CHAPTER

3

The science of flourishing in child and adolescent development – description, explanation and implications for prevention and promotion

This chapter should be cited as:

Since ancient times, the question of what it means to truly live a life of flourishing has been contemplated, debated and pursued. This chapter reviews contemporary scientific research on flourishing in psychological science and neuroscience, linking this contemporary scholarship to the classical idea that flourishing emerges over time from the support, practice and development of various skills. From this foundation, we cast research on flourishing into an explicitly developmental systems, contemplative science framework in an effort to: (a) describe the development of flourishing from infancy through childhood and adolescence to early adulthood years in terms of specific underlying skills; (b) explain variation in the development of flourishing and these underlying skills in terms of key biological and social-contextual factors that transact across levels of analysis and time; and thereby (c) optimize the development of flourishing across the first two decades of life by identifying key opportunities for targeting specific malleable skills aimed at enrichment in families, schools and communities in order to prevent problems and promote flourishing.

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3.1 Introduction

Since ancient times, the question of what it means to truly live a life of flourishing has been contemplated, debated and practically pursued **(Dahl, Wilson-Mendenhall and Davidson, 2020)**. In the middle of the twentieth century, the question of how to go beyond surviving in this world to really thrive, flourish, and live a life of deep fulfilment and meaning began to be investigated scientifically **(e.g. Maslow, 1950, 1968; Jahoda, 1958; Frankl, 1959)**. Since that time, with the founding of positive psychology **(Csikszentmihalyi and Seligman, 2000)** and contemplative science **(Goleman and Davidson, 2017)**, the study of what some call flourishing **(e.g. Seligman, 2010)** and others call thriving **(Bundick et al., 2010)**, eudemonic well-being **(e.g.**

Tell me, what is it you plan to do with your one wild and precious life?

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Ryan, Curren and Deci, 2013; Ryff, 2014) or genuine human happiness (e.g. Ekman et al., 2005; Ricard, 2011) has been growing rapidly. We are beginning to learn much more about what flourishing is and what factors affect its development across the lifespan (e.g. Keyes, 2007).

In this chapter, we explore flourishing from a developmental systems perspective and cast questions about human flourishing into an explicitly developmental framework. We begin by describing the assumptive framework we use to approach the question of how flourishing develops, and how this assumptive framework coheres with the view of flourishing put forth in previous chapters. Next, we outline what a developmental framework for studying flourishing might look like based on extant research in psychological science and neuroscience, and on the classical idea that flourishing emerges over time as the result of dynamic person–context transactions involving scaffolding and social

support, the sustained practice of various virtuous skills, and discussion and meaning-making around ideas of what it means to flourish; to live well for oneself and the world (e.g. Roeser et al., 2014; Goleman, 2015).

Based on these central ideas, we explore three core developmental questions (Baltes, Reese and Nesselroade, 1977): (1) what is flourishing and its constituent elements, and how are these elements transformed in sociocultural contexts and developmental time? (i.e. description); (2) what biological, mental and socio-cultural processes explain continuity and change in the elements of flourishing across development? (i.e. explanation); and (3) what are the implications of our descriptive and explanatory understandings of flourishing for the prevention of problems and the promotion of optimal development through programmes, socialization practices and forms of education during the first two decades of life ? (i.e. optimization).

3.2

Assumptive framework for understanding the development of flourishing

Three big assumptions underlying our view of flourishing are: 1) that human beings have an intrinsic potential for positive transformation and a tendency towards actualizing their passions and capabilities in the direction of flourishing; (2) that

> **A flourishing life, is also an ethical life in which the balance of self- and other interests is focal, a balance of flourishing for self and others.**

it is the sustained practice of learned skills (e.g. procedural knowledge or 'knowing how' to practise flourishing) and related perspectives on flourishing (e.g. declarative knowledge or 'knowing what' flourishing is) that underlies individuals' resilience and flourishing; and (3) a community is needed to foster individuals' learning of flourishing-related skills and motivation, as well as how to embody them ethically in ways that foster the well-being of self, others and the world, together. A flourishing life, according to this view, is also an ethical life in which the balance of self- and other interests is focal, a balance of flourishing for self and others **(Roeser et al., 2014)**. We briefly elaborate each of these assumption sin **WG1-ch2**.

Firstly, a life of flourishing is hypothesized to be possible insofar as human beings possess the tendency to grow and the potential to transform themselves in ways that lead towards flourishing – as seen in the study of the lives of historical/exemplary individuals **(e.g. Erikson, 1958,**

1969); resilience across the lifespan **(Werner and Smith, 1992; Masten, 2001)**; and modern neuroscience **(e.g. Begley, 2007; Davidson and Lutz, 2008; Stiles, 2008)**. Thus, the first foundational idea for this chapter is that our potential to change default mental habits for those that promote flourishing is possible, even following significant life adversity. This requires practice, sustained effort and social support.

Secondly, the process of self-transformation involves the learning and development of new skills through structured practice over time. As the saying goes, 'Train your mind, change your brain' **(Begley, 2007)**. What this means is that psychological mastery/skill development is accompanied by structural and functional changes in brain systems **(Ericsson and Charness, 1994)**. This process is called neural plasticity. The big idea here is that flourishing can now be conceptualized as the cultivation of specific kinds of ethical skills that are malleable – and which can be learned through practice

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.... we cannot thrive or flourish in isolation from community or by ignoring our responsibilities to others who, like ourselves, wish to flourish ....

(Varela, 1999; MLERN, 2012). These skills include empathy, mindful awareness and compassion for oneself and others. Further, the development of these virtuous skills is being studied in relation to changes in brain behaviour and social relationships in the areas of health, well-being and growth rather than their opposites. In summary, the process of flourishing involves learning various skills that, given average-expectable contextual conditions, can lead to a life of flourishing.

Methodologies for developing these skills of flourishing include 'meditation' or 'contemplation' practices. The word contemplative means to mark out a space for observation; and such practices are designed for us to make time to observe our minds and lives in ways that can help move us in the direction of flourishing. Accordingly, a new science is emerging that studies how we can develop our awareness, attention and the power that these qualities can have for leading a life of meaning, purpose and flourishing. This new field is

called contemplative science **(e.g. Goleman and Davidson, 2017)**, and research from this field forms a key part of the developmental theory we propose. Contemplative science aims to integrate insights about the optimization of human development from both science and the wisdom of the world's contemplative meditative traditions in order to gain a better understanding of the nature of the mind and of life, as well as how various practices can help us to cultivate skills leading to a personally meaningful and socially beneficial life **(Goleman and Davidson, 2017)**.

The third foundational idea in this chapter is that flourishing involves community; it is interpersonal and not a personal pursuit or project **(Lavelle, 2017; Condon and Makransky, 2020)**. Many traditions, including science **(e.g. Coan and Sbarra, 2015)**, suggest that humans are inherently social by nature, and we cannot thrive or flourish in isolation from community or by ignoring our responsibilities to others who, like ourselves, wish to flourish and not to suffer. This

idea is based on the fundamental interdependence between one's own happiness and the happiness of others. Understanding such interdependence is thought to be a key dimension of living a life of flourishing **(e.g. Dalai Lama, 1999, 2012)**. This idea is also central to our understanding of human development – it is fundamentally a process of interdependence and relationality **(e.g. Overton, 2015)**.

