Child Indicators Research (2025) 18:1363–1392
https://doi.org/10.1007/s12187-025-10238-6

Family Functioning and Meaning in Life among Chinese Pre-adolescents and Adolescents: A 4-wave Longitudinal Study

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Accepted: 23 March 2025 / Published online: 4 April 2025

Abstract

Existing literature highlights the lack of longitudinal studies examining the mutual influences between micro-ecological environments, such as family functioning, and meaning in life among young people within Chinese cultural contexts. Against this backdrop, we conducted a four-wave longitudinal study to examine the trajectories of family functioning and meaning in life and investigated their reciprocal relationships over time. Data were collected from 2,652 primary and junior high school students in mainland China (M_{age} at Wave 1 = 10.94 years old, SD = 1.32; 51.1% males). Using cross-lagged panel model (CLPM) and random-intercept cross-lagged panel model (RI-CLPM) analyses, we examined the autoregressive paths and cross-lagged regressions in family functioning and meaning in life at between- and within-person levels. Both models showed that across the four waves, prior meaning in life positively predicted subsequent family functioning and meaning in life. Consistent with CLPM analyses, RI-CLPM analyses indicated that across Wave 1 to Wave 3, prior family functioning positively predicted subsequent meaning in life and family functioning, but this predictive effect disappeared from Wave 3 to Wave 4. While family functioning displayed an upward trajectory, meaning in life showed a U-shaped curve. This study highlights the stability of meaning in life over time and its positive influence on family functioning and meaning in life over time, even during challenging times such as the COVID-19 pandemic.

Keywords Spirituality · Positive youth development · Late childhood · Adolescence · CLPM · RI-CLPM

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1 Introduction

1.1 Concepts of Spirituality, Meaning in Life, and Well-being

The concept of spirituality is inherently difficult to define, and there has been no consensus on its definition in the research conducted thus far. One widely cited working definition was proposed by Koenig and colleagues (2001) that *"spirituality is a personal quest for understanding answers to ultimate questions about life, about meaning, and about relationship to the sacred or transcendent, which may (or may not) lead to or arise from the development of religious rituals and the formation of community"* (pp. 18).

In the scientific literature, a concept that is often used interchangeably with spirituality, yet is distinct and interrelated, is religiosity. To delineate the boundaries between these two concepts, spirituality is commonly conceived at the individual level, emphasizing it as *"individuals' personal quests for meaning, satisfaction, and wisdom"* (King et al., 2011, pp. 168) where religiosity is conceptualized at the organizational level by highlighting the degree of an individual's relationship with a specific institutionalized doctrine within a cultural-historical system (Benson & Roehlkepartain, 2008; King et al., 2011).

In the field of youth development, scholars understand spirituality from the perspective of developmental systems theories (DST) as a sense of transcendence that emerges from the ongoing interactions between youth and their multilayered developmental contexts. This sense of transcendence is an experience of meaning beyond oneself, which motivates and fosters concern for others and the community in which one resides. Ultimately, it drives youth to contribute to the well-being and interests of the world beyond themselves, generating prosocial and moral behaviors (King et al., 2011, pp. 170–171). Thus, spiritual development is a process of growing identity, which Lerner et al. (2008) described as a shift in the cognitive and emotional orientations of young individuals from focusing on the self to embracing a transcendent other. From this perspective, spiritual development is a broader domain experienced by all youth, not limited to a religious context.

Conceptually, meaning in life is an integral component of adolescent spiritual development. Based on his conceptual analysis, Shek (2012) synthesized both broad and narrow definitions of spirituality and identified three central elements—relationships, beliefs/values, and meaning in life—that are commonly recognized by scholars in their understanding of spirituality. Martela and Steger (2016) further distilled three basic dimensions of meaning in life from the literature: coherence (one's comprehensibility of life), purpose (the direction and goals of life), and significance (the recognition of life's intrinsic value).

Theoretically, adolescents' perception of life meaning, such as a "sense of purpose" reflects their level of spiritual development and is thus considered an internal developmental asset (Hay et al., 2024; King et al., 2011). Methodologically, by measuring levels of life meaning, scholars assess spiritual development and have demonstrated that a sense of meaning among adolescents serves a protective role against health risk behaviors (Brassai et al., 2011, 2015), and mutually reinforces and develops alongside prosocial behaviors among adolescents over time (Lai et al.,

2015; Xie et al., 2023). Furthermore, adolescents cultivate a sense of well-being by discovering meaning in life and establishing goals (Krok, 2018). During adolescence, possessing a sense of meaning in life, experiencing positive affect, and maintaining optimism are critical protective factors that enhance overall well-being among adolescents (Russo-Netzer & Tarrasch, 2024). Moreover, cultivating young children' and adolescents' self-knowledge, self-esteem, positive relationships, and values that support their well-being and positive development (Benoit & Gabola, 2021; Hongell-Ekholm et al., 2024) can help to reduce the developmental issues in young people (Shek, 2006a, b).

Despite the lack of a common understanding of well-being, scholars generally agree that it is a multidimensional concept, including subjective well-being and objective well-being. According to Western and Tomaszewski (2016), the former includes self-actualization (e.g., meaning in life), hedonic well-being (e.g., life satisfaction), and other positive psychological indicators (e.g., optimism), while the latter focuses on various objective indicators of quality of life such as official statistics (e.g., GDP per capita).

In recent years, scholars have endeavored to develop a consensus framework for defining, programming, and measuring child and adolescent well-being. In this regard, Ross et al. (2020) introduced a conceptual framework that comprises five interrelated domains to understand adolescent well-being, namely, "health and nutrition," "connectedness, positive values, and contribution to society," "supportive environment," "competence and skill," and "agency and resilience." Based on this framework, a concise definition of adolescent well-being was proposed as *"adolescents thrive and are able to achieve their full potential"* (Ross et al., 2020, pp. 473). Building on years of ongoing validation efforts (Leriou, 2022, 2023; Leriou et al., 2021), Leriou and colleagues developed a comprehensive conceptual framework to understand child well-being and identified a series of indicators. Within this framework, multidimensional economic factors (home conditions, nutrition, and guardians' unemployment) influence "economic child well-being," while multidimensional non-economic factors (free healthcare, moral education, and leisure) impact "non-economic child well-being." Together, these two core components constitute and determine "general child well-being" (Leriou, 2022, 2023). Under this multidimensional conceptual framework, Leriou (2022) defines child well-being as *"a society's chief end*, *manifested as the (potential) pleasure that they enjoy*, *originating from certain economic and non-economic factors that determine this chief end*, *with the most important being education that instills in children what kind of persons they ought to be"* (pp. 1970). Based on this model, meaning in life is a non-economic factor that shapes children's well-being.

Conceptually, well-being encompasses a broader range of aspects, including both material and spiritual dimensions, with spiritual development (meaning in life) being one of the core domains. In Leriou's (2022, 2023) conceptual framework, moral education is a central dimension of "non-economic child well-being," and virtues are considered critical indicators (Michalos et al., 2012), alongside other measures such as empathy, love, and social solidarity. While different economic factors influence the quality of life, health, and well-being of children and adolescents, multidimensional non-economic factors determine whether they can grow positively, find mean-

ing, achieve self-actualization, and experience well-being. As Leriou (2024) recently emphasized, moral education should be the most vital component in this process.

Conceptually speaking, spirituality, meaning in life, and well-being are closely interrelated and collectively influence the development of children and adolescents. These three constructs emphasize individuals' inner experiences, focusing on their transcendence beyond material aspects of life to address deeper spiritual and psychological needs, thereby fostering a more profound understanding of themselves, others, and the world. As individuals develop, children and adolescents try to contemplate the purpose and value of their existence, exploring core questions about the meaning of life, such as "what is a meaningful life?" In the process of seeking answers, they need to comprehend others and the world, identify the purpose of actions and life directions, and discover what is truly worthwhile in their lives (Martela & Steger, 2016). The fulfillment of these needs drives their spiritual development, helping them build connections and focus on contribution, morality, and ethical principles (King et al., 2011; Koenig et al., 2001; Lerner et al., 2008). Furthermore, spiritual development, with meaning in life as one of its dimensions, enhances young individuals' internal positive experiences and improves psychosocial competencies such as resilience and moral competence, thereby promoting their well-being (Shek, 2024; Shek & Liang, 2018).

