen et al., 2019; Christophe et al., 2019). Moreover, this is not an anomalous phenomenon; typically 35% to 55% of lower-class individuals facing adversity remain healthy (Bonanno, 2005). What factors protect these resilient individuals? What mechanisms enable them to preserve their physical well-being?

Based on substantial empirical research, investigators have identified the "shift-and-persist"strategy as a psychological factor that effectively protects the health of lower-class individuals confronting hardship, shielding them from disease onset. What exactly constitutes the shift-and-persist strategy, and how does it protect lower-class health? Current researchers have explained lower-class health disparities from environmental (Schreier & Chen, 2013), psychological (Stephens et al., 2012), physiological (McEwen & McEwen, 2017), and socio-ecological perspectives (Adler & Ostrove, 1999), noting that the most direct and proximal factors influencing lower-class health are pathophysiological mechanisms of disease formation (Miller et al., 2016). Therefore, after thoroughly examining what the shift-and-persist strategy is and its effects as a specific psychological characteristic protecting lower-class health, this paper focuses on analyzing the potential physiological mechanisms linking this strategy to disease from a physiological perspective, followed by an exploration of relevant behavioral mechanisms, aiming to provide theoretical reference and policy basis for narrowing health disparities and addressing health poverty during China' s relative poverty period.

1 The "Shift-and-Persist" Strategy

1.1 Definition of the "Shift-and-Persist" Strategy

The "shift-and-persist"strategy refers to a coping style in which individuals adapt themselves through accepting stress and cognitive reappraisal (shifting), while simultaneously enduring adversity with strength by maintaining optimism and finding meaning (persisting) (Chen & Miller, 2012). For example, when coping with the specific stressor of being fired, an individual might adjust themselves through cognitive reappraisal and other emotion regulation strategies, accepting the fact of being dismissed (shifting); simultaneously, from the perspective of career goals, they can see the benefits of unemployment and learn lessons from it, as well as distinguish priorities in life, enabling them to cope with this stressful event by maintaining optimism and finding meaning in life (persisting).

1.1.1 The "Shift" Strategy "Shifting" is a strategy that involves adjusting oneself to adapt to the environment by accepting realistic pressures and engaging in cognitive reappraisal (Chen & Miller, 2012). According to the

shift-and-persist model, "shifting" first involves cognitive reappraisal, which is a regulation strategy that actively reconstructs emotion-eliciting events before emotional responses are fully activated, thereby reducing their emotional impact and altering behavioral and physiological response tendencies (Gross, 1998). Additionally, "shifting" requires individuals to accept external stressors, representing a secondary control coping strategy. Building upon life-span theories of control (Heckhausen et al., 2010), the shift-and-persist model notes that lower-class individuals face numerous constraints in life. Due to accumulated life experiences, they place greater emphasis on secondary control coping strategies —adjusting themselves to adapt to the environment and others rather than controlling the environment (Stephens et al., 2009). Unlike life-span theories that emphasize primary control and view "striving to implement primary control as a fundamental human motivation," the shift-and-persist model posits that when facing difficulties and stress, lower-class individuals often cannot achieve primary control due to resource limitations, making secondary control strategies that involve self-regulation and acceptance of reality more conducive to successful stress management. Therefore, the "shifting" strategy of adjusting oneself to adapt to the environment through accepting reality and cognitive reappraisal represents an adaptive strategy for lower-class individuals (Chen et al., 2015).

1.1.2 The "Persist" Strategy "Persisting" refers to a stress coping strategy that involves enduring adversity with strength, maintaining self-stability, finding meaning in life, and remaining optimistic about the future (Chen & Miller, 2012). Grounded in theories of resilience, the shift-and-persist model proposes that individuals living in low socioeconomic status environments must endure adversity with strength by forming life goals and maintaining hope for possible future improvement in order to successfully adapt (Chen & Miller, 2012; Chen et al., 2015). "Persisting" enables lower-class individuals to focus on larger life goals when facing current adversity, which may help maintain hope during difficult times (Chen et al., 2015). Particularly important to "persisting" is finding meaning in life. Meaning-making is considered a fundamental human motivation, especially when facing adversity, as it enables people to maintain hope (Frankl, 1963). Finding meaning can increase individuals' sense of security, status, and benevolence in the world, help them understand why adversity occurs, promote hope and optimism for the future, and facilitate adaptation during hardship (Shiah et al., 2015). For example, research has found that meaning-making helps individuals cope with traumatic events (Kim et al., 2011). Additionally, meaning-making helps reconcile conflicts between people' s beliefs about the world and themselves, enabling individuals to grow in important ways and see value in life even during adversity (Bryan et al., 2020; Dezutter et al., 2013; Fu et al., 2020). Therefore, for lower-class individuals, successful adaptation requires "persisting" —enduring adversity with strength by understanding why it occurs, maintaining stability, finding meaning and purpose in life, and preserving hope and optimism for the future.

1.1.3 The Combination of "Shift"and "Persist" However, either "shifting" or "persisting" alone is insufficient; the combination of both proves crucial. For lower-class individuals, possessing an approach that emphasizes changing oneself while coping with stress, combined with enduring adversity with strength and maintaining optimism and hope for the future, proves more beneficial for alleviating stress responses than any single strategy. Specifically, while employing emotion regulation (the "shifting" strategy) to cope with current adversity, individuals also need to find broader meaning in life, maintain optimism in the face of hardship, and develop toward potential future possibilities (the "persisting" strategy). "Persisting" facilitates "shifting," as optimism makes it easier for individuals to adapt when problems cannot be solved, promotes more adaptive coping efforts, and makes individuals more likely to use cognitive reappraisal strategies to cope with stressful events. Optimism also promotes post-traumatic growth through its effects on threat appraisal and adaptive coping strategies (Zoellner & Maercker, 2006). Furthermore, "persisting" requires "shifting," as positive cognitive reappraisal represents an important strategy for helping older adults with chronic diseases maintain hope (Duggleby et al., 2012). Therefore, the combination of "shifting" and "persisting" strategies proves more advantageous than single strategies alone for lower-class individuals to successfully adapt to adversity.

By contrast, higher-class individuals on average possess more resources for preventive behaviors, problem-solving, and influencing outcomes, meaning they have a broader range of available coping strategies such as active coping, instrumental social support, and emotional expression. These proactive efforts prove more effective for eliminating stress (Gallo & Matthews, 2003; Hobfoll, 2001). In such contexts, using strategies best suited for largely uncontrollable life situations (like shift-and-persist) does not help higher-class individuals and may even prove detrimental to alleviating physiological stress responses (Chen et al., 2015). This may occur because using strategies ill-suited to particular contexts hinders goal achievement and increases frustration or negative affect. Research shows that compared to disadvantaged individuals employing "shifting" strategies, advantaged individuals using the same strategies exhibit more negative effects (Wrosch & Heckhausen, 1999).

