

## Positive developmental psychology: A review of literature concerning well-being throughout the lifespan

Pozitif gelişimsel psikoloji: Yaşam boyu iyi oluşla ilgili literatür taraması

Tim Lomas<sup>1</sup>, Kate Hefferon<sup>2</sup>, Itai Ivtzan<sup>3</sup>

### Abstract

As positive psychology has matured as a discipline, sub-fields have emerged focusing on particular areas, including a number concentrating on specific life stages. These include positive parenting, positive education, positive youth development, and positive aging. However, until now, there has not been a systematic appreciation of these various developmental paradigms, nor an attempt to consider them as a whole. As such, the current paper introduces the overarching notion of positive developmental psychology, an umbrella term encompassing these intersecting developmental disciplines. The paper offers a narrative review of selected literature within these areas – highlighting key theoretical concepts, empirical studies and applied interventions – doing so through the prism of a multidimensional framework. Thus the paper provides a synthesis of the wealth of theory and research within positive developmental psychology, offering a much-needed overview of this burgeoning new field, and setting out a comprehensive research agenda for the years ahead.

**Keywords:** Developmental psychology, positive parenting, positive education, positive youth development, positive aging

### Özet

Pozitif psikoloji geliştikçe, belirli yaşam evrelerinin de dahil olduğu, spesifik alanlara odaklanan alt dallar ortaya çıkmıştır. Bunlar pozitif ebeveynlik, pozitif eğitim, pozitif gençlik gelişimi ve pozitif yaşlamayı kapsıyor. Fakat şimdiye kadar bu gelişimsel paradigmlar sistematik bir şekilde gözden geçirilmedi ya da bütünüyle ele alınmadı. Bu nedenle bu çalışma pozitif gelişimsel psikolojiyi kapsayıcı bir kavram ve bu kesişen gelişimsel disiplinleri birleştiren bir çatı terim olarak ortaya koyuyor. Mevcut çalışma bu alanlardan seçilmiş olan literatürün anlatımsal taramasını anahtar teorik kavramların, deneysel çalışmaların ve uygulanan müdahalelerin altını çizerek çok boyutlu çerçeveden bakarak sunuyor. Böylelikle çalışma yeni gelişen bir alanın çok gerekli olan kısa gözden geçirmesini, gelecek için kapsamlı bir araştırma ajandası ortaya koyarak pozitif gelişimsel psikoloji alanında zengin teori ve araştırmaların sentezini sunuyor.

**Anahtar Kelimeler:** Gelişimsel psikoloji, pozitif ebeveynlik, pozitif eğitim, pozitif gençlik gelişimi, pozitif yaşlanma

---

<sup>1</sup> University of East London, Department of Psychology, Stratford Campus, London. E-mail: t.lomas@uel.ac.uk

<sup>2</sup> University of East London, Department of Psychology, Stratford Campus, London

<sup>3</sup> University of East London, Department of Psychology, Stratford Campus, London

Received: 20.06.2016 Accepted: 22.08.2016

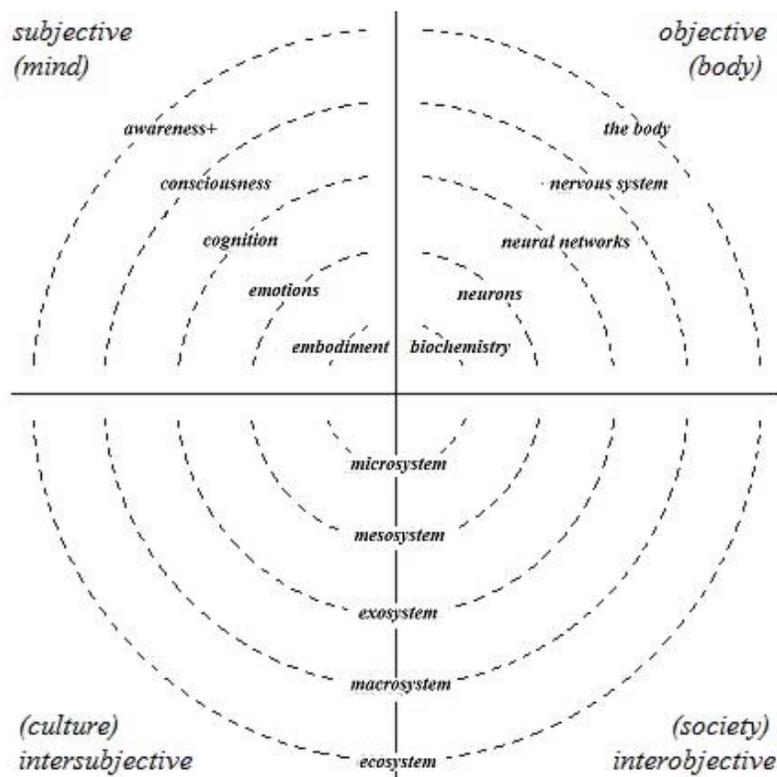
© The Journal of Happiness & Well-Being (JHW)

## Introduction

As positive psychology has developed, sub-fields have emerged focusing on particular areas of interest. Among these are disciplines concentrating upon specific life stages. There is a nascent literature on positive parenting (Latham, 1994), which approaches children's wellbeing by focusing on the role of parents/caregivers. Positive education – arguably the most prominent of these developmental paradigms – looks at flourishing in the context of school (Seligman et al., 2009). At a slightly later age, we have 'positive youth development' (Larson, 2000), addressing the potentially turbulent waters of adolescence and early adulthood. Finally, at the end of the existential journey, we find 'positive aging' (Tornstam, 2005), which aims to add "more life to years, not just more years to life" (Vaillant, 2004, p.561). We might group all these paradigms together under the overarching label of 'positive developmental psychology' (PDP). Much of the empirical and theoretical work of concern to PDP has been on-going for years, pre-dating the emergence of positive psychology itself; nevertheless, PDP does offer a new conceptual and discursive space where literature focusing on the wellbeing aspects of development can be systematically brought together.

The current paper, then, offers a narrative summary of PDP – including key theories, studies, and applied interventions – drawing on the subfields elucidated above. To do this, the paper will explore the various life stages through the prism of a multidimensional framework for conceptualizing wellbeing, the LIFE (Layered Integrated Framework Example) model (Lomas et al., 2015). In contrast to most other multidimensional models – such as Engel's (1977) biopsychosocial medical paradigm – the LIFE model identifies four main ontological domains of the person. While acknowledging the distinction between subjective 'mind' and objective 'body/brain' (as per Engel), it also separates the collective 'social' dimension of Engel's model into subjective (or 'intersubjective') and objective (or 'interobjective'). The former can be referred to as 'culture,' encompassing shared language and worldviews, while the latter can be termed 'society,' and pertains to the material and structural scaffolding of these networks (e.g., economic systems).

The LIFE model provides further nuance to our multidimensional understanding of the person, and their wellbeing, by stratifying the four dimensions into five layers/levels. (The choice of five is just a heuristic. One could stratify each dimension into fewer or more levels according to one's priorities. Thus, the model is just one 'example' of stratification, hence the name.) The mind is differentiated into embodied sensations, emotions, cognitions, conscious awareness, and 'awareness+' (advanced states of consciousness). The body is deconstructed into biochemistry, neurons, neural networks, the nervous system, and the body as a whole. Finally, culture and society are both stratified using Bronfenbrenner's (1977) ecological systems theory (into microsystems, mesosystems, exosystems, macrosystems), plus an additional outer layer of the global environmental exosystem. (See Lomas (2015) for a more detailed examination of this socio-cultural stratification, labelled as 'Positive Social Psychology.') The dimensions and levels of the LIFE model are shown in figure 1 below.



**Figure 1.** *The Layered Integrated Framework Example (LIFE) model*

The LIFE model offers a meta-theoretical ‘map’ of the person, and their wellbeing. Each level within each dimension encompasses the various ‘aspects’ of wellbeing, from the subjective (e.g., positive affect) to the objective (e.g., neurotransmitter levels) to the intersubjective (e.g., interpersonal trust) to the interobjective (e.g., socioeconomic status). This model can be used to understand the ways in which wellbeing is manifested and experienced across the lifespan. Thus, in this paper, the aim is to introduce a synchronic element to the LIFE model, exploring it through the prism of a lifespan perspective. This aim is in keeping with Bronfenbrenner’s systems theory (which helped form the basis of the LIFE model), as a key aspect of his model was the ‘chronosystem,’ defined as ‘change or consistency over time not only in the characteristics of the person but also of the environment in which that person lives’ (Bronfenbrenner, 1994, p.1646).

In this paper, a chronosystem perspective will be applied to the LIFE model by considering the four dimensions in turn (body, mind, then culture and society together), with each differentiated into their five levels, exploring research and interventions aimed at promoting wellbeing at each of these levels. For each level, there will be a sense of progression through the lifespan, focusing on five broad phases: infancy, childhood, youth, adulthood, and aging. The relevant literature is so vast that rather than provide a comprehensive summary of all relevant theories and research – far beyond the scope of any paper – the paper will simply alight on indicative research in the respective areas to show the scope of enquiry in PDP. Even then, just highlighting exemplars in this way, in order to cover all the ‘bases’ there are 75 different strands of research, given that there are four dimensions, each with five

levels, each of which can be considered with respect to five life stages. As such, the paper merely offers an illustrative birds-eye review, capturing the vast sweep of enquiry that constitutes PDP.

