Measuring Positive Childhood Experiences: Testing the Structural and Predictive Validity of the Health Outcomes From Positive Experiences (HOPE) Framework

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The authors have no conflicts of interest to disclose.

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Received for publication May 23, 2021; accepted November 6, 2021.

ABSTRACT

OBJECTIVE: Positive childhood experiences (PCEs), that occur within secure and nurturing social environments, are fundamental to healthy physical, social-emotional, and cognitive development. However, reliable measures of these experiences are not yet widely available. We used data from the Longitudinal Study of Australian Children (LSAC) to empirically represent and psychometrically evaluate 3 primary domains of PCEs defined within the Health Outcomes from Positive Experiences (HOPE) framework, specifically: 1) nurturing and supportive relationships; 2) safe and protective environments and; 3) constructive social engagement and connectedness.

METHODS: LSAC is a nationally representative cohort that has followed young Australians from birth since 2004. LSAC data were used to represent the 3 primary HOPE-PCEs domains (birth to 11 years) across 4 inter-related PCEs constructs: 1) positive parenting, 2) trusting and supportive relationships, 3) supportive neighborhood and home learning environments, and 4) social engagement and enjoyment. Confirmatory factor analysis was used to test the proposed 4-factor structure. Predictive validity was examined through associations with mental health problems and academic difficulties at 14 to 15 years.

RESULTS: The 4-factor structure was supported by empirical data at each time point. Higher exposure to PCEs across each domain was associated with lower reporting of mental health problems ($\beta = -0.20$ to -2.05) and academic difficulties ($\beta = -0.01$ to -0.13) in adolescence.

CONCLUSIONS: The 4 LSAC-based HOPE-PCEs have sufficient internal coherence and predictive validity to offer a potentially useful way of conceptualizing and measuring PCEs in future cohort studies and intervention trials aiming to enhance the understanding of, and mitigate the negative impacts of, adverse childhood experiences.

KEYWORDS: academic skills; children; longitudinal studies; mental health; positive experiences

ACADEMIC PEDIATRICS 2022;22:942−951

WHAT'S NEW

We found evidence for the structural and predictive validity of a new population-based measure of positive childhood experiences. The Health Outcomes from Positive Experiences framework can be used as a useful way to conceptualize and assess positive childhood experiences.

THE ECOLOGICAL MODEL highlights that many complex and interacting exposures across multiple nested contexts shape a child's health and development over time.[1] Adverse childhood experiences (ACEs) are potentially traumatic events that occur prior to the transition to adulthood.[2] It is well documented that ACEs have long-term and harmful effects on physical, psychological,

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behavioral, and academic outcomes across the life course.[3] However, much less is known about positive childhood experiences (PCEs), which refer to a range of positive events, activities or situations that enhance a child's life, promoting flourishing, and successful health and developmental outcomes.[4]

Empirical evidence suggests that PCEs play an important role in promoting healthy physical, social-emotional, and cognitive development, operating as both protective factors (ie, moderating the risk of poor outcomes in the presence of adversity) as well as promotive factors (ie, having a positive effect on outcomes in the presence or absence of adversity).[5, 6] For example, empirical studies have shown dose-response relationships between the number of PCEs and health outcomes across the life span, even controlling for the number of ACEs.[7, 8] PCEs may also help to explain why some individuals are resilient, managing to thrive even in adverse circumstances.[3] These beneficial impacts of positive experiences may be particularly pronounced in early childhood when rapid physiological change and sensitivity to environmental exposures create a window of plasticity.[9]

However, similar to the assessment of ACEs,[10] measuring PCEs is complex and presents a challenge to building this evidence base across the early life course.[11] The few psychometrically validated measures available (eg, the 10-item Benevolent Childhood Experiences Scale,[6] the 22-item Positive Childhood Experiences Scale[12]) are mostly intended to be retrospectively reported by adults and focus narrowly on interpersonal relationships. The lack of comprehensive, validated measurement options is impeding the development of evidence on how to leverage positive assets to promote child health and well-being.

Currently, there are several theories and conceptual frameworks emerging that consider the measurement of positive experiences (Table 1). While they have different emphases, there is consensus that positive experiences are beyond the absence of adversities. Rather, they reflect the presence of developmental assets or resources that establish fertile conditions for healthy development. In addition, all frameworks agree that positive experiences can occur at multiple levels of a child's surrounding environments, such as in the family and community contexts, in line with the ecological model of human development.[1]

We focus on the Health Outcomes from Positive Experiences (HOPE) framework as a guide for our measurement work,[4] bringing together central features of existing frameworks. PCEs are proposed to comprise 4 core components within the HOPE framework: 1) nurturing and supportive relationships, 2) safe and protective environments, 3) constructive social engagement and connectedness, and 4) learning social and emotional competencies. The HOPE framework identifies specific positive experiences that can be used to inform intervention strategies and build children's resilience that might mitigate the negative effects of ACEs. The HOPE framework also takes a developmental perspective, emphasizing the importance of childhood for future physical, social-emotional, and cognitive outcomes. For these reasons, the framework is gaining attention among researchers[13]; attention not only around new approaches to intervention designs but also around new approaches to measurement development.

