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## *Commentary*

# Defining adolescence: A call for consistency in the chronic pain literature

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Adolescence is the distinct developmental period of transition from childhood to adulthood, involving changes in physical, psychological and biological functioning (Tanti et al., 2011; Berenbaum et al., 2015; Tilton-Weaver & Marshall, 2017; Nahman-Averbuch et al., 2023). Whilst adolescence itself is a well-recognized term, there is a lack of consensus regarding the temporal boundaries of adolescence, leading to confusion across the developmental literature.

When considering a definition of adolescence, a common approach is to align with puberty, such that adolescence spans from the start of puberty to physical maturation. Adopting this position, the World Health Organization (WHO) defines adolescence as spanning ages 10 to 19 years (WHO, 2014). However, this purely physical definition overlooks the significant psychological and social development quintessential to this adolescent period (Lesko, 2012). Indeed, literature has shown adolescence to be a time of increased risk taking, autonomy development, focus on identity formation and increased importance of peer relationships compared with other developmental timepoints (e.g. Lam et al., 2014; Smith et al., 2015; Soenens et al., 2017; Schwartz & Petrova, 2018). Neuropsychological research over the last 20 years has shown that such psychosocial development occurs alongside neurological maturation, which continues into the mid-20s (Foulkes & Blakemore, 2018).

Adding complexity, these developmental processes appear to be elongating over time. Universally, adolescence is assumed to end when adulthood begins, often identified by life events such as moving out of the familial home and assuming financial responsibility for oneself. Over time, such normative signs of entering adulthood are occurring later. For example, across the Western World, the average ages associated with entering full-time employment, moving out from the parental home, getting married, and having children have increased over time (Office for National Statistics, 2019; Population Reference Bureau, 2019; Eurostat, 2022). Despite greater variation, such trends towards signs of adulthood appearing later in life are seen globally (e.g. Raymo et al., 2015). Considering these trends alongside increased life expectancy (GBD 2017 Mortality Collaborators, 2018) suggests that developmental trajectories across the lifespan have elongated. In the normative developmental literature, such changes have led to calls for the creation of a new life stage referred to as emerging adulthood (Arnett et al., 2014). This new life stage of emerging adulthood encapsulates those individuals who are legally adults, but who are yet to achieve adult developmental milestones. However, although the idea of emerging adulthood has been adopted by some, it has also been met with criticism and debate regarding its evidence base and conceptual usefulness (Côté, 2014). It is also important to note that there is a distinction between developmental concepts such as childhood,

adolescence, and adulthood, and legal or societal concepts of child and adult. For example, a 22-year-old may be legally and societally considered an adult, and yet may not be developmentally an adult.

The challenges of clearly defining the age boundaries of adolescence means a plethora of terms and age ranges exist to describe and define this developmental period. In an attempt to overcome this, Sawyer and colleagues (2018) present a valuable overview of the variable terms which are often used interchangeably across the literature (see Table 1). Sawyer et al. (2018) also propose an extended definition of adolescence, spanning an age range of 10 to 24 years old. We agree with this extended definition of adolescence and that its adoption would help to create consistency across the literature.

Table 1
Variations in ages and terminology used in the pediatric pain literature

| Language Used | Ages of participants |
|---|---|
| Children | 2-12 years (Pas et al., 2018) |
| | 10-17 years (Meldrum et al., 2009) |
| Youth | 13-17 years (Forgeron & McGrath, 2008) |
| | 8-18 years (Soltani et al., 2018) |
| Young People | 10-24 years (Jones et al., 2021) |
| | 8-16 years old (Huguet et al., 2009) |
| Adolescent | 12-17 years (Donovan et al., 2013) |
| | 10-24 years (Heathcote et al., 2020) |
| Emerging Adulthood | 18-30 years (Twiddy et al., 2017) |
| | 18-25 years (Bonvanie et al., 2016) |

Whilst it is important to consider the developmental context of adolescence in the normative literature, it has arguably greater importance in the pediatric pain literature. There is a growing body of literature providing evidence that adolescent developmental trajectories are altered in the context of chronic pain. For example, adolescents who experience chronic pain may struggle with their peer relationships and identity development (Jordan et al., 2018; Jones et al., 2021). Alternatively, some adolescents with chronic pain report enhanced autonomy as a result of having to manage the many challenges associated with living with chronic pain (Jones et al., 2022). Such evidence points to the extended age definition of adolescence as the most appropriate term to use within the pain literature, over alternatives such as emerging adulthood, as the developmental tasks are fundamentally adolescent in nature and occur on an elongated timescale. These altered developmental trajectories require pain researchers to ensure greater clarity and transparency regarding conceptual definitions and language around adolescence. Consequently, we strongly encourage members of the pain community to be mindful of their language choices, and to consider the developmental stages and influences on their participants.