## **Body**

We begin by considering the ‘objective’ dimension of the body, i.e. physiological functioning and behaviour. This is differentiated into five levels – biochemistry, neurons, neural networks, the nervous system, and the body as a whole – which are considered in turn.

## **Biochemistry**

Although in one sense the entire body is a biochemical entity, biochemistry is used in the LIFE model to refer to all subcellular components and processes, like DNA. Research here relates to what Narvaez and Gleason (2013) refer to as ‘developmental optimization,’ which examines ‘the complex interactions among genes, environment, critical periods, the timing, intensity, and duration of experiences and their contexts’ in order to explore their ‘interrelationships and effects on the functioning of brain and body systems.’ Beginning with the antenatal and perinatal phases, as the baby’s wellbeing is ‘inextricably linked’ to the health of the mother (Darmstadt, Donnay, & Starrs, 2013, p.1), we find a wealth of recommendations for healthy antenatal practices. These include suggestions around nutritional substances which impact upon the physiology of the mother, and consequently upon the embryonic child (NHS, 2014a, 2014b). Nutrition is equally important post-birth; for instance, breast milk contains active biological compounds that support the development of the infant's immune system (Niers et al., 2007). Progressing through infancy and childhood, a notable line of work has been on the biochemistry of maternal bonding, particularly the role of oxytocin (see IsHak et al. (2011) for a review). As children move into adolescence, overall morbidity and mortality increases by 200% in adolescence (compared to early school age), principally due to ‘difficulties in the control of behaviour and emotion’ (Dahl, 2004, p.3). As such, it is relevant that there is a genetic component to the extent to which adolescents are susceptible to parental influence vis-à-vis such adaptive self-regulation (Belsky & Beaver, 2011). Moving into adulthood, work has explored the genetic contribution to wellbeing, such as Lykken and Tellegen’s (1996) analysis, which suggested around 44–52% of the variance in subjective wellbeing is associated with genetic variation. Finally, Gatz et al. (1992) found that the genetic contribution to emotional wellbeing appears to actually increase into older age.

## **Neurons**

The next emergent level in the LIFE model are neurons. Relevant work here falls generally within the ‘neural correlates of consciousness’ paradigm, which explores ‘neural systems and properties of those systems’ (Fell, 2004, p.709), and more specifically, within the ‘neural correlates of wellbeing’ subfield (Urry et al., 2004, p.376). In infancy, there is work around the factors supporting synaptogenesis, like ‘affectively laden attachment communications’ between mother and child, which drive an epigenetic relational process of ‘experience-dependent maturation’ (Schore, 2013, pp.35-36). Into childhood, research on neuroplasticity includes analyses of the impact of stress, which can increase the growth of the amygdala, but hinder the development of the hippocampus and prefrontal cortex (Davidson & McEwen, 2012). The brain continues to develop throughout adolescence, with peaks in grey matter volume around age 11-12, reflecting dendritic overproduction, followed by selective pruning (Spear, 2000). Factors affecting this process include maternal responsiveness in childhood (Frye et al., 2010).

Into adulthood, a prominent line of enquiry (which also pertains to all other ages) is the impact of neurotransmitter levels upon wellbeing, such as serotonin (Ferguson, 2001) and endorphins (Boecker et al., 2008). Finally, entering older age, a promising area of research is on activities, e.g., meditation, that help prevent or slow age-related cortical thinning in areas of the brain associated with attention and executive function (Lazar et al., 2005).

### **Neural networks**

The next level is neural networks, which reflect the notion that mental states are produced by the interaction of areas distributed throughout the brain (Fell, 2004). In infancy, the newborn's undifferentiated neural systems depend on environmental cues, such as responsiveness and synchrony within the caregiver-infant dyad, to support the maturation of neural connections (Pickler et al., 2010). Lines of enquiry includes analysis of mirror neuron system during mother-infant interaction (Lenzi et al., 2009), or the way oxytocin exerts its bonding effects by modulating affiliation-related neural networks (Bora et al., 2009). Still in childhood, Davidson's (2000) linkage between wellbeing and left-sided hemispheric asymmetry has been found at this age too (Light et al. 2009). Adolescence brings further development of neural networks, including circuits pertaining to intentionality and perspective-taking, which underpin social cognition and skills (Güroğlu et al., 2009). Other intriguing analyses include functional neuroimaging studies of loci underpinning feelings of love (Beauregard et al., 2009). Analyses of the impact of aging on neural networks include St. Jacques et al. (2010), who found age-related differences in the functional connectivity of the amygdala with the rest of the brain, such as greater connectivity with the anterior cingulate cortex in older adults, possibly reflecting greater emotional regulation.

### **Nervous system**

Encompassing neural networks is the broader nervous system. In infancy, relevant research includes studies on the vagus nerve (which helps regulate the autonomic nervous system); for instance, Doussard-Roosevelt et al. (1997) found that vagal activity predicted developmental outcomes in low birthweight infants. Moreover, Feldman et al. (2010) found that maternal touch during a stressful task helped increase infants' vagal tone, and reduced cortisol levels. Into childhood, Bothe et al. (2014) report the positive lasting impact of a school-based stress management course (involving biofeedback training) on anxiety and heart-rate variability (an index of vagal activity). Other relevant analyses include the beneficial effects of exercise on physiological measures such as blood pressure and respiration across age ranges, including children (Murphy et al., 2009), adolescents (Rocchini et al., 1988), adults (Mueller, 2007) and older adults (Turner et al., 2011).

### **The body**

The final tier is the body 'as a whole,' which encompasses generic health-related factors and activities, from nutrition to sleep. In infancy, eating behaviour may impact upon weight later in life, with protective factors against future obesity including breastfeeding (Koletzko et al., 2009) and parenting styles that help infants regulate food intake (Epstein, 1996). Moreover, childhood obesity may also adversely impact aspects of psychological wellbeing, such as self-esteem; as such, interventions to promote healthy eating in childhood have been found to enhance both physical and psychological health (see De Bourdeaudhuij et al. (2011) for a review). Research has also highlighted the importance of restorative sleep patterns to the wellbeing of infants and young children (Smaldone et al., 2007). Moving into adolescence, emergent pressures that affect adolescents include differential sleep pattern

needs (Boergers et al., 2014), and new barriers to exercise participation, such as alcohol use (Tappe et al., 1989). Into adulthood, research on the toll that work takes on the body has generated recommendations around healthy practices, such as regulations to limit excessive working hours (Sparks et al., 2013). Finally, factors that promote healthy aging include refraining from smoking or alcohol abuse, maintaining a healthy weight, and engaging in regular exercise, as well as non-physical factors such as marriage and education (Vaillant, 2004). Here we also see interventions tailored for older adults, such as including physical activity initiatives (see King et al. (1998) for a review).

## **Mind**

The ‘subjective’ dimension of the mind refers to subjective experiences of wellbeing, and to psychological skills that help to promote wellbeing. This is differentiated into five levels: embodiment, emotions, cognition, consciousness and awareness+.

## **Embodiment**

Embodiment refers to ‘the subjectivity of the lived body’ (Turner, 2001, p.253), and to the related notion of body awareness, an ‘overall concept for experience and use of the body, representing body consciousness, body management and deepened body experience’ (Roxendale, 1985, p.10). In infancy, research on embodiment focuses on the importance of touch, particularly since in Piaget’s (1971) theory of cognitive development, learning during the initial sensorimotor stage proceeds primarily through exploratory tactile engagement with the world. The importance of parental touch at this stage is illustrated by interventions, like moderate-pressure massage, which can help accelerate the cognitive and emotional development of pre-term and low birth weight babies (Field et al., 2010). Into childhood, there is work around the value of increasing children’s awareness and understanding of their bodies, e.g., through yoga, which can be helpful for children with emotional and behavioural issues who may be resistant to more cognitive interventions (Steiner et al., 2013). In adolescence, different pressures relating to embodiment arise; for instance, girls in particular may face pressures to adopt unrealistic standards of beauty that can lead to problematic relationships with one’s body; as such, initiatives have been developed to help young people cultivate more adaptive embodied identities (Yarnal et al., 2006). Into adulthood, activities enabling people to explore their embodiment in positive ways include yoga (Rani & Rao, 1994) and Pilates (Latey, 2001). These continue to be relevant into old age, although modifications may be needed to render these suitable; an effective intervention in this regard is Tai Chi, which as well as being relatively gentle, is also helpful for maintaining balance, which is particularly vital in older age (Wolfson et al., 1996).