Taken together, these foundational assumptions of flourishing also cast it as a developmental, lifelong process of growth in fulfilling our potential in positive ways. This would involve the cultivation of various virtuous skills and mindsets, in relationship with others and the world. As such, we can begin to describe and explain how flourishing can unfold across the lifespan, and use the knowledge so gained for the good of the world in terms of prevention and health promotion programmes aimed at promoting/supporting the elements of flourishing as they develop in young people. This idea of a developmental approach to flourishing is only a promissory note at this point, but much of the newer work on flourishing and its relation to skill development through contemplative practices and exercises remains developmental at this time **(Roeser and Eccles, 2015; Roeser, Colaianne and Greenberg, 2018; Roeser, 2019)**.

3.3

Towards a developmental framework for studying flourishing

Although there are various theories of adult flourishing **(VanderWeele, 2017)** and positive youth development **(e.g. Leman et al., 2017)**, there is no agreed upon lifespan theory of flourishing. Thus, in this section we propose one developmental framework for studying flourishing and illustrate it across typical stages of human psychological development. This framework builds on the proposal of psychological needs postulated in self-determination theory **(Ryan and Deci, 2008)**, and is an extension of Eccles et al.'s **(1993)** stage–

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environment fit (SEF) theory where the need for autonomy, belonging and competence are thought to differentiate into wider needs with development **(Roeser and Pinela, 2014)**. The framework outlined here links psychological needs and their underlying cognitive and neural sources with a focus on two key neurocognitive well-being capacities **(Dorjee, 2021)**.

Ryan, Curren and Deci **(2013)** propose three basic psychological needs that need to be satisfied for human flourishing to manifest. These are: the need for autonomy, the need for competence and the need for relatedness **(Ryan and Deci, 2008)**. The need for autonomy is satisfied via self-directedness that is congruent with personal values and a sense of self, whereas the need for competence describes a sense of mastery (experiencing oneself as capable) over activities that one considers important. Finally, the need for relatedness concerns the need to be positively related to others, including a supportive social climate and relationships. Evidence suggests that these three

needs are universal across cultures, for instance, they determine psychological well-being regardless of differences between collectivist and individualist cultures **(Deci and Ryan, 2008)**.

Building on SEF theory **(Eccles et al., 1993)** in which the 'fit' between psychological needs and changing social environments is seen as key to flourishing during different life stages, Roeser and Pinela **(2014)** propose an elaboration of the three basic psychological needs discussed in SEF theory during adolescence, and imply that fit between this expanded set of needs and social environments is key to flourishing during adolescence and beyond.

Specifically, they propose that the need for autonomy develops to include a need for self-transcendence – not just engaging in activities deeply endorsed by the self but engaging in those activities that take one beyond self – activities such as prosocial behaviour, the arts, being in nature or contemplative practice **(e.g. Frankl, 1962; Staub, 1979; Hart,**

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2004). The need for competence is proposed to develop into a concomitant need for wisdom concerning how to live a good life and be fully human through reflective exploration of philosophical ideas and myths regarding the big questions of life and death **(Kessler, 2000).** Finally, Roeser and Pinela **(2014)** propose that the need for relatedness also develops into a need for mattering in the world of adults to others **(Eccles and Gootman, 2002; Damon, 2009).** This is hypothesized to encompass contributing significantly to one's ingroups, strangers and society at large. We build on this proposal and related work below in our considerations about the relative prominence of psychological needs during different developmental stages.

To provide a more complete picture of flourishing development, we connect Roeser and Pinela's **(2014)** proposal of this expanded set of psychological needs that shape flourishing with key neurocognitive sources of well-being to bridge psychological research on flourishing with recent relevant advances in cognitive, affective and social neuroscience. Here we build on the proposal of two neurocognitive well-being capacities – the self-regulatory capacity and the self-world capacity **(Dorjee, 2021).** The self-regulatory capacity broadly describes the ability to manage our attention, emotions and behaviour in ways that foster our flourishing. It postulates that adaptive regulation of mind-wandering (daydreaming or random off-task ruminative thinking) is a necessary prerequisite for this ability. The self-world capacity describes an overarching integrated state or trait of cognition, affect and awareness that determines our sense of self and reality in connection to others and the world more broadly. The term 'capacity' is used here to indicate the malleability of these sources of flourishing **(WG1-ch2)** by social, cultural, communal, familial and educational factors as well as targeted development of skills and knowledge that enhance these capacities (such as training in mindfulness, social and emotional learning (SEL), art education,

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engagement in prosocial volunteering, etc.). The links between these two capacities and psychological needs are depicted in Figure 1.

The concept of self-regulatory capacity builds on established theories of self-regulation, particularly those with a cognitive focus, which are often linked to related concepts of self-control, metacognition and executive control. There is strong evidence that cognitive self-regulation significantly predicts a range of positive outcomes across development. For example, better self-regulation during early childhood predicts lower risk behaviours, higher well-being and better educational outcomes in adolescence **(Woodward et al., 2017; WG2-ch5; WG3-ch3)**. There is also robust evidence indicating that better early self-regulation is linked to better physical health, income and less criminal activity in adulthood **(Moffitt et al., 2011)**. Recent research shows that self-regulation can be improved by targeted educational programmes, such as SEL training involving

taking turns, Montessori education, training in martial arts or mindfulness **(Pandey et al., 2018)**.

The concept of the self-regulatory capacity extends traditional approaches to cognitive self-regulation by its explicit emphasis on trainability of self-regulation skills and by pinpointing regulation of mind-wandering as the basis for effective management of attention, emotions and behaviour. Mind-wandering is often defined as mental activity we engage in when we are not focusing on a task **(Smallwood and Schooler, 2006)**. Both the amount and the content of mind-wandering are linked to well-being. We tend to mind-wander for nearly 50 per cent of our waking hours, and increased mind-wandering has been associated with lower levels of happiness **(Killingsworth and Gilbert, 2010)**. However, the content of mind-wandering - what we mind wander about - matters too; those who habitually mind-wander about positive events or experiences are less likely to experience disturbances in their

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affect and this is associated with greater well-being **(Wang et al., 2018)**. In line with intervention research on self-regulation, initial research evidence shows that programmes (such as those involving mindfulness training) that reduce mind-wandering also improve well-being and can enhance academic performance **(e.g. Mrazek et al., 2013)**. In addition, various recent theories and studies have developed links between mind-wandering and education, and also ethical decision-making, propensity to compassionate behaviour, well-being, emotional intelligence and capacity to change **(Immordino-Yang, 2015; Ergas and Berkovich-Ohana, 2017)**.

At the neural level, cognitive processes of the self-regulatory capacity have been linked to increased activity in brain areas associated with cognitive control, including the anterior cingulate cortex (ACC) and parts of the prefrontal cortex (PFC) **(Posner and Rothbart, 2007)**. Developmental maturation of these brain areas enables increasing self-reflectivity (as a pre-requisite of moral

reasoning) during development since they are involved in metacognitive monitoring of attention, emotions and thinking patterns. Such metacognitive monitoring is a prerequisite for skillful regulation of mind-wandering; it modulates the default mode of brain function describing activity in a network of brain areas during off-task activity **(Raichle et al., 2001)**. Regulation of mind-wandering is associated with activation decreases in some of the key nodes of the default mode network, while activation in the ACC increases as a result of error monitoring **(Schooler et al., 2011)**.

