Character Strengths Afforded by Arts Engagement During Adolescence: The Development and Validation of the Creative Artistic Activities Strengths Affordances Scale (CAASA scale)

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Abstract

Research into the impact of arts engagement on young people, particularly with regard to their wellbeing, is seeing ever-growing interest. However, it has been argued that methodological limitations, particularly a shortage of reliable measurement tools, may be undermining progress in this research area. Character strengths are established in the literature as a collection of positive traits - displayed through thoughts, feelings, and behaviour - that are related to positive development and enhanced mental wellbeing outcomes. Motivated by the possibility that character strengths that are exercised during arts activities may, at least in-part, account for the positive wellbeing outcomes that have been associated with such activities, this paper outlines the development and evaluation of a novel self-report questionnaire. Specifically, following exploratory and confirmatory factor analysis on data collected from two separate samples of young people, we present a final 15-item scale for measuring patterns of character strengths exercised during arts activities. Our scale, which comprises Self-belief, Social Competence and Curiosity and Exploration, as key groups of strengths exercised during arts engagement shows reliability, convergent validity, and evidence of relative independence from trait level measurements. Following our presentation of its development and validation, the current paper discusses key ways in which our scale can be beneficial in both research and practice: from helping to clarify the precise mechanisms by which arts engagement promotes adolescent development and wellbeing, to supporting arts educators and practitioners that have an interest in leveraging arts engagement in this way.

Keywords: *Character Strengths, Arts engagement, Adolescence, Wellbeing, Development*

Introduction

Creating opportunities to engage in the arts for infants, children and adolescents, is a priority in most societies. Arts programmes specifically for babies are increasingly available, artistic activities are embedded into preschool curricula, and - in addition to subjects like Art, Drama and Music being part of the school curriculum - arts clubs are popular after-school activities. Interestingly, while the promotion of arts engagement in young people may have grown due to implicit assumptions regarding its importance, the potential veracity of such assumptions is seeing ever-greater scientific interest. Today, it is argued, based on research evidence, that early engagement in music, song and dance enhances children's rapidly developing communication and motor skills (Tafuri, 2017; Gerry et al., 2012). Similarly, theoretical accounts suggest that in adolescent years, creative activities, intrinsic to many participatory forms of arts engagement, may have an impact on the development of the self as a whole.

Indeed, in one account, Barbot and Heuser (2017) suggest at least three ways in which creativity may contribute to the development of identity. They suggest that regular engagement in divergent and integrative creative thinking may help the individual explore a wide range of possibilities before finally landing on a "self" or "identity" that is new but adapted to the social world. Similarly, they suggest that the creative outlets adolescents engage in may become a part of their identity, in turn, enhancing their feelings of self-esteem. Last but not least, they argue that the self-expression afforded by creativity can be a source of resilience against the anxieties prevalent in young people.

Interestingly, in many accounts of adolescent engagement with the arts, even passive, more aesthetic forms of engagement, are argued to have the potential to enhance the self. Indeed, music listening, a popular activity engaged in by most young people, has been linked

to empowerment (Elvers, 2016), self-determination (Saarikallio, 2019; Saarikallio et al, 2020), self-esteem (Elvers, 2019), self-awareness (Tarrant et al., 2000; Daykin et al., 2018) and self-identity formation (North, Hargreaves & Oneil, 2000; Laiho, 2004), as well as positive social development (Hallam, 2010; Boer & Abubakar, 2014; Schäfer & Eerola, 2020) and mood regulation (Saarikallio & Erkkilä, 2007; Schäfer et al., 2013; Groarke et al., 2020). In turn, engagement with literature has been associated with enhanced empathy (Bouley & Godfrey, 2008; Bal & Veltkamp, 2013), and improved social skills more broadly (Anderson, 2000; Wolf & Baker, 2012).

Critically, such accounts of how both aesthetic (more passive) and creative (more active) forms of arts engagement may benefit young people resonate well with a positive psychology approach to explaining the outcomes of arts engagement (Nakamura, & Csikszentmihalyi, 2003). Emerging in 1998, in reaction to what was seen as an over-emphasis on mental illness and maladaptive behaviour in psychology, positive psychology focuses on happiness, well-being and positivity (Seligman & Csikszentmihalyi, 2000). Positive psychology is seeing an increasing presence in the art therapy literature (Wilkinson & Chilton, 2013), in addition to increasingly being used as a basis for school-based interventions (Clonan et al., 2004; Shankland & Rosset, 2017). In the current paper, motivated by the possibility that amongst others, the creativity, self-esteem and social skills that are exercised during arts activities may, at least in-part, account for positive outcomes that have been associated with such activities in adolescence, we outline the development and evaluation of a novel self-report questionnaire for testing this possibility.