1.2 Meaning in Life as a Developmental Asset

Different theories have been proposed to explain spiritual development. In particular, Positive Youth Development (PYD) offers a developmental systems theoretical approach to understanding spiritual development, such as meaning in life, by focusing on the interactions and bidirectional influences between individuals and their environments. PYD emphasizes four aspects. Firstly, it takes an optimistic view of youth development, which highlights the inherent plasticity of every child and their potential for positive development and improvement (Lerner, 2004, 2007). Secondly, it highlights the importance of safe and supportive developmental contexts, emphasizing the crucial role of mutually beneficial interactions between individuals and their multiple environments in fostering positive development. (Benson et al., 2007). Thirdly, it acknowledges the complexity of development, valuing holistic growth and positing that when youth receive adequate support, challenges can transform into opportunities for fostering positive development (Damon, 2004). Fourthly, it upholds positive personal development and social contribution indicators, arguing that the standards of health are not merely the absence of problems but also emphasize the extent to which youth are on an optimal developmental trajectory. This trajectory includes experiencing personal fulfillment, a sense of purpose, and contributing to the greater good of society (Lerner, 2004, 2007).

According to the developmental systems approach, meaning in life can serve as a catalyst for fueling personal commitment to contribution and as an indicator of PYD. This view aligns with the findings of Einolf (2013, pp. 76), which indicated that daily spiritual experiences, such as "*a feeling of being deeply moved by the beauty of life*," significantly predicted helping others, volunteering, and donating behaviors.

This suggests that spiritual development, specifically, meaning in life, inspires helping behaviors by fostering prosocial and moral actions.

Findings arising from different cultural contexts consistently showed the close association between spiritual development and positive development outcomes. For instance, life meaning (e.g., "*a belief in the purpose of life*") predicted higher levels of prosocial behavior and subjective well-being among Israeli adolescents (Kor et al., 2019). Roth (2017) found that empathy and prosocial behavior among Catholic youth in Bolivia were closely linked to spiritual development, yet there was no strong evidence supporting a connection between prosocial behavior and religiosity. Similarly, Scales et al. (2014) surveyed 6,725 adolescents from eight countries (Australia, Ukraine, Thailand, Cameroon, etc.) and found that spiritual development, such as "*experiencing meaning in life*," had a greater influence on their well-being, prosocial behavior, and civic engagement compared to religiosity. The study by Shahina and Parveen (2020) supported the positive predictive role of spiritual development (e.g., "*a realization of the meaning in life*") on resilience, self-discovery, mental health, and environmental awareness among Indian adolescents. Additionally, based on adolescent samples in Vancouver, London, Johannesburg, and Mumbai, Pandya (2015) further supported the protective and positive effects of spiritual development on mental health and subjective well-being among adolescents, emphasizing its importance in reducing and preventing problem behaviors in pre-adolescence.

In a Chinese context, a longitudinal investigation spanning six years in Hong Kong by Shek and Liang (2018) reported that among Chinese adolescents, the presence of life meaning served as a significant predictor of both life satisfaction and hope levels throughout adolescent development. Another longitudinal study by Shek and Zhu (2018) examined behavioral outcomes in Hong Kong Chinese adolescents, revealing that those with higher life meaning levels exhibited significantly lower rates of delinquent behavior and reduced intentions toward problematic conduct. These empirical findings collectively underscore the protective function of spiritual development in adolescence, particularly its role in mitigating behavioral risks during this critical developmental period.

1.3 Family Functioning as an Antecedent of Meaning in Life

A consensus has been reached that spiritual development is a continuous process rather than a specific outcome or product of a developmental stage (Benson et al., 2003). To understand spiritual development, three important questions should be considered: How does the sense of meaning in life emerge? Under what conditions do the levels of life meaning develop (i.e., the context of spiritual development)? At what point in an individual's developmental trajectory does the awareness of meaning in life first appear?

According to the model by Benson and Roehlkepartain (2008), spirituality emerges through at least three dynamically interacting processes: "awareness or awakening," "interconnecting and belonging," and "a way of living." Through these processes, young people gain identity and meaning in their lives, explore and experience relationships with others and the world, and express their identity and values through various relationships and practices. The model posits that spirituality develops

continuously through interactions and transactions with environmental dimensions across micro (family) and meso (school, community) social contexts, macro cultural contexts (national, ethnic heritage), and metanarratives (myths, stories) (Benson & Roehlkepartain, 2008).

Regarding the earliest onset of spiritual development, researchers generally agree that by adolescence, young people exhibit an awareness of meaning in life. As they enter adolescence, with the development of cognitive abilities, adolescents begin to focus on broader existential questions beyond themselves, seek purpose, explore meaning, attempt to understand a meaningful self-concept and focus on identity and social connections (Damon et al., 2003; Erikson, 1968). A small body of evidence suggests that the sense of meaning in life may begin in childhood (e.g., Coles, 1990; Reimer & Furrow, 2001).

As the first significant micro-developmental context, the family exerts the most direct influence on young people's developmental outcomes and profoundly impacts their growth trajectory in the long term. Healthy family functioning, which includes effective communication, interaction, harmony, and appropriate and reasonable parental care and control, serves as a safeguard for the healthy growth of children and adolescents along a positive developmental trajectory (Brodzinsky & Pinderhughes, 2002).

Indeed, various studies collectively support the significant association between healthy family functioning and fewer aggressive behaviors (Pérez-Fuentes et al., 2019), addictive behaviors (Tafà & Baiocco, 2009), and risky sexual behaviors (Garcia Saiz et al., 2021; Orihuela et al., 2020) during adolescence. Furthermore, compared to the school environment, family functioning has a greater impact on the development of character strengths (i.e., positive qualities related to cognitive, emotional, and behavioral competencies) in middle school students (Ramadhani et al., 2023). Additionally, spirituality significantly and positively mediated this relationship.

Focusing on a Chinese context, Shek et al. (2024) conducted a longitudinal study and examined the interrelationships between family dynamics, life meaning, and academic outcomes among mainland Chinese adolescents. Their findings revealed that both healthy family functioning and elevated levels of life meaning were predictive of enhanced academic performance and reduced academic anxiety over a six-month period. Meaning in life positively mediated the associations between academic outcomes and family functioning. Conversely, unhealthy family functioning or family dysfunction negatively impacted the health and development of Chinese adolescents. A three-year longitudinal study involved Chinese junior high school students from Hong Kong by Leung and Shek (2024) showed that elevated levels of parental over-control in seventh grade were positively associated with increased anxiety and depression symptoms in subsequent eighth and ninth grades. Additionally, when parental over-control decreased significantly, students experienced corresponding reductions in anxiety levels.

PYD models and Benson and Roehlkepartain's (2008) model jointly support the thesis that a supportive family environment fosters adolescent life meaning. In turn, a higher sense of life meaning and better spiritual development might promote harmonious family relationships by encouraging adolescents to actively seek meaning,

purpose, connection, and contribution, thereby enhancing and maintaining family cohesion and promoting healthy family functioning.

1.4 Research Gaps

Six prominent research gaps are identified in the existing literature. First, most studies have not paid sufficient attention to the subtle differences between spirituality and religiosity (Hay et al., 2024), although some scholars have proposed clear definitions to distinguish these two concepts (e.g., Benson et al., 2003; Koenig et al., 2001), and the distinct impacts of spirituality and religion on youths have been supported (e.g., King & Mangan, 2023; Roth, 2017; Scales et al., 2014). The terms "spirituality" and "religion" are often used interchangeably and are continuously merged into a single-dimensional experience (Scales et al., 2014). This has contributed to the focus of research in regions and cultural contexts where religiosity is heavily emphasized.