## **Emotions**

In this level, the focus is not so much on emotions as an outcome (which arguably applies to all of PDP), but with emotional skills and processes that are conducive to wellbeing, such as emotional regulation (Gross, 1999) and resilience (Werner, 1993). The development of emotional regulation begins in infancy, with parental interaction taking a crucial role, particularly through actions such as mirroring (Feldman et al., 1999). There is also a large literature on the development of resiliency in childhood, much of which stems from Werner’s (1993) longitudinal work, in which the key factors include a positive self-concept, a close bond with a caregiver, and a strong support network. We are also seeing emergent interventions to promote resilience in childhood, which fall under the general banner of social and emotional learning (SEL) programmes. Among the most prominent and successful is the Penn Resilience Program (Gillham et al., 1990), although meta-analyses of its

longitudinal effectiveness are inconclusive (Brunwasser et al., 2009). Overall though, SEL programmes appear beneficial: a meta-analysis of 213 studies found these were generally successful in reducing conduct and emotional issues (Durlak et al., 2010). Such initiatives continue to be important in adolescence, although the challenges addressed often shift according to the needs of the age, such as violence and substance abuse (Belfield et al., 2015). Into adulthood, there are initiatives to enhance emotional skills in a work context, like Reivich et al.'s (2011) 'Master Resilience Training,' which has been widely and successfully implemented in the U.S. military (Elbogen et al., 2014). Finally, factors that enhance resiliency in older age include personal control/self-efficacy and a sense of meaning in life (Lamond et al., 2008).

### **Cognition**

In the LIFE model, cognition encompasses non-emotional mental functioning, from discursive thoughts to perceptual processing. Here we can also situate constructs that pertain to 'character' (Lickona, 1996), such as morals (Kohlberg, 1981) and strengths (Peterson & Seligman, 2004). Pre-birth, research aims to identify factors linked to the subsequent cognitive development of the infant, such as the mother's prenatal stress levels (Buitelaar et al., 2003); likewise, post-birth factors include the quality of childcare (Burchinal et al., 1996). In childhood, we see initiatives designed to inculcate cognitive qualities that are beneficial to wellbeing, such programmes in moral values, ethics and citizenship education (Lickona, 1996). In adolescence, there is an emergent focus on skills relevant to entering adulthood. For instance, in Oyserman et al.'s (2002) career-orientated intervention, students contemplate their ideal 'future selves,' and are assisted to connect this to current educational engagement. In adulthood, similar themes recur, again reconfigured to meet the demands of the life stage. For instance, in the work arena, initiatives include facilitation of strengths, such as Page and Vella-Brodrick's (2013) Working for Wellness Program. There is also research stemming from Erikson's (1963) and Kohlberg's (1981) work on psychosocial and moral development throughout the lifespan. Into older age, retrospectively-focused interventions promote wellbeing by helping people to develop meaningful life narratives, such as reminiscence therapies (Cook, 1998).

### **Consciousness**

In the LIFE model, consciousness refers to awareness and attention. The development of awareness and attention skills – most prominently through practices like meditation – can impact upon wellbeing in multiple ways, such as the self-regulation of emotions (Gross, 1999). As such, there is a wealth of meditation-based research, adapted for all stages of the lifespan. There are mindfulness-based interventions (MBIs) for the antenatal period (Vieten & Astin, 2008), childbirth (Sale, 2008), and the whole perinatal phase (Duncan & Bardacke, 2010), as well as Duncan et al.'s (2009) 'mindful parenting,' which covers childhood more generally. There are likewise MBIs specifically tailored for educational contexts (see Burnett (2011) for a review), and for adolescents, including vulnerable subsets like at-risk youth (Himmelstein et al., 2012). Into adulthood, there are dozens of MBIs, adapting Kabat-Zinn's (1982) prototypical mindfulness-based stress reduction course for both clinical and non-clinical settings. Finally, mindfulness can help reduce burdens associated with aging, including ameliorating age-related cognitive decline (Gard et al., 2014), and assisting pain management and mobility (Morone et al., 2008).

### **Awareness+**

Finally, ‘awareness+’ features work suggesting that conscious awareness can be superseded by ‘higher’ states/levels of consciousness (cf. Maslow, 1972). It also includes literature on spiritual experiences and practices, which are seen as conducive to wellbeing (Koenig, 2009). In infancy, some attention has been paid to spiritual care in nursing, and to the possibility that infants may experience an age-specific ‘spiritual developmental stage’ (Murphy et al., 2015, p.114). In children, spirituality is operationalised in an age-specific way, for instance as reflecting the ‘spiritual essence of wonder,’ a capacity which may be cultivated through make-believe play (Harris, 2014, p.12). Entering adolescence, spirituality takes on additional beneficial attributes appropriate to that age, like an association with health behaviours such as abstinence, partly because such spirituality is frequently intertwined with participation in a religious tradition that contains proscriptions against such behaviours (Delva et al., 2015). In adulthood, there is a large literature on spirituality, including as a source of meaning, and a potent resource in coping with adversity (Wachholtz et al., 2007). It is also argued that spiritual experiences constitute an existential and/or developmental zenith, as encapsulated by Maslow’s (1972) notion of ‘peak experiences.’ Finally, since spirituality almost always involves some type of ‘positive’ perspective on mortality (e.g., belief in an afterlife), it can be valuable in older age, and is a predictor of resilience (Lamond et al., 2008).

### **Culture & Society**

The collective dimensions of the LIFE model, culture and society, are both stratified using Bronfenbrenner’s (1977) systems theory (microsystem, mesosystem, exosystem, and macrosystem), together with an outer tier of the ecosystem. As we proceed through the levels, bear in mind that all initiatives and factors considered here have an intersubjective aspect (e.g., how the social dimension is experienced) and an interobjective aspect (e.g., the non-personal scaffolding of this dimension).

### **Microsystems**

The microsystem refers to the immediate social setting of the person, e.g., the family. Such settings feature a range of relevant factors, from aesthetics to their level of comfort; above all though, of overriding importance are relationships, arguably the most important contextual factor for wellbeing (Helliwell & Putnam, 2004). In infancy, the quality of infant-parent relationships is vital for wellbeing in multiple ways. As outlined above, mother-infant interactions impact upon most aspects of emotional, cognitive and social development (Schore, 2013), and help establish secure attachments which are not only beneficial in childhood, but predict wellbeing and development in later life too (Mikulincer & Shaver, 2013). Moving into childhood, there is recognition of the impact of parenting styles on wellbeing (Cameron & Maginn, 2011). School is also a key microsystem, with research highlighting the importance of a positive ‘ethos’ in a school (Wells et al., 2003). Into adolescence, the ‘positive youth’ paradigm (Larson, 2000) highlights the importance of programmes aimed at the needs of adolescents, such as helping them develop Lerner’s (2009) ‘5 Cs’ – competence, confidence, connection, character, and caring – through activities like volunteering (Johnson et al., 1998). Into adulthood, aside from the family, the dominant microsystem is work. Here we see a vast literature on the importance of good relationships, as reflected in Levering’s (1988) Great Place to Work initiative. Finally, in older age, other microsystems assume prominence, such as residential homes, the quality of which markedly impacts on wellbeing (Ballard et al., 2001). As such, there are efforts to encourage the

design of these homes with quality of life in mind, facilitating factors that contribute to positive aging like autonomy (Lamond et al., 2008).

### **Mesosystems**

The mesosystem refers to the interaction between microsystems, recognising that people ‘exist in interlocking contexts’ which together affect functioning (Sheridan et al., 2004, p.7). In infancy, a key mesosystem interaction for parents is work-life balance; there is consequently work on the value of employers providing assistance with childcare (Brandon & Temple, 2007). Into childhood, it is recognised that school-based interventions are more effective if they also engage with family life. For instance, adapted the Penn Resilience Program for adults as an adjunct to the school-based programme; this encouraged parents to develop/use resilience skills and to support their child’s use of these at home. Likewise, Families and Schools Together – a multifamily intervention in which families attend the school to participate in joint activities with their children – has been successful on a range of wellbeing and developmental indices (McDonald et al., 2006). In adolescence, many development programmes take a mesosystem approach, recognising the multiple contextual influences that affect youth behaviour and wellbeing (Larson et al., 2004). This is particularly important with at-risk youth, for whom community assets, like mentoring programmes, are especially vital (Smith, Faulk, et al., 2013). Into adulthood, the importance of work-life balance for wellbeing has already been highlighted. Finally, mesosystem consideration in older age include providing community resources to older adults who are themselves caregivers (Simpson & Lawrence-Webb, 2009).

### **Exosystems**

The exosystem is the wider ‘social structures’ that ‘impinge upon or encompass’ one’s microsystems (Bronfenbrenner, 1977, p.515), and essentially refers to the community in which one lives/works. Beginning in infancy, exosystem considerations include community provision of infant care facilities/services (Baqui et al., 2008) and safe spaces for play and recreation (Farley et al., 2007). Likewise, research shows the value of providing structured leisure, culture and exercise opportunities for children and adolescents in the community, such as sports clubs (Fletcher et al., 2003). Entering adulthood, there is a wide range of community-based initiatives to improve wellbeing, such as the ‘Well London’ project (Phillips et al., 2012). Then, for older adults, quality of life can be enhanced through interventions such as community-based exercise programmes (Munro et al., 2004), and the provision of good public services, such as transport and accessible facilities (Cramm et al., 2013).