1.2 Formation Process of the "Shift-and-Persist" Strategy

How does the "shift-and-persist" strategy develop as an individual difference? Specifically, given the persistent daily difficulties some lower-class individuals face, what enables them to reappraise stressful environments and find meaning in adversity? Researchers identify role models as key to the formation of shift-and-persist strategies among lower-class individuals (Chen & Miller, 2012; Chen et al., 2013). Regarding role models, these typically refer to any individual who serves as an attachment figure and provides inspiration and motivation to children, such as parents, extended family members, or teachers. Researchers propose that role models promote the formation of shift-and-persist strategies

through at least two pathways: by fostering secure attachment relationships that promote positive beliefs about others and the world (e.g., trust and optimism, which form the foundation for shift-and-persist strategy development), and by modeling socialization behaviors that teach children emotion regulation strategies (the "shifting" component).

First, attachment shapes fundamental beliefs about trust in others, with secure attachment promoting beliefs that others are trustworthy and reliable (Bowlby, 1988). Therefore, positive attachment relationships enable children to develop trust in others, view them as dependable and reliable, and encourage optimism —the belief that good things will happen. These beliefs form the starting point for shift-and-persist strategies. Simultaneously, attachment relationships help children learn how to regulate their emotions, with securely attached children and adolescents demonstrating better emotion regulation capacities (Cooke et al., 2019). Thus, forming secure attachments to role models proves important for promoting the underlying beliefs and emotion regulation abilities required for shift-and-persist strategies.

Second, role models help in concrete ways by teaching children appropriate emotion regulation behaviors and helping them focus on the future. First, role models establish clear rules that help children know what will happen after expressing emotions, which assists children in expressing emotions in socially acceptable ways—for example, "you can be angry, but you cannot hit" (Houltberg et al., 2016). If parents provide more guidance on emotional expression, children' s emotion regulation abilities improve several years later (Gottman et al., 1996). Second, role models teach children through their own reactions to children' s emotions. Research finds that parents' positive responses to children' s negative emotions—such as helping solve problems causing emotional distress, assisting children in expressing emotions, and encouraging them—positively correlate with children' s emotion regulation capacities (Uyar et al., 2018). Finally, role models provide children with models for how emotions should be expressed, with mothers' greater positive emotional expression associated with better child emotion regulation (Tan & Smith, 2019). For example, mothers who display more positive emotions during difficult times have children who demonstrate better emotional balance with peers (Denham et al., 1997). Role models provide a framework for children to learn adaptive emotion regulation strategies, and when children reach adulthood, role models help them focus on their future, promoting optimism and meaning-making (Lerner et al., 2020).

In summary, role models as attachment figures foster the development and growth of shift-and-persist strategies by cultivating children' s trust in others and positive worldviews, teaching emotion regulation strategies, and encouraging adolescents to focus on their future.

1.3 Measurement of the "Shift-and-Persist" Strategy

Currently, researchers treat the shift-and-persist strategy as an individual difference variable and rely primarily on questionnaire methods for measurement (Chen et al., 2015; Christophe et al., 2019; Dahlstrand et al., 2021; Lam et al., 2018; Lee & Nakashima, 2020; Liu et al., 2020). Initially, researchers used separate scales to measure the "shifting" and "persisting" components, such as the Responses to Stress Questionnaire (RSQ) cognitive reappraisal subscale and the Primary-Secondary Control Questionnaire (PSCQ) to measure the tendency toward self-transformation under stress (the "shifting" component), and the Life Orientation Test (LOT) and Purpose in Life Scale to measure individuals' positive future expectations (the "persisting" component) (Chen et al., 2011; Chen et al., 2012; Chen et al., 2013; Kallem et al., 2013).

As research progressed, Chen et al. (2015) developed a specialized instrument for measuring shift-and-persist based on the theoretical concept and drawing from measures of similar constructs. Specific items include those measuring "shifting" during difficult times or circumstances (e.g., "When stressful events happen in my life, I accept that it has happened," "I can benefit from this situation") and items measuring "persisting" in adversity (e.g., "I feel my life is worthwhile," "I have no hope that the future will be better" [reverse-scored]). All items are rated on a Likert scale from 1 (not at all) to 4 (a lot). Because the shift-and-persist model posits that "shifting" and "persisting" exert maximal health effects when used in combination, researchers typically calculate a total shift-and-persist score by averaging the "shifting" and "persisting" subscale scores and summing them, with higher scores indicating greater use of the shift-and-persist strategy (Chen et al., 2015; Kallem et al., 2013; Lam et al., 2018). It should be noted that "shifting" and "persisting" are correlated ($r = 0.56$, $p < 0.001$) yet independent dimensions (confirmatory factor analysis shows poor fit for a single-factor model combining all items, whereas a two-factor model fits well and significantly outperforms the single-factor model; Lam et al., 2018). The reliability and validity of the two-dimensional shift-and-persist scale have been tested across different samples (Lee & Nakashima, 2020; Liu et al., 2020). The scale demonstrates good internal consistency ($\alpha = 0.77$), satisfactory convergent and discriminant validity (Chen et al., 2015), and good criterion validity, showing significant positive correlation with adolescents' future orientation (Steinberg et al., 2009) and negative correlation with adolescents' hopelessness (Kazdin et al., 1986).

2 The Protective Effects of the "Shift-and-Persist" Strategy on Lower-Class Health

The shift-and-persist model posits that for individuals from low socioeconomic status backgrounds, possessing an approach that emphasizes changing oneself while coping with stress, combined with enduring adversity with strength and maintaining optimism and hope for the future, can reduce stress responses

among lower-class individuals and thereby protect their health (Chen et al., 2012).

2.1 Protective Effects of "Shifting" on Lower-Class Health

Evidence indicates that components of the shift-and-persist strategy affect clinical health outcomes. For example, the "shifting" strategy (cognitive reappraisal) helps reduce long-term susceptibility to cardiovascular disease among lower-class individuals. In low socioeconomic status individuals, negative emotions—particularly high anger expression—correlate more strongly with cardiovascular disease risk (carotid intima-media thickness, myocardial infarction risk). Cognitive reappraisal strategies that effectively regulate such negative emotional expression significantly improve cardiovascular health among lower-class individuals (Merjonen et al., 2008). Compared to low-class participants scoring low on the "shifting" strategy (cognitive reappraisal), those scoring high show higher likelihood of normal blood pressure range and lower hypertension risk; they also exhibit lower cardiovascular reactivity and lower ambulatory blood pressure when facing acute stressors (Chen et al., 2007; Gross, 1998). Furthermore, research finds that after interventions targeting emotion regulation skills, lower-class individuals with adverse childhood experiences show reduced sick days, fewer physical symptoms, and improved physical health (Cameron et al., 2018).