Second, research on spirituality has largely concentrated on the "WEIRD" world, which stands for "Western, educated, industrialized, rich, and democratic" societies (Hay et al., 2024). Theoretical and empirical work on spiritual development, such as meaning in life, within PYD remains underdeveloped, particularly in a Chinese cultural context. A search in the PsycINFO database on March 8, 2025, using the keywords "adolescents" and "meaning in life" yielded 194 articles. With the addition of the keyword "Chinese," the results narrowed to 44 articles. As Chinese adolescents represented approximately 13% of the global adolescent population in 2022 (UNICEF China & UNFPA China, 2023), any useful theories should be supported by evidence from Chinese young people.

Third, existing research on spirituality (or meaning in life) in pre-adolescence is notably lacking, despite the fact that spiritual development is an important protective factor that offers a powerful potential resource for positive development throughout at least the first 20 years of life, and possibly longer (Benson et al., 2003). Given this limitation, it is unsurprising that research on meaning in life among pre-adolescents in broader cultural contexts and social structures outside the "WEIRD" world is almost nonexistent. Pre-adolescence is a critical transitional phase from childhood to adolescence, during which children (typically aged 9 to 12, as referenced by Buhrmester, 1990; Verburgh et al., 2014) exhibit significant neurological changes and cognitive development (Giedd et al., 1999), undergo psychological and social development, and adopt perspectives on their relationships with family members as well as others and the world that are markedly different from those of younger children (Snyder et al., 1986). Extending the investigation of meaning in life to earlier developmental periods than adolescence will be an important step in understanding the variability and plasticity of individual spiritual development and how this development influences interactions with significant micro-ecological environments, such as the family context.

Fourth, very few studies examined trajectories of changes in family functioning and spirituality (meaning in life) in pre-adolescent and adolescent years. Intuitively, family functioning may drop in adolescent years because of adolescent rebellion (Steinberg, 2000). At the same time, with cognitive maturation, adolescents may start to ask questions about meaning in life (Damon et al., 2003). Unfortunately, there are

very few studies on the changes in family functioning and spirituality (meaning in life) over time in pre-adolescence and adolescence. In particular, we are not certain whether life meaning (and family functioning) at one time is related to future life meaning (and family functioning).

Fifth, there is a lack of longitudinal studies on exploring the bidirectional influences between family functioning and adolescent life meaning over time (King & Boyatzis, 2015). Theoretically, adolescence is a critical developmental period. Longitudinal studies allow researchers to track how meaning in life evolves in this critical period and how family dynamics influence this process, providing insights into the development of theoretical and model frameworks. Practically, longitudinal studies help establish causal relationships and the directionality of effects, allowing for the identification of critical periods for intervention.

Family functioning is a dynamic continuum rather than a fixed structure, subject to changes in its multiple dimensions such as communication and cohesion (Olson, 2000), family adaptability and interaction quality (Beavers & Hampson, 2000), and behavioral control and problem-solving (Miller et al., 2000). Family dynamics, such as the quality of relationships and family harmony, can influence children's experience or sense of meaning and purpose in life. Conversely, a child's beliefs and values regarding life meaning can also have an impact on the parents (Knafo & Galansky, 2008). From this perspective, examining the longitudinal bidirectional interactions between family functioning and adolescent life meaning may be an important missing piece in completing the puzzle. Particularly within highly child-centered Chinese families, children often form the core of activities and interactions. Changes in children's behavior and performance can significantly influence how parents interact and communicate with them, thereby affecting, enhancing, or undermining the family's functioning. Understanding how family dynamics and adolescents' sense of purpose interact over time in the Chinese culture can inform strategies to enhance both youth and family well-being.

Six, although the "cross-lagged panel model" (CLPM) is widely employed to examine bidirectional relationships between variables of interest, it has methodological limitations. A fundamental assumption of CLPM is that within-person changes remain consistent across time (Hamaker et al., 2015), an assumption that is particularly problematic when analyzing highly individual-specific variables. A significant criticism of CLPM centers on its inability to differentiate *"over-time causal effects from simple between-persons associations"* (Lucas, 2023, pp. 20, own emphasis added), potentially leading to overestimated paths or spurious cross-lagged effects (Burns et al., 2020). To address these methodological constraints, Hamaker et al. (2015) developed the "random intercept cross-lagged panel model" (RI-CLPM). By eliminating trait-like between-person differences, the RI-CLPM enables researchers to examine how fluctuations in a variable relative to an individual's mean level (within-person changes) influence subsequent variations.

In recent years, there has been a growing trend for researchers in adolescent development to use both CLPM and RI-CLPM to distinguish between- and within-person effects in developmental outcomes (e.g., Kojima et al., 2021; Liu et al., 2024; Yang et al., 2020). Empirical evidence has revealed notable discrepancies between these two analytical approaches. For example, Yang et al. (2020) found that while CLPM

model indicated significant positive temporal associations between depressive symptoms and peer rejection from late childhood to early adolescence, the RI-CLPM analysis showed no significant cross-lagged relationships between these variables. Similarly, Liu et al. (2024) found that significant cross-lagged paths between parental autonomy support and adolescent self-compassion identified through CLPM were not substantiated when using RI-CLPM. Given that no single analytical framework can comprehensively address all aspects of longitudinal changes and variable interrelationships (Burns et al., 2020), researchers suggested implementing diverse analytical methods to examine longitudinal dynamic relationships from multiple perspectives. Hence, we argue that over-reliance on CLPM alone in understanding the relationship between family functioning and adolescent spirituality is not adequate.

1.5 The Current Study

We argue that more longitudinal studies are needed to clarify how the micro-ecological environments, such as the family context, and the meaning in life among pre-adolescents and adolescents in Chinese cultural settings mutually influence each other. The related findings can help to support and develop relevant theories and inform policies, practices, and initiatives that promote the positive development of the vast population of Chinese children and adolescents. Against this backdrop, we designed a four-wave longitudinal study to elucidate the trajectories of family functioning and meaning in life among pre-adolescents and adolescents, and to examine their autoregressive predictions as well as bidirectional relationships over time. Our initial survey was conducted from late 2019 to early January 2020, followed by the outbreak of the global COVID-19 pandemic. Therefore, this longitudinal study spanning three academic years also captured the developmental trajectories and mutual influences of meaning in life and family functioning among students both before and during the pandemic.

Overall, this study aimed to address the aforementioned research gaps by answering the following six research questions. Additionally, we employed both CLPM and RI-CLPM to examine the research questions.

Research Question 1: What are the trajectories of family functioning among Chinese pre-adolescents and adolescents?

Based on the preliminary findings by Shek and his colleagues (2021) that parent-child relational quality displayed a declining trend across the six waves, we hypothesized that the trajectories of family functioning among Chinese pre-adolescents and adolescents would show a downward trend (**Hypothesis 1**).

Research Question 2: How does family functioning among Chinese pre-adolescents and adolescents at a time point influence their subsequent family functioning?

As family functioning reflects the dynamic characteristics of interactions among various parts of the family (Miller et al., 2000), we hypothesized that family functioning

at a time point would positively predict family functioning at a subsequent time point among Chinese pre-adolescents and adolescents (**Hypothesis 2**).

Research Question 3: What are the trajectories of meaning in life among Chinese pre-adolescents and adolescents?

As the previous research suggested that the trajectories of PYD attributes among Chinese adolescents showed a U-shaped curve of first decreasing and then increasing (Li et al., 2024), we hypothesized that meaning in life among Chinese pre-adolescents and adolescents would first decline and then rise (i.e., a U-shape relationship) (**Hypothesis 3**).

Research Question 4: How does meaning in life among Chinese pre-adolescents at a time point influence their subsequent meaning in life?

Consistent with existing studies (Shek & Liang, 2018), we hypothesized that meaning in life at a time point would positively predict meaning in life at a subsequent time point among Chinese pre-adolescents and adolescents (**Hypothesis 4**).