Arts engagement and wellbeing

The idea that engagement with the arts, both in terms of aesthetic consumption and creative engagement, can provide benefits for wellbeing is a proposition that is gaining widespread attention. Such wellbeing advantages are believed to be present over the lifespan

(Davies et al., 2015; Tymoszuk et al., 2020). However, they may have particular importance in adolescence: indeed, it is well documented that adolescence is a pivotal age period for the onset of mental health conditions, and also increasingly widely acknowledged that, unmanaged, such conditions may lead to a range of difficulties that continue well into adulthood (Kessler et al., 2007; De Girolamo et al., 2012; Galvan, 2017). With the increasing recognition of the need to support mental wellbeing from early adolescence (De Girolamo et al., 2012; Fisher, 2021), and in age-appropriate ways, the potential usefulness of arts-related activities, in boosting cognitive, emotional, and social assets, is increasingly considered, researched and debated.

To explore the potential efficacy of the arts in supporting adolescent mental health, several studies have examined the cognitive, emotional and behavioural outcomes of young people's engagement with interventions across a range of artistic domains (Anderson, 2000; Karkou & Glasman, 2004; Bouley & Godfrey, 2008; Hallam, 2010; Hampshire & Matthijsse, 2010; Connolly et al., 2011; Bungay & Vella-Burrows, 2013; Boer & Abubakar, 2014; Zarobe & Bungay, 2017; Daykin et al., 2018; Ennis & Tonkin, 2018; Geipel et al., 2018; Rizzi et al., 2020; Mannay et al., 2021). In a review that sought to generally summarise the effects of creative and artistic activities on different aspects of young people's mental well-being, Bungay and Vella-Burrows (2013) examined 20 studies involving 11 to 18-year-olds participating in either performing arts (12 studies), visual arts (4 studies), dance (3 studies), or music activities (1 study) both at school and within the community. Across these studies, in activities that were undertaken over a range of time-periods, Bungay and Vella-Burrows found that improvements in a wide range of outcomes - including confidence, self-esteem, sense of achievement, empowerment, social skills, and positive behaviour change - were consistently reported. However, they also rated 16 of the 20 included papers as being at high risk for bias, and argued that the reliability of any conclusions that the studies drew, was

overshadowed by the use of weakly validated measures. In a later paper, Zarobe and Bungay (2017), reviewed eight studies that involved 11 to 18-year-olds undertaking dance, music, theatre/ performance, and visual arts activities in the community or as extra-curricular activities. Increased self-confidence and self-esteem were once more the most frequently reported benefits of arts activities. However, again, and despite being published four years on from the review of Bungay and Vella-Burrows (2013), many of the same methodological issues, including the lack of standardised measurements, were raised.

In summary, there is evidence to suggest that art-based activities have the potential to positively affect young people, with studies documenting improvements in confidence and self-esteem (Zarobe & Bungay, 2017; Mak & Fancourt, 2019; Rizzi et al., 2020; Mannay et al., 2021), emotional regulation and expression (Goldstein, 2011; Moneta & Rousseau, 2008; Rapp-Paglicci et al., 2011), social skills (Karkou & Glasman, 2004; Wolf & Baker, 2012; Boer & Abubakar, 2014; Ennis & Tonkin, 2018), and creative thinking (Hsiao, 2010; Robson & Rowe, 2012). However, it is also clear that despite a growing research interest in exploring the potential benefits of arts engagement on young people's development and wellbeing (Karkou & Glasman, 2004; Stickley et al., 2012; Bungay & Vella-Burrows, 2013; Zarobe & Bungay, 2017; Ennis & Tonkin, 2018), the literature is seeing significant criticism for its lack of standardised measurement using valid tools (Daykin et al., 2008; Bungay & Vella-Burrows, 2013; Zarobe & Bungay, 2017). A major problem arising from different studies using non-standardised measurements is the difficulty of trusting and integrating the conclusions drawn from such studies. In contrast, the widespread use of theory-driven scales with dimensions that have internal and convergent validity and test-retest reliability would encourage the testing of clear hypotheses about how different aspects of arts activities may offer different benefits to young people.

Character strengths and adolescence

When considering the mechanisms that may underlie the positive impact of arts engagement on adolescent wellbeing, an interesting possibility is that the arts exert their influence by allowing individuals to exercise so-called character strengths. Character strengths, described as comprising crucial aspects of affective, cognitive, and behavioural tendencies, as well as social and moral abilities, are well established in positive psychology literature as a collection of positive traits that individuals possess in varying amounts, and which are related to positive development and enhanced mental wellbeing outcomes (Petersen & Seligman, 2004; Park, 2004). Critically, following work in which Peterson and Seligman (2004) proposed the existence of 24 key character strengths in adults, scales measuring individual differences in these positive traits have been translated to several languages, and have seen shown to be consistent across different cultures (e.g., Ruch et al., 2010; Feraco et al., 2021).