### **Macrosystems**

The macrosystem refers to ‘overarching institutional patterns’ at a national and international scale, including ‘economic, social, educational, legal, and political systems’ of which the other levels are ‘concrete manifestations’ (Bronfenbrenner, 1977, p.515). With infancy, a macrosystem perspective is evident in national/international policies pertaining to infant health and wellbeing, such as nutrition guidance issued by the World Health Organization and UNICEF (2003). Moving into childhood and adolescence, all manner of macrosystem analyses are possible. For instance, Embse and Hasson (2012) highlight the detrimental impact of an intrusive culture of testing in schools, which is associated with emotional issues like anxiety. Likewise, scholars have argued for systemic policy-level changes to child-time-structure patterns, e.g., incorporating time for play into the school day (Ginsburg, 2007). Into adulthood, macrosystemic analyses include assessment of the impact of socioeconomic status upon wellbeing; for instance, men in the poorest 5th of the population are almost three times more

likely to suffer a common mental disorder than men in the richest 5th (EHRC, 2011). As such, macro level attempts to improve wellbeing include policy recommendations such as reducing societal inequality through redistributive mechanisms like taxes (Wilkinson & Pickett, 2010). Regarding older age, macrosystemic considerations include the interaction of demographic changes (e.g., in the UK, the number of people aged over 85 has increased by 30% from 2005 to 2014) and public spending cuts (funding for care of the elderly in the UK has been reduced by 10% from 2010 to 2014), and consequently the need for cost-effective ways of meeting the needs of an aging population (Abrahams et al., 2014).

### **Ecosystems**

Lastly, the LIFE model adds a final tier of the broader ecosystem, reflecting the idea that all other levels are embedded within a still larger context of the biosphere. Existentially, human wellbeing is recognised as dependent upon ‘environment wellbeing’ (Smith, Case, et al., 2013). As such, research situated within this level concerns efforts to promote environmental wellbeing at the various stages of the lifespan. In infancy, this includes efforts to develop environmentally-friendly childcare products (Weisbrod & Van Hoof, 2012). In childhood, ‘environmental education’ aims to teach children the importance of sustainable behaviour (Stevenson, 2007). Entering adolescence, relevant research includes analysis of factors that enhance environmental behaviours, such as perceived self-efficacy (Meinhold & Malkus, 2005), and pro-environmental modelling behaviour by parents (Grønhøj & Thøgersen, 2012). Into adulthood, relevant initiatives include interventions that encourage engagement with nature, such as gardening (Milligan et al., 2004); and the promotion of environmentally-friendly behaviours like recycling (Hopper & Nielsen, 1991). Finally, into older age, scholars are incorporating environmental concerns into research on healthy aging, including notions such as environmental ‘stewardship’ (Wright & Lund, 2000).

### **Conclusion**

The paper has provided a brief tour of PDP, highlighting key theoretical and empirical work that provides the substance of this new field. It has done so using a multidimensional meta-theoretical framework, Lomas et al.’s (2015) LIFE model, which provides a conceptual space that allows one to situate all relevant concepts and work within a particular field, in this case, wellbeing throughout the lifespan. Such a framework is useful in that it enables one to fully appreciate the vast scope of relevant literature. While it would be beyond the scope of any paper to outline all relevant research, one can at least offer an overview of the terrain by highlighting indicative examples of relevant work. This means not only taking into account the four key ontological dimensions of the person (mind, body, culture and society), but aiming for an even more nuanced understanding by delineating different levels within these. Thus, this paper has provided indicative research examples for each of the levels within each of the domains, and moreover doing so for each of the broad life stages (infancy, childhood, youth, adulthood, and older age), as encapsulated in Table 1 below.

**Table 1.** Table showing indicative research pertaining to life stages, differentiated according to the dimensions and levels of the LIFE model

Phase	Domain	Level	Indicative research	
Infancy	Body	Biochemistry	Role of breast milk in supporting the infant's immune system (Niers et al., 2007).	
		Neurons	Synaptogenesis influenced by maternal wellbeing (Schore, 2013)	
		Neural networks	Activation of mirror neuron system during mother-infant interaction (Lenzi et al., 2009)	
		Nervous system	Vagal tone shaping through caregiver touch (Ruth Feldman et al., 2010)	
		Body	The importance of nutrition for development (Niers et al., 2007)	
	Mind	Embodiment	Embodiment	Touch interventions (e.g., massage) for pre-term and low birth weight babies (Field et al., 2010).
			Emotions	Learning emotional self-regulation through parental interaction (R. Feldman et al., 1999)
		Cognition	Cognition	Quality of childcare impacts on cognitive development (Burchinal et al., 1996)
			Consciousness	Peri-natal mindfulness interventions (Duncan & Bardacke, 2010)
		Awareness+	Awareness+	The role of spiritual care in infant nursing (M. M. Murphy et al., 2015)
			Culture/ Society	Microsystem
		Mesosystem		Family provision in the workplace – e.g., childcare facilities (Brandon & Temple, 2007)
		Exosystem		Health impact of provision of infant care facilities and services in the community (Baqui et al., 2008)
		Macrosystem		National/international policies around infant nutrition (Organization & UNICEF., 2003)
Ecosystem		Development of environmentally-friendly childcare products (Weisbrod & Van Hoof, 2012)		
Childhood	Body	Role of oxytocin in maternal bonding and child wellbeing (IsHak et al., 2011)		
Childhood	Body	Neurons	Analysis of stress on neural development and neuroplasticity (Richard J. Davidson & McEwen, 2012)	
		Neural networks	link between wellbeing and left-sided hemispheric asymmetry (Light et al., 2009)	
		Nervous system	Improvement of heart-rate variability in children through biofeedback training (Bothe et al., 2014)	
		Body	Importance of restorative sleep patterns (Smaldone et al., 2007).	
	Mind	Embodiment	Embodiment	Yoga for children with emotional and behavioural problems (Steiner et al., 2013)
			Emotions	Penn resilience programme (J. E. Gillham et al., 1990)
		Cognition	Cognition	School based 'character education' programmes (Lickona, 1996)
			Consciousness	Mindfulness interventions for schoolchildren (Burnett, 2011)
		Awareness+	Awareness+	Spirituality in children reflected in experiences of wonder and imagination (Harris, 2014)
			Culture/ Society	Microsystem
		Mesosystem		School-family initiatives – e.g., Families and Schools Together ((McDonald et al., 1997)

		Exosystem	Provision of safe spaces for play (Farley et al., 2007)
		Macrosystem	Systemic time allowances for play in school (Ginsburg, 2007)
		Ecosystem	Environmental/sustainability education in schools (Stevenson, 2007)
Youth	Body	Biochemistry	Genetic influence on the impact of parenting on self-regulation in adolescence (Belsky & Beaver, 2011)
		Neurons	Cortical thickness in adolescence linked to supportive parenting (Frye et al., 2010)
		Neural networks	Development of networks pertaining to intentionality and perspective-taking (Güroğlu et al., 2009)
		Nervous system	Reduced blood relating to exercise (Rocchini et al., 1988)
		Body	Altered sleep patterns in adolescence (Boergers et al., 2014)
	Mind	Embodiment	Promoting positive body image and embodiment in adolescence (Yarnal et al., 2006)
		Emotions	Life Skills Training for adolescents (Belfield et al., 2015)
		Cognition	Career-based interventions relating to 'ideal selves' (Oyserman et al., 2002)
		Consciousness	Mindfulness interventions for at-risk youth (Himelstein et al., 2012)
		Awareness+	Spirituality as protective factor for health (e.g., reduced alcohol use) in adolescence (Delva et al., 2015)
	Culture/ Society	Microsystem	Positive youth programmes (R. W. Larson, 2000)
		Mesosystem	Impact of linkage to community resources on youth wellbeing (E. P. Smith et al., 2013)
		Exosystem	Positive impact of community youth development programmes (R. M. Lerner et al., 2005)
		Macrosystem	Negative impact of culture of testing (Embse & Hasson, 2012)
		Ecosystem	Impact of family behaviour on adolescent attitudes to environment (Grønhøj & Thøgersen, 2012)
Adulthood	Body	Biochemistry	Genetics may account for up to 50% of the variance of wellbeing in adulthood (Lykken & Tellegen, 1996)
		Neurons	Endorphin release related to exercise (Boecker et al., 2008)
		Neural networks	Analysis of the functional neuroanatomy of love (Beauregard et al., 2009)
		Nervous system	Beneficial effects of exercise in on blood pressure and respiration (Mueller, 2007)
		Body	Regulations to limit excessive working hours (Sparks et al., 2013)
	Mind	Embodiment	Body awareness therapies/activities – e.g., Pilates (Latey, 2001)
		Emotions	Work-based emotional resilience initiatives (Reivich et al., 2011)
		Cognition	Workplace strengths-based programmes (Page & Vella-Brodrick, 2013)
		Consciousness	Generic mindfulness interventions for adults, e.g., MBSR (Kabat-Zinn, 1982)
		Awareness+	Spirituality as a source of meaning (Wachholtz et al., 2007).
	Culture/ Society	Microsystem	Importance of quality relationships at work (Levering, 1988)
		Mesosystem	Promoting work-life balance (Brandon & Temple, 2007)
		Exosystem	Community wellbeing interventions for adults (Phillips et al., 2012)