Since self-regulation is often an interpersonal pursuit, it also engages the social brain regions, such as the temporoparietal junction (TPJ) involved in perspective-taking, understanding others' thoughts, emotions and behaviour **(Langner et al., 2018)**. An overlapping network of brain areas is also involved in moral reasoning and emotions, which are associated with virtue-aligned well-being **(Eres et al., 2016)**. Finally, enhanced self-regulatory capacity

is also associated with better regulation of the hypothalamic–pituitary–adrenocorticalaxis underlying the stress response and resulting in better physiological stress regulation **(Lupien et al., 2009; Blair and Cybele Raver, 2015)**, which can serve as a protective factor for a range of negative outcomes of stress exposure during development.

The cognitive and neural processes of the self-regulatory capacity

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> ... the ability to manage emotions and focus attention in interactions with others (including mind-wandering distractions and reactivity to these) is essential in developing a sense of connectedness associated with positive relationships.

particularly underlie adaptive satisfaction of the psychological needs for autonomy, relatedness and competence (see Figure 1). For example, deliberate engagement in behaviour in alignment with one's goals and mastery of any activity strongly relies on the ability to regulate distractions of mind-wandering, including affective disturbances which can interfere with effective decision-making and sustained goal focus. Similarly, the ability to manage emotions and focus attention in interactions with others (including mind-wandering distractions and reactivity to these) is essential in developing a sense of connectedness associated with positive relationships.

The second capacity underlying well-being – the self-world capacity – is a much newer concept than the concept of self-regulation. The self-world capacity describes an overarching state or trait which integrates five dimensions: 'self-other-world focus (extent to which one primarily focuses on oneself as a source of self-understanding, or

alternatively has a wider more inclusive sense of self); connection or disconnect (having a sense of connection with others and the world more broadly); solidity of self (fixed inflexible sense of self, or a flexible changeable sense of self); agency (being able to control who one aspires to be) and sense of purpose locus (having a sense of purpose focused on oneself or a wider self-transcending locus)' **(Dorjee, 2021, p. 6)**.

The first two dimensions are closely linked to adaptive or maladaptive self-focus associated with qualities such as empathy and compassion. Maladaptive self-focus and reduced empathy are associated with lower well-being and mental ill-health **(e.g. Watkins and Teasdale, 2004)**. In contrast, compassion is associated with positive emotions, prosociality and a sense of connection with others **(Singer and Klimecki, 2014)**. While the research evidence on cultivating compassion in education is still limited, initial findings suggest encouraging benefits both for children's well-being and their relationships **(Jazaieri, 2018)**.

> The link between the third dimension of the self-world capacity and well-being can be illustrated by research on 'decentring' – a state in which one experiences healthy distance from one's own thoughts, feelings and mental events.
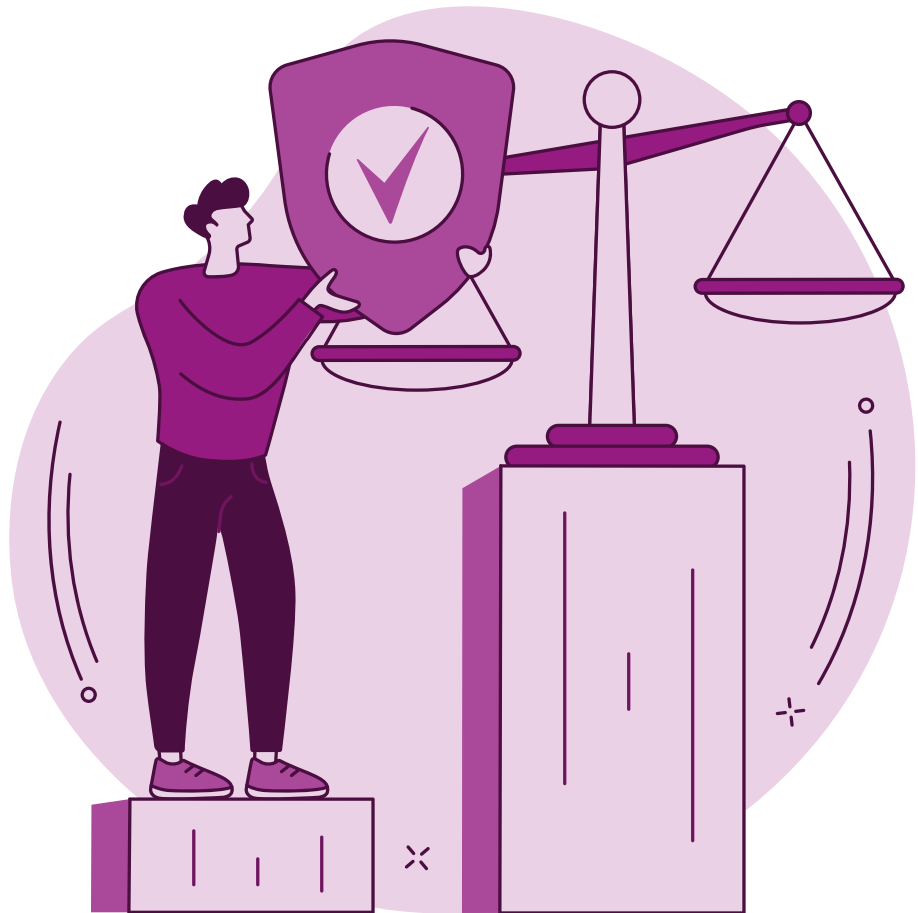
The link between the third dimension of the self-world capacity and well-being can be illustrated by research on 'decentring' – a state in which one experiences healthy distance from one's own thoughts, feelings and mental events **(Fresco et al., 2007)**. In the state of decentring, thoughts and emotions are perceived as impermanent and changeable, not as solid facts **(Teasdale, 1999)**, hence the sense of self becomes more flexible. Decentring has been associated with decreased reactivity to experience and better well-being; it also predicts decreased anxiety and depression after mindfulness training **(e.g. Hoge et al., 2015)**. In contrast, a self-world mode that could be described as an immersion and identification with thoughts and emotions is a predictor of low well-being and mental ill-health. Interestingly, decentring has been negatively associated with personal distress as an aspect of empathy and is not significantly related to the perspective-taking and empathic concern aspects of empathy **(Fuochi and Voci, 2020)**. This further highlights the need to cultivate all the dimensions of the self-world capacity in support of optimal flourishing.

The last dimension of the self-world capacity particularly highlight the importance of developing a sense of purpose as a protective factor of well-being. Indeed, research with adults has linked greater sense of purpose to a range of psychological and physical health benefits **(e.g. Ryff et al., 2004; Ryff, 2014)**. Evidence in children and adolescents associates purpose with positive emotions, prosociality and fewer social and emotional difficulties. Greater sense of purpose has also been found to predict fewer depression symptoms and less risk-taking behaviour in adolescents **(Cotton et al., 2005)**. Self-transcending purpose with beyond-the-self focus (involving contribution to the greater good) can be particularly beneficial to individual well-being and wider community well-being. Indeed, self-transcending purpose has been linked to higher positive affect and healthy coping strategies (e.g.

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positive reframing) **(Malin et al., 2019)**. However, the benefits are not limited to well-being only; research shows that fostering of self-transcending sense of purpose results in improved academic performance in adolescents **(Cotton et al., 2005)**.