Research Question 5: How does family functioning among Chinese pre-adolescents and adolescents influence their meaning in life over time?

As healthy family functioning is associated with positive developmental outcomes (Shek et al., 2024), we hypothesized that family functioning at a time point would positively predict meaning in life at a subsequent time point among Chinese pre-adolescents and adolescents (**Hypothesis 5**).

Research Question 6: How does meaning in life among Chinese pre-adolescents and adolescents influence their family functioning over time?

As life meaning is positively associated with greater intentions of contribution among adolescents (e.g., Kor et al., 2019; Scales et al., 2014),we hypothesized that meaning in life at a time point would positively predict family functioning at a subsequent time point among Chinese pre-adolescents and adolescents (**Hypothesis 6**).

2 Measures and Methods

2.1 Participants and Procedures

This longitudinal study surveyed pre-adolescents and adolescents from Chengdu, Sichuan Province, China. The surveys were conducted at four time points: January 2020 (Wave 1), June 2020 (Wave 2), June 2021 (Wave 3), and June 2022 (Wave 4). During the 2019-20 academic year, there were a total of 623 primary schools and 317 junior high schools in Chengdu, along with 156 schools that enrolled both primary and junior high school students. Applying a cluster sampling approach, we selected

one primary school, one junior high school, and three schools that enrolled both primary and junior high students. The second survey was conducted in June 2020, after all participating schools had resumed in-person classes. Despite the impact of the pandemic, which led to school closures, local schools gradually resumed face-to-face instruction starting on April 1, 2020. By the time of our second survey, students in the participating schools had returned to their normal school routines, and thus the implementation of the classroom-based survey was not significantly affected by the pandemic.

Participants who completed all four surveys with less than 10% missing data on variables of interest were included in the final analysis sample. The study sample comprised 2,652 students, with 51.1% being males ($n = 1{,}354$). In Wave 1, students were in grades 4 through 8, with 853 in fourth grade, 232 in fifth grade, 742 in sixth grade, 816 in seventh grade, and 9 in eighth grade. The average age of participants in Wave 1 was 10.94 years (SD = 1.32; range 9–15). According to Buhrmester (1990), 89.8% were pre-adolescents (ages 9–12), while 10.2% were adolescents (over 12 years old).

Students in upper primary grades (fourth grade and above) have been shown to possess adequate cognitive and intellectual capabilities to comprehend psychosocial factors and provide reliable self-reported data (He & Xiang, 2022). Prior to data collection, the study obtained ethical approval from the Institutional Review Board (IRB) at Sichuan University, and informed consent was secured from both participating students and their parents. The survey was administered in classroom settings using paper-and-pencil questionnaires, with a trained and experienced researcher present to thoroughly explain the study's objectives. To ensure accurate responses, participants were explicitly informed both before and during the questionnaire administration that they could seek clarification from the researcher regarding any questions and were encouraged to respond honestly based on their genuine feelings.

2.2 Measures

2.2.1 Meaning in Life

Levels of life meaning among participants were assessed using the "Spirituality" subscale from the 90-item "Chinese Positive Youth Development Scale" (CPYDS; Shek et al., 2007). This subscale consists of 7 items that evaluate perceptions of purpose and meaning in life using a 7-point Likert scale (1 = *strongly negative description*, 7 = *strongly positive description*). The CPYDS has been demonstrated to have good psychometric properties (Shek & Zhu, 2018). In the current study, this subscale exhibited good internal consistency (see Table 1).

2.2.2 Family Functioning

Family functioning was evaluated using the 33-item "Chinese Family Assessment Instrument" (C-FAI; Shek et al., 2023). The C-FAI assesses family functioning across five dimensions: "Communication," "Mutuality," "Harmony and Conflict," "Parental Concern," and "Parental Control." Participants gave their responses on a 5-point Lik-

Table 1 The mean value, standard deviation, correlation matrix between study variables, and reliability of scales across 4 time points

	α	Inter-item correlation	Mean	SD	1	2	3	4	5	6	7	8	9
1 gender[a]					--								
2 age			10.94	1.32	0.005	--							
3 FFT (W1)	0.935	0.324	4.16	0.72	0.035	−0.014	--						
4 FFT (W2)	0.941	0.365	4.17	0.73	0.003	−0.087***	0.482***	--					
5 FFT (W3)	0.948	0.388	4.18	0.73	−0.025	−0.108***	0.410***	0.455***	--				
6 FFT (W4)	0.948	0.390	4.27	0.66	−0.004	−0.040*	0.102***	0.120***	0.174***	--			
7 SP (W1)	0.857	0.461	5.88	1.20	−0.042**	−0.105***	0.454***	0.377***	0.350***	0.110***	--		
8 SP (W2)	0.894	0.547	5.73	1.32	−0.120***	−0.115***	0.336***	0.493***	0.394***	0.101***	0.590***	--	
9 SP (W3)	0.917	0.612	5.68	1.34	−0.159***	−0.134***	0.268***	0.366***	0.489***	0.148***	0.437***	0.566***	--
10 SP (W4)	0.919	0.617	5.81	1.23	−0.015	−0.019	0.096***	0.083***	0.144***	0.456***	0.108***	0.111***	0.188***

Note.[a]1 = male, 2 = female; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

W1 =Wave 1; W2 = Wave 2; W3 = Wave 3; W4 = Wave 4; SD = standard deviation; FFT = Family functioning; SP = Spirituality

ert scale (1 = *most similar*, 5 = *most dissimilar*). The scale has been shown to have strong validity and reliability among Chinese adolescent samples (Shek et al., 2023). In the current study, this scale also showed good reliability, as shown in Table 1.

2.3 Data Analysis

Two software packages were used to conduct data analyses: SPSS 28.0 for descriptive statistics, correlation analyses, and scale reliability assessments, and Mplus (version 8.3) for structural equation modeling. Both CLPM and RI-CLPM were estimated using maximum likelihood estimation, yielding standardized path coefficients. The adequacy of the model fit was assessed using multiple indices, as recommended by Hu and Bentler (1999): (a) non-significant chi-square (χ^2) statistics; (b) "Comparative Fit Index (CFI)" (adequate if≥0.90, good if≥0.95); (c) "Tucker-Lewis Incremental Fit Index (TLI)" (adequate if≥0.90, good if≥0.95); (d) "Root Mean Square Error of Approximation (RMSEA)" (adequate if≤0.08, good if≤0.05); (e) "Standardized Root Mean Square Residual (SRMR)" (adequate if≤0.08, good if≤0.05). Analysis revealed that both CLPM and RI-CLPM demonstrated satisfactory fit to the empirical data (see Table 2).

3 Results

3.1 Descriptive Statistics

Across four waves, family functioning was significantly and positively correlated with meaning in life (*r*s range 0.083–0.590, *p*s < 0.001; see Table 1). Family functioning in Wave 2, Wave 3, and Wave 4, respectively, was significantly and negatively correlated with age (*r*s range −0.040 – −0.108; *p*s range 0.041 – < 0.001). Similarly, meaning in life in Wave 1, Wave 2, and Wave 3, respectively, were significantly and negatively correlated with age (*r*s range −0.105 – −0.134; *p*s < 0.001). Moreover, meaning in life in Wave 1, Wave 2, and Wave 3, respectively, was significantly correlated with gender (*r*s range −0.042 – −0.159; *p*s range 0.030 – < 0.001). Figures 1 and 2 depict the average trajectory of family functioning and meaning in life over time.