		Macrosystem	Active labour market programs that aim towards full employment (Coutts et al., 2014)
		Ecosystem	Promotion of environmentally-friendly behaviours, e.g., recycling (Hopper & Nielsen, 1991)
Aging	Body	Biochemistry	Genetic contribution to emotional wellbeing appears to increase in older age (Gatz et al., 1992)
		Neurons	Prevention of age-related cortical thinning – e.g., through meditation (Lazar et al., 2005)
		Neural networks	Improved amygdala connectivity with regions involved in emotional regulation (St. Jacques et al., 2010)
		Nervous system	Impact of positive emotions on hypertension in older adults (Ostir et al., 2006)
		Body	Physical activity initiatives for older adults (King et al., 1998)
	Mind	Embodiment	Tai-Chi programmes for older adults to enhance body awareness (Wolfson et al., 1996)
		Emotions	Personal control/self-efficacy enhance resiliency in later life (Lamond et al., 2008).
		Cognition	Reminiscence therapies/interventions (e.g., (Cook, 1998)
		Consciousness	Mindfulness interventions for older adults (Morone et al., 2008).
		Awareness+	Spirituality as a predictor of wellbeing in older age (Jahan & Khan, 2014)
	Culture/ Society	Microsystem	Designing care homes with quality of life as a priority (Ballard et al., 2001)
		Mesosystem	Provision of community resources for older adults who are caregivers (Simpson & Lawrence-Webb, 2009)
		Exosystem	Community-based exercise programme for older adults (Munro et al., 2004)
		Macrosystem	Importance of national funding for care of older adults (Abrahams et al., 2014)
		Ecosystem	Incorporating environmental concerns into research on healthy aging (Wright & Lund, 2000)

In summarising the literature in this way, the paper provides the outlines of a comprehensive future research agenda. At a minimum, as set out in this paper (and the table), this agenda features 75 lines of enquiry, comprising 15 levels (three dimensions, each with five levels), over five different life stages. Moreover, the framework allows for far more complexity than is contained in the paper and the Table. For instance, while each of the 75 lines of enquiry outlined here featured just one or two indicative pieces of research, there are of course many others that could be explored in that particular realm. Furthermore, there is no reason to limit the number of lines of enquiry to 75. The choice of five levels per dimension, and five broad life stages, is just a heuristic device. Each of the dimensions could be stratified into many more levels, and it would likewise be possible to segment the lifespan into a greater number of levels. Finally, arguably the key point about a multidimensional model is that its different dimensions and levels are not compartmentalised, but intersect and interact. As such, it is possible to analyse any given line of enquiry in terms of all the other lines of enquiry. Take, for example, the PRP (Gillham et al., 1990), situated here in the subjective domain under the level of ‘emotion.’ While ostensibly about the development of emotional skills, the PRP could be analysed in all manner of ways. In terms of the other layers of the subjective domain, participation may impact upon embodiment, cognition, consciousness and awareness+. Taking a physiological perspective, one might analyse participation in terms of biochemistry, neural activity, nervous system functioning, and the body as a whole. One could also look at it as a socio-cultural phenomenon, exploring its impact on the microsystem of the school and its mesosystemic impact on family life, or considering how it is

supported by exo and macrosystem contexts (e.g., local and national educational policy), and even looking at how it affects participants' attitudes towards the environment. As such, it is hoped that this framework may not only provide a useful conceptual and discursive space for the consideration of existing work, but can also promote a future research agenda aimed at furthering our understanding of how to facilitate flourishing across the lifespan.

## References

- Abrahams, C., Green, M., & Mortimer, J. (2014). *Care in crisis*. London, UK: Age.
- Ballard, C., O'Brien, J., James, I., Mynt, P., Lana, M., Potkins, D., . . . Fossey, J. (2001). Quality of life for people with dementia living in residential and nursing home care: The impact of performance on activities of daily living, behavioral and psychological symptoms, language skills, and psychotropic drugs. *International Psychogeriatrics, 13*(1), 93-106.
- Baqui, A. H., El-Arifeen, S., Darmstadt, G. L., Ahmed, S., Williams, E. K., Seraji, H. R., . . . Black, R. E. (2008). Effect of community-based newborn-care intervention package implemented through two service-delivery strategies in Sylhet district, Bangladesh: A cluster-randomised controlled trial. *The Lancet, 371*(9628), 1936-1944. doi: 10.1016/S0140-6736(08)60835-1
- Beauregard, M., Courtemanche, J., Paquette, V., & St-Pierre, É. L. (2009). The neural basis of unconditional love. *Psychiatry Research: Neuroimaging, 172*(2), 93-98. doi: 10.1016/j.psychres.2008.11.003.
- Belfield, C., Bowden, B., Klapp, A., Levin, H., Shand, R., & Zander, S. (2015). *The economic value of social and emotional learning*. Columbia, CA: Center for Benefit-Cost Studies in Education.
- Belsky, J., & Beaver, K. M. (2011). Cumulative-genetic plasticity, parenting and adolescent self-regulation. *Journal of Child Psychology and Psychiatry, 52*(5), 619-626. doi: 10.1111/j.1469-7610.2010.02327.x
- Boecker, H., Sprenger, T., Spilker, M. E., Henriksen, G., Koppenhoefer, M., Wagner, K. J., . . . Tolle, T. R. (2008). The runner's high: Opioidergic mechanisms in the human brain. *Cerebral Cortex, 18*(11), 2523-2531. doi: 10.1093/cercor/bhn013
- Boergers, J., Gable, C. J., & Owens, J. A. (2014). Later school start time is associated with improved sleep and daytime functioning in adolescents. *Journal of Developmental & Behavioral Pediatrics, 35*(1), 11-17. doi: 10.1097/dbp.0000000000000018
- Bora, E., Yucel, M., & Allen, N. B. (2009). Neurobiology of human affiliative behaviour: implications for psychiatric disorders. *Current Opinion in Psychiatry, 22*(3), 320-325. doi: 10.1097/YCO.0b013e328329e970
- Bothe, D. A., Grignon, J. B., & Olness, K. N. (2014). The effects of a stress management intervention in elementary school children. *Journal of Developmental & Behavioral Pediatrics, 35*(1), 62-67. doi: 10.1097/dbp.0000000000000016
- Brandon, P. D., & Temple, J. B. (2007). Family provisions at the workplace and their relationship to absenteeism, retention, and productivity of workers: Timely evidence from prior data. *Australian Journal of Social Issues, 42*(4), 447-460.
- Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American Psychologist, 32*(7), 513-531. doi: 10.1037/0003-066X.32.7.513
- Bronfenbrenner, U. (1994). Ecological models of human development. In T. Husen & T. N. Postlethwaite (Eds.), *International Encyclopedia of Education* (pp. 1643-1647). Oxford, UK: Pergamon.

- Brunwasser, S. M., Gillham, J. E., & Kim, E. S. (2009). A meta-analytic review of the Penn Resiliency Program's effect on depressive symptoms. *Journal of Consulting and Clinical Psychology, 77*(6), 1042-1054. doi: 10.1037/a0017671
- Buitelaar, J. K., Huizink, A. C., Mulder, E. J., de Medina, P. G. R., & Visser, G. H. A. (2003). Prenatal stress and cognitive development and temperament in infants. *Neurobiology of Aging, 24, Supplement 1*, S53-S60. doi: 10.1016/S0197-4580(03)00050-2
- Burchinal, M. R., Roberts, J. E., Nabors, L. A., & Bryant, D. M. (1996). Quality of center child care and infant cognitive and language development. *Child Development, 67*(2), 606-620. doi: 10.1111/j.1467-8624.1996.tb01754.x
- Burnett, R. (2011). Mindfulness in schools: Learning lessons from the adults, secular and Buddhist. *Buddhist Studies Review, 28*(1), 79-120.
- Cameron, S., & Maginn, C. (2011). Living psychology: The 'emotional warmth' dimension of professional childcare. *Educational and child psychology, 28*(3), 44-62.
- Cook, E. A. (1998). Effects of reminiscence on life satisfaction of elderly female nursing home residents. *Health Care for Women International, 19*(2), 109-118. doi: 10.1080/073993398246449
- Coutts, A. P., Stuckler, D., & Cann, D. J. (2014). The health and wellbeing effects of active labor market programs. In F. A. Huppert & C. L. Cooper (Eds.), *Interventions and policies to enhance wellbeing* (Vol. VI, pp. 465-482). Chichester, UK: Wiley-Blackwell.
- Cramm, J. M., van Dijk, H. M., & Nieboer, A. P. (2013). The importance of neighborhood social cohesion and social capital for the well being of older adults in the community. *The Gerontologist, 53*(1), 142-152. doi: 10.1093/geront/gns052
- Dahl, R. E. (2004). Adolescent brain development: A period of vulnerabilities and opportunities. Keynote address. *Annals of the New York Academy of Sciences, 1021*(1), 1-22. doi: 10.1196/annals.1308.001
- Darmstadt, G. L., Donnay, F., & Starrs, A. (2013). Healthy mother, healthy newborn: An interconnected continuum. *The Journal of Maternal-Fetal & Neonatal Medicine, 26*(S1), 1-2. doi: 10.3109/14767058.2012.741154
- Davidson, R. J. (2000). Affective style, psychopathology, and resilience: Brain mechanisms and plasticity. *American Psychologist, 55*(11), 1196-1214.
- Davidson, R. J., & McEwen, B. S. (2012). Social influences on neuroplasticity: Stress and interventions to promote well-being. *Nature Neuroscience, 15*(5), 689-695. doi: 10.1038/nn.3093
- De Bourdeaudhuij, I., Van Cauwenberghe, E., Spittaels, H., Oppert, J. M., Rostami, C., Brug, J., . . . Maes, L. (2011). School-based interventions promoting both physical activity and healthy eating in Europe: A systematic review within the HOPE project. *Obesity Reviews, 12*(3), 205-216. doi: 10.1111/j.1467-789X.2009.00711.x
- Delva, J., Han, Y., Sanchez, N., Andrade, F. H., Sanhueza, G., & Krentzman, A. (2015). Spirituality and alcohol consumption among adolescents in Chile: Results of propensity score stratification analyses. *Social Work Research, 41*(1), 1-15. doi: 10.1093/swr/svv019
- Doussard-Roosevelt, J. A., Porges, S. W., Scanlon, J. W., Alemi, B., & Scanlon, K. B. (1997). Vagal regulation of heart rate in the prediction of developmental outcome for very low birth weight preterm infants. *Child Development, 68*(2), 173-186. doi: 10.1111/j.1467-8624.1997.tb01934.x
- Duncan, L. G., & Bardacke, N. (2010). Mindfulness-based childbirth and parenting education: Promoting family mindfulness during the perinatal period. *Journal of Child and Family Studies, 19*(2), 190-202. doi: 10.1007/s10826-009-9313-7