The purpose of the present study was to design and test new measurement options for enriching research on positive experiences across childhood. We used rare positive development data from Longitudinal Study of Australian Children (LSAC), which has prospectively gathered comprehensive and national Australian data on multiple aspects of child development every 2 years,[14] to address 2 inter-related measurement aims. The first aim was to define the best possible representations of HOPE-PCEs domains using measures of positive development available in LSAC (birth to 11 years). The second aim was to examine whether LSAC-defined HOPE-PCEs were associated with mental health problems and academic difficulties at 14 to 15 years, to inform the measure's predictive validity. Findings from this study will provide new measurement options for enriching cohort research on PCEs and the potential impact of interventions in future research.

Table 1. Relevant Theories and Frameworks Conceptualizing Positive Experiences That Promote Health and Well-Being

Theory or Framework	Brief Description
Health Outcomes from Positive Experiences (HOPE) framework	Emphasizes the promotion of positive childhood experiences that create a strong foundation for physical and mental health, cognitive and social outcomes.[4]
Salutogenesis framework	Asserts that focusing on an individual's resources and capacity is essential to create, enhance and improve physical, mental and social well-being, as opposed to the concept of pathogenesis.[39]
Resiliency theory	Emphasizes the positive contextual, social, and individual factors that interfere or disrupt developmental trajectories from risks to poor health outcomes.[40]
Positive psychology/positive mental health	Highlights the positive aspects of human behavior and successful adaptation.[41]
Mental health competence	Describes adaptational success in the developmental tasks expected of individuals of a given age in a particular cultural and historical context.[35]
Empower action model	Merges several important frameworks (eg, social-ecological model, protective factors, life course theory) and aims to prevent adverse childhood experiences by building individuals' resilience across multiple levels of influence to promote health and well-being.[42]
Childhood health promotion framework	Builds on the social-ecological model and focuses on the pathway from policies and programs to child health, via enhancing family and community capacities and building health foundations (eg, responsive care, safe environments).[43]

METHODS

DATA SOURCES

LSAC is a nationally representative sample of 2 cohorts of Australian children: a birth cohort of 5107 infants; and a kindergarten cohort of 4983 4-year-olds. The study commenced in May 2004. In short, a 2-stage clustered design was employed to select a sample that was broadly representative of the Australian child population except those living in remote areas.[14] Data were collected on multiple aspects of child development as well as family and community characteristics, and multiple information sources were utilized such as parent interview, parent-report and child-report questionnaires.

We drew on data from the birth cohort (51.2% male), focusing primarily on parent-reported data collected when children were aged 0 to 1 years (Wave 1; n = 5107), 2 to 3 years (Wave 2; n = 4606), 4 to 5 years (Wave 3; n = 4386), 6 to 7 years (Wave 4; n = 4242), 8 to 9 years (Wave 5; n = 4085), 10 to 11 years (Wave 6; n = 3764), and 14 to 15 years (Wave 8; n = 3127). To examine predictive validity, we also drew on data regarding children's mental health and academic skills at 14 to 15 years. The LSAC methodology was approved by the Australian Institute of Family Studies Human Research Ethics Review Board (ID 13-04) and the Royal Children's Hospital Human Research Ethics Committee (ID 2019.170).

MEASURES

POSITIVE CHILDHOOD EXPERIENCES AT 0 TO 11 YEARS

In this study we used LSAC data to operationalize 3 primary PCEs domains defined within the HOPE framework: 1) nurturing and supportive relationships; 2) safe and protective environments and; 3) constructive social engagement and connectedness (Supplementary File 1 for detailed rationales). We excluded the "learning social and emotional competencies" HOPE-PCEs domain to keep a clear distinction between PCEs and health outcomes of those positive experiences (eg, children exposed to warm parenting are likely to develop better social and emotional skills).[15] We identified 17 indicators relevant to the 3 focal HOPE-PCEs, and which represented the presence of assets rather than the absence of risk factor (eg, high levels of warm parenting rather than low levels of harsh parenting). We then re-grouped these into 4 domains of PCEs based on our evaluation of conceptual cohesion: 1) positive parenting, 2) trusting and supportive relationships, 3) supportive neighborhood and home learning environments, and 4) social engagement and enjoyment. Details of measures used to indicate each positive experience are shown in Table 2.