Finally, agency brings together the other four dimensions by translating self-transcending purpose motivated by compassionate concern for others supported by a flexible sense of self into action making a difference in everyday life. Education

The need for wisdom is also linked to expansion of the self-world state towards connection with bigger issues of humanity beyond self-focus.

needs to foster such a sense of agency, combined with the other dimensions of the self-world capacity developed on the basis of the self-regulatory capacity, for young people to develop a sense of compassionate mattering and courage to contribute to bettering of their immediate communities and wider societal challenges. These qualities are arguably much needed now, as we are tackling a range of societal crises including climate change and political polarization fuelled by the attention economy encouraging constant distractibility **(Dorjee, 2021)**.

At the neural level, the self-world mode is virtually unexplored given the nascent nature of the concept. However, there is initial neuroscientific evidence from studies with experienced meditators who are able to shift their self-world state at will. This evidence suggests that self-world states linked to flourishing are likely to change brain-wave oscillations associated with changes in synchronicity and frequency of neuronal

firing. This was the case when meditators engaged in a state of unconditional compassion towards others **(Lutz et al., 2004)**. This research suggests that shifts in self-world states are likely to be associated with changes in global markers of brain activity which need to be investigated in future studies, particularly from a developmental perspective. The findings also point to trainability of self-world states that foster flourishing and associated neural plasticity.

The self-world capacity is particularly linked to the psychological need for self-transcendence, wisdom and mattering proposed by Roeser and Pinela **(2014)**. The need for self-transcendence is associated with a shift from self-focus towards self-world states of caring other-focus in acts of kindness, helping or sharing, or during contemplative practices when one cultivates states of acceptance, tolerance and compassion. The need for wisdom is also linked to expansion of the self-world state towards connection with bigger issues

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The three remaining learning trajectories of education are aligned with the needs for self-transcendence, wisdom and mattering linked to the self-world capacity.

of humanity beyond self-focus. Finally, the need for mattering shifts the self-world capacity from narrow self-interest to broader issues of a group one connects with, thus expanding one's self-construal towards inclusion of wider world concerns.

Importantly, the proposed developmental theory of flourishing closely links to the six learning trajectories of education and flourishing elaborated in **WG1-ch4** (see Figure 1). The needs of autonomy, mastery and relatedness associated with the self-regulatory capacity seem to map onto the learning to know and think, learning to do and evaluate and learning to learn learning trajectories. Indeed, the need to make choices about our own behaviour (autonomy) builds on knowledge and considerations about our environment, culture and self which are acquired and modified across the lifespan. Similarly, skills (learning how to) of literacy, numeracy, technology and so on are the stepping stones for mastery in any activity. Finally, learning to learn – including

the ability to notice, observe and reflect on the processes of our learning– is essential across the six psychological needs, whether it is reflection on behaviour choices, progression towards mastery in activities, communication or relationships that are important to us. The self-regulatory capacity underlies all three types of learning; extensive research **(e.g. Veenman et al., 2006)** particularly documents strong positive associations between metacognitive abilities (being able to observe and reflect on our thoughts, feelings and behaviour) and learning to learn which facilitates learning to know and think and learning to do and evaluate.

The three remaining learning trajectories of education are aligned with the needs for self-transcendence, wisdom and mattering linked to the self-world capacity. Learning to live together and learning to live with nature are manifestations of the needs for mattering and wisdom which go beyond the immediate circle of relationships and reach further
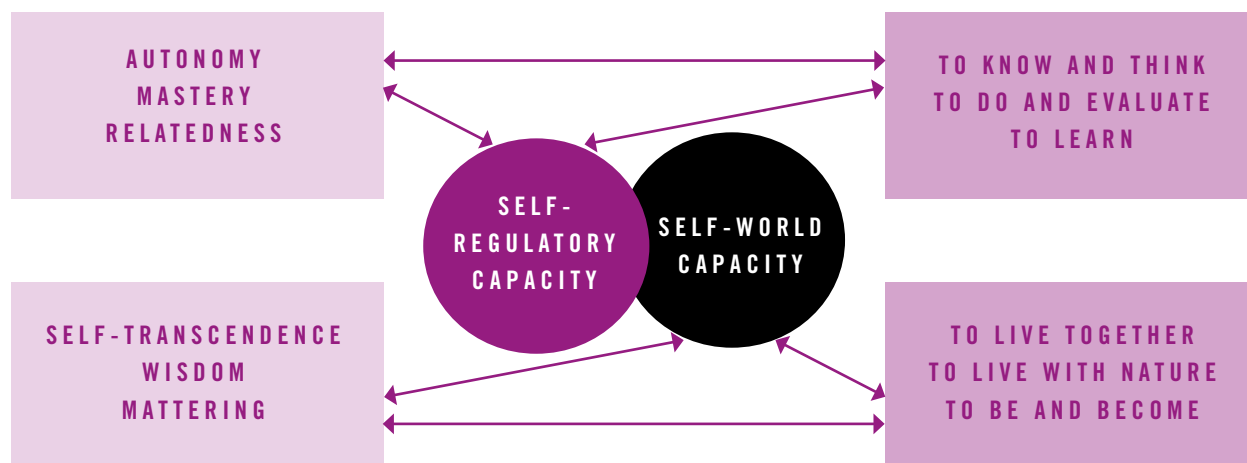
Figure 1. The links between self-regulatory, self- world capacities and psychological needs

into connecting with groups, traditions or causes of wider ethical significance. Similarly, learning to be and become is closely linked to the need for self-transcendence, as both highlight exploration of self-identity and its expansion beyond self-focus. These three psychological needs and associated learning trajectories of education map closely onto the self-world capacity, which enables grounding of their further exploration in development in their neurocognitive sources. We will now apply the proposed developmental theory of flourishing to explain the development of flourishing across developmental stages.

3.4

Describing and explaining flourishing across development

PRENATAL STAGE

The foundations of flourishing are laid during the prenatal stage, that is, from conception to birth. For example, we know that maternal stress during pregnancy (including depression and anxiety) is associated with low birth weight in babies and this has been further linked to higher likelihood of mental health and behavioural problems in childhood **(Lupien et al., 2009)**. One of the possible underlying mechanisms of these effects might be the impact of prenatal exposure to glucocorticoids which leads to

Infancy is a sensitive period for both cognitive and social emotional development – it shapes life-long learning and relational tendencies impacting flourishing.

genetic changes predisposing the child to increased vulnerability to stress during further development **(Provençal et al., 2019)**. The mediating mechanism between genetic impacts and increased stress vulnerability is likely the diminished self-regulatory capacity, which in turn particularly negatively impacts the first three learning trajectories of education's ability to fulfill the needs for autonomy, mastery and relatedness.

To minimize the negative impacts of stress during the prenatal stage, societies, communities and workplaces should make concentrated efforts to reduce major sources of stress – such as not having access to adequate health care, and job and income concerns – during pregnancy. Educating policy-makers, employers, families, health and social workers, and pregnant women about common stressors and the impact of stress on their and their child's flourishing prospects is the first step in addressing these risk factors to lifelong flourishing. The

implication of this understanding should be policy and care changes resulting in access to stress-reduction courses, counselling and coaching during pregnancy as part of routine prenatal care.

3.4 .2

INFANCY

Infancy, the developmental stage between birth and two years of age, is a sensitive period for both cognitive and social-emotional development – it shapes life-long learning and relational tendencies impacting on flourishing. In Erikson's **(1993)** psychosocial theory of development, infancy is a stage during which we develop a sense of trust or mistrust towards others. Trust develops if the infant receives consistent, responsive and emotionally stable care, whereas mistrust results from experiences of unresponsiveness, rejection and emotional unavailability.