- Duncan, L. G., Coatsworth, J. D., & Greenberg, M. T. (2009). A model of mindful parenting: Implications for parent-child relationships and prevention research. *Clinical Child and Family Psychology Review, 12*(3), 255-270. doi: 10.1007/s10567-009-0046-3
- Durlak, J. A., Weissberg, R. P., & Pachan, M. (2010). A meta-analysis of after-school programs that seek to promote personal and social skills in children and adolescents. *American Journal of Community Psychology, 45*(3-4), 294-309. doi: 10.1007/s10464-010-9300-6
- Economic and Human Rights Commission (2011). *How fair is Britain? Equality, human rights and good relations in 2010, triennial review 2010*. London, UK: EHRC
- Elbogen, E. B., Johnson, S. C., Newton, V. M., Timko, C., Vasterling, J. J., Van Male, L. M., . . . Beckham, J. C. (2014). Protective mechanisms and prevention of violence and aggression in veterans. *Psychological Services, 11*(2), 220-228. doi: 10.1037/a0035088
- Embse, N. V. D., & Hasson, R. (2012). Test anxiety and high-stakes test performance between school settings: Implications for educators. *Preventing School Failure: Alternative Education for Children and Youth, 56*(3), 180-187. doi: 10.1080/1045988X.2011.633285
- Engel, G. L. (1977). The need for a new medical model: A challenge for biomedicine. *Science, 196*(4286), 129-136. doi: 10.1126/science.847460
- Epstein, L. (1996). Family-based behavioural intervention for obese children. *International Journal of Obesity and Related Metabolic Disorders: Journal of the International Association for the Study of Obesity, 20*, S14-21.
- Farley, T. A., Meriwether, R. A., Baker, E. T., Watkins, L. T., Johnson, C. C., & Webber, L. S. (2007). Safe play spaces to promote physical activity in inner-city children: Results from a pilot study of an environmental intervention. *American Journal of Public Health, 97*(9), 1625-1631. doi: 10.2105/AJPH.2006.092692
- Feldman, R., Greenbaum, C. W., & Yirmiya, N. (1999). Mother-infant affect synchrony as an antecedent of the emergence of self-control. *Developmental Psychology, 35*(1), 223-231. doi: 10.1037/0012-1649.35.1.223
- Feldman, R., Singer, M., & Zagoory, O. (2010). Touch attenuates infants' physiological reactivity to stress. *Developmental Science, 13*(2), 271-278. doi: 10.1111/j.1467-7687.2009.00890.x
- Fell, J. (2004). Identifying neural correlates of consciousness: The state space approach. *Consciousness and Cognition, 13*(4), 709-729. doi: 10.1016/j.concog.2004.07.001
- Erikson, E. H. (1963). *Childhood and society* (2nd ed.). New York, NY: Norton.
- Ferguson, J. M. (2001). SSRI antidepressant medications: Adverse effects and tolerability. *Journal of Clinical Psychiatry, 3*(1), 22-27.
- Field, T., Diego, M., & Hernandez-Reif, M. (2010). Preterm infant massage therapy research: A review. *Infant Behavior and Development, 33*(2), 115-124. doi: 10.1016/j.infbeh.2009.12.004
- Fletcher, A. C., Nickerson, P., & Wright, K. L. (2003). Structured leisure activities in middle childhood: Links to well-being. *Journal of Community Psychology, 31*(6), 641-659. doi: 10.1002/jcop.10075
- Frye, R. E., Malmberg, B., Swank, P., Smith, K., & Landry, S. (2010). Preterm birth and maternal responsiveness during childhood are associated with brain morphology in adolescence. *Journal of the International Neuropsychological Society, 16*(05), 784-794. doi: doi:10.1017/S1355617710000585
- Gard, T., Hölzel, B. K., & Lazar, S. W. (2014). The potential effects of meditation on age-related cognitive decline: A systematic review. *Annals of the New York Academy of Sciences, 1307*(1), 89-103.

- Gatz, M., Pederson, N. L., Plomin, R., & Nesselroade, J. R. (1992). Importance of shared genes and shared environments for symptoms of depression in older adults. *Journal of Abnormal Psychology, 101*(4), 701-708. doi: 10.1111/nyas.12348
- Gillham, J. E., Jaycox, L. H., Reivich, K. J., Seligman, M. E. P., & Silver, T. (1990). *The Penn Resiliency Program: Unpublished Manual*. Philadelphia, PA: University of Pennsylvania.
- Gillham, J. E., Reivich, K. J., Freres, D. R., Lascher, M., Litzinger, S., Shatté, A., & Seligman, M. E. P. (2006). School-based prevention of depression and anxiety symptoms in early adolescence: A pilot of a parent intervention component. *School Psychology Quarterly, 21*(3), 323-348. doi: 10.1521/scpq.2006.21.3.323
- Ginsburg, K. R. (2007). The importance of play in promoting healthy child development and maintaining strong parent-child bonds. *Pediatrics, 119*(1), 182-191. doi: 10.1542/peds.2006-2697
- Grønhoj, A., & Thøgersen, J. (2012). Action speaks louder than words: The effect of personal attitudes and family norms on adolescents' pro-environmental behaviour. *Journal of Economic Psychology, 33*(1), 292-302. doi: 10.1016/j.joep.2011.10.001
- Gross, J. J. (1999). Emotion regulation: Past, present, future. *Cognition & Emotion, 13*(5), 551-573. doi: 10.1080/026999399379186
- Güroğlu, B., van den Bos, W., & Crone, E. A. (2009). Neural correlates of social decision making and relationships. *Annals of the New York Academy of Sciences, 1167*(1), 197-206. doi: 10.1111/j.1749-6632.2009.04502.x
- Harris, K. I. (2014). Embracing make believe play and theories of early childhood: Understanding children's spirituality and the spiritual essence of a young child. *International Journal of Integrative Pediatrics and Environmental Medicine, 1*, 12-21.
- Helliwell, J. F., & Putnam, R. D. (2004). The social context of well-being. *Philosophical Transactions of the Royal Society of London. Series B: Biological Sciences, 359*(1449), 1435-1446. doi: 10.1098/rstb.2004.1522
- Himmelstein, S., Hastings, A., Shapiro, S., & Heery, M. (2012). Mindfulness training for self-regulation and stress with incarcerated youth: A pilot study. *Probation Journal, 59*(2), 151-165. doi: 10.1177/0264550512438256
- Hopper, J. R., & Nielsen, J. M. (1991). Recycling as altruistic behavior: Normative and behavioral strategies to expand participation in a community recycling program. *Environment and Behavior, 23*(2), 195-220. doi: 10.1177/0013916591232004
- IsHak, W. W., Kahloon, M., & Fakhry, H. (2011). Oxytocin role in enhancing well-being: A literature review. *Journal of Affective Disorders, 130*(1-2), 1-9. doi: 10.1016/j.jad.2010.06.001
- Johnson, M. K., Beebe, T., Mortimer, J. T., & Snyder, M. (1998). Volunteerism in adolescence: A process perspective. *Journal of Research on Adolescence, 8*(3), 309-332. doi: 10.1207/s15327795jra0803\_2
- Kabat-Zinn, J. (1982). An outpatient program in behavioral medicine for chronic pain patients based on the practice of mindfulness meditation: Theoretical considerations and preliminary results. *General Hospital Psychiatry, 4*(1), 33-47. doi: 10.1016/0163-8343(82)90026-3
- King, A. C., Rejeski, W. J., & Buchner, D. M. (1998). Physical activity interventions targeting older adults: a critical review and recommendations. *American journal of preventive medicine, 15*(4), 316-333. doi: 10.1016/S0749-3797(98)00085-3
- Koenig, H. G. (2009). Research on religion, spirituality, and mental health: A review. *Canadian Journal of Psychiatry, 54*(5), 283-291. doi: 10.1177/070674370905400502