Based on the notion that character strengths mature over the life span, such that a number of them (e.g., Appreciation of beauty, Leadership, and Self-regulation), may show less prominence in young people than in adults, The Values in Action Youth (VIA-Youth) scale (Park & Peterson, 2006b) was developed to measure character strengths in 10 to 17-year-olds. Here, while an initial assignment of 24 strengths in the VIA-Youth scale to six underlying “virtue” categories was largely theoretical, factor analysis provided empirical support for the existence of four factors in adolescent populations, namely Temperance strengths (e.g., Self-Regulation, Prudence), Intellectual strengths (e.g., Curiosity, Love of learning), Theological strengths (e.g., Hope, Love), and Other-directed strengths (e.g., Kindness, Modesty). Providing support for their validity, the four factors were seen to show convergent validity with relevant stable personality traits (Park & Peterson, 2006). For instance, highly associated with the personality trait Openness to experience (Silvia & Christiansen, 2020) were the strengths grouped under Intellectual strengths, while most

associated with Agreeableness were those strengths that grouped under Other-directed and Theological strengths (e.g., Kindness, Love, Social Intelligence, Teamwork, and Perspective). In further checks on its reliability and validity, the VIA-Youth scale has been demonstrated to have moderate internal consistency, six-month test-retest reliability, and to correlate with teachers' ratings of school children's behaviours and traits (Park & Peterson, 2006b). Indeed, character strengths have been associated with objective outcomes in a range of academic contexts (Weber & Ruch 2012; Shoshani & Slone 2013; Wagner & Ruch, 2015; Wagner et al., 2020), with strengths like Love of learning, Perseverance, and Prudence, showing links to school achievement in 12-year-old Swiss children (Weber & Ruch, 2012).

Here, it is relevant to clarify that efforts have been made to clarify the extent to which character strengths should be viewed as different from personality traits (Dametto & Noronha 2021; McGrath et al., 2017). Indeed, it has been suggested that while character strengths and personality traits are similar in describing dispositions with regard to values and self-perceptions, they are different in at least three ways: firstly, unlike personality traits, which include a very wide spectrum of personal attributes, character strengths are more prescriptive; for example, including only positive traits (McGrath, 2015). Secondly, and conversely, some strengths like gratitude, perspective and fairness are argued to not necessarily be reflected in the main models of personality assessment (McGrath et al., 2017). Thirdly, personality traits are held to have a biological basis (Bouchard, 1994) and to be relatively stable over time (Johnsen, 2014), while in contrast it is argued that, because of the greater malleability they have compared to personality traits, it is possible to train character strengths (Park & Peterson, 2009). This final difference is perhaps the most important for our research, which seeks to promote understanding regarding character strengths development through arts engagement.

The development of character strengths through curated arts activities?

Justification for the study of links between character strengths, arts engagement, and wellbeing arguably comes from at least three lines of research. The first line of research is cross-sectional data showing associations between character strengths and the subjective wellbeing of both young people (Van Eeden et al., 2008; Gillham et al., 2011; Weber et al., 2013; Ruch et al., 2014) and adults (Park et al., 2004; Shimai et al., 2006; Peterson et al., 2007). Furthermore, suggesting nuanced underlying mechanisms, links have been made between specific groups of strengths and specific aspects of wellbeing, with, for instance, interpersonal or other-directed strengths being particularly related to emotional wellbeing (Gillham et al., 2011).

The second line of research is a preliminary literature linking character strengths development to arts engagement. One example of such research is a study of the character strengths exercised during poetry reading in the context of language learning (Piaseka, 2016). There, participants reported exercising character strengths like creativity and curiosity that have been related to self-efficacy and life-satisfaction. Other examples of such research - using qualitative methods - found that young people associate activities such as writing and dancing with purpose, where purpose is described as “the long-term, forward-looking intention to accomplish aims that are meaningful to the self and of consequence to the world beyond the self” (Malin et al., 2017, pp 1200, Malin, 2015).

Finally, a third line of research is based on the notion that character strengths can be trained and developed (Park & Peterson, 2009); in other words that certain activities or interventions that are designed to train or enhance certain character strengths in individuals are indeed able to do so. Indeed, a pertinent seminal study by Proyer and colleagues (2013), that included a writing task, sought to experimentally test the effect of training specific character strengths on changes in adult life satisfaction. Accordingly, an adult sample, constituting an “experimental group” was trained in strengths previously identified to be

strongly correlated with life satisfaction. Specifically, these participants carried out interventions relating to Curiosity (participating in new activities that encouraged exploration), Gratitude (composing a "gratitude letter") and Humor (completing a Humor training program by McGhee, 2010), amongst others. Scores on life satisfaction measures were taken before and after the interventions and compared with those of two control groups: a waitlist control group and one that was trained in strengths weakly correlated with life satisfaction. In line with the authors' hypotheses, the experimental group (trained in character strengths highly associated with life satisfaction) showed significantly larger increases (pre-to-post intervention) in life satisfaction levels when compared to both control groups. Furthermore, the authors reported that those participants that, prior to the intervention, displayed the lowest levels of the trained strengths, also showed the greatest increases in life satisfaction following the intervention (Proyer et al., 2013).