Similarly, Bowlby's theory of attachment **(1982)** describes

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At the neural level, infancy is a time of rapid growth of cells as a result of sensory input, increasing ability to explore environment and social interactions with others.

infancy from the age of six months as the developmental stage during which we develop attachment to a primary caregiver. Attachment is described as an emotional connection to a primary caregiver, with the child seeking their closeness in times of anxiety or stress. Based on the degree of sensitivity and continuity of care one receives, we develop a lifelong attachment style (secure or insecure) that influences our relationships with peers and partners. Attachment styles impact on flourishing – insecure attachment styles have been particularly associated with mental health and behavioural problems in children **(Fearon and Roisman, 2017)**. At the biological level insecure attachment has been linked to abnormalities in glucocorticoid levels in children, suggesting abnormalities in the neuroendocrine stress response as an underlying mechanism.

At the neural level, infancy is a time of rapid growth of connections between brain cells as a result of sensory

input, increasing ability to explore environment and social interactions with others. Access to nurturing, rich sensory stimulation and warm, responsive, supportive care are the key factors in enabling infants to develop the foundations of their lifelong flourishing. The brain region that is particularly sensitive to the influences of care children receive during infancy is the hippocampus. This region is involved in learning and memory processes throughout the lifespan. Inadequate care or significant stress during infancy can negatively impact the maturation of the hippocampus and result in developmentally delayed mental health problems including anxiety, depression and post-traumatic stress disorder (PTSD) in adolescence and adulthood **(Lupien et al., 2009)**, thus diminishing one's flourishing prospects.

In cognitive terms, the concept of attachment is linked to mind-mindedness **(Meins et al., 2002)** – the ability of a parent to tune into what their child is feeling or thinking. Mind-mindedness has been strongly associated with

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children's self-regulatory capacity and is a strong predictor of a range of outcomes in adolescence and adulthood, including academic performance. Attachment style manifesting via mind-mindedness can be considered one of the determinants of successful satisfaction of autonomy, mastery and relatedness needs throughout development.

Based on available evidence, attachment style is largely influenced by social, relational and cultural factors and much less by genetic factors **(Fearon and Roisman, 2017)**. There is also relatively strong evidence of internal working models of attachment, describing the expectations of relationships transferred between generations. Hence, one of the key targets for interventions that aim to foster flourishing of infants and their future flourishing prospects is support of caregivers in delivering supportive, responsive and consistent care to their children, which is attuned to their feelings and needs.

We propose that the stabilization of attention affected through attuned care-giving and joint attention, and the noting and labelling of significant features of emotionally charged social experiences (e.g. feelings, feeling–action linkages), enhances the ability of young people to clearly perceive and develop rich cognitive-affective representations regarding ethical dilemmas they experience in daily life **(e.g. Tharp and Gallimore, 1988)**. Enriched perceptions and representations, in turn, enhance children's ability to accurately extend their moral understandings to situations and encounters that share correspondences and affinities with previously encountered ones – from the known to the similar **(Varela, 1999)**. This was the view of Mencius, who posited, 'truly virtuous people attend to their nature sufficiently well to understand an event in terms of their experience and thus ensure that appropriate extension follows easily' **(Varela, 1999, p. 29)**.

Self-regulation abilities, particularly during early childhood, robustly predict risk behaviours and academic achievement in adolescents, as well as income, educational level and even levels of engagement in criminal activity in adults.

3.4 .3

CHILDHOOD

Childhood (two to eleven years of age) is a particularly sensitive stage for development of the self-regulatory capacity, and accordingly the needs for autonomy, mastery and relatedness impacting the first three learning trajectories in education. Self-regulation abilities, particularly during early childhood, robustly predict risk behaviours and academic achievement in adolescents, as well as income, educational level and even levels of engagement in criminal activity in adults **(Moffitt et al., 2011)**. This is why there have been increasing calls to implement self-regulation interventions in primary schools, especially in early education. A recent meta-analysis of self-regulation interventions – including family based programmes, social and personal skills interventions, mindfulness and yoga – summarizes their positive impacts on academic achievement, social skills,

mental health and reductions in behavioural problems and conduct disorders **(Pandey et al., 2018)**. Similarly, a systematic review of interventions enhancing executive function as a central component of self-regulation shows that interventions such as games involving taking turns (e.g. Simon says), martial arts, Montessori approach, yoga and mindfulness are more effective in improving self-regulation in children than computer based training **(Diamond and Lee, 2011)**. A recent review of the field of mindfulness in education also suggests that school based mindfulness programmes for children can support development of their self-regulation **(Roeser, Galla and Baelen, 2020)**.

At the neural level, the development of self-regulation is linked to increasing reliance on the executive attention network involving the ACC and the PFC, which undergoes gradual maturation into adolescence and until the age of 25. This gradual development enables increasing reliance on metacognition (monitoring of attention,

emotion and behaviour) and less reactive responses to situations (delayed gratification). At the same time, regions of the social brain involving the TPJ undergo maturational changes resulting in increasing perspective-taking, development of empathy and prosocial behaviour, including sharing and helping. Development of empathy and prosocial

behaviour can be particularly enabled though parenting and education that encourages awareness and verbalization of emotions, inviting taking on the perspectives of others and rewarding positive prosocial behaviour **(e.g. Farrant et al., 2012)**. Neuroscience research also shows that children are particularly sensitive to rewards, more so than

negative feedback, when learning **(Martin and Ochsner, 2016)**.

Development of self-regulation and prosociality enables initial satisfaction of the need for autonomy, mastery and relatedness as well as mattering. Indeed, in Erikson's **(1973)** psychosocial theory, childhood is described as the age of developing autonomy, initiative and mastery. Children start exploring their environment by themselves and gradually also learn to take initiative in peer relationships. To progress in their development towards satisfaction of the need for autonomy they need to be provided with sufficient opportunities for self-initiated exploration and self-initiated play without discouragement or excessive intervention from caregivers. As they progress through acquisition of new skills, they also develop an initial sense of mastery in activities of interest. Through parental and/ or educational guidance they can also start exploring their need for mattering, by engaging in activities of wider significance, for example, learning and participating in

initiatives aimed at protecting the environment. Developing new ways of measuring flourishing during childhood in ways that are useful to communities, schools and families represents a new frontier in this work **(Thomson et al., 2018)**.

3.4 .4

ADOLESCENCE

Adolescence (eleven to nineteen years of age) is a developmental period of self-regulatory capacity vulnerabilities and extensive self-world capacity development with changes in both capacities impacting on fulfillment of associated psychological needs **(WG3-ch2)**. Maturation in the PFC, which continues until the age of 25, is a hallmark of developmental brain changes in adolescence and underlies adolescents' increasing metacognitive ability to reflect on their thinking, emotions, behaviour and relationships. It

Adolescence is a developmental period of self-regulatory capacity vulnerabilities and extensive self-world capacity development with changes in both capacities impacting fulfillment of associated psychological needs.

also expands the scope of self-regulatory skills towards more complex strategies involving planning, consideration of a range of information sources, others' perspectives, including considerations about communal and wider societal issues, and one's longer-term goals. This expansion of self-regulatory skills is foundational to wisdom.