2.2 Protective Effects of "Persisting" on Lower-Class Health

Previous research examining the health benefits of the "persisting" strategy for lower-class individuals has tested components such as optimism, life purpose, and meaning-making. For example, research with lower-class adolescents finds that optimism significantly predicts cardiovascular health levels (Midei & Matthews, 2014), and among participants with low childhood socioeconomic status, lower optimism scores correlate with higher cardiovascular disease risk (Boylan et al., 2020). In another study of middle-aged women, optimistic lower-class women showed significantly lower ambulatory blood pressure and hypertension risk compared to pessimistic individuals; notably, optimistic lower-class women showed similar ambulatory blood pressure and hypertension risk to higher-class women (Grewen et al., 2000). Additionally, compared to highly educated participants, optimism more strongly predicts functional and subjective health among less educated individuals (Schöllgen et al., 2011). Similar patterns emerge for meaning-making; for instance, higher life purpose (similar to meaning-making) predicts lower cardiovascular disease risk among low socioeconomic status adults (Boylan et al., 2020; Morozink et al., 2010). A longitudinal study of older adults found that lower-class individuals with higher life purpose showed lower mortality risk (Shiba et al., 2021). These findings indicate that the "persisting" strategy alone can protect lower-class individuals from health risks.

2.3 Combined Strategy Effects on Lower-Class Health

Recently, researchers have directly examined the protective effects of the combined shift-and-persist strategy on lower-class individuals. For example, a correlational study using a nationally representative adult sample in the United States measured participants' childhood social class, shift-and-persist strategy, and clinically assessed health indicators. Results showed that "shifting" and "persisting" significantly predicted health levels among adults from low childhood socioeconomic status backgrounds. Further analysis revealed that lower-class participants with high scores on both "shifting" and "persisting" showed the best health outcomes, compared to those with high scores on only one component (Chen et al., 2012). These findings indicate that the combined shift-and-persist strategy represents a more advantageous approach for lower-class individuals' health.

Research using asthma as a health outcome has demonstrated positive effects of the shift-and-persist strategy. For example, a study of 121 adolescents (ages 9-18) diagnosed with asthma examined the strategy's effects in a clinical sample. "Shifting" was assessed through positive cognitive reappraisal, and "persisting" through optimism. Asthma-related inflammatory indicators were obtained at baseline, and children's clinical indicators were followed for six months. Results showed that higher shift-and-persist scores correlated with lower baseline asthma inflammation levels. After six months, controlling for baseline asthma levels, lower-class children with higher shift-and-persist levels showed lower scores on indicators such as school absences due to asthma and rescue inhaler use. In fact, regarding asthma impairment, lower-class children with high shift-and-persist scores appeared similar to higher-class children (Chen et al., 2011). Additional research (Lam et al., 2018) with adolescents aged 8-17, using laboratory measures and self-reporting, further confirmed the health-promoting effects of shift-and-persist strategies, finding that the strategy correlated with better asthma control, higher quality of life, and fewer daily asthma symptoms only among adolescents from lower parental-reported family social status.

Furthermore, evidence from other health outcomes such as overweight and obesity (Kallem et al., 2013) and Type 1 diabetes (Mello et al., 2019) reveals the protective effects of shift-and-persist strategies on lower-class individuals' health. Specifically, shift-and-persist strategies can protect low socioeconomic status children from overweight and obesity. Researchers (Kallem et al., 2013) had 1,523 middle school students (ages 9-15) participating in a school-based obesity prevention trial complete health surveys and physical assessments. Results showed that among lower socioeconomic status children, higher body mass index (BMI) significantly correlated with lower shift-and-persist scores, whereas higher shift-and-persist scores showed no relationship with BMI. In other words, the shift-and-persist strategy protects children from the adverse effects of low socioeconomic status on high BMI. Similarly, research finds that shift-and-persist strategy use buffers the relationship between economic hardship and diabetes, with higher shift-and-persist scores correlating with lower diabetes

risk (Dahlstrand et al., 2021; Lee & Nakashima, 2020; Hayman et al., 2014; Houle et al., 2016).

3 Mechanisms by Which the "Shift-and-Persist" Strategy Promotes Lower-Class Health

As discussed above, the shift-and-persist strategy protects lower-class health, prompting the fundamental psychological question of mechanism: Why does this strategy effectively protect lower-class health? Researchers have elaborated the processes through which shift-and-persist influences lower-class health from physiological and behavioral perspectives. Because the most direct and proximal factors influencing health are biological—specifically, the pathophysiological factors underlying disease formation (Miller et al., 2016)—this paper first addresses physiological mechanisms before turning to behavioral mechanisms.

3.1 Physiological Mechanisms

The combination of shift-and-persist strategies simultaneously balances adaptation to stress and perseverance in life, altering physiological stress pathways and suppressing physiological stress responses when lower-class individuals face adversity. Specifically, the shift-and-persist strategy reduces perceived stress, thereby decreasing acute physiological activation of the HPA axis. Over time, this prevents the development of pathogenic processes and ultimately reduces disease risk triggered by lower-class-related stressors (Chen & Miller, 2012; Ertekin et al., 2021). In concrete terms, the HPA systems of lower-class individuals become overactivated due to chronic or frequent stress, distorting the normal balance of homeostatic components and leading to excessive or insufficient production of cortisol, adrenaline, cytokines, metabolic hormones, or neurotransmitters. Over time, these alterations in physiological systems become irreversible—that is, they cannot automatically return to normal parameters. This damage manifests as dysregulation across multiple physiological systems, including cardiovascular, autonomic, metabolic, and inflammatory systems, while promoting long-term pathogenic processes that increase individuals' disease risk (McEwen & McEwen, 2017). In short, the shift-and-persist strategy reduces acute HPA axis activation when lower-class individuals confront stress, blocks pathogenic sequelae of stress responses such as insulin resistance, hypertension, and systemic inflammation, and thereby reduces disease risk and protects health.