Of note, indicators sometimes varied by the child's developmental period due to data availability. For instance, an age-appropriate measure of consistent parenting was not available at child age 0 to 3. For interpretability, we dichotomized each PCEs indicator using the top quartile to indicate exposure to a positive experience at each time point.[16] In addition, similar to the ACE score approach,[10] we calculated a cumulative score for PCEs (each type and total) across childhood (0 to 11 years). In this way, we considered PCEs measures from both a point-in-time and cumulative benefit perspective.

HEALTH AND DEVELOPMENTAL OUTCOMES AT 14 TO 15 YEARS

We tested predictive validity by quantifying the association between PCEs (each type and total) and children's health and developmental outcomes, measured by mental health and academic skills at 14 to 15 years. We measured these outcomes from a problems perspective (ie, higher scores indicate poorer outcomes) to estimate associations between PCEs and the avoidance of poor outcomes.

Mental health was assessed using the parent-reported Strengths and Difficulties Questionnaire (SDQ)—a brief screening measure of behavioral and emotional problems for 3- to 16-year olds.[17] The SDQ measures 5 subscales with 5 items in each: prosocial behavior, peer relationship problems, emotional symptoms, hyperactivity/inattention, and conduct problems. The primary caregiver answered each item with 3 response options (not true, somewhat true, and certainly true). The SDQ total difficulties score (range 0−40) is a sum of scores on 20 items from peer relationship problems, emotional symptoms, hyperactivity/inattention and conduct problems, with higher scores indicating more social-emotional and behavioral difficulties and representing poorer mental health.

Academic skills were measured by the teacher-reported Academic Rating Scale of Language and Literacy subscale,[18] which has 9 items assessing performance on language tasks including reading, writing and oral communication. Teachers answered each item with 5 response options (proficient, intermediate, in progress, beginning, and not yet) according to each student's language and literacy development. An average score (range 1−5) was calculated, with higher scores reflecting more academic difficulties.

ANALYTIC APPROACH

We used confirmatory factor analysis (CFA) to verify the underlying factor structure of the measurement model.[19] Similar to previous research,[20] we examined a first-order (ie, focusing on the 4 specified PCEs domains as distinct, correlated factors) rather than a second-order measurement model (ie, each PCEs domain contributes to an overarching PCEs factor). The reason for this is that higher-order factors did not seem to cohere well into a single overarching factor, and we also considered such an overarching factor to be difficult to interpret conceptually from an intervention perspective. At each time point, we used all available PCEs indicators as a scale to test the proposed 4-factor framework. The CFA model was fitted using maximum likelihood estimation. Three indices were used to determine model fit: root mean squared error of approximation (RMSEA), comparative fit index (CFI) and standardized root mean squared residual (SRMR). Good fit thresholds for these indices are RMSEA < 0.08, CFI > 0.90, and SRMR < 0.08.[21]

Table 2. Measures Used to Define Positive Childhood Experiences in the Longitudinal Study of Australian Children