- Kohlberg, L. (1981). *The philosophy of moral development: Moral stages and the idea of justice*. London, UK: Harper & Row.
- Koletzko, B., von Kries, R., Monasterolo, R. C., Subías, J. E., Scaglioni, S., Giovannini, M., . . . Grote, V. (2009). Can infant feeding choices modulate later obesity risk? *The American Journal of Clinical Nutrition*, 89(5), 1502S-1508S. doi: 10.3945/ajcn.2009.27113D
- Lamond, A. J., Depp, C. A., Allison, M., Langer, R., Reichstadt, J., Moore, D. J., . . . Jeste, D. V. (2008). Measurement and predictors of resilience among community-dwelling older women. *Journal of Psychiatric Research*, 43(2), 148-154. doi: <http://dx.doi.org/10.1016/j.jpsychires.2008.03.007>
- Larson, R., Jarrett, R., Hansen, D., Pearce, N., Sullivan, P., Walker, K., . . . Wood, D. (2004). Organized youth activities as contexts for positive development. In P. A. Linley & S. Joseph (Eds.), *Positive psychology in practice* (pp. 540-560). Hoboken, NJ: John Wiley & Sons Inc.
- Larson, R. W. (2000). Toward a psychology of positive youth development. *American Psychologist*, 55(1), 170-183. doi: 10.1037/0003-066X.55.1.170
- Latey, P. (2001). The Pilates method: History and philosophy. *Journal of Bodywork and Movement Therapies*, 5(4), 275-282.
- Latham, G. I. (1994). *The power of positive parenting*. North Logan, UT: P&T Ink.
- Lazar, S. W., Kerr, C. E., Wasserman, R. H., Gray, J. R., Greve, D. N., Treadway, M. T., . . . Benson, H. (2005). Meditation experience is associated with increased cortical thickness. *NeuroReport*, 16(17), 1893-1897.
- Lenzi, D., Trentini, C., Pantano, P., Macaluso, E., Iacoboni, M., Lenzi, G. L., & Ammaniti, M. (2009). Neural basis of maternal communication and emotional expression processing during infant preverbal stage. *Cerebral Cortex*, 19(5), 1124-1133. doi: 10.1093/cercor/bhn153
- Lerner, R. (2009). The positive youth development perspective: Theoretical and empirical bases of a strengths based approach to adolescent development. In S. Lopez & C. R. Snyder (Eds.), *Handbook of positive psychology* (2nd ed., pp. 149-164). New York, NY: Oxford University Press.
- Levering, R. (1988). *A great place to work*. New York, NY: Avon Books.
- Lickona, T. (1996). Eleven principles of effective character education. *Journal of Moral Education*, 25(1), 93-100. doi: 10.1080/0305724960250110
- Light, S. N., Coan, J. A., Frye, C., Goldsmith, H. H., & Davidson, R. J. (2009). Dynamic variation in pleasure in children predicts nonlinear change in lateral frontal brain electrical activity. *Developmental Psychology*, 45(2), 525-533. doi: 10.1037/a0014576
- Lomas, T. (2015). Positive social psychology: A multilevel inquiry into socio-cultural wellbeing initiatives. *Psychology, Public Policy, and Law*, 21(3), 338-347. doi: 10.1037/law0000051
- Lomas, T., Hefferon, K., & Ivztan, I. (2015). The LIFE model: A meta-theoretical conceptual map for applied positive psychology. *Journal of Happiness Studies*, 16(5), 1347-1364. doi: 10.1007/s10902-014-9563-y
- Lykken, D., & Tellegen, A. (1996). Happiness is a stochastic phenomenon. *Psychological Science*, 7(3), 186-189. doi: 10.1111/j.1467-9280.1996.tb00355.x
- Maslow, A. H. (1972). *The farther reaches of human nature*. London, UK: Maurice Bassett.
- McDonald, L., Moberg, D. P., Brown, R., Rodriguez-Espiricueta, I., Flores, N. I., Burke, M. P., & Coover, G. (2006). After-school multifamily groups: A randomized controlled trial involving low-income, urban, Latino children. *Children & Schools*, 28(1), 25-34. doi: 10.1093/cs/28.1.25
- Meinhold, J. L., & Malkus, A. J. (2005). Adolescent environmental behaviors: Can knowledge, attitudes, and self-efficacy make a difference? *Environment and Behavior*, 37(4), 511-532. doi: 10.1177/0013916504269665

- Mikulincer, M., & Shaver, P. R. (2013). Adult attachment and happiness: Individual differences in the experience and consequences of positive emotions. In S. A. David, I. Boniwell & A. Conley Ayers (Eds.), *The Oxford handbook of happiness* (pp. 834-846). Oxford, UK: Oxford University Press.
- Milligan, C., Gatrell, A., & Bingley, A. (2004). 'Cultivating health': Therapeutic landscapes and older people in northern England. *Social Science & Medicine*, *58*, 1781-1793. doi: 10.1016/S0277-9536(03)00397-6
- Morone, N. E., Greco, C. M., & Weiner, D. K. (2008). Mindfulness meditation for the treatment of chronic low back pain in older adults: A randomized controlled pilot study. *PAIN*, *134*(3), 310-319. doi: 10.1016/j.pain.2007.04.038
- Mueller, P. J. (2007). Exercise training and sympathetic nervous system activity: Evidence for physical activity dependent neural plasticity. *Clinical and Experimental Pharmacology and Physiology*, *34*(4), 377-384. doi: 10.1111/j.1440-1681.2007.04590.x
- Munro, J. F., Nicholl, J. P., Brazier, J. E., Davey, R., & Cochrane, T. (2004). Cost effectiveness of a community based exercise programme in over 65 year olds: cluster randomised trial. *Journal of Epidemiology and Community Health*, *58*(12), 1004-1010. doi: 10.1136/jech.2003.014225
- Murphy, E. C. S., Carson, L., Neal, W., Baylis, C., Donley, D., & Yeater, R. (2009). Effects of an exercise intervention using Dance Dance Revolution on endothelial function and other risk factors in overweight children. *International Journal of Pediatric Obesity*, *4*(4), 205-214. doi: 10.3109/17477160902846187
- Murphy, M. M., Begley, T., Timmins, F., Neill, F., & Sheaf, G. (2015). Spirituality and spiritual care: Missing concepts from core undergraduate children's nursing textbooks. *International Journal of Children's Spirituality*, *20*(2), 114-128. doi: 10.1080/1364436X.2015.1055458
- Narvaez, D., & Gleason, T. (2013). Developmental optimization. In D. Narvaez, J. Panksepp, A. Schore & T. Gleason (Eds.), *Evolution, early experience and human development: From research to practice and policy* (pp. 307-325). New York, NY: Oxford University Press.
- NHS. (2014a, 22 May 2013). NHS Choices: Alcohol and Drugs During Pregnancy. Retrieved 22 January, 2014, from <http://www.nhs.uk/conditions/pregnancy-and-baby/pages/alcohol-medicines-drugs-pregnant>.
- NHS. (2014b, 31 January 2013). NHS Choices: Vitamins and Nutrition in Pregnancy. Retrieved 22 January, 2014, from <http://www.nhs.uk/conditions/pregnancy-and-baby/pages/vitamins-minerals-supplements-pregnant>.
- Niers, L., Stasse-Wolthuis, M., Rombouts, F. M., & Rijkers, G. T. (2007). Nutritional support for the infant's immune system. *Nutrition Reviews*, *65*(8), 347-360. doi: 10.1111/j.1753-4887.2007.tb00313.x
- Ostir, G. V., Berges, I. M., Markides, K. S., & Ottenbacher, K. J. (2006). Hypertension in older adults and the role of positive emotions. *Psychosomatic Medicine*, *68*(5), 727-733. doi: 10.1097/01.psy.0000234028.93346.38
- Oyserman, D., Terry, K., & Bybee, D. (2002). A possible selves intervention to enhance school involvement. *Journal of Adolescence*, *25*(3), 313-326. doi: 10.1006/jado.2002.0474
- Page, K., & Vella-Brodrick, D. (2013). The Working for Wellness program: RCT of an employee well-being intervention. *Journal of Happiness Studies*, *14*(3), 1007-1031. doi: 10.1007/s10902-012-9366-y
- Peterson, C., & Seligman, M. E. P. (2004). *Character strengths and virtues: A handbook and classification*. Washington, DC: American Psychological Association.
- Phillips, G., Hayes, R., Bottomley, C., Petticrew, M., Watts, P., Lock, K., . . . Renton, A. (2012). OP06 Well London: Results of a cluster-randomised trial of a community development approach to improving health behaviours and mental wellbeing in deprived inner-city neighbourhoods. *Journal of Epidemiology and Community Health*, *66*(Suppl 1), A3. doi: 10.1136/jech-2012-201753.006
- Piaget, J. (1971). *The theory of stages in cognitive development*. New York, NY: McGraw Hill.