Taken together then, three lines of findings suggest that carefully designed interventions, including art-based ones, may be able to contribute to the development of character strengths that, in turn, promote life satisfaction and other aspects of wellbeing. Critically, since even outside the character strengths literature, creativity is understood to be something that can be trained and developed (Scott et al., 2004), arts engagement-based interventions would appear to afford both the development of creativity specifically, and the enhancement of character strengths more generally. However, despite these lines of support for a scale measuring the extent to which creativity and other strengths are being exercised during the arts, such a scale remains as yet, unavailable.

When designing new tools, it is important to be sure that they are truly necessary. We argue that the tool that we seek to create is valuable for a number of reasons. Firstly, arts educators and practitioners would benefit greatly from a tool that allows them to robustly evaluate the impact of their arts-related projects, education programmes, and interventions on

young people's character development, and consequently wellbeing. While qualified researchers could arguably adapt an existing list of character strengths or items in a way that allows the specific question of character development through art engagement to be addressed, other groups (e.g., arts educators and practitioners) may not have the confidence or expertise to do so effectively. Critically, failure to use an appropriate tool in this context (for example, using, as is, the 96 items present in the VIA youth scale, many of which would not seem relevant in an arts context) could have detrimental effects on the meaningfulness of the data acquired.

Secondly, our tool is much needed in a research field looking to not only improve the quality of its insights but which is also looking to better characterise the mechanisms by which engagement in the arts may afford benefits. Geipel and colleagues (2018) highlighted how the consistent use of validated scales would allow more accurate estimation of the size of the effect of arts participation on mental health. Here we emphasise that a validated tool, that allows careful measurement of the different groups of strengths that may be exercised during different types of arts engagement, would also allow nuanced insights into mechanistic links between arts engagement, character strength development and mental wellbeing. From a methodological perspective, a psychometrically validated scale that allows researchers to clarify that certain arts activities may afford certain strengths, before they then test the impact of these activities on mental wellbeing using experimental designs (e.g., randomised controlled trials), would be an invaluable addition to the resources available to researchers.

Last but not least, the ability of both researchers and arts practitioners to more carefully quantify and therefore document the impact of arts engagement on adolescent development would mean the growth of a much needed-evidence base that can be used to inform relevant policy-makers' decision-making.

Taken together, a reliable tool that can be used to promote insights into how the arts may be able to promote and enhance adolescent mental wellbeing is much needed. It is against this backdrop that the current study sought to develop a scale that measures character strengths exercised during the arts.

The current study

Research to date suggests that aspects of character that are developed through adolescence may go on to promote future wellbeing (Park & Peterson, 2006b; Gillham et al., 2011). Further, observations that arts interventions are associated with the exercising of character strengths (Piaseka, 2016; Malin, 2015; Malin, 2017) and may have wide-ranging positive impact on wellbeing (e.g., Zarobe & Bungay, 2017), provide support for the idea that the arts can be used to pre-emptively build and develop strengths that will later inhibit certain mental health issues from emerging.

Predicated on the idea that a promising way to examine the mechanisms underlying the benefits of the arts is by measuring the character strengths young people are exercising whilst engaging in art activities, the current paper chronicles the development and validation of a self-report scale -the Creative Artistic Activities Strengths Affordances Scale (CAASA)- that allows just that. In Study 1, inspired by 24 key character strengths found in the positive psychology literature, scale items were generated and an initial scale was administered to a large sample of young adolescents. Subsequently, Exploratory Factor Analysis (EFA) was conducted to remove irrelevant items and to identify the factor structure in the acquired data. In Study 2, a second sample of young people filled out the reduced (based on Study 1) set of items either once or twice. Subsequently, a Confirmatory Factor Analysis (CFA) was used to confirm the factor structure of the scale, while further evaluation was carried out using tests of reliability, validity, and independence from trait measures.

"The arts" are often described as comprising key domains such as music, visual art, dance, and literature. However, more sophisticated definitions describe it as a multifaceted construct encompassing features, including but not limited to novelty, creativity, representation, enjoyment and individual expression (Dutton, 2006). In this study, we observed Dutton's definition of the arts as activities in line with these features. Further, operating in what is termed the 'digital age', we chose to recognize that young people increasingly show artistry and creativity in the context of digital technologies (Peppler, 2010), and so, rather than exclude them, considered activities such as photograph editing and digital music production as forms of arts engagement.