These processes of PFC maturation in adolescence also bear a risk of increased sensitivity to stress, given that neurotoxic effects of glucocorticoids associated with stress particularly impact regions with glucocorticoid receptors including the PFC and the hippocampi **(Lupien et al., 2007)**. This increased vulnerability to stress also means that programming effects resulting from earlier experiences of chronic stress or abuse in infancy or childhood can manifest in mental health or behavioural difficulties in adolescence. Such vulnerabilities often manifest as increases in negative mind-wandering that can predict and are symptomatic of anxiety and depression **(Burwell

and Shirk, 2007; Young and Dietrich, 2015). About a half of adult mental health problems begin in adolescence **(Jones, 2013)**.

In addition to PFC vulnerabilities, imbalanced maturation of connections between the PFC and other brain regions impacts on adolescents' susceptibility to risk behaviour, particularly under peer pressure. This is because the neural connections between the PFC and the ventral striatum (VS), a brain region associated with rewarding experiences, mature faster than the connections between the PFC and amygdalae associated with threat detection **(Spear, 2013)**. As a result, adolescents are prone to hot cognitions – impulsive behaviour associated with risk-taking – particularly in the presence of peers, while decision-making is associated with increased activity in the VS.

However, increased self-regulatory capacity enabled by PFC maturation, changes in other areas of the social brain and increased susceptibility to peer influence can also have protective effects

> ... strengthening the self-regulatory capacity by enabling fulfillment of the psychological needs of autonomy, mastery and relatedness, fostered via corresponding learning trajectories in adolescence, can positively impact adolescent flourishing.

on well-being in adolescence. For example, Ronen et al. **(2016)** show that self-regulation not only predicts better subjective well-being in adolescents, but also predicts higher levels of positive affect when adolescents experience crisis. In the same study, greater social support also has protective effects on adolescent subjective well-being. Contemplative practice interventions, such as martial arts or mindfulness, have been shown to improve self-regulation **(Pandey et al., 2018)** and reduce mind-wandering in adolescence **(Mrazek et al., 2013)**. This suggests that strengthening the self-regulatory capacity by enabling fulfillment of the psychological needs of autonomy, mastery and relatedness, fostered via corresponding learning trajectories in adolescence, can positively impact adolescent flourishing.

Similarly, extensive development of the self-world capacity in adolescence can also be harnessed in support of adolescent flourishing. In Erikson's **(1973)** theory of psychosocial development, adolescence is the stage during which one needs to resolve the conflict between finding one's identity and role confusion. Healthy development of identity involves moving towards a sense of self that goes beyond immediate self-focus and includes value-oriented virtuous qualities. In this way, adolescence is a key period for meeting the needs of self-transcendence, mattering and wisdom which can steer identity development in a direction that facilitates flourishing. Education has a key role to play in this via fostering the learning trajectories associated with these needs. Indeed, research shows that character strengths that build connections to people and a sense of purpose beyond self predict future well-being in adolescents **(Gillham et al., 2011)**. In another study, greater sense of purpose in adolescents is shown to have protective effects on depression symptoms **(Cotton et al., 2005)**. And the self-transcending purpose of adolescents has also been linked to better academic performance **(Yeager et al., 2014)**. Adolescent susceptibility to peer influence can be harnessed in

> **Adolescent susceptibility to peer influence can be harnessed in positive ways too, for example, in encouraging prosocial behaviour.**

positive ways too, for example, in encouraging prosocial behaviour.

Overall, adolescence is a developmental period of vulnerabilities and sensitivities but also one of great opportunities. Better understanding of these, **(WG3-ch2)** combined with understanding of psychological needs and underlying well-being capacities, can guide development and implementation of effective school curricula addressing the six learning trajectories in an effective and age-appropriate manner. Although research is just beginning, there is some evidence that developmentally appropriate flourishing-related programmes for adolescents that include reflection, contemplative practices and service can engender salutary effects, both by reducing distress and increasing the skills and perspectives of flourishing. This work is in its initials stages, however, and more research is needed **(Roeser and Eccles, 2015; Roeser and Pinela, 2015; Eccles and Roeser, 2016; Roeser et al., 2020).**

3.4 .5

ADULTHOOD

According to Erikson's theory **(1973)**, adulthood is the stage of development during which one resolves the conflict between intimacy (having a partner) and isolation and the conflict between generativity (contributing to family, society, etc.) and stagnation. Healthy resolution of these conflicts contributes to flourishing, for example, marriage has been associated with better psychological health but factors such as relationship quality and social support mediate the impact on this association **(Soulsby and Bennett, 2015; Chapman and Guven, 2016)**. This reflects the manifestation of need for relatedness in adulthood as one of the determinants of flourishing.

Similarly, those in employment that satisfies the needs for mastery and competence linked to intrinsic motivation tend to show higher levels of flourishing **(Ryan and Deci,**

... flourishing of adults is inseparable from flourishing of the young people they look after or work with.

2013). And at the neurocognitive level, higher levels of off-task mind-wandering have been linked to unhappiness, suggesting that a decrease in the self-regulatory capacity is indicative of less flourishing **(Killingsworth and Gilbert, 2010)**. However, the affective content of mind-wandering matters too; positive mind-wandering content has been linked to less affective disturbance suggesting greater levels of flourishing **(Wang et al., 2018)**.

In terms of the self-world capacity – and associated needs for self-transcendence, mattering and wisdom – there is robust evidence suggesting that a greater sense of virtue-oriented purpose is linked to health benefits such as lower risk of cardiovascular problems **(Kubzansky et al., 2018)**, decreased risk of cognitive impairments associated with ageing and possibly longer life **(Cohen, Bavishi and Rozanski, 2016)**. There is also evidence elucidating the underlying mechanisms of these effects – these may modulate the neuroendocrine pathways of the stress response since greater sense

of purpose is associated with lower cortisol levels, lower inflammatory markers and better sleep **(Ryff et al., 2004; Cole at al., 2015)**. And at the neural level, eudemonic happiness, emphasizing a virtue-oriented sense of purpose, has been associated with increased activity in the insula **(Lewis et al., 2014)**, a region of the brain involved in emotional awareness and modified in the same direction by contemplative practices **(Farb, Segal and Anderson, 2013)**. Engagement in prosocial activities, such as volunteering, has also been shown to increase well-being, presumably via changes in the self-world capacity in response to such activities meeting needs for self-transcendence and mattering.

As noted in preceding sections, well-being of adults strongly impacts on flourishing of infants, children and adolescents. Children of parents who experience depression, for example, are more likely to have difficulties with self-regulation, and a low sense of well-being in teachers is associated with lower well-being in children (reflected in their

> ... an intricate relation between inner (cognitive and emotional) development and a stimulating and encouraging environment exists from the beginning of life.

stress response biomarkers). This clearly indicates that flourishing of adults is inseparable from flourishing of the young people they look after or work with. As Erikson **(1973)** notes in his lifespan theory of development, the life-task he describes for adulthood involves, in part, the discovery of whom one would take care of **(p. 124)**. In this way, he articulates the interdependence of successful child/adolescent and adult development: the developmental life task of society's elders is to assist young people in progressing along fruitful educational, social and moral lines of development that eventuates in their full participation in an ongoing cultural concern. The developmental life task of society's youth is to open outward to the opportunities of their times, to co-create and perpetuate society in conjunction with their elders, and sometimes, to reshape the future direction of society in spite of them **(Erikson, 1969; Mead, 1970)**. Erikson **(1970, p. 754)** describes this notion of the interdependence of adolescent and adult development from the perspective of the child:

an intricate relation between inner (cognitive and emotional) development and a stimulating and encouraging environment exists from the beginning of life, so that no stage and no crisis could be formulated without a characterization of the mutual fit of the individual's capacity to relate to an ever expanding life-space of people and institutions, on the one hand, and on the other, the readiness of people and institutions to make him [sic] part of an ongoing cultural concern'.