3.2 Trajectories and Autoregressive Paths in Family Functioning

Contrary to Hypothesis 1, family functioning showed an upward trend, with a slight increase from Wave 1 to Wave 2, and then showing a greater increase from Wave 3 to Wave 4 (see Fig. 1). Regarding the autoregressive paths within the CLPM, across four waves, family functioning levels at a previous survey time point significantly predicted family functioning at subsequent time points. The standardized regression coefficients ranged from 0.134 to 0.391 (*p*s < 0.001; see Fig. 3). Compared to the CLPM, different findings were obtained within the RI-CLPM (see Fig. 4). Family functioning levels in Wave 1 significantly and positively predicted family functioning in Wave 2 (β = 0.316, $p < 0.001$). Similarly, family functioning in Wave 2 also positively predicted family functioning in Wave 3 (β = 0.251, $p < 0.001$). However,

Table 2 Model fit indices of the cross-lagged panel model and the random intercept cross-lagged panel model

Model	Chi-square	*df*	CFI	TLI	RMSEA	SRMR
CLPM	164.024	12	0.958	0.905	0.069	0.036
RI-CLPM	133.673	9	0.979	0.935	0.072	0.036

Note. CLPM = Cross-Lagged Panel Model; RI-CLPM = Random Intercept Cross-Lagged Panel Model; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual

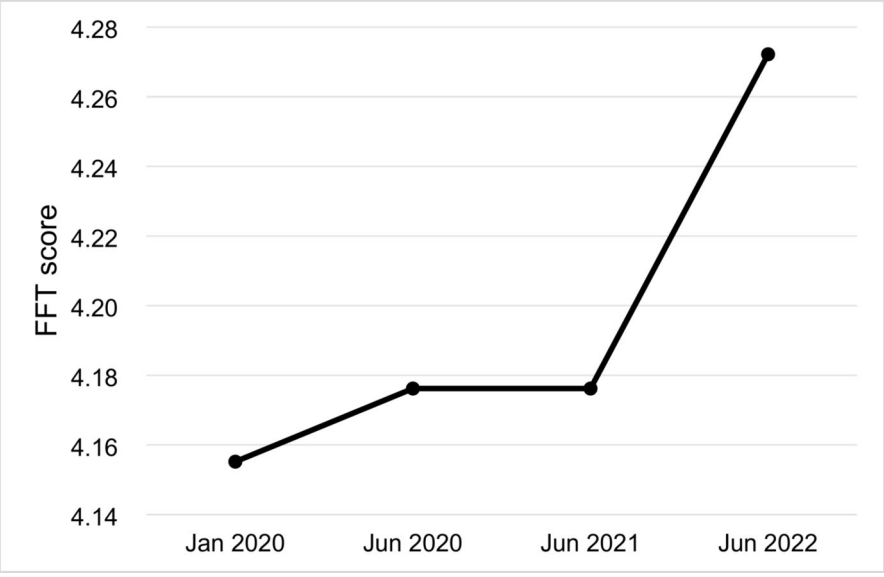

Fig. 1 Developmental trajectory of family functioning across 4 waves. FFT = Family functioning

such an autoregressive path from Wave 3 to Wave 4 was not significant (β = −0.020, $p = 0.539$). By and large, Hypothesis 2 was supported.

3.3 Trajectories and Autoregressive Paths in Meaning in Life

Basically, levels of life meaning presented a U-shape curve, that is, a continuous decline from Wave 1 to Wave 3 and then a rebound from Wave 3 to Wave 4 (see Fig. 2), supporting Hypothesis 3. For autoregressive prediction, the CLPM revealed that across four waves, prior levels of life meaning significantly and positively predicted levels of life meaning at subsequent time points, with standardized regression coefficients ranging from 0.154 to 0.551 ($ps < 0.001$; see Fig. 3). Similarly, the standardized autoregressive coefficients obtained from the RI-CLPM indicated that across four waves, previous levels of life meaning significantly and positively predicted levels of life meaning at subsequent time points. However, the regression parameters were attenuated, with standardized regression coefficients ranging from

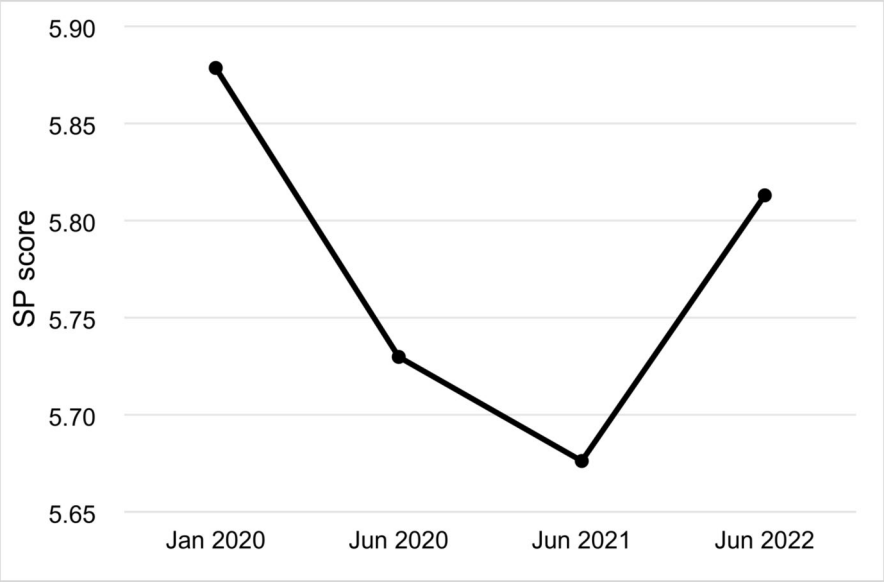

Fig. 2 Developmental trajectory of meaning in life across 4 waves. SP = Spirituality

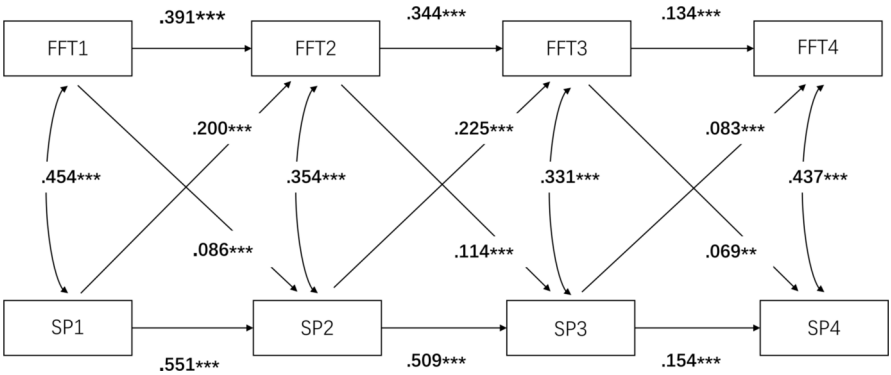

Fig. 3 Standardized regression coefficients in the cross-lagged panel model. FFT = Family functioning, SP = Spirituality. FFT1–FFT4 are mean scores of family functioning in Wave 1–Wave 4; SP1–SP4 are mean scores of spirituality (meaning in life) in Wave 1–Wave 4. Dashed lines represent the non-significant paths. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

0.086 to 0.511 (*p*s range < 0.001–0.006; see Fig. 4). Overall speaking, the findings supported Hypothesis 4.