Continuing along these lines of inclusivity, our study included arts activities engaged in at home, school (including lessons) and elsewhere and counted relatively passive arts activities (aesthetic in essence such as music listening and reading), alongside more active and creative ones (such as playing an instrument or writing) in its definition of arts engagement. This approach was taken not only because it was deemed optimal to provide a scale that is relevant for the wide spectrum of ways young people engage with the arts, but also due to the large amount of literature (as reviewed earlier) confirming the benefits and importance of even more passive forms of art consumption.

Study 1- Item generation and CAASA scale development

The aim of Study 1 was to carry out the first step in the development of a scale that measures the character strengths young people exercise during engagement in a range of arts activities.

The creation of a new scale involves three stages, namely item development, scale development, and scale evaluation (Boateng et al., 2018). Here, in Study 1, the item and scale development stages were undertaken. First, items were generated that pertained to character strengths-inspired thoughts, feelings, and behaviours that could materialise during artistic

activities, before a first version of the scale was then administered to an initial sample of young people. Next, scale development took place through factor extraction and rotation processes that allowed item reduction and the establishment of a robust factor structure.

Based on previous categorisations and factor structures of character strengths, and on the results of our review of positive outcomes seen to emerge from adolescent arts engagement, we predicted that our initial set of items would generally cluster into three or four clusters: Specifically, we hypothesised our list of items would likely group into - at the very least – distinct dimensions capturing strengths related to self-empowerment, social belonging, and intellectual satisfaction.

Methods

Participants

Early adolescents (11- to 14-year-olds) were recruited through secondary schools via a collaboration with Curious Minds- a charity organisation that brokers arts and culture opportunities for young people. In terms of data collection for scale development, general rules of thumb suggest a minimum of 10 participants per variable (Boateng et al., 2018) or a minimum number of 300 or more participants, to provide stable solutions and increase statistical power. Thus, we aimed to recruit at least 450 participants to allow for the rejection of any inappropriate (non-arts activity related) or incomplete responses. Preliminary screening procedures yielded 385 data cases remaining for analysis, after excluding incomplete survey responses and all entries that were related to sport activities, non-art related school subjects and non-creative leisure activities. The final participant sample selected for inclusion was between 11 and 14 years old (M = 12.67, SD = 1.03) and showed a roughly equal balance of gender (Males = 183 participants, Females = 179 participants, Non-binary/ Prefer not to say = 23 participants).

In addition to parents or guardians providing informed consent, young people were also required to agree to participate or not at the beginning of the online questionnaire. Ethical approval was granted by the University's Ethics committee. A prize draw for £20 gift vouchers served as an incentive for participation.

Materials and procedure

Questionnaire items were inspired by 24-character strengths included in the VIA-Youth scale (Park & Peterson, 2006b), where character strengths can be described as positive traits displayed by young people in varying degrees (Park & Peterson, 2006b; Gillham et al., 2011). In addition to its justification based on the large literature suggesting meaningfulness of these strengths, basing items for our scale on strengths listed in the well-known VIA-youth framework, promised greater ease of re-integrating any findings, using our scale, into the broad and constantly growing literature on character strengths in adolescence.

First, three researchers were tasked with generating, for each of the 24 named strengths, two items that captured how participants might think, feel, or behave when engaging in any given art activity. Items were worded appropriately for young people and were framed within familiar social settings (e.g., with friends, at school, or at home). The items were kept unspecific enough to apply to a diverse range of artistic activities, thus adhering to our definition of arts engagement as encompassing a range of passive and active activities.

The researchers then established item concurrence by independently evaluating the quality and relevance of each item generated, before agreeing and settling on a final initial pool of 24 statements (one item for each strength). Finally, two experts in scale development and in developmental psychology research assessed the scale items for clarity and age appropriateness.

All final items began with the stem "*In general, when I am doing the art activity that I most frequently engage in…*" and ended with a statement related to the corresponding strength. For instance, for the strength, "Bravery and Valour", the item was "*In general, when I am doing the art activity that I most frequently engage in, I tend to try out new things even if I don't feel very confident"*, for the strength "Perspective" the item was *"In general, when I am doing the art activity that I most frequently engage in, it helps a lot to put myself in other people's shoes"* while for the strength "Self-regulation", the item was "*In general, when I am doing the art activity that I most frequently engage in, I feel able to keep my emotions in check*". A full list of the items can be seen in Table 1. In addition to using the stem ["In general, when I am doing the art activity that …"], our instructions also emphasised the need for participants to report on their state during the activity. "Please also note that we are not asking about how you tend to feel in general or how you tend to see yourself (more questions about that in the second part of survey!). Rather, we'd like you to think specifically about what tends to happen and how you tend to feel during the arts activity you just mentioned."