In sum, effective educational interventions aiming to support the flourishing of children and adolescents should, wherever possible, target enhancements in the self-regulatory and self-world capacities of pupils/students, and their caregivers, parents and teachers **(e.g. MLERN, 2012)**.

3.5 Measuring flourishing

The overarching goal of supporting the flourishing of children and adolescents implicates the need to measure flourishing effectively in order to develop a strong evidence base on flourishing development which can in turn inform policy and practice recommendations. However, effective measurement is not an easy task given there is no agreed definition of flourishing. The most common way of measuring flourishing in children and adolescents involves self-reports or informant reports (provided by teachers or parents) of a range of skill and quality types which are related to flourishing. These include relationship skills such as empathy or social skills, flourishing in relationships (with parents or peers), flourishing at school (assessing qualities such as diligence, educational engagement, thrift, trustworthiness, etc.), prosociality (altruism, generosity), environmental stewardship or personal flourishing (qualities including forgiveness, gratitude, hope, purpose, spirituality, etc.) **(Lippman, Guzman and Moore, 2012).**

> **....any large-scale assessments of pupil flourishing in education would need to carefully consider suitable measures and ethical implications of such evaluations.**

As can be seen from this long list, some assessments seem to focus more on skills and qualities associated with the self-regulatory capacity (e.g. diligence, goal orientation), while others seem to target the self-world capacity (e.g. altruism, purpose).

In recent years, there have been increasing calls for routine assessments of flourishing (happiness or well-being) in schools as one of the metrics schools are evaluated and guided on. The primary aim of these suggestions has been to highlight cultivation of flourishing as an educational priority **(Minds, 2017; Layard and Ward, 2020)**. Such recommendations from researchers and non-profit organizations supporting the mental health of young people are encouraged by recent surveys with teachers and parents in the United Kingdom (UK). For example, 82 per cent of teachers surveyed said that there is a disproportionate focus on exams in education in contrast to the well-being of students, and 73 per cent of parents would rather send their children to school where

they would be happy even if their previous exam results were not good **(Minds, 2017)**. Eighty-one per cent of young people reported that they would like to learn more about how to look after their mental well-being in school **(Minds, 2017)**. These findings clearly point to the current imbalance in the educational system – overemphasis on academic performance and insufficient focus on supporting student flourishing, with academic pressures often undermining student flourishing. Inclusion of large-scale regular flourishing assessments in schools, and their results being considered in evaluations of school provisions, may help bring flourishing to the central stage of educational policy.

However, any large-scale assessments of pupil flourishing in education would need to carefully consider suitable measures and ethical implications of such evaluations. The most appropriate measures are likely to assess positive skills and qualities associated with flourishing, rather than evaluate flourishing as absence of mental ill-health

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... any plans for large scale assessments of flourishing would need to carefully consider the ethical implications of such evaluations, including informed consent from parents and assent from adolescents, data handling, and data access by schools and government institutions

(Huppert, 2017). How to select the most suitable flourishing skills and qualities will be one of the main questions in that process. Arguably, this is where assessments of underlying capacities would be particularly useful as concise predictors of a range of flourishing skills and qualities. Measuring underlying capacities could lead to the development of effective flourishing interventions (Huppert, 2017), targeting groups of flourishing skills and qualities rather than limited sets of selected skills/qualities associated with flourishing.

Importantly, any plans for large-scale assessments of flourishing would first and foremost need to carefully consider the ethical implications of such evaluations, including informed consent from parents and ascent from adolescents, data handling, and data access by schools and government institutions. For example, it is an open question whether teachers should have access to their students' individual flourishing data and whether such information could be helpful in

supporting student flourishing. It is also an open question whether anonymized longitudinal data on student flourishing could be made openly accessible to researchers given the lack of developmental research on the flourishing trajectories of children and adolescents. Finally, where would such data be stored and how would we ensure that information linking anonymized student data with their identity is kept strictly confidential with restricted access?

Another question that needs to be addressed in the process of designing and implementing such large-scale evaluations in schools pertains to the most suitable methods of measuring flourishing. Self-reports have been the default approach in flourishing research, but they have their limitations (Dolan and Metcalfe, 2012), particularly in research with children and young adolescents given that self-reporting relies on still-developing metacognitive abilities facilitating monitoring, reflecting upon and reporting of one's mental processes and behaviour.

Given the increasing interest in neuroscientific research as a means of informing flourishing initiatives in education, neuroscientific methods are also relevant for investigating flourishing development with educational implications

For these reasons, self-reports are not reliable for assessments with children younger than seven or eight years of age. Innovative assessments with methods such as experience sampling, where children or adolescents report on their momentary experiences of flourishing several times during a selected day or week might be an alternative **(Vilaysack et al., 2016)**.

Other possibilities include using peer reports of student behaviour prior to and following flourishing interventions **(e.g. Schonert-Reichl et al., 2015)**. In addition, other peer metrics that assess peer hierarchies, neglected/rejected students and other peer-group characteristics are interesting measures for future evaluation studies to consider as targets of change **(Kindermann and Gest, 2018)**.

There is also a range of measures other than self-reports that may provide more complete understanding of flourishing in the context of education. However, these methods are more demanding on data collection and analysis, and are therefore

not suitable for large-scale implementation. Observational methods are one such research measure **(Briesch et al., 2015)**. They involve a researcher spending time in a classroom during lessons and evaluating indicators of flourishing such as class atmosphere or use of feedback strategies, for example, positive rewards. And in younger children, observation methods evaluating child behaviour can be used to assess self-regulatory capacity **(Woodward et al., 2017)**.

Given the increasing interest in neuroscientific research as a means of informing flourishing initiatives in education, neuroscientific methods are also relevant for investigating flourishing development with educational implications. Neuroscientific research typically utilizes electrophysiological methods or magnetic resonance imaging (MRI) methods. Electrophysiological methods measure cumulative electrical signals resulting from synchronous firing of neurons on the surface of the scalp. From this signal, researchers can derive markers

..... randomized controlled trials are costly and it often takes several years for their results to be translated into educational practice. For these reasons, there is increasing interest in naturalistic (real-world) implementation studies in flourishing research ...

of cognitive and affective processing, such as attention control or emotion regulation, indicative of the self-regulatory capacity **(Kaunhoven and Dorjee, 2017)**. There is also preliminary research suggesting that aspects of the self-world capacity could be assessed using electrophysiology. Electrophysiological methods are less costly than other neuroscientific methods, such as MRI, and they are portable, enabling testing in schools **(e.g., Sanger, Thierry and Dorjee, 2018)**. Whilst these methods have excellent temporal resolution (timing of neuronal firing), they cannot easily locate specific brain structures generating the neural signal measured.