First, shift-and-persist effectively reduces repeated HPA axis activation among lower-class individuals, thereby protecting health. Cortisol, the end product of HPA axis activity, represents one of the most widely used physiological indicators in psychosocial stress research. Cortisol secretion follows strong circadian rhythms, with higher levels upon awakening; steeper diurnal cortisol slopes represent a reliable and consistent predictor of better physical and mental health outcomes (Adam et al., 2017). Shift-and-persist effectively protects the circadian rhythm of cortisol secretion among lower-class individuals, thereby protect-

ing their health. For example, one study surveyed 645 adolescents (ages 8-15) from lower-class backgrounds with at least one HIV-positive parent, collecting saliva samples four times daily for three days to assess diurnal cortisol and derive three cortisol parameters (cortisol at awakening, cortisol awakening response, and cortisol slope). Results showed that higher levels of shift-and-persist correlated with higher cortisol levels at awakening and steeper cortisol slopes, significantly outperforming the effects of single "shifting" or "persisting" strategies. After controlling for covariates, associations between shift-and-persist and both awakening cortisol levels and cortisol slopes remained significant (Chen et al., 2019). Lower socioeconomic status children who strive to accept stress and adjust themselves (shifting) while maintaining hope for the future (persisting) show higher cortisol levels upon awakening and steeper cortisol slopes, leading to better health outcomes (Chen & Miller, 2012).

Additionally, shift-and-persist effectively regulates inflammatory processes among lower-class individuals, thereby reducing chronic disease risk. Exposure to chronic stress causes inflammation-promoting immune cells (monocytes and macrophages) to respond more actively to microbial threats and become less sensitive to cortisol inhibition. Over time, these tendencies lead to inflammation among lower-class individuals (Miller et al., 2011). Inflammation contributes to the pathogenesis and expression of many aging-related chronic diseases (Chung et al., 2009). However, lower-class individuals with high shift-and-persist scores show reduced inflammatory responses to microbial threats and increased sensitivity to cortisol signals. Research finds that social class interacts with shift-and-persist to predict in vitro monocyte inflammatory responses. As socioeconomic status decreases, higher shift-and-persist scores correlate with greater sensitivity to the anti-inflammatory properties of glucocorticoids. Once in vitro monocytes are activated by lipopolysaccharide (a common bacterial stimulus), shift-and-persist enables lower economic status individuals to more effectively "slow down" monocyte inflammatory cytokine production. This capacity can counteract excessive inflammatory stimuli present in many low socioeconomic status environments (e.g., stress, violence, conflict, cigarette smoke, air pollution, high-fat diets) and reduce chronic inflammation by decreasing/eliminating repeated activation of monocytes and macrophages, thereby lowering chronic disease risk (Nathan & Ding, 2010; Raison & Miller, 2013). Additionally, social class shows significant main effects on two systemic inflammatory indicators, CRP and IL-6 composite scores, with lower class associated with higher CRP and IL-6 levels. Social class and shift-and-persist show significant interaction effects, such that among adolescents with decreasing class levels, higher shift-and-persist correlates with lower inflammation (Chen et al., 2015). Notably, single "shifting" or "persisting" strategies do not significantly predict inflammatory levels among lower-class individuals, whereas lower-class individuals with high combined shift-and-persist scores show lower IL-6 levels (Chen et al., 2013). These findings indicate that shift-and-persist enables lower-class individuals to more effectively "slow down" monocyte inflammatory cytokine production, a capacity that can counteract excessive inflammatory

stimuli in many lower-class environments and benefit their health.

3.2 Behavioral Mechanisms

Health behaviors represent another important pathway through which shift-and-persist promotes health among lower-class individuals. Evidence shows that lower-class individuals are more likely to engage in unhealthy behaviors such as smoking, sedentary lifestyles, and high-fat diets (Non et al., 2017). These unhealthy behaviors increase individuals' risk of cardiovascular disease, cancer, and premature death (Rowlands, 2016; Waziry et al., 2016). Research finds that after statistically controlling for health behaviors, the association between social class and all-cause mortality decreases by 42% (Stringhini et al., 2010).

However, the shift-and-persist strategy effectively promotes healthy behaviors among lower-class individuals. First, optimistic, future-oriented individuals are less likely to engage in health-damaging behaviors such as smoking, drug, and alcohol abuse. Optimism functions as a behavioral strategy that bridges different health domains by increasing positive expectations (Dillard & Ellis, 2017). Research shows that regardless of childhood social disadvantage levels, highly optimistic adults are more likely to engage in health-related behaviors, including healthier diets, healthier BMI, higher exercise frequency, and lower likelihood of smoking (Non et al., 2020). A study of 150 impoverished Jakarta residents aged 18-29 found that optimism significantly predicted health-promoting behaviors such as physical exercise and stress management among poor participants (Musabiq et al., 2019). Recently, researchers (Non et al., 2020) used longitudinal data from a U.S. prospective birth cohort tracked for over 40 years to examine optimism' s potential protective effects on adult health behaviors related to childhood social environments. The childhood social disadvantage index was derived from mothers' reports of adverse socioeconomic factors at birth and age 7, while optimism and health behavior outcomes were self-reported at age 47. Results showed that regardless of childhood social disadvantage levels, higher optimism correlated with higher adult health behavior scores. Each one-unit increase in optimism (on a 1-5 scale) increased the probability of not smoking by 18%, healthy eating by 27%, and healthy BMI by 21% among lower-class individuals. Notably, as social disadvantage increased, optimism' s effect on lower-class health behaviors weakened slightly (by 1-2%) but remained significantly associated with all three outcomes. These findings suggest that optimism helps maintain healthy lifestyles in middle adulthood and buffers the effects of childhood social disadvantage on health.

Additionally, emotion regulation strategies such as cognitive reappraisal can significantly enhance health-protective behaviors among lower-class individuals. Researchers surveyed 56 orphaned children across 24 rural middle schools. Results showed that childhood trauma could directly lead to health-risk behaviors (smoking, alcohol abuse) among orphans, while negative cognitive emotion regulation further increased health-risk behavior likelihood, but positive cognitive emotion regulation effectively reduced health-risk behavior risk (Liu, 2018).

Similarly, individuals showing higher emotional expression and positive cognitive reappraisal demonstrate better BMI control, higher daily physical activity rates, and better sleep hygiene (Shimanoe et al., 2015). Conversely, research finds that without healthy emotion regulation skills, many individuals with adverse experiences may exhibit dangerous, maladaptive behaviors when coping with difficulties; for example, individuals with high rates of adverse childhood experiences are more likely to engage in health-damaging behaviors such as alcohol abuse and illegal drug use (Felitti et al., 1998; Jazaieri et al., 2014; LeBlanc et al., 2017). Finally, exploring meaning in life is viewed as an adaptive way of living that shows significant strong positive correlations with health-protective behaviors such as healthy eating and physical activity (Brassai et al., 2012). Preliminary evidence suggests that meaning-making can significantly increase health behaviors among lower-class individuals, such as healthy eating and exercise levels (Brassai et al., 2012; Brassai et al., 2015). In summary, preliminary evidence shows that different dimensions of the shift-and-persist strategy can reduce health-damaging behaviors among lower-class individuals, thereby decreasing disease risk.