During sessions guided by their school teachers, young people accessed the survey, which was hosted on an online survey platform (Qualtrics, Provo, UT), through computers in computer labs. Following inputting of their demographic information at the beginning of the survey, participants were first provided with a definition of arts activities and were then required to enter up to five artistic activities they engaged in, indicating the regularity with which they engaged in each of them.

After specifying the art activity that they engaged in the most, as well as where, and with whom they tended to engage in the given art activity, participants were directed to consider each of the 24 scale items in terms of their agreement with them. Participants rated their agreement with each of the items using a 5-point Likert scale ranging from "1- *Not true at all*" to "5- *Very true*".

Analysis

R Studio version 1.4.1717 was used to conduct data analysis. The data of 4 participants were excluded as they provided the same rating to all items, leaving 381 participants for inclusion in further analysis.

To determine the appropriate number of factors to be extracted in a subsequent EFA, the *nfactors* function from the psych R package (Revelle, 2018) was used to compute a number of different estimates (e.g., Velicer MAP and Empirical BIC). All items/variables were then evaluated for skewness, while the Kaiser-Meyer-Olkin (KMO) test, and Bartlett's test of sphericity were conducted to assess the suitability of the data for structure detection. Finally, an EFA, specifying *maximum likelihood* as method, was carried out using the function *fa* from the R package *psych*. Expecting that the extracted factors would be interrelated, *oblimin* (oblique) factor extraction, which results in variables maximally loading onto one factor, and which thus increases the interpretability of the analysis (Field et al., 2012), was employed as the factor rotation method.

After the initial EFA, items were removed on three conditions: *i)* if they had uniqueness values greater than 0.7, since high uniqueness values indicate that a high amount of the item's variance is not explained by factors in the model (Chen, West & Sousa, 2006) *ii)* if they had only very low loadings (all < 0.3), or *iii)* if they showed cross loading across dimensions (i.e. where the ratio of the loading of the strongest group factor to the loading on the second strongest group factor was 1.5 or less). Different factor solutions were then estimated and compared based on a number of measures (namely the Bayesian information criterion (BIC), RMSEA (root-mean-square error of approximation), RMSR (root mean square of the residuals), TLI (Tucker Lewis index)) before a final solution was accepted.

Results

A large proportion of children reported on painting/drawing (~20%) and general arts and crafts, and singing (~10% each). Slightly smaller proportions reported on activities related to drama/theatre, digital creative activities (photo or video editing, coding), music instrument playing, dance, general music activities, writing, reading and music lessons (on average ~7% each). Finally, the smallest proportions reported on art lessons and music listening (each < 3%). A full list can be seen in the appendix.

The overall KMO measure of sampling adequacy was revealed to be 0.9 while the KMO for each of the 24 variables exceeded 0.8. As KMO values between .8 and .9 are deemed to be 'great' and values above .9 considered 'superb' (Field et al., 2012), the obtained KMO values confirmed that the data was highly suitable for factor structure detection. Bartlett's test of sphericity also confirmed sufficient correlations between variables ($\chi 2$ (276) = 2566.46, $p < .001$), thus providing further evidence that the data were suitable for factor analysis. No variables displayed skewness or kurtosis (no values > 2 or <- 2), and thus all were included in further analysis.

A scree plot shows the first 6 eigenvalues to be 6.66, 1.83 1.64, 1.26, 0.98 and 0.97 (Supplementary Figure 1). Testing for the appropriate number of factors, Sample size adjusted BIC and Parallel analysis suggested a 4-factor solution would be best, while the Velicer MAP and Empirical BIC measures recommended a 3-factor solution. BIC indicates whether higher complexity affords a better model fit over a simpler model. As lower BIC values signify a better model fit, models with low values should be preferred over those with higher values (Vrieze, 2012). Thus, as comparison of a 3 and 4-factor model, following EFA, showed the 3-factor model to have the lower BIC value (3-factor model: -849.82, 4-factor model: -810.09), an initial EFA with three factors was accepted and, as planned, items were removed in line with pre-described criteria. Specifically, seven items (corresponding to Leadership, Love, Perseverance, Prudence, Appreciation of Beauty, Creativity and Gratitude)

were removed for yielding high uniqueness values ($h > 0.7$) while a further three items (corresponding to Teamwork, Forgiveness and Judgment strengths) were removed due to high cross-loading.

Following item rejection, three models (3-factor, 4-factor and 2-factor) were once more compared to ensure that the 3-factor solution still provided the simplest and best solution. Once again, the model with three factors yielded a lower BIC value than the 4-factor model and was also seen to be better than the 2-factor model (3-factor BIC: -186.79; 4-factor BIC: -166.98; 2-factor BIC: -167.39).