3.4 Correlations between Family Functioning and Meaning in Life

In the CLPM (see Fig. 3), standardized correlation coefficients between family functioning and levels of life meaning ranged from 0.331 to 0.454 (*p*s < 0.001). In the RI-CLPM (see Fig. 4), the standardized between-person correlation coefficients ranged

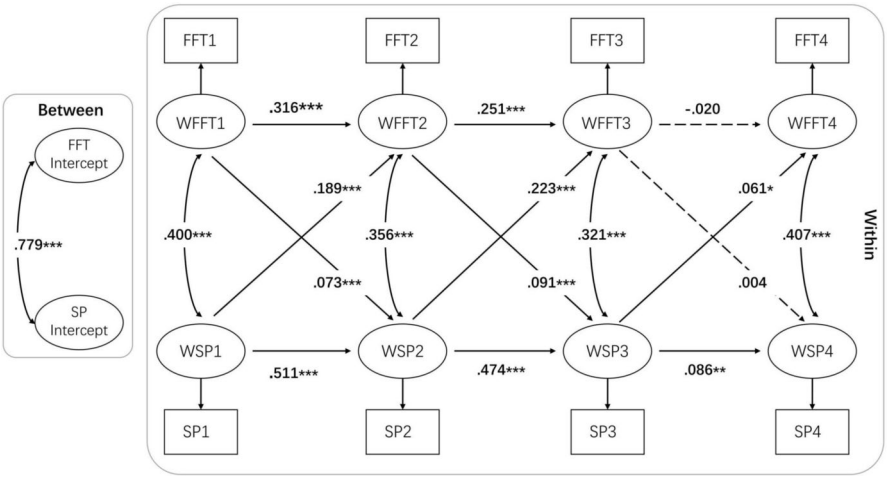

Fig. 4 Standardized regression coefficients in the random intercept cross-lagged panel model. FFT = Family functioning, SP = Spirituality. WFFT= the within-person fluctuations of family functioning, WSP = the within-person fluctuations of spirituality. FFT1–FFT4 are mean scores of family functioning in Wave 1–Wave 4, SP1–SP4 are mean scores of spirituality (meaning in life) in Wave 1–Wave 4. Dashed lines represent the non-significant paths. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

from 0.321 to 0.407 ($ps < 0.001$), which are slightly lower than the results from the CLPM. When within-person variance was controlled, the standardized between-person correlation coefficient for the random intercept factor is 0.779 ($p < 0.001$), suggesting that pre-adolescents and adolescents who self-reported higher levels of family functioning tended to report higher levels of life meaning overall.

3.5 The Longitudinal Reciprocal Effects between Family Functioning and Meaning in Life

The standardized regression coefficients obtained from the CLPM indicated that family functioning in Wave 1 ($\beta = 0.086$, $p < 0.001$), Wave 2 ($\beta = 0.114$, $p < 0.001$), and Wave 3 ($\beta = 0.069$, $p = 0.003$) significantly and positively predicted levels of life meaning in Wave 2, Wave 3, and Wave 4, respectively. In contrast, the predictive effect of family functioning on meaning in life yielded different results using RI-CLPM. Specifically, family functioning in Wave 3 did not significantly predict levels of life meaning in Wave 4 ($\beta = 0.004$, $p = 0.901$). Furthermore, although family functioning in Wave 1 and Wave 2 significantly and positively predicted levels of life meaning in Wave 2 ($\beta = 0.073$, $p < 0.001$) and Wave 3 ($\beta = 0.091$, $p < 0.001$), respectively, the standardized regression coefficients obtained were smaller. Roughly speaking, there was support for Hypothesis 5, at least for the first three waves of data.

For the predictive effect of meaning in life on family functioning, CLPM analyses revealed that levels of life meaning in Wave 1 ($\beta = 0.200$, $p < 0.001$), Wave 2 ($\beta = 0.225$, $p < 0.001$), and Wave 3 ($\beta = 0.083$, $p < 0.001$) significantly and positively predicted family functioning levels at the subsequent time points. Similarly, RI-CLPM analyses suggested that levels of life meaning in Wave 1 ($\beta = 0.189$, $p < 0.001$),

Wave 2 ($\beta = 0.223, p < 0.001$), and Wave 3 ($\beta = 0.061, p = 0.038$) significantly predicted family functioning at subsequent time points. However, compared to the CLPM, the regression parameters were slightly attenuated. Generally speaking, Hypothesis 6 was supported.

4 Discussion

This study examined the trajectories and autoregressive prediction of family functioning and meaning in life as well as the bidirectional relationships between the two variables through four surveys conducted with pre-adolescents and adolescents from mainland China. Additionally, the study compared the results from CLPM and RI-CLPM models to test whether the autoregressive prediction and cross-lagged associations between these variables remain supported when considering both between-person and within-person differences.

For Research Question 1, we observed an overall upward trend in the trajectories of family functioning, which did not support Hypothesis 1. Given the temporal context of the study (i.e., spanning before and after the pandemic), we suggest that this overall upward trend may reflect the resilience of families in challenging circumstances and difficult times. During the early stages of the pandemic, families faced pressures such as home isolation and health threats, which may have led to a new period of adjustment (Maison et al., 2021). Over time, family members adapted to new lifestyles, such as increased and improved communication (Brown & Greenfield, 2021; Gayatri & Irawaty, 2022; Sabah et al., 2023), mutual support (Everri et al., 2022), and the reallocation of family roles (Andrade et al., 2022; Biroli et al., 2021) to cope with the pressures of home isolation. This adaptation allowed families to recover and even surpass pre-crisis levels of family functioning, promoting better family functioning, which may explain the sharp increase in family functioning from Wave 3 to Wave 4 (post-pandemic phase). Echoing findings from other studies, family adaptability and resilience contributed to a significant enhancement in family functioning levels (Zhu et al., 2024) and increased family closeness (Langley et al., 2021) in the later stages of the pandemic.

Regarding Research Question 2, CLPM analyses fully supported Hypothesis 2. Across the four survey time points, prior family functioning positively predicted family functioning at subsequent time points. The significant paths in the CLPM may reflect relatively stable between-person characteristics of family functioning, indicating that participants who reported healthy family dynamics at earlier assessments tend to indicate better family functioning in subsequent evaluations. In contrast, RI-CLPM analyses suggested that the autoregressive effects of family functioning weakened or became non-significant in the later wave (from Wave 3 to Wave 4). In other words, the within-person fluctuations (increases) in family functioning led to fluctuations (increases) at the subsequent time point in the earlier three waves. However, this autoregressive effect was no longer significant in the post-pandemic phase (Wave 4). Two possible reasons may jointly contribute to this finding. The first possibility is that the long-term cumulative effect of family functioning adaptability may have amplified the overall trend's impact on Wave 4. After a long readjustment

period (from Wave 1 to Wave 3), the overall recovery trend in family functioning may have dominated the changes in family functioning, making the influence of Wave 3 fluctuations (within-person differences) on Wave 4 relatively minor. This inference aligns with the notion that in the absence of major family changes, the initial state and characteristics of family functioning tend to persist (Sianko & McDonell, 2020). In contrast, at earlier time points, during and immediately after the pandemic, families were in the process of developing new adaptation patterns, making within-person fluctuations in family functioning more likely to directly influence subsequent within-person fluctuations and changes. The second possibility is that when families are in relatively stable structures and interaction patterns (in later waves), within-person fluctuations in family functioning are more likely to be influenced by other factors, such as meaning in life, rather than directly by previous within-person changes in family functioning.

Supporting Hypothesis 3, the trajectory of meaning in life among participants generally followed a U-shape curve, initially declining and then rising. This pattern is consistent with the developmental trajectory of PYD attributes previously observed among Chinese adolescents (Li et al., 2024). Similar to the temporal context of Li et al.'s study (2024), our four surveys spanned the pre-pandemic, return-to-school immediately after the pandemic, and post-pandemic phases. Therefore, the continuous decline in life meaning from Wave 1 to Wave 3 is reasonable. Consistent with our observations, various studies have reported that adolescents experienced moderate to severe hopelessness during the pandemic (Sarman & Tuncay, 2024; Takács et al., 2023). Even after the pandemic, adolescents reported a high level of hopelessness, a significant reduction in life meaning, and poorer well-being upon returning to school (Kolakowsky-Hayner et al., 2021; Sanz-Sendra et al., 2024). The rebound in life meaning from Wave 3 to Wave 4 (post-pandemic phase) may indicate the adaptability and resilience of young people, reflecting the plasticity of individuals.