Domain	Indicator	Child Age	Measurement and Example Items
Positive parenting	Warm parenting	0–1, 2–3, 4–5, 6–7, 8–9, 10–11 years	Six items derived from the original 9-item Childrearing Questionnaire, reported by Parent 1 (P1) and Parent 2 (P2). For example, "How often do you express affection by hugging, kissing and holding this child?"
	Co-parenting alliance	0–1, 2–3, 4–5, 6–7, 8–9, 10–11 years	Two or 3 items adapted from the Quality of Co-parental Interaction Scale; reported by P1 and P2. For example, "How often is your partner a resource or support to you in raising your child?"
	Consistent parenting	4–5, 6–7, 8–9, 10–11 years	Five items derived from the National Longitudinal Survey of Children and Youth (NLSCY): Cycle 4 (Survey Instruments, 2000–2001, Parent Questionnaire), reported by P1 and P2. For example, "When you give this child an instruction or make a request to do something, how often do you make sure that he/she does it?"
Trusting and supportive relationships	Family relationship quality between parents	0–1, 2–3, 4–5, 6–7, 8–9, 10–11 years	Wave 1, 3–6: Six items derived from the Relationship Assessment Scale [RAS]; Wave 2: Two items derived from the Early Childhood Longitudinal Study-Birth Cohort, reported by P1 and P2. For example, "How well does your partner meet your needs?"
	Parental support for raising children	0–1, 2–3, 4–5, 6–7, 8–9, 10–11 years	Wave 1: A single item from the Australian Life Course Survey (1996); Wave 2–6: Five LSAC designed items, reported by P1 and P2. For example, "How often do your parents support you in raising your child?"
	Child's social support	10–11 years	Seven items adapted from the British Cohort Study, reported by study child (SC). For example, "If you had a problem, who would you talk to about it?"
	Child's relationship with parents	10–11 years	Eight items derived from the Trust & Communication Scale which was drawn from the People in My Life measure (PIML), reported by SC. For example, "My parents accept me as I am."
	Child's relationship with teachers/carers	4–5, 6–7, 8–9, 10–11 years	Three (Wave 3–5) or 4 items (Wave 6) derived from the Student-Teacher Relationship Scale (STRS), reported by Teacher/carer. For example, "I share an affectionate, warm relationship with this child."
	Child's relationship with peers	8–9, 10–11 years	Eight items derived from the Marsh Self-Description Questionnaire II, reported by SC. For example, "I have many friends."
Supportive neighborhood and home learning environments	Neighborhood livability	0–1, 2–3, 4–5, 6–7, 8–9, 10–11 years	Three (Wave 1, 3–6) or 4 (Wave 2) items derived from AIFS Families, Social Capital and Citizenship survey and the NSW 'Communities 4 Kids' initiative/WA Child Health Survey, reported by P1. For example, "There are good parks, playgrounds and play spaces in this neighbourhood."
	Neighborhood facilities	0–1, 2–3, 4–5, 6–7, 8–9, 10–11 years	Three items designed by LSAC, based on work from the WA Child Health Survey, AIFS Families, Social Capital and Citizenship survey, and the NSW 'Communities 4 Kids' initiative/WA Child Health Survey, reported by P1. For example, "There is access to close, affordable, regular public transport in this neighbourhood."
	Neighborhood social capital	0–1, 2–3, 4–5, 6–7, 8–9, 10–11 years	Wave 1: A single item adapted from National Longitudinal Survey of Children and Youth (NLSCY): Cycle 1 (Survey Instruments, 1994–1995, Parent Questionnaire); Wave 2–6: Two items derived from the WA Child Health Survey and the National Longitudinal Survey of Children and Youth (NLSCY): Cycle 1, reported by P1. For example, "It is safe for children to play outside during the day."
	Home education environment	0–1, 2–3, 4–5, 6–7, 8–9, 10–11	Wave 1–5: Two to 7 items derived from a range of longitudinal study surveys including the Early Childhood Longitudinal Study—Birth Cohort K Base Year instruments, Head Start Family and Child Experiences Survey, the National Household Education Survey and the Longitudinal Literacy and Numeracy Study; Wave 6: Two items adapted from the "Millennium Cohort Study (MCS4)"; reported by P1. For example, "In the past week, on how many days have you or an adult in your family, read to child from a book?"
Social engagement and enjoyment	Child's contact with family and friends	0–1, 2–3, 4–5, 6–7, 8–9, 10–11 years	Two (Wave 6), 5 (Wave 2–5), or 6 (Wave 1) LSAC designed items, based on frequency of contact questions contained in the National Statistics Omnibus Survey 2002 (Nonresident parental contact module) and the Early Childhood Longitudinal Study, Birth Cohort, ECLS-B, reported by P1. For example, "How often does the study child see or spend time with your neighbours?"

(*Continued*)

Table 2. (*Continued*)

Domain	Indicator	Child Age	Measurement and Example Items
	Child's activities outside the home	0–1, 2–3, 4–5, 6–7, 8–9, 10–11 years	Wave 1: Two items derived from AIFS Families, Social Capital and Citizenship survey; Wave 2–6: Five items derived from the National Longitudinal Survey of Children and Youth (NLSCY): Cycle 3 (Survey Instruments, 1998–1999, Parent Questionnaire); reported by P1. For example, "In the past month, has child visited a library with you or another family member?"
	Child's enjoyment at child-care/school	4–5, 6–7, 8–9, 10–11 years	Wave 3: Four items derived from Leiden Inventory for the Child's Well-being in Day Care (LICW-D); Wave 4–6: Nine or 12 items derived from School Liking & Avoidance Scale, adapted from the School Sentiment Inventory, reported by Teacher/carer. For example, "How often does study child appear to look forward to going to school?"
	Neighborhood belonging	0–1, 2–3, 4–5, 6–7, 8–9, 10–11 years	Four items adapted from the Project on Human Development, Chicago Neighbourhoods: Community Survey, 1994–1995, Instrument for ICPSR 2766, AIFS Families, Social Capital and Citizenship survey and the NSW 'Communities 4 Kids' initiative/WA Child Health Survey; reported by P1. For example, "Most people in your neighbourhood can be trusted."