4 Summary and Future Directions

Lower socioeconomic status represents one of the most reliable social determinants of poor health outcomes. However, little is understood about why some individuals from the same lower-class backgrounds nevertheless maintain good health. Research indicates that in adversity, some individuals find "role models" who teach them to trust others, better regulate their emotions, and focus on their future. Over time, these lower-class individuals develop a coping style of adapting themselves through accepting stress and cognitive reappraisal (shifting) while enduring adversity with strength by maintaining optimism and finding meaning (persisting). Extensive research demonstrates that this shift-and-persist strategy reduces acute HPA axis activation and inflammatory processes, preventing pathogenic development over time. Simultaneously, the strategy reduces unhealthy behaviors among lower-class individuals, thereby protecting their health. The shift-and-persist strategy has sparked researchers' interest, and its theoretical and practical value continues to be uncovered, promising a bright future. To address health poverty during China' s relative poverty period and better serve lower-class health, future research should consider the following directions:

(1) Conduct longitudinal life-course studies to reveal developmental patterns of shift-and-persist strategies and causal relationships with health. From a developmental perspective, the shift-and-persist model and preliminary empirical findings suggest that due to the presence of role models, some lower-class individuals acquire shift-and-persist strategies during childhood; the ability to apply these strategies may emerge after adolescence because the required capacities are thought to develop during adolescence; by middle age, sensitive periods may exist for the strategy' s health ef-

fects (Chen & Miller, 2012; Christophe & Stein, 2021; Heckhausen & Schulz, 1995). These views remain largely theoretical hypotheses that cross-sectional evidence cannot adequately test, urgently requiring longitudinal data. Additionally, longitudinal life-course studies can assess a range of childhood class-related indicators (beyond parental education) and potential confounding variables (e.g., childhood health levels) early in life, thereby inferring the strategy' s health effects. Without longitudinal data, shift-and-persist strategies measured in adulthood may reflect outcomes of childhood factors such as childhood health or early-life stress levels. Therefore, future research must track samples over time to determine when shift-and-persist develops and how it changes across the lifespan, more clearly establishing directional relationships between the strategy and health.

(2) Examine mechanisms through multi-level, multi-pathway perspectives. The most direct and proximal factors influencing health are biological—specifically, pathophysiological mechanisms of disease formation. Therefore, current research has primarily examined physiological mechanisms through which shift-and-persist influences health. Studies show that shift-and-persist reduces acute HPA axis activation when lower-class individuals confront stress, blocks pathogenic sequelae such as insulin resistance, hypertension, and systemic inflammation, and thereby reduces disease risk (Chen & Miller, 2012; Ertekin et al., 2021). However, lower-class health problems involve multi-level, multi-layered social, psychological, and physiological issues and represent an important social challenge worldwide. Since the World Health Organization established the Commission on Social Determinants of Health, research on social determinants of health has become particularly important. International experience demonstrates that focusing solely on biological causes of disease is insufficient, as some social determinants affect population health more than health services (Schroeder, 2016). What core social-psychological factors operate during the process by which this psychological strategy promotes lower-class health, and how do they act on physiological factors to protect health? Few studies have deeply examined these questions. Researchers have focused only on single biological or behavioral factors without comprehensively considering social and psychological factors, limiting understanding of shift-and-persist' s role in lower-class health. Therefore, future research should build comprehensive conceptual models from existing theoretical foundations to further explore core mechanisms through which shift-and-persist influences lower-class health, laying a solid theoretical foundation for developing more effective intervention programs.

(3) Vigorously develop intervention programs to promote shift-and-persist. According to the strategy' s formation process, role models in early childhood environments enable individuals to learn this strategy, which gradually develops in later environments. Since the strategy is learned through

environmental exposure, individuals who did not acquire it in early childhood can similarly gain health-protective effects through active intervention. For example, research finds that after emotion regulation skills interventions, individuals with adverse childhood experiences show reduced sick days, fewer physical symptoms, and improved physical health (Cameron et al., 2018). Additionally, interventions such as producing and showing documentaries demonstrating role model behaviors, using goal exercises to increase hope, and offering hope curricula significantly increase optimism and future orientation among lower-class individuals (Lybbert & Wydick, 2018). Empirical evidence also shows that relatively brief writing exercises, meditation, and even more intensive cognitive-behavioral therapy practices can improve optimism. Combined with findings linking optimism to healthier behaviors, this suggests optimism represents a promising intervention target that can subsequently lead to behavioral changes such as physical exercise (Malouff & Schutte, 2016). In summary, specific indicators of the shift-and-persist strategy can all be targeted through intervention. Future research should develop more integrated shift-and-persist intervention programs specifically for lower-class health, providing policy references for bridging health class gaps and solving health poverty during China' s relative poverty period.

References

Deng, Z., Chen, X., & Wei, Q. (2020). Health and education disparities across social classes from a sociocultural perspective. *Advances in Psychological Science*, 28(12).

Fu, A., Zhang, Z., Zheng, J., Yue, T., Lin, Z., & Wu, N. (2020). A qualitative exploration of endogenous poverty alleviation mechanisms. *Acta Psychologica Sinica*, 52(1).

Hu, X., Yang, S., Zhong, Q., Yu, F., & Chen, H. (2019). The relationship between social class and health: A "social-psychological-physiological" mechanism. *Chinese Science Bulletin*, 64(02), 194-205.

Liu, X. (2018). The mediating role of cognitive emotion regulation between childhood trauma and health-risk behaviors among rural orphans. *Chinese Journal of Behavioral Medicine and Brain Science*, 27(10), 931-936.

Wang, F., & Ma, Y. (2020). Socioeconomic status, social capital, and health inequality. *Journal of Huazhong University of Science and Technology (Social Science Edition)*, 34(06).

Wang, S., & Liu, M. (2019). The mechanism, implementation dilemmas, and policy choices of health poverty alleviation. *Journal of Xinjiang Normal University (Philosophy and Social Sciences Edition)*, 40(03), 82-91+2.

Wu, X. (2021). Research on the internal logic and collaborative governance of health poverty from the perspective of relative poverty. *Modern Business Trade*

Industry, 42(31), 31-32.