As for autoregressive paths in meaning in life (Research Question 4), the results from both CLPM and RI-CLPM models confirmed that prior life meaning significantly and positively predicted subsequent life meaning levels, which supported Hypothesis 4. Combining the results of CLPM and RI-CLPM, this study suggests that pre-adolescent spiritual development may consistently foster a stronger sense of life meaning among young people in the future. This driving force remains consistent between individuals and within each person, even during challenging times. These results resonate with previous studies conducted among Chinese adolescents in Hong Kong (Shek & Liang, 2018; Shek & Zhu, 2018) and mainland China (Zhu & Shek, 2020), which reported positive developmental outcomes associated with spirituality. Our findings provide evidence within the Chinese cultural context that spirituality (life meaning) is an important developmental asset for youth and promotes positive growth (Hay et al., 2024; King et al., 2011). Collectively, these diverse findings underscore the importance of spiritual development in fostering the thriving and positive developmental trajectories of pre-adolescents and adolescents across different cultural contexts.

For Research Question 5, the CLPM analyses revealed that family functioning at earlier time points consistently and positively predicted subsequent meaning in life across all four survey periods, providing comprehensive support for Hypothesis

5. The cross-lagged regression paths collectively illustrated a temporal relationship wherein family functioning positively influenced changes in meaning in life, aligning with recent research by Li et al. (2024) that documented positive associations between healthy family functioning and both baseline levels and developmental trajectories of PYD attributes. These findings are further corroborated by studies among Hong Kong Chinese adolescents, which established significant predictive relationships between various dimensions of parent-child relationships—paternal, maternal, and overall—and adolescents' sense of life meaning (Shek et al., 2021). The convergence of these empirical findings substantiates the theoretical proposition that well-functioning family systems and quality parent-child relationships create supportive conditions that facilitate youth's exploration and comprehension of the external world (Desrosiers et al., 2011).

However, when within- and between-person variations were disaggregated through the RI-CLPM, the predictive relationship between family functioning in Wave 3 and meaning in life in Wave 4 did not reach statistical significance. Put differently, in the post-pandemic phase, variations in family functioning at the individual level showed no significant link to later changes in an individual's sense of life meaning, after accounting for stable differences between persons. One possibility is that as social life gradually resumed post-pandemic, changes in students' sense of life meaning were influenced by a broader range of external factors. For example, increased social opportunities and peer support (Andrews et al., 2020; Desai et al., 2024), a sense of academic achievement following school resumption (Bozzato, 2024), as well as enhanced hope and a more defined sense of life direction (Garagiola et al., 2022), have all been linked to improved well-being among students following their return to school post-pandemic. These external factors may have diluted the direct impact of fluctuations in family functioning in Wave 3 on changes in levels of life meaning in Wave 4. The second possibility is that as entering adolescence, the impact of the family environment and parental influence on adolescents may "naturally" diminish (Keijsers & Poulin, 2013). Instead, the school environment becomes a more important setting that provides a social learning environment for students when they spend most of their day there (Moos, 2002). Through interactions and engagement with peers, they explore their identities, find meaning and enjoyment in life, and prepare for a hopeful future (Lin et al., 2021; Yuen et al., 2021). The RI-CLPM findings highlight the possible change in the relationship in early adolescence. The increased peer interactions, the development of close peer relationships, and individual resilience may have served as significant drivers of meaning in life. These factors could potentially explain the rebound in levels of life meaning from Wave 3 to Wave 4.

Despite only partial support for Hypothesis 5 in RI-CLPM, the significant regression paths observed in both the CLPM and RI-CLPM models collectively demonstrate the crucial influence of healthy family functioning on adolescents' spiritual development and sense of meaning in life, particularly during periods of adversity. Especially during periods of family isolation and initial school resumption (Wave 1 to Wave 3), harmonious family environments served as essential protective factors, providing crucial emotional support and security for young people in their quest to define life meaning (Shi et al., 2023) and maintain hope (Gayatri & Irawaty, 2022). Spirituality has been conceptualized as both a resilience factor (Werner, 1997) and as

a mechanism for adaptive coping in the face of adverse situations (Van Dyke & Elias, 2007). In this context, well-functioning family systems appear to create conducive environments that enhance young people's psychological resilience and adaptability, thereby facilitating their spiritual development during challenging periods (Werner, 1997). This supportive family foundation ultimately enables young people to discover meaning and purpose in life while maintaining optimistic perspectives, even in the face of adversity.

For Research Question 6, both CLPM and RI-CLPM analyses supported Hypothesis 6 and confirmed that meaning in life during pre-adolescence and adolescence is beneficial for maintaining good family functioning. Prior life meaning levels among participants positively predicted their subsequent family functioning at both individual and group levels across four time periods. As adolescents reflect on and explore their values through understanding the external world and broader existence, and as they form attachments with others, these experiences and competencies may also enhance their contributions to the family. This finding adds to the current knowledge of longitudinal bidirectionality between these two variables, especially since existing literature primarily focuses on the impact of family functioning (family environment) and parental control on adolescent spiritual development, rather than the reverse. Theoretically, by confirming the positive predictive effect of life meaning on family functioning, this study supports the spiritual development model by Benson and Roehlkepartain (2008), which posits that levels of life meaning develop through dynamic interactions, where meaning in life, as a way of life for youth, is expressed and embodied in family relationships, activities, and practices. Furthermore, meaning in life may promote or enhance adolescents' positive perceptions of their environment (e.g., the family environment) and strengthen their positive beliefs about the external environment and the outside world. This in turn fosters more positive interaction patterns and healthy interactions with others, such as more harmonious family relationships. Empirically, our findings provide additional support for emerging research on children's influence over parents in family interactions and relationships (De Mol & Buysse, 2008; Knafo & Galansky, 2008), reporting that parents' values can be passively and actively influenced and altered by their children's values (Knafo & Galansky, 2008).

This discussion is particularly enlightening in the context of Chinese culture, where traditional Chinese culture places a strong emphasis on filial piety and obedience (either active or passive obedience) to parents (Qiao et al., 2024). Our findings may reflect two changes occurring in contemporary Chinese families. First, the structure of contemporary Chinese families has shifted from traditional extended families to nuclear families, which is highly child-centered, potentially enhancing the direct influence of children on parents. Second, influenced by Western culture and values, contemporary Chinese society, especially its youth, is gradually "abandoning" some traditional Chinese cultural values, such as obedience to parental authority (Rosen, 2009; Shek & Sun, 2014), and is more focused on personal experiences and the realization of individual values (Sun & Wang, 2010).

This study advances existing research in three key areas. First, in terms of the cross-cultural context of meaning in life, it responds to the call by Hay et al. (2024) for increased research in non-Western societies by providing significant observations

from the Chinese context. There are notable differences in the emphasis on religious beliefs among different Chinese communities, such as mainland China and Hong Kong. Nevertheless, findings from samples of Chinese adolescents across different social systems and economic structures (e.g., Shek & Zhu, 2018; Zhu & Shek, 2020) and from adolescents in Western cultural contexts (e.g., Scales et al., 2014) collectively support the notion that spiritual development is an experience and ongoing developmental process that transcends religious contexts (Benson et al., 2003; King et al., 2011).

Second, regarding the environment for the cultivation and development of life meaning, this study supports the positive direct impact of a supportive micro-family environment on levels of life meaning among pre-adolescents and adolescents. It also highlights that meaning in life, in turn, directly enhances the family functioning of young individuals. The current study confirms a general trend of mutual enhancement over time between life meaning and healthy family functioning among pre-adolescents and adolescents, which sheds light on how positive growth may occur within these groups. Healthy family functioning provides supportive factors for youth spiritual development, and conversely, the spiritual development of youth contributes to maintaining or improving their family functioning. This study constitutes theoretical advance to enrich the models on the mutual influences of family functioning and adolescent life meaning.