Finally, goodness of fit indices were estimated to allow assessment of the fit of the 3-factor model: the RMSR was 0.04 (values below .05 are recommended; Jackson et al., 2009); the RMSEA was 0.059, 90% CI [0.046 - 0.073] (values below .060 indicate close fit; Hu & Bentler, 1999; Field et al., 2012); and the TLI was 0.91 (and was thus acceptable according to Hu & Bentler, 1999).

Figure 1 and Table 1 show how the final remaining 14 items grouped into the three obtained factors: Factor one, thanks to its items relating to several aspects of self-related positive thinking and self-regulation, was labelled Self-Belief. Factor two, comprising items related to positive and constructive interactions with others, was labelled Social Competence. Finally Factor three, comprising items related to information seeking and positive experiences with learning, was labelled Curiosity and Exploration (Figure 1).

Supplementary Table 1 shows descriptive statistics for scores on this initial scale. There was no indication of floor or ceiling effects, and all items had very good kurtosis levels (all values within +1 and -1) and at least acceptable skewness levels (all values within +2 and -2). Cronbach's alpha measures of reliability for each of the factors indicated moderate/ acceptable internal reliability (Self-belief $\alpha = 0.75$; Social Competence $\alpha = 0.75$; Curiosity & Exploration $\alpha = 0.65$).

Insert Tables 1 and Figure 1 here.

Summary of Study 1

The purpose of Study 1 was to, using EFA, reject ill-fitting scale items and identify the factor structure within those items that remained. Results recommended the removal of 10 out of 24 items and revealed that a 3-factor solution offered the most stable grouping of the remaining items. We called the emerging dimensions Self-belief, Social Competency and Curiosity and Exploration.

In line with our predictions, and lending support to their meaningfulness, we note that the three dimensions are reminiscent of the positive psychology literature on character strengths in young people (Park & Peterson, 2006b), where four dimensions (labelled Temperance, Transcendence, Other Directed and Intellectual strengths) tend to be reported. We note our dimensions are also reminiscent of some of the most widely reported outcomes of arts engagement in the literature, namely increased self-confidence, and social and emotional competence.

The results of Study 1 were thus compelling in emphasising that strengths exercised during arts engagement group persuasively into factors related to positive self-view, social competencies and intellectual strengths. Ultimately, however, the interpretability of factors and the good model fits obtained in our first study was a necessary basis for continuation to the next stage of our tool's development.

Study 2- Evaluation of the CAASA scale

The purpose of Study 2 was to carry out evaluation of our tool, an important stage in scale development in which *i)* tests of dimensionality are conducted on data collected from a new sample of individuals, and *ii)* the confirmed dimensions are then tested for reliability and validity (Boateng et al., 2018).

We administered a new survey comprising items that fell into three distinct parts. The first part of the survey was the items of our reduced scale comprising statements capturing character strengths that may be exercised during arts activities. The second part of the survey, which sought to determine how well our scale's dimensions correlated with items measuring similar constructs, included items from subscales of three validated measures: the Emotion Regulation Strategies for Artistic Creative Activities Scale (ERS-ACA; Fancourt et al., 2019), the Aesthetic Emotions (AESTHEMOS) scale (Schindler et al., 2017), and the Milwaukee Youth Belongingness Scale (MYBS, Slaten et al., 2019). Finally, the third part of our survey, which sought to allow evaluation of the extent to which our scale captures state rather than trait measures, contained both a widely-used test of personality (an adapted version of the Ten Item Personality Inventory (TIPI) from Gosling et al., 2003, described in Müllensiefen et al, 2015) and a widely-used test of adolescent social and emotional adjustment (Strengths and Difficulties Questionnaire (SDQ); He et al., 2013)).

With regard to the results of tests of dimensionality of our scale, we expected to find support (as provided by good model fit indices and evidence of good internal and test-retest reliability) for the three dimensions we had previously identified using the EFA in Study 1. Further with regard to determining how well our scale's dimensions correlated with items measuring similar constructs (convergent validity), we predicted particularly good convergence between our three scale dimensions and the three subscale dimensions we selected based on the construct similarities.

Firstly, in relation to our Self-belief dimension, which encompasses the strengths Zest, Self-regulation, Hope, Meaning and Honesty, the Self-development strategies subscale of the ERS-ACA (Fancourt et al., 2019) was selected. The ERS-ACA measures the different types of emotion regulation strategies used when engaging in the arts; from 'avoidance' (e.g., distraction) and 'approach' (e.g., problem solving) strategies to so-called 'self-development'

strategies'. Self-development strategies of the ERS-ACA was considered a similar construct to Self-belief because it encapsulates items related to a positive self-evaluation and world view; from enhanced self-identify (e.g., '*…it reaffirms my identity')*, to improved self-esteem, confidence and agency (e.g., '*…it boosts my self-esteem',* '*…I feel more confident in myself')*.