You, J., An, L., Shen, H., Zhu, Y., & Li, C. (2018). Health disparities across the lifespan from a life-span developmental perspective. *Advances in Psychological Science*, 26(9).

Adam, E. K., Quinn, M. E., Tavernier, R., McQuillan, M. T., Dahlke, K. A., & Gilbert, K. E. (2017). Diurnal cortisol slopes and mental and physical health outcomes: A systematic review and meta-analysis. *Psychoneuroendocrinology*, 83, 25-41.

Adler, N. E., Boyce, W. T., Chesney, M. A., Folkman, S., & Syme, S. L. (1993). Socioeconomic inequalities in health: No easy solution. *Journal of the American Medical Association*, 269(24), 3140-3145.

Adler, N. E., & Ostrove, J. M. (1999). Socioeconomic status and health: What we know and what we don' t. *Annals of the New York Academy of Sciences*, 896, 3-15.

Bonanno, G. A. (2005). Resilience in the face of potential trauma. *Current Directions in Psychological Science*, 14(3), 135-138.

Bowlby, J. (1988). *A secure base: Clinical applications of attachment theory*. London, England: Routledge.

Boylan, J. M., Cundiff, J. M., Fuller-Rowell, T. E., & Ryff, C. D. (2020). Childhood socioeconomic status and inflammation: Psychological moderators among Black and White Americans. *Health Psychology*, 39(6).

Brassai, L., Piko, B. F., & Steger, M. F. (2012). Existential attitudes and Eastern European adolescents' problem and health behaviors: Highlighting the role of the search for meaning in life. *The Psychological Record*, 62(4), 719-734.

Brassai, L., Piko, B. F., & Steger, M. F. (2015). A reason to stay healthy: The role of meaning in life in relation to physical activity and healthy eating among adolescents. *Journal of Health Psychology*, 20(5), 473-482.

Bryan, C. J., Bryan, A., Rugo, K. et al. (2020). Happiness, Meaning in Life, and PTSD Symptoms Among National Guard Personnel: A Multilevel Analysis. *Journal of Happiness Studies*, 21(4), 1251-1264.

Cameron, L. D., Carroll, P., & Hamilton, W. K. (2018). Evaluation of an intervention promoting emotion regulation skills for adults with persisting distress due to adverse childhood experiences. *Child Abuse & Neglect*, 79, 423-433.

Chen, E., Strunk, R. C., Trethewey, A., Schreier, H. M., Maharaj, N., & Miller, G. E. (2011). Resilience in low-socioeconomic-status children with asthma: Adaptations to stress. *The Journal of Allergy and Clinical Immunology*, 128(5), 970-976.

Chen, E., Matthews, K., & Zhou, F. (2007). Interpretations of ambiguous social situations and cardiovascular responses in adolescents. *Annals of Behavioral*

Medicine, 34(1), 26-36.

Chen, E., & Miller, G. E. (2012). "Shift-and-Persist" Strategies: Why Low Socioeconomic Status Isn' t Always Bad for Health. *Perspectives on Psychological Science*, 7(2), 135-158.

Chen, E., Miller, G. E., Lachman, M. E., Gruenewald, T. L., & Seeman, T. E. (2012). Protective factors for adults from low-childhood socioeconomic circumstances: The benefits of shift-and-persist for allostatic load. *Psychosomatic Medicine*, 74(2), 178-186.

Chen, E., Lee, W. K., Cavey, L., & Ho, A. (2013). Role models and the psychological characteristics that buffer low-socioeconomic-status youth from cardiovascular risk. *Child Development*, 84(4), 1241-1252.

Chen, E., McLean, K. C., & Miller, G. E. (2015). Shift-and-Persist Strategies: Associations With Socioeconomic Status and the Regulation of Inflammation Among Adolescents and Their Parents. *Psychosomatic Medicine*, 77(4), 371-382.

Chen, L. H., Li, X. M., Imami, L., Lin, D. H., Zhao, J. F., Zhao, G. X., & Zilioli, S. (2019). Diurnal Cortisol in a Sample of Socioeconomically Disadvantaged Chinese Children: Evidence for the Shift-and-Persist Hypothesis. *Psychosomatic Medicine*, 81(2), 200-208.

Christophe, N. K., Stein, G. L., Martin Romero, M. Y., Chan, M., Jensen, M., Gonzalez, L. M., & Kiang, L. (2019). Coping and Culture: The Protective Effects of Shift-&-Persist and Ethnic Racial Identity on Depressive Symptoms in Latinx Youth. *Journal of Youth and Adolescence*, 48(8), 1592-1604.

Christophe, N. K., & Stein, G. L. (2021). Shift-&-Persist and discrimination predicting depression across the life course: An accelerated longitudinal design using MIDUSI-III. *Development and Psychopathology*, 1-16.

Chung, H. Y., Cesari, M., Anton, S., Marzetti, E., Giovannini, S., & Seo, A. Y., et al. (2009). Molecular inflammation: Underpinnings of aging and age-related diseases. *Ageing Research Reviews*, 8(1), 18-30.

Cohen, S., Doyle, W. J., Turner, R. B., Alper, C. M., & Skoner, D. P. (2004). Childhood socioeconomic status and host resistance to infectious illness in adulthood. *Psychosomatic Medicine*, 66(4), 553-558.

Cooke, J. E., Kochendorfer, L. B., Stuart-Parrigon, K. L., Koehn, A. J., & Kerns, K. A. (2019). Parent-child attachment and children' s experience and regulation of emotion: A meta-analytic review. *Emotion*, 19(6).

Dahlstrand, J., Friberg, P., Fridolfsson, J., Börjesson, M., Arvidsson, D., Ekblom, Ö., & Chen, Y. (2021). The use of coping strategies "shift-persist" mediates associations between physical activity and mental health problems in adolescents: A cross-sectional study. *BMC public health*, 21(1), 1-11.

Denham, S. A., Mitchell-Copeland, J., Strandberg, K., Auerbach, S., & Blair, K. (1997). Parental contributions to preschoolers' emotional competence: Direct and indirect effects. *Motivation and Emotion*, 21(1).

Dezutter, J., Casalin, S., Wachholtz, A., Luyckx, K., Hekking, J., & Vandewiele, W. (2013). Meaning in life: An important factor for the psychological well-being of chronically ill patients? *Rehabilitation Psychology*, 58(4), 334-341.