Third, this study has some methodological contributions. By separating between-person and within-person differences, this study provides richer findings to understand whether the general trends observed at the group level align with the fluctuations experienced by individuals over time. This approach helps avoid the "ecological fallacy," which occurs when inferences about individual-level relationships are made based solely on group-level associations (Brewer & Venaik, 2014; Connolly, 2006). In this study, our results indicate that even during challenging periods, i.e., during the pandemic and the early stages of school reopening (from Wave 1 to Wave 3), the positive association between healthy family functioning and meaning in life observed at the between-person level is consistent with the within-person level. Furthermore, over a longer period (from Wave 1 to Wave 4), the promotion of healthier family functioning by meaning in life remains consistent across both analytical (between- and within-person) levels. These consistent findings highlight the beneficial and effective nature of fostering a sense of purpose and meaning in life among pre-adolescents and adolescents and intervening in their family environments at both the group and individual levels. Such interventions are particularly crucial when significant external changes or life events occur. Based on the RI-CLPM results, we cautiously suggest that in the later stages of the investigation (from Wave 3 to Wave 4, post-pandemic phase), life meaning is more likely to be an antecedent rather than a consequence of family functioning among participants.

However, it is noteworthy that RI-CLPM also has its limitations. A concern was highlighted by Sorjonen et al. (2023) through their comparative analysis of the RI-CLPM and the "Stable Trait, Autoregressive Trait, and State (STARTS) model" (Kenny & Zautra, 1995). Their study revealed contradictory findings: while the RI-CLPM analyses suggested that the need for cognition negatively influenced subsequent anxiety and depressive symptoms, the STARTS model suggested that

an increased need for cognition predicted heightened anxiety and depressive symptoms. This discrepancy, as Sorjonen and colleagues (2023) argued, may arise from the RI-CLPM's inability to "differentiate between unique occasion-specific variance (e.g., measurement error) and true deviations at the general, trait-like between-person level of the study variables" (pp. 6). Lüdtke and Robitzsch (2021) also emphasized the need for caution when interpreting within-person causal effects in the RI-CLPM framework. They noted that the model primarily captures temporary fluctuations around individual means, potentially reflecting short-term situational changes rather than stable, long-term causal mechanisms. Additionally, the RI-CLPM does not adequately account for potential underlying factors that might explain between-person differences. Nevertheless, the consistency of results across both the CLPM and RI-CLPM in the present study strengthens our findings regarding the significance of meaning in life during pre-adolescence and adolescence. This convergence of evidence substantiates both the impact of life meaning on promoting positive developmental outcomes and enhanced family functioning, and the protective function of family dynamics in fostering positive growth, particularly during challenging periods and contexts.

In terms of practical implications, this study highlights that Chinese youth exhibit the development of spirituality (or meaning in life) at least in pre-adolescence. It emphasizes that spiritual development is beneficial for positive developmental outcomes at the individual level and healthy family functioning at the family level. Therefore, implementing relevant interventions in Chinese primary and secondary schools to cultivate and promote life meaning and spiritual development among students is advantageous. In this regard, conducting PYD programs in Chinese primary and secondary schools to foster students' psychosocial competencies and promote their holistic positive development not only optimizes growth trajectories at the individual level but also strengthens family harmony or reduces crises in parent-child relationships at the social level (Shek, 2024; Shek & Dou, 2024; Zhu et al., 2025). Additionally, providing family-based counseling services and interventions within the Chinese cultural context would be an important step. Currently, the family-centered social work service system is not well-developed in mainland China. Therefore, establishing a student-centered school-family liaison network across society would create favorable conditions for timely interventions and engagement.

Based on the findings from pre-adolescents and adolescents in Chengdu, Sichuan Province (a large city in Southwestern China), this study offers theoretical and practical implications for other regions in China (e.g., coastal, central, and western areas). Theoretically, the study underscores the universality of spiritual development among young people across diverse cultural and socioeconomic contexts. Despite regional differences in economic development and cultural practices, the core mechanisms linking meaning in life (spiritual development) and well-being are likely applicable throughout China. The emphasis on family harmony and psychosocial competencies in promoting holistic development resonates with traditional Chinese values prevalent across all regions. Practically, we recommend that in economically advanced coastal and developed areas of China, schools can integrate advanced resources and technologies to implement PYD programs and offer related curricula. In developing regions, community-based approaches could be prioritized to address resource

limitations. Additionally, a scalable school-family liaison network model could be established to facilitate timely interventions and support systems tailored to local conditions nationwide. Given the universality of spirituality (meaning in life) and its closely associated psychosocial competencies in promoting the positive development of young individuals, the findings based on our sample have the potential for cross-regional applicability. This could significantly inform policy-making aimed at fostering the development and supporting and improving well-being of children and adolescents across China. For example, the P.A.T.H.S. project (Shek, 2006a, b) is making impacts in different parts of China and outside China (Shek & Dou, 2024).

Several limitations of the study are identified. First, the study relied on self-reports from pre-adolescents and adolescents for the questionnaires. Younger participants may tend to provide overly positive evaluations of themselves and their families (Shek & Liang, 2018), which could lead to biased results. Future research would benefit from incorporating multiple perspectives through parent and teacher surveys, thereby enabling a more comprehensive assessment of student family functioning. Second, the context of this study is somewhat unique, spanning the period before the pandemic, the early stages of school reopening, and the return to normal life. This unusual circumstance may limit the generalizability of findings regarding the bidirectional relationship between family functioning and spirituality (life meaning) among pre-adolescents and adolescents under typical conditions. In particular, the discrepancies observed between the CLPM and RI-CLPM models in terms of autoregressive effects on family functioning and life meaning may be attributable to this specific temporal context. Further replication studies are essential to determine whether these findings reflect general patterns in adolescent family dynamics and meaning-making processes or are context-specific. Third, our participants were from Chengdu, China, and their living and developmental environments may differ from those of their peers in other Chinese communities. Additional replication studies are needed to investigate life meaning and family functioning among Chinese youth across diverse communities and environmental contexts, thereby enhancing our understanding of how environmental variations influence spiritual development and PYD attributes.

5 Conclusion

Through four surveys conducted with pre-adolescents and adolescents in mainland China, this longitudinal study investigated the trajectories and autoregressive effects of family functioning and meaning in life among these Chinese youths and examined the bidirectional relationships between the two variables. Overall, participants' family functioning displayed an upward trend, and meaning in life showed a U-shaped curve. There were positive autoregressive effects for both measures. Consistent results revealed by both CLPM and RI-CLPM models suggest that prior levels of meaning in life positively predicted subsequent family functioning and subsequent life meaning levels among participants. The results from the RI-CLPM suggested that in the earlier waves, from before the outbreak of the pandemic (January 2020, Wave 1) to one year after school reopening (June 2021, Wave 3), prior family functioning positively predicted subsequent levels of life meaning and family functioning. However, in the

later wave, entering the second year after school reopening (from June 2021 to June 2022; Wave 4), this predictive effect was no longer significant. In contrast, the CLPM analysis indicated that across all four survey time points, previous family functioning was significantly and positively correlated with subsequent life meaning and family functioning. The differences observed between the RI-CLPM and CLPM models suggest that in the later wave (from Wave 3 to Wave 4), within-person fluctuations in family functioning are more likely to be directly influenced by within-person changes in life meaning, rather than the previous levels of family functioning.

Acknowledgements We would like to acknowledge the financial support of the Matching Fund from the Research Grants Council (ZH4Q and ZECL) and The Hong Kong Polytechnic University (ZZ4U, WZ8A and ZZUE).

Author Contributions DS: Conceptualization, Funding acquisition, Investigation, Methodology, Supervision, Writing – review & editing. Y-TT: Writing – original draft, Formal analysis. XL: Data curation.

Funding Open access funding provided by The Hong Kong Polytechnic University.
This research and preparation of this paper are financially supported by the Matching Fund from the Research Grants Council (ZH4Q and ZECL) and The Hong Kong Polytechnic University (ZZ4U, WZ8A and ZZUE).

Data Availability The raw data supporting the conclusions of this article will be made available by the corresponding author, without undue reservation.

Declarations

Conflict of Interest The authors have no conflicts of interest to disclose.

Ethics Statement The studies involving humans were reviewed and approved by the Institutional Review Board (IRB) at Sichuan University (K2020025).

Consent Statement All parents and students provided their informed consent before participating in the study.

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