P1 indicates Parent 1, defined as the parent who knew the child best; in most cases (98.3%) this was the child's biological mother; P2, Parent 2; this was Parent 1's partner or another adult in the home with a parental relationship to the study child; and SC, study child.

In CFA, factor loadings describe the extent to which individual items correspond to an underlying latent factor. An error term represents the variance of an item that is not shared with that latent factor, and some error terms were allowed to correlate to improve model fit. After fitting the model, continuous latent factor scores reflecting each PCEs domain were generated for each participant at each wave. These factor scores were then dichotomized at the 75th percentile to indicate relatively high exposure to that type of positive experience. To generate a cumulative PCEs indicator, we also summed the number of PCEs at each wave and across childhood.

If the above 4 specified domain measures meaningfully captured PCEs, they should negatively correlate with poor health and developmental outcomes (ie, demonstrating predictive validity). Hence, in the second stage of the analysis, generalized linear models with the identity link function were conducted to examine the associations between PCEs (each type and total) at each wave and across childhood (0 to 11 years) and children's mental health and academic skills at 14 to 15 years. We hypothesized that these PCEs would negatively correlate with poor outcomes, even once adjusting for family socioeconomic position (SEP), child's sex (male/female) and ethnicity (Anglo-European, ethnic minority, and Indigenous). Family SEP was measured by a composite z-score of each parent's education, occupation and income when the child was 0 to 1 year, and dichotomized as "the bottom 25%—low" and "the top 75%—high."[22]

MULTIPLE IMPUTATION

The analyzed sample included participants (N = 3111) who had at least one outcome measured at 14 to 15 years. The proportion of children with missing data across all study variables was 26.9% in our analysis sample (Supplementary File 2 for details). Multiple imputation by chained equation with predictive mean matching was conducted to impute missing data arising from attrition and item nonresponse within waves (N = 3111).[23] Thirty imputed datasets were imputed, under the missing at random assumption. The imputation model included all study variables and one auxiliary variable (maternal age at birth) in the analysis model. Results from each imputed dataset were combined using Rubin's rules.[24] When examining predictive validity, we accounted for the sample design whereby clustering occurred via residential postcodes. The LSAC Wave 1 Population Weight was also used to account for the initial sampling and nonresponse,[25] and the missing data due to sample attrition were accounted for with multiple imputation approach.[26] To examine the potential impact of the choice of missing data approach on our findings, we also compared results to those obtained using complete case analysis (Supplementary File 3). All analyses were conducted in Stata 16.1.[27]

SENSITIVITY ANALYSIS

In addition to the main approach to testing predictive validity using PCEs scores derived from factor analysis,

we also ran analysis using PCEs variables derived from a simpler scoring approach. Specifically, we dichotomized each indicator and summed the number of relevant exposures for each type PCEs (eg, 0−2 for positive parenting at Wave 1) and total PCEs (eg, 0−11 at Wave 1) at each wave and across childhood. Then we repeated the same analytic approach, using this more simply derived variable, to examine the associations between PCEs (each type and total) at each wave and across childhood and children's outcomes at 14 to 15 years (Supplementary File 4).

RESULTS

SAMPLE CHARACTERISTICS

At outcome assessment, there was an even distribution of child sex (51.3% male). A large proportion of families (85.8%) were from Anglo-European backgrounds, followed by ethnic minority backgrounds (11.8%) and Indigenous backgrounds (2.5%). By definition, 25% of children in our sample were considered disadvantaged in infancy. The average child age was 14.33 (SD 0.47) years old (Table 3).

STRUCTURAL VALIDITY OF THE PROPOSED 4-FACTOR FRAMEWORK

Using available PCEs indicators at each wave, we tested the proposed 4-factor framework. Taking PCEs at age 4 to 5 years as an example, there were 14 PCEs indicators. After modifications, the model demonstrated good fit with the observed data (chi-square = 67.076, $P < .001$; RMSEA = 0.021, 95% confidence interval, 0.014, 0.029; CFI = 0.962; SRMR = 0.021). We repeated the same approach at each time point (Supplementary File 5 for details). After modification, the model fit was satisfactory at each time point, with RMSEA ranging from 0.017 to 0.030, CFI ranging from 0.915 to 0.983, and SRMR ranging from 0.020 to 0.031 (Supplementary File 6). We observed that the sizes of factor loadings of PCEs indicators were mostly consistent (eg, warm parenting: 0.23−0.47; parental support for raising children: 0.15−0.26; neighborhood livability: 0.43−0.53) across waves, with some indicators showing smaller loadings onto one latent factor at a particular age (eg, home education environment at 0 to 1 year: 0.09; child's enjoyment at childcare/school at 4 to 5 years: 0.07).