Dillard, A., & Ellis, E. (2017). Optimism and Its Associations with Health Behavior and Responses to Health Communication. *Oxford Research Encyclopedia of Communication*. Retrieved September 14, 2021, from https://oxfordre.com/communication/view/10.1093/acrefore/9780190228613.001.0001/acrefore-9780190228613-e-342

Duggleby, W., Hicks, D., Nekolaichuk, C., Holtslander, L., Williams, A., Chambers, T., & Eby, J. (2012). Hope, older adults, and chronic illness: A metasynthesis of qualitative research. *Journal of Advanced Nursing*, 68(6), 1211-1223.

Ertekin, Z., Berument, S. K., & Gunnar, M. R. (2021). Examining the role of socioeconomic status and temperament in the hair cortisol levels of infants. *Developmental Psychobiology*, 63(1), 31-41.

Frankl, V. (1963). *Man' s search for meaning*. New York, NY: Washington Square Press.

Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., & Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The Adverse Childhood Experiences (ACE) Study. *American journal of preventive medicine*, 14(4), 245-258.

Gallo, L. C., & Matthews, K. A. (2003). Understanding the association between socioeconomic status and physical health: Do negative emotions play a role? *Psychological Bulletin*, 129(1), 10-51.

Gottman, J. M., Katz, L. F., & Hooven, C. (1996). Parental metaemotion philosophy and the emotional life of families: Theoretical models and preliminary data. *Journal of Family Psychology*, 10(3), 243-268.

Gross, J. J. (1998). Antecedent- and response-focused emotion regulation: Divergent consequences for experience, expression, and physiology. *Journal of Personality and Social Psychology*, 74(1), 224-237.

Grewen, K., Girdler, S. S., West, S. G., Bragdon, E., Costello, N., & Light, K. C. (2000). Stable pessimistic attributions interact with socioeconomic status to influence blood pressure and vulnerability to hypertension. *Journal of Womens Health & Gender-Based Medicine*, 9(8), 905-915.

Hayman, L. W., Lucas, T., & Porcerelli, J. (2014). Cognitive Appraisal vs. Exposure-Based Stress Measures: Links to Perceived Mental and Physical

Health in Low-Income Black Women. *The Journal of Nervous and Mental Disease*, 202(11), 807-812.

Heckhausen, J., & Schulz, R. (1995). A life-span theory of control. *Psychological Review*, 102(2), 284-304.

Heckhausen, J., Wrosch, C., & Schulz, R. (2010). A motivational theory of life-span development. *Psychological Review*, 117(1), 32-60.

Hobfoll, S. E. (2001). The influence of culture, community, and the nested-self in the stress process: Advancing conservation of resources theory. *Applied psychology*, 50(3), 337-421.

Houle, J., Lauzier-Jobin, F., Beaulieu, M., Meunier, S., Coulombe, S., Côté, J., Lespérance, F., Chiasson, J., Bherer, L., & Lambert, J. (2016). Socioeconomic status and glycemic control in adult patients with type 2 diabetes: A mediation analysis. *BMJ Open Diabetes Research & Care*, 4(1), e000184.

Houltberg, B. J., Morris, A. S., Cui, L., Henry, C. S., & Criss, M. (2016). The Role of Youth Anger in Explaining Links Between Parenting and Early Adolescent Prosocial and Antisocial Behavior. *The Journal of Early Adolescence*, 36(3), 29-318.

Jazaieri, H., McGonigal, K., Jinpa, T., Doty, J. R., Gross, J. J., & Goldin, P. R. (2014). A randomized controlled trial of compassion cultivation training: Effects on mindfulness, affect, and emotion regulation. *Motivation and Emotion*, 38(1), 23-35.

Kallem, S., Carroll-Scott, A., Rosenthal, L., Chen, E., Peters, S. M., McCaslin, C., & Ickovics, J. R. (2013). Shift-and-persist: A protective factor for elevated BMI among low-socioeconomic-status children. *Obesity*, 21(9), 1759-1763.

Kazdin, A. E., Rodgers, A., & Colbus, D. (1986). The hopelessness scale for children: Psychometric characteristics and concurrent validity. *Journal of Consulting and Clinical Psychology*, 54(2), 241-245.

Kim, S. H., Kjervik, D., Belyea, M., & Choi, E. S. (2011). Personal strength and finding meaning in conjugally bereaved older adults: A four-year prospective analysis. *Death Studies*, 35(3), 197-218.

Lam, P. H., Miller, G. E., Chiang, J. J., Levine, C. S., Le, V., Shalowitz, M. U., . . . Chen, E. (2018). One size does not fit all: Links between shift-and-persist and asthma in youth are moderated by perceived social status and experience of unfair treatment. *Development and psychopathology*, 30(5), 1699-1714.

LeBlanc, S., Uzun, B., Pourseied, K., & Mohiyeddini, C. (2017). Effect of an emotion regulation training program on mental well-being. *International Journal of Group Psychotherapy*, 67(1), 108-123.

Lee, S., & Nakashima, K. i. (2020). Do shift-and-persist strategies predict the mental health of low-socioeconomic status individuals? *The Japanese Journal of Experimental Social Psychology*, 59(2), 107-113.

Lerner, J. V., Wong, C. A., Weiner, M. B., & Johnson, S. K. (2020). Profiles of adolescent character attributes: Associations with intentional self-regulation and character role model relationships. *Journal of Moral Education*, 50(3), 293-316.

Liu, S., Cui, Z., Duprey, E. B., Kogan, S. M., & Oshri, A. (2020). Adverse Parenting Is Indirectly Linked to Delayed Reward Discounting via Blunted RSA Reactivity: The Protective Role of a Shift-and-Persist Coping Strategy. *Adversity and Resilience Science*, 1(3), 149-163.

Lybbert, T. J., & Wydick, B. (2018). Poverty, aspirations, and the economics of hope. *Economic Development and Cultural Change*, 66(4), 709-753.

Malouff, J. M., & Schutte, N. S. (2016). Can psychological interventions increase optimism? A meta-analysis. *The Journal of Positive Psychology*, 12(6), 594-604.

McEwen, C. A., & McEwen, B. S. (2017). Social Structure, Adversity, Toxic Stress, and Intergenerational Poverty: An Early Childhood Model. *Annual Review of Sociology*, 43(1), 445-472.

Mello, D., Wiebe, D., & Berg, C. (2019). Maternal shift-and-persist coping, SES, and adolescent type 1 diabetes management. *Children' s Health Care*, 49(1), 100-114.

Merjonen, P., Pulkki-Raback, L., Puttonen, S., Keskivaara, P., Juonala, M., Telama, R., . . . Keltikangas-Jarvinen, L. (2008). Anger is associated with subclinical atherosclerosis in low SES but not in higher SES men and women. The Cardiovascular Risk in Young Finns Study. *Journal of Behavioral Medecine*, 31(1), 35-44.