In contrast, MRI methods have excellent brain localization, but they do not assess neuronal firing directly as it is happening in real time **(WG3-ch2)**. These methods make inferences about localization of cognitive and affective processes based on assumptions about brain structure or metabolic changes in the brain. Structural MRI can assess associations between self-reported flourishing and the volume or thickness of some brain structures. It works on the assumption that higher involvement of brain structures in a particular flourishing process will result in more frequent or more efficient use of some brain areas resulting in such anatomic changes **(e.g. Lewis et al., 2014)**. This differs from the assumptions of the functional MRI, which detects changes in oxygenated levels of blood as it flows to different parts of the brain in response to changes in their metabolic demand. The assumption here is that brain areas that require more oxygen are the areas that are involved in performance of tasks participants are engaging in while their brain activity is being scanned. In studies on flourishing, researchers can, for instance, select tasks that aim to elicit empathy or compassion in participants **(Kim, Cunnington and Kirby, 2020)** or engage attention control as part of self-regulation **(Tang et al., 2014)**.

Finally, one of the main questions in assessing flourishing relates to choice of research design.
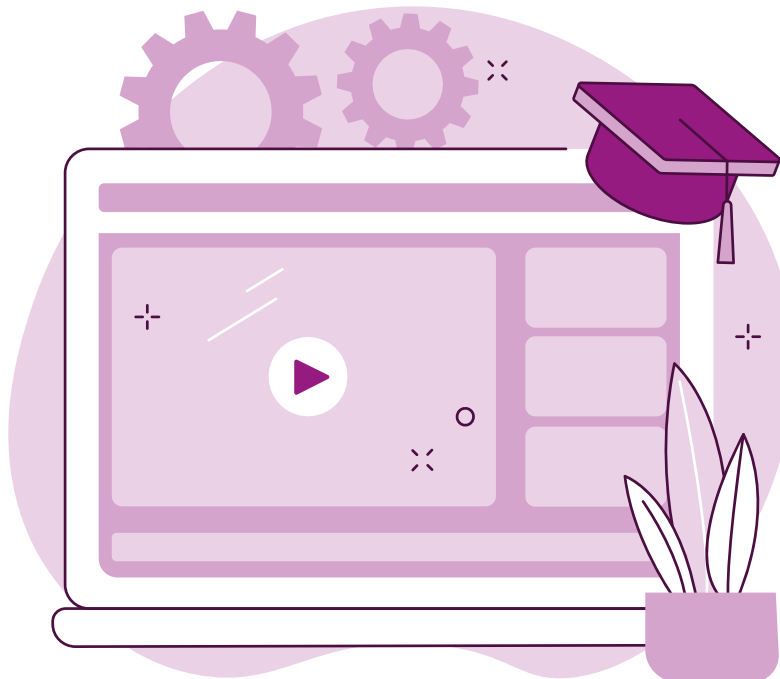
Longitudinal developmental studies with repeated assessments of the same participants can provide us with better understanding of developmental changes in flourishing. Such designs would need to carefully monitor types of flourishing interventions delivered to pupils/students over time to enable inferences about the possible developmental impacts. Whilst they are most valuable for understanding developmental changes in flourishing, longitudinal studies require significant funding since they are time-consuming. Cross-sectional studies, where researchers look at flourishing at particular points in time, often in the form of a survey or in neuroscience studies, can provide further understanding of mechanisms underlying flourishing. And in intervention research, randomized controlled trials are the gold standard, with participants allocated randomly into a training group or a control group with the two groups being compared at a baseline and then at a time point when the intervention in the training groups is completed. However, randomized controlled trials are costly and it often takes several years for their results to be translated into educational practice. For these reasons, there is increasing interest in naturalistic (real-world) implementation studies in flourishing research **(Layard and Ward, 2020)**. The large-scale assessments mentioned earlier are examples of such possible assessments.
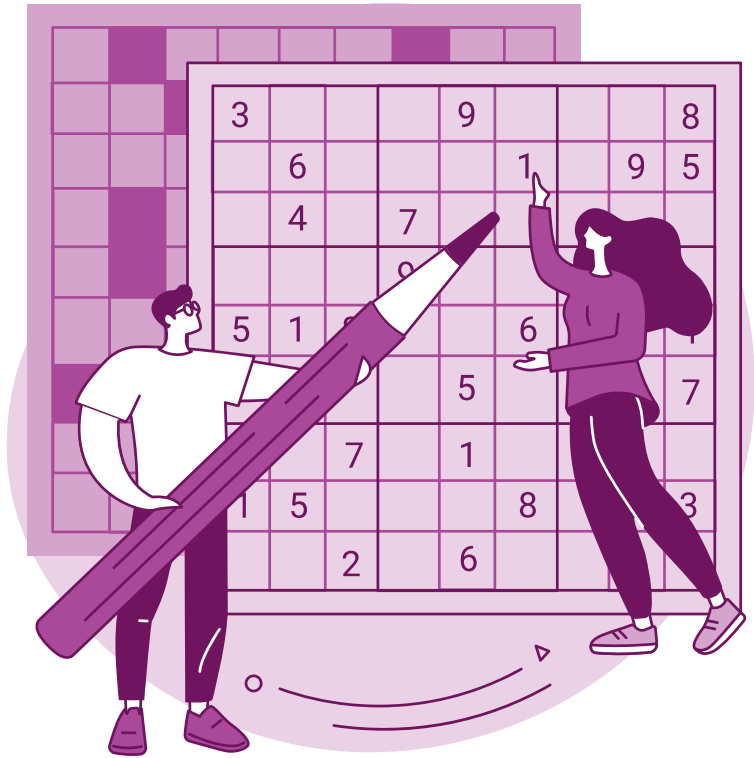
3.6

Conclusion

This chapter proposes a new developmental framework of flourishing. We suggest that flourishing can be operationalized in the developmental context in terms of key psychological needs and their underlying neurocognitive capacities linked to the six learning trajectories of education. This framework highlights the malleability of flourishing by biological and social factors, and the trainability of underlying capacities by targeted school interventions. We highlight the intertwined nature of educational context, and teacher and pupil flourishing in education, and the importance of research informed policy guidance and teacher training in effectively supporting pupil/student flourishing throughout the educational journey. The first step towards such flourishing-enabling educational policies needs to be acknowledgement of flourishing as a central aim of education. Any policy guidance on flourishing in education needs to take into account the multifaceted psychological and neurocognitive changes during child and adolescent development impacting on their abilities to engage with flourishing-supporting initiatives.

3.7 <u>Recommendations</u>

1. Flourishing development is dynamic and malleable, influenced by biological, cultural and social factors including influences of educational environment such as school ethos and teacher stress. Educational policy should reflect understanding of these influences.

2. Research suggests that the predominant focus of current educational policy on academic performance as the educational priority can undermine student flourishing. There is a lack of focus on flourishing as a central purpose of education in educational policy. This imbalance needs to be addressed to create systemic conditions for education to enable flourishing development.

3. Development of flourishing in the educational context can be understood in terms of six key psychological needs, namely autonomy, mastery, relatedness, self-transcendence, wisdom and mattering, which need to be satisfied for flourishing to manifest. These psychological needs are associated with the six pillars of education and underlying neurocognitive capacities which are elaborated in **WG1-ch4**. Policy-makers and educators need to understand these psychological needs and their neurocognitive sources and, in doing so, can guide development and implementation of effective flourishing interventions in education.

4. Formulation of educational provisions that aim to support flourishing in children and adolescents in education needs to be based on understanding of the developmental progression of flourishing determinants, psychological needs and neurocognitive capacities, including developmental vulnerabilities and sensitive periods. This will ensure that effective, developmentally appropriate ways of fostering flourishing are designed and implemented in education.

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