Currently in the pediatric pain literature, terminology used to refer to adolescents is loosely defined and used inconsistently, creating confusion and lack of clarity. By way of illustration, the examples in Table 1 show that the same group of 10- to 17-year-olds could be described in multiple ways including as children, youth, young people, or adolescents, dependent on the term adopted by the authors.

Without clarity and developmentally appropriate language, it is impossible to fully contextualize, understand, compare, and draw robust conclusions from research findings. Additionally, further clarity would also provide substantial methodological benefits, for example facilitating sub-group analysis in meta-analytic research. We believe that the extended definition of adolescence proposed by Sawyer et al. (2018) provides the most appropriate and inclusive definition for use within a pediatric pain context. However, we acknowledge that there are challenges raised by this extended definition of adolescence and that inconsistencies in terminology occur due to no single definition being perfect. For example, the 10 to 24 years of age definition of adolescence runs the risk of suggesting that a 12-year-old and a 22-year-old are developmentally equal. Such a problem can be overcome by researchers disaggregating adolescence into early-, mid-, and late-adolescence where needed. A more difficult challenge of the extended definition of adolescence is the inclusion

of some individuals who are pre-pubescent, and some who are developmentally established adults. However, no age-bound definition of adolescence would be able to include all, but solely only those who are developmentally adolescents. Additionally, this extended definition of adolescence could be argued to suggest a reduction in the span of childhood if adolescence is considered to begin earlier. Such issues highlight the complexity of defining adolescence and the need to make a decision concerning whether to have an overly inclusive definition of adolescence (such as the proposed extended age range), an overly exclusive definition, or one that will include some individuals yet exclude others. We feel that the best of these imperfect options is to adopt an overly inclusive definition of adolescence as doing so ensures that all aspects of adolescent development are included, adopting a view of adolescence as a broad transition from childhood to adulthood.

We feel that whilst it is important to acknowledge these imperfections, they do not outweigh the benefits gained by ensuring greater clarity and consistency across the literature. Such consistency would allow for easier review and knowledge synthesis of the literature regarding chronic pain and adolescence. Additionally, consistent use of this extended age definition of adolescence would help to ensure that all aspects of chronic pain and adolescent development are explored.

## Conclusions

Going forward, we propose two strategies. Firstly, in the context of chronic pain and associated altered developmental trajectories, we argue that researchers use the extended age range of adolescence (10 to 24 years of age). Depending on the research question under investigation, this large age range may be disaggregated into early (10 to 14 years), mid (15 to 19 years), and late (20 to 24 years) to reflect more developmentally distinct periods of adolescence. Researchers may decide that only one or two of these subdivisions of adolescence are appropriate for a study, and in those instances, we urge researchers to clearly state which they are using and why. When the entire adolescent age range is used, we recommend that researchers include descriptive statistics outlining the distribution of their sample across the three adolescent subdivisions.

Secondly, although we feel the literature would benefit from consistent use of the extended definition of adolescence, we acknowledge that researchers may disagree and consider alternative terminology more appropriate. For example, terminology choices may be determined by patient and public involvement or how their participants self-define, as seen in the autism literature (Kenny et al., 2016). Regardless of such disagreements, we emphasize the importance of researchers carefully considering terminology and the developmental context of their participants. We urge researchers to be transparent around the rationale for their language choices, and how it aligns with the research question and the participants' developmental stage. Connected to this, we urge reviewers and editors not to impose their own language preferences, and if language choices are well-defined and well-justified, we recommend allowing authors to use the terminology they feel most appropriate. This approach would ensure authors consider and justify their language choices and create greater clarity across the literature as terminology would represent the preferences of the authors and their rationale for their use.

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