Midei, A., & Matthews, K. (2014). Positive attributes protect adolescents from risk for the metabolic syndrome. *The Journal of Adolescent Health: Official Publication of the Society for Adolescent Medicine*, 55(5).

Miller, G., Chen, E., & Cole, S. W. (2009). Health psychology: Developing biologically plausible models linking the social world and physical health. *Annual review of psychology*, 60, 501-524.

Miller, G. E., Chen, E., & Parker, K. J. (2011). Psychological stress in childhood and susceptibility to the chronic diseases of aging: Moving toward a model of behavioral and biological mechanisms. *Psychological Bulletin*, 137(6), 959-997.

Morozink, J. A., Friedman, E. M., Coe, C. L., & Ryff, C. D. (2010). Socioeconomic and psychosocial predictors of interleukin-6 in the MIDUS national sample. *Health Psychology*, 29(6), 626-635.

Musabiq, S., Wibowo, D. A., & Hanifa, D. (2018, September). Seeking the Mediating Effect of Optimism toward Hardiness and Health-Promoting Behavior among East Jakarta' s Low-Income Community. *The 2nd International Conference on Intervention and Applied Psychology (ICIAP 2018)* (pp. 458-463). Depok, West Java, Indonesia.

Nathan, C., & Ding, A. (2010). Nonresolving inflammation. *Cell*, 140(6), 871-882.

Non, A. L., Roman, J. C., Gross, C. L., Gilman, S. E., Loucks, E. B., Buka, S. L., & Kubzansky, L. D. (2016). Early childhood social disadvantage is associated with poor health behaviours in adulthood. *Annals of Human Biology*, 43(2), 144-153.

Non, A. L., Roman, J. C., Clausing, E. S., Gilman, S. E., Loucks, E. B., Buka, S. L., . . . Kubzansky, L. D. (2020). Optimism and Social Support Predict Healthier Adult Behaviors Despite Socially Disadvantaged Childhoods. *International Journal of Behavioral Medicine*, 27(2), 200-212.

Raison, C. L., & Miller, A. H. (2013). Role of inflammation in depression: Implications for phenomenology, pathophysiology and treatment. *Inflammation in Psychiatry*, 28, 33-48.

Rosengren, A., Smyth, A., Rangarajan, S., Ramasundarahettige, C., Bangdiwala, S. I., AlHabib, K. F., . . . Yusuf, S. (2019). Socioeconomic status and risk of cardiovascular disease in 20 low-income, middle-income, and high-income countries: The Prospective Urban Rural Epidemiologic (PURE) study. *The Lancet Global Health*, 7(6), 748-760.

Rowlands, A. V. (2016). Physical Activity, Inactivity, and Health During Youth. *Pediatric Exercise Science*, 28(1).

Schöllgen, I., Huxhold, O., Schüz, B., & Tesch-Römer, C. (2011). Resources for health: Differential effects of optimistic self-beliefs and social support according to socioeconomic status. *Health Psychology*, 30(3).

Schreier, H., & Chen, E. (2013). Socioeconomic status and the health of youth: A multilevel, multidomain approach to conceptualizing pathways. *Psychological bulletin*, 139(3), 606-654.

Schroeder, S. A. (2016). American Health Improvement Depends Upon Addressing Class Disparities. *Preventive Medicine*, 92(S1), 6-15.

Shiah, Y. J., Chang, F., Chiang, S. K., Lin, I. M., & Tam, W. C. C. (2015). Religion and health: Anxiety, religiosity, meaning of life and mental health. *Journal of Religion and Health*, 54(1), 35-45.

Shiba, K., Kubzansky, L., Williams, D. R., VanderWeele, T., & Kim, E.S. (2021). Associations Between Purpose in Life and Mortality by SES. *American Journal of Preventive Medicine*, 61(2), e53-e61.

Shimanoe, C., Hara, M., Nishida, Y., Nanri, H., Otsuka, Y., Nakamura, K., ··· Tanaka., K. (2015). Perceived stress and coping strategies in relation to body mass index: Cross-sectional study of 12045 Japanese men and women. *Plos One*, 10(2), e0118105.

Starfield, B., Robertson, J., & Riley, A. W. (2002). Social class gradients and health in childhood. *Ambulatory Pediatrics*, 2(4), 238-246.

Steinberg, L., Graham, S., O' Brien, L., Woolard, J., Cauffman, E., & Banich, M. (2009). Age differences in future orientation and delay discounting. *Child Development*, 80(1), 28-44.

Stephens, N. M., Hamedani, M. G., Markus, H. R., Bergsieker, H. B., & Eloul, L. (2009). Why did they "choose" to stay? Perspectives of Hurricane Katrina observers and survivors. *Psychological Science*, 20(7).

Stephens, N. M., Fryberg, S. A., Markus, H. R., Johnson, C. S., & Covarrubias, R. (2012). Unseen disadvantage: How American universities' focus on independence undermines the academic performance of first-generation college students. *Journal of Personality and Social Psychology*, 102(6), 1178-1197.

Stringhini, S., Sabia, S., Shipley, M., Brunner, E., Nabi, H., Kivimaki, M., & Singh-Manoux, A. (2010). Association of Socioeconomic Position With Health Behaviors and Mortality. *Journal of the American Medical Association*, 303(12), 1159-1166.

Tan, L., & Smith, C. L. (2019). Intergenerational transmission of maternal emotion regulation to child emotion regulation: Moderated mediation of maternal positive and negative emotions. *Emotion*, 19(7).

Uyar, R. Ö., Yılmaz Genç, M. M., & Arnas, Y. A. (2018). Emotion Regulation and Emotion Understanding in Preschoolers as a Predictor of the Maternal Socialization of Emotion. *Egitim Ve Bilim-Education and Science*, 43(195), 1-17.

Waziry, R., Jawad, M., Ballout, R. A., Al Akel, M., & Akl, E. A. (2017). The effects of waterpipe tobacco smoking on health outcomes: An updated systematic review and meta-analysis. *International Journal of Epidemiology*, 46(1), 32-43.

Wrosch, C., & Heckhausen, J. (1999). Control processes before and after passing a developmental deadline: Activation and deactivation of intimate relationship goals. *Journal of Personality and Social Psychology*, 77(2), 415.

Zoellner, T., & Maercker, A. (2006). Posttraumatic growth in clinical psychology—A critical review and introduction of a two component model. *Clinical Psychology Review*, 26(5), 626-653.

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