- Pickler, R. H., McGrath, J. M., Reyna, B. A., McCain, N., Lewis, M., Cone, S., . . . Best, A. (2010). A model of neurodevelopmental risk and protection for preterm infants. *The Journal of Perinatal & Neonatal Nursing*, 24(4), 356-365. doi: 10.1097/JPN.0b013e3181fb1e70
- Rani, N. J., & Rao, P. V. K. (1994). Body awareness and yoga training. *Perceptual and Motor Skills*, 79(3), 1103-1106. doi: 10.2466/pms.1994.79.3.1103
- Reivich, K. J., Seligman, M. E., & McBride, S. (2011). Master resilience training in the US Army. *American Psychologist*, 66(1), 25-34. doi: 10.1037/a0021897
- Rocchini, A. P., Katch, V., Anderson, J., Hinderliter, J., Becque, D., Martin, M., & Marks, C. (1988). Blood pressure in obese adolescents: Effect of weight loss. *Pediatrics*, 82(1), 16-23.
- Roxendale, G. (1985). *Body awareness therapy and the body awareness scale*. (PhD), Gothenburg, Sweden: Goteborgs Universitet.
- Sale, R. (2008). Mindful yoga as a vehicle for childbirth education. *International Journal of Childbirth Education*, 23(4), 7-8.
- Schore, A. N. (2013). Bowlby's "Environment of Evolutionary Adaptedness": Recent studies on the interpersonal neurobiology of attachment and emotional development. In D. Narvaez, J. Panksepp, A. Schore & T. Gleason (Eds.), *Evolution, early experience and human development: From research to practice and policy* (pp. 99-128). New York, NY: Oxford University Press.
- Seligman, M. E. P., Ernst, R. M., Gillham, J., Reivich, K., & Linkins, M. (2009). Positive education: Positive psychology and classroom interventions. *Oxford Review of Education*, 35(3), 293-311. doi: 10.1080/03054980902934563
- Sheridan, S. M., Warnes, E. D., Cowan, R. J., Schemm, A. V., & Clarke, B. L. (2004). Family-centered positive psychology: Focusing on strengths to build student success. *Psychology in the Schools*, 41(1), 7-17. doi: 10.1002/pits.10134
- Simpson, G. M., & Lawrence-Webb, C. (2009). Responsibility without community resources: Informal kinship care among low-income, African American grandmother caregivers. *Journal of Black Studies*, 39(6), 825-847. doi: 10.1177/0021934707303631
- Smaldone, A., Honig, J. C., & Byrne, M. W. (2007). Sleepless in America: Inadequate sleep and relationships to health and well-being of our nation's children. *Pediatrics*, 119(Supplement 1), S29-S37.
- Smith, E. P., Faulk, M., & Sizer, M. A. (2013). Exploring the meso-system: The roles of community, family, and peers in adolescent delinquency and positive youth development. *Youth & Society*. doi: 10.1177/0044118x13491581
- Smith, L. M., Case, J. L., Smith, H. M., Harwell, L. C., & Summers, J. K. (2013). Relating ecosystem services to domains of human well-being: Foundation for a U.S. index. *Ecological Indicators*, 28(0), 79-90. doi: <http://dx.doi.org/10.1016/j.ecolind.2012.02.032>
- Sparks, K., Cooper, C. L., Fried, Y., & Shirom, A. (2013). The effects of working hours on health: A meta-analytic review. In C. L. Cooper (Ed.), *From stress to wellbeing: The theory and research on occupational stress and wellbeing* (pp. 292-314). Basingstoke, UK: Palgrave Macmillan.
- Spear, L. P. (2000). The adolescent brain and age-related behavioral manifestations. *Neuroscience & Biobehavioral Reviews*, 24(4), 417-463. doi: [http://dx.doi.org/10.1016/S0149-7634\(00\)00014-2](http://dx.doi.org/10.1016/S0149-7634(00)00014-2)
- St. Jacques, P., Dolcos, F., & Cabeza, R. (2010). Effects of aging on functional connectivity of the amygdala during negative evaluation: A network analysis of fMRI data. *Neurobiology of Aging*, 31(2), 315-327. doi: <http://dx.doi.org/10.1016/j.neurobiolaging.2008.03.012>

- Steiner, N., Sidhu, T., Pop, P., Frenette, E., & Perrin, E. (2013). Yoga in an urban school for children with emotional and behavioral disorders: A feasibility study. *Journal of Child and Family Studies*, 22(6), 815-826. doi: 10.1007/s10826-012-9636-7
- Stevenson, R. B. (2007). Schooling and environmental/sustainability education: from discourses of policy and practice to discourses of professional learning. *Environmental Education Research*, 13(2), 265-285. doi: 10.1080/13504620701295650
- Tappe, M. K., Duda, J. L., & Ehrnwald, P. M. (1989). Perceived barriers To exercise among adolescents. *Journal of School Health*, 59(4), 153-155. doi: 10.1111/j.1746-1561.1989.tb04689.x
- Tornstam, L. (2005). *Gerotranscendence: A developmental theory of positive aging*. New York, NY: Springer Publishing Company.
- Turner, B. S. (2001). Disability and the sociology of the body. In G. L. Albrecht, K. D. Seelman & M. Bury (Eds.), *Handbook of disability studies* (pp. 252-266). Thousand Oaks, CA: Sage.
- Turner, S., Eastwood, P., Cook, A., & Jenkins, S. (2011). Improvements in symptoms and quality of life following exercise training in older adults with moderate/severe persistent asthma. *Respiration*, 81(4), 302-310. doi: 10.1159/000315142
- Urry, H. L., Nitschke, J. B., Dolski, I., Jackson, D. C., Dalton, K. M., Mueller, C. J., . . . Davidson, R. J. (2004). Making a life worth living: Neural correlates of well-being. *Psychological Science*, 15(6), 367-372. doi: 10.1111/j.0956-7976.2004.00686.x
- Vaillant, G. (2004). Positive aging. In P. A. Linley & S. Joseph (Eds.), *Positive psychology in practice* (pp. 561-580). Hoboken, NJ: John Wiley & Sons.
- Vieten, C., & Astin, J. (2008). Effects of a mindfulness-based intervention during pregnancy on prenatal stress and mood: Results of a pilot study. *Archives of Women's Mental Health*, 11(1), 67-74. doi: 10.1007/s00737-008-0214-3
- Wachholtz, A., Pearce, M., & Koenig, H. (2007). Exploring the relationship between spirituality, coping, and pain. *Journal of Behavioral Medicine*, 30(4), 311-318. doi: 10.1007/s10865-007-9114-7
- Weisbrod, A., & Van Hoof, G. (2012). LCA-measured environmental improvements in Pampers® diapers. *The International Journal of Life Cycle Assessment*, 17(2), 145-153. doi: 10.1007/s11367-011-0343-1
- Wells, J., Barlow, J., & Stewart-Brown, S. (2003). A systematic review of universal approaches to mental health promotion in schools. *Health Education*, 103(4), 197-220. doi: 10.1108/09654280310485546
- Werner, E. E. (1992). The children of Kauai: Resiliency and recovery in adolescence and adulthood. *Journal of Adolescent Health*, 13(4), 262-268. doi: 10.1016/1054-139X(92)90157-7
- Werner, E. E. (1993). Risk, resilience, and recovery: Perspectives from the Kauai Longitudinal Study. *Development and Psychopathology*, 5, 503-515. doi: 10.1017/S095457940000612X
- Wilkinson, R. G., & Pickett, K. (2010). *The spirit level: Why more equal societies almost always do better*. London, UK: Allen Lane.
- Wolfson, L., Whipple, R., Derby, C., Judge, J., King, M., Amerman, P., . . . Smyers, D. (1996). Balance and strength training in older adults: Intervention gains and Tai Chi maintenance. *Journal of the American Geriatrics Society*, 44(5), 498-506. doi: 10.1111/j.1532-5415.1996.tb01433.x
- World Health Organization & UNICEF. (2003). *Global strategy for infant and young child feeding*. Geneva, Switzerland: World Health Organization.
- Wright, S. D., & Lund, D. A. (2000). Gray and green? Stewardship and sustainability in an aging society. *Journal of Aging Studies*, 14(3), 229-249. doi: http://dx.doi.org/10.1016/S0890-4065(00)08020-8

Yarnal, C. M., Hutchinson, S., & Chow, H.-W. (2006). "I could probably run a marathon right now": Embodiment, space, and young women's leisure experience. *Leisure Sciences*, 28(2), 133-161. doi: 10.1080/01490400500484040