Secondly, concerning our Social Competence dimension, which encompasses the strengths Fairness, Humility, Humour, Kindness, Social intelligence and Perspective, both the Peer and School subscales of the MYBS (Slaten et al., 2019) were used. The MYBS is a measure of belonging in youth that seeks to capture the multidimensionality of the construct (family, school, and peers) and which has better psychometric properties than many previous similar tools. Belonging is characterised by consistent interpersonal relationships within a group, and so we expected our Social Competence dimension, comprised of interpersonal strengths, to show high correlation with feelings of belonging to school and peers (e.g., Peer Belongingness '*…get along with peers'* and School Belongingness '*….enjoy going to school')*.

Lastly, we compared our Curiosity and Exploration dimension with the Epistemic Emotion items of the AESTHEMOS scale (Schindler et al., 2017). The AESTHEMOS scale, which is a tool designed to assess the aesthetic emotional responses to stimuli from a range of domains (e.g., design, architecture, nature), comprises seven factors: negative, prototypical aesthetic, animation, nostalgia/relaxation, sadness, amusement and epistemic emotions. We used the Epistemic Emotion items of the AESTHEMOS scale since these relate to knowledge-based responses to the arts such as Curiosity (e.g., '*made me curious'*), Interest (e.g., '*sparked my interest'*), and Insight (e.g., '*felt a sudden insight'*).

In general, we expected that the three dimensions of our scale would be at least moderately to strongly correlated with the scales that we selected (*r* values from .5 upwards)

in line with conventions for assessing convergent validity. However, given the inter-relatedness of our scale's dimensions, and the inter-related nature of the constructs we used for validity checking, we also anticipated small to moderate correlations between *i)* all of the dimensions of our scale and *ii)* pairs of the set of constructs (*r* values up to approximately .6)

Finally, with regard to determining the extent to which art-activity related states rather than merely trait character strengths were indeed being measured by our scale, we expected that while we would see largest associations between each of our three dimensions and those stable traits that the literature has suggested are most associated with the character strengths in each of these three dimensions (e.g. our Curiosity and Exploration dimension correlating most strongly with Openness to Experience of the Big 5 TIPI scale, and our Social Competence dimension with both the Agreeableness of the Big 5 TIPI scale, and the pro-social scale of the SDQ), we would also see that such correlations were nevertheless only small to moderate sized (rather than strong) and that such associations were not exclusive (i.e. such predictable state-trait associations were accompanied by comparable sized correlations between less expected pairs of state-trait constructs).

Methods

Participants

As for Study 1, we aimed to recruit 450 participants since we anticipated a number of both incomplete responses and responses where young people erroneously responded based on a non-creative non-art activity. Data screening procedures matching those in Study 1 resulted in 301 data cases for analysis (M = 12.67, SD = 0.89; Females =142 participants, Males = 138 participants, Non-binary / Prefer not to say = 21 participants).

Of these participants, approximately 70 were invited to complete the scale at a second time point, so as to allow assessment of test-retest reliability of our scale. These participants were the only ones invited to participate as they belonged to the only classes that were able to

participate again before the school year ended. On completing the scale a second time, they were required to think back to the activity they had reported the first time they completed it, and to once more provide responses based on that activity. To increase the likelihood that we would obtain a correct identifying code (necessary for matching participants' responses across their two completions of the survey), participants were required to provide their unique identifying code both at the beginning and at the end of the second survey.

We opted for a semi-conservative approach whereby i) as long as it was clear that entries were from the same participant (e.g., juab11 and abju11, with no other codes containing ju or ab), and ii) as long as the activities reported were similar across timepoints *(e.g., 1st entry: drawing and 2nd entry: art)*, participant data was included in the analysis. This led to a final sample of 55 participants being used in the test-retest reliability analysis. In addition to requesting informed consent from parents and guardians, young people were also required to provide consent before commencing all surveys. Ethical approval was granted by the University's ethics committee.

Materials and procedure

Supplementary Table 2 shows the items used in Study 1 and Study 2. In the interest of increasing the stability of the final scale, it was decided to add a new item to the 14 items that were retained following Study 1. This new Creativity-related item *"When I am engaging…I tend to think of new and different ways of doing things"* was expected to load onto the Curiosity and Exploration dimension and, in potentially bringing the number of items in this dimension from three to four, was expected to provide an item-to-factor loading more comparable to the two other dimensions (having five and six items).

Participants completed all scales in the same order. First, they rated their agreement with the 15