PREDICTIVE VALIDITY OF THE PROPOSED 4-FACTOR FRAMEWORK

We found evidence that PCEs (each type and total) at each wave were associated with fewer mental health problems and fewer academic difficulties (Table 4). Overall, the association with mental health problems appeared stronger than with academic difficulties. When examining cumulative exposure to PCEs across childhood (0−11 years), we also found that children with more PCEs had fewer mental health problems and fewer academic difficulties at 14 to 15 years.

The complete case analysis showed similar associations between PCEs and each outcome (Supplementary File 3). In sensitivity analyses, we also found similar results using the simpler approach to scoring and deriving PCEs indicators (Supplementary File 4).

DISCUSSION

This study used the HOPE framework as a foundation to develop a population-based measure of PCEs. We tested the structural and predictive validity of this measure with respect to child mental health and academic skills, using prospective longitudinal data across childhood from a representative sample of Australian children. Empirical data supported the 4-factor model (positive parenting, trusting and supportive relationships, supportive neighborhood and home learning environments, social engagement and enjoyment). Associations between PCEs and children's mental health and academic skills also supported the predictive validity of the proposed 4-factor framework.

Our CFA results suggest that the 4-factor model is an empirically valid structure to represent PCEs in this sample. Compared with existing studies that define PCEs

Table 3. Socio-demographic Characteristics in the Response Sample (n = 3111)

Variable	Observed Data (n)	Mean ± SD (Range)/Frequency (%)
Child's sex	3111	
Female		1515 (48.7)
Male		1596 (51.3)
Family socio-economic position	3105	
Top 75%		2328 (75.0)
Bottom 25%		777 (25.0)
Ethnicity	3111	
Anglo/European		2668 (85.8)
Ethnic minority		366 (11.8)
Indigenous		77 (2.5)
Child age at outcome assessment	3111	14.33 (0.47)
Mental health at 14 to 15 years	3085	7.23 (5.59)
Academic skills at 14 to 15 years	2303	1.81 (0.82)

LSAC indicates Longitudinal Study of Australian Children; SD, standard deviation.

Table 4. Predictive Validity of the Proposed 4-Factor Framework at Each Time Point and Across Childhood (Imputed Sample, n = 3111)

		Predictive Validity (β, 95% CI)	
Wave (Age)	Type	Association With Poor Mental Health at 14 to 15 Years*	Association With Poor Academic Skills at 14 to 15 Years*
Wave 1 (0 to 1 year)	PPP	−1.34 (−1.81, −0.87)	−0.10 (−0.17, −0.02)
	TSR	−1.52 (−1.97, −1.07)	−0.12 (−0.19, −0.04)
	NHE	−1.08 (−1.53, −0.62)	−0.07 (−0.15, 0.01)
	SEE	−1.21 (−1.67, −0.75)	−0.10 (−0.18, −0.02)
	TPCE	−0.54 (−0.70, −0.38)	−0.04 (−0.06, −0.02)
Wave 2 (2 to 3 years)	PPP	−1.55 (−2.04, −1.05)	−0.12 (−0.19, −0.05)
	TSR	−1.69 (−2.18, −1.19)	−0.13 (−0.20, −0.06)
	NHE	−1.10 (−1.61, −0.59)	−0.07 (−0.15, 0.00)
	SEE	−0.94 (−1.45, −0.43)	−0.05 (−0.13, 0.02)
	TPCE	−0.48 (−0.63, −0.33)	−0.03 (−0.06, −0.01)
Wave 3 (4 to 5 years)	PPP	−1.64 (−2.09, −1.20)	−0.05 (−0.13, 0.03)
	TSR	−1.61 (−2.06, −1.15)	−0.03 (−0.11, 0.05)
	NHE	−1.32 (−1.82, −0.82)	−0.03 (−0.11, 0.05)
	SEE	−1.18 (−1.66, −0.70)	−0.02 (−0.09, 0.06)
	TPCE	−0.57 (−0.72, −0.42)	−0.01 (−0.04, 0.01)
Wave 4 (6 to 7 years)	PPP	−1.26 (−1.74, −0.78)	−0.09 (−0.17, −0.01)
	TSR	−1.20 (−1.70, −0.70)	−0.09 (−0.17, −0.01)
	NHE	−0.99 (−1.50, −0.48)	−0.03 (−0.11, 0.05)
	SEE	−0.70 (−1.21, −0.18)	0.00 (−0.09, 0.08)
	TPCE	−0.40 (−0.55, −0.24)	−0.02 (−0.05, 0.00)
Wave 5 (8 to 9 years)	PPP	−2.05 (−2.50, −1.61)	−0.10 (−0.18, −0.03)
	TSR	−1.91 (−2.36, −1.47)	−0.12 (−0.20, −0.05)
	NHE	−1.59 (−2.04, −1.14)	−0.02 (−0.10, 0.06)
	SEE	−1.58 (−2.03, −1.13)	−0.02 (−0.10, 0.06)
	TPCE	−0.66 (−0.79, −0.53)	−0.02 (−0.05, 0.00)
Wave 6 (10 to 11 years)	PPP	−1.93 (−2.38, −1.47)	−0.11 (−0.19, −0.03)
	TSR	−1.76 (−2.21, −1.31)	−0.11(−0.18, −0.03)
	NHE	−1.28 (−1.74, −0.83)	−0.02 (−0.09, 0.05)
	SEE	−1.22 (−1.67, −0.77)	0.00 (−0.08, 0.08)
	TPCE	−0.65 (−0.81, −0.50)	−0.02 (−0.05, 0.00)
Wave 1–6 (0 to 11 years)	PPP	−0.68 (−0.80, −0.55)	−0.04 (−0.06, −0.02)
	TSR	−0.70 (−0.83, −0.57)	−0.04 (−0.06, −0.02)
	NHE	−0.51 (−0.63, −0.39)	−0.02 (−0.04, 0.00)
	SEE	−0.47 (−0.59, −0.35)	−0.01 (−0.03, 0.01)
	TPCE	−0.20 (−0.23, −0.16)	−0.01 (−0.02, 0.00)

CI indicates confidence interval; NHE, supportive neighborhood and home learning environments; PPP, positive parenting; SEE, social engagement and enjoyment; TPCE, total positive childhood experiences; and TSR, trusting and supportive relationships.

*All estimates are adjusted for family socio-economic position, child's sex, and ethnicity.

using select variables of interest,[8, 13] PCE indicators as measured here seem to more adequately capture positive experiences across a variety of contexts. For example, the family environment is the first place where a child grows and learns over the life course. Positive parenting, trusting relationships, and supportive home learning environment are essential to achieve optimal child health and developmental outcomes, and are potentially modifiable intervention opportunities.[8, 16, 28] While some factor loadings of specific experiences were small, this is to be expected from the broad and complex nature of the underlying constructs, such that many individual experiences likely contribute a small amount to that domain-level exposure.

There was consistent evidence of associations between each PCE and children's health and developmental outcomes up to 14 years later, even when controlling for family SEP, child's sex, and ethnicity, supporting predictive validity. Specifically, each type of PCE was associated with fewer mental health problems and academic difficulties, as would be expected given current knowledge of the important role that such experiences play in the development of these outcomes.[8, 29] Particularly stronger associations were observed with mental health difficulties, possibly because mental health is a more proximal outcome that may mediate the relationship between early life experiences and children's learning outcomes.[30, 31] Our focus here was on demonstrating predictive validity of PCEs, but suggests the need for future research to unpack the relationship between PCEs and health outcomes. In doing so, our results suggest the importance of including a focus on a clustering of PCEs that are likely to have a cumulative effect on child health and learning outcomes.

STRENGTHS AND LIMITATIONS

Data were analyzed from a national-level sample of children in Australia, thus increasing the generalizability of our findings. A considerable strength of the present study is the prospective data on a range of positive experiences. We tested the structural and predictive validity of the proposed 4-factor framework at each wave, enhancing the rigor of our findings.

However, there are several limitations. First, the LSAC was not specifically designed to study positive experiences. The HOPE framework was empirically evaluated within the boundaries of what has been measured in LSAC. We selected the most appropriate indicators by conceptually aligning constructs in the LSAC with HOPE framework constructs reflecting PCEs, informed by our existing content knowledge. However, some aspects of PCEs (eg, family cohesion, parental attachment, neighborhood walkability) could not be included in this study due to a lack of available data. Second, within the LSAC, some PCE indicators (eg, consistent parenting, child's social support, child's relationship with peers) are not available at all waves. In this case, we included relevant indicators that were only available at later waves. In addition, some PCE indicators might have more than one possible measure at a particular age. We selected the most well-known and consistent measures for use. Third, measurement bias may also exist in the reporting of PCEs. For example, reporting on questions about parenting can be influenced by feelings of guilt, shame, and embarrassment, and the desire to portray oneself in a positive light.[32] Fourth, as with any longitudinal study, there has been gradual attrition of the LSAC sample over time. We used multiple imputation to reduce the potential for selection bias arising from missing data.

IMPLICATIONS FOR RESEARCH AND PRACTICE

Operationalizing the HOPE framework is a good starting point to advance empirical understanding of positive experiences and their health sequelae. Based on this measurement framework, researchers can capture a broader construct of positive experiences and further examine its impact on health and well-being over time. To further extend this work, it will be valuable for future research to replicate the current findings in different cohorts and populations outside of Australia, and explore other possible PCEs indicators and factor structures. It would also be helpful to validate the 4-factor structure for specific population groups such as Aboriginal and/or Torres Strait Islanders. Similarly, because developmentally appropriate assessment protocols often necessitate changes in measurement as a child's capacities develop, it is also worthwhile for future research to explore the longitudinal measurement invariance of PCEs measures during different developmental periods.[33]

To keep the complex work of operationalizing the HOPE framework within a manageable scope, we focused on PCEs at specific time points, while obtaining some initial indication of cumulative effects over time. Children's health and development unfold over time and are responsive to changing circumstances and exposures in their lives. Therefore, it will be important to explore the co-occurrence, timing, frequency, duration, severity, and relative impact for each type of PCEs and how they interact with each other to contribute to health and developmental outcomes, which are also dynamic and time-varying.

There is also a need to expand efforts to focus on not only positive exposures but also positive outcomes such as mental health competence[34,35] and academic success. The breadth of existing longitudinal and multilevel cohort data offers an opportunity to generate policy-relevant findings quickly and cost-effectively.[36] Using prospective cohort data, researchers can examine the causal directionality and investigate whether positive experiences serve as mediators in the relationship between socio-economic circumstances and health outcomes within a causal framework.[3] In the context of adversity, positive experiences have been documented to moderate the relationship between adverse experiences and health outcomes.[3] However, it is more difficult for families and communities to maintain PCEs when facing adversities.[28] A better understanding of PCEs as protective factors is crucial to provide insights into why some individuals can manage to thrive even in the presence of adversity.

The assessment of PCEs can also inform interventions that enable positive health and developmental outcomes at the population level.[11] There is an increasing interest in programs that aim to promote positive experiences. For instance, *Within My Reach* in the United States[37] and *Be You* in Australia[38] are strengths-based mental health initiatives that support parents and their children to build capacity and promote resilience. Even when supporting families experiencing high levels of adversity, these programs have shown positive outcomes for children.[37] Continued efforts are still needed to translate this body of research into practice and policies.

CONCLUSIONS

PCEs are an integral part of understanding determinants of individual and population health in its fullest sense. This study has operationalized the HOPE framework that captures a range of positive factors and events contributing to optimal health and development. Findings from this study can be used to understand better how positive experiences act as personal assets to promote health and developmental outcomes and lead to interventions that can mitigate the negative effect of adversities. There is a need for future research and public health practice that advocate for the importance of positive experiences, not only adverse experiences.

DATA SHARING STATEMENT

All data used in this manuscript are available from the Longitudinal Study of Australian Children (http://dx.doi.org/10.26193/VTCZFF). Data analysis coding is available at https://osf.io/tjny7/.

ACKNOWLEDGMENTS

This research is supported by the Victorian Government's Operational Infrastructure Support Program. This paper uses unit record data from Growing Up in Australia, the Longitudinal Study of Australian Children (LSAC). LSAC is conducted by the Australian Government Department of Social Services (DSS). The findings and views reported

in this paper, however, are those of the authors and should not be attributed to the Australian Government DSS or any of DSS' contractors or partners. DOI: 10.26193/F2YRL5.

Funding statement: Dr O'Connor is supported by the Melbourne Children's LifeCourse initiative, funded by a Royal Children's Hospital Foundation Grant (2018-984). Dr Mensah was supported by Australian National Health and Medical Research Council (NHMRC) Career Development Fellowship (1111160). Prof Olsson is supported by an NHMRC Investigator Grant (APP1175086). Prof Goldfeld is supported by the NHMRC Practitioner Fellowship (1155290). Dr Lacey is supported by a UK Economic and Social Research Council Grant (ES/P010229/1). Dr Slopen is supported by the National Heart, Lung, and Blood Institute of the National Institutes of Health (1R01HL151848-01). Dr Thurber is supported by the NHMRC Early Career Fellowship (1156276). Prof Priest was supported by the NHMRC Career Development Fellowship (APP1123677).

Role of the funder: The funding sources had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

SUPPLEMENTARY DATA

Supplementary data related to this article can be found online at https://doi.org/10.1016/j.acap.2021.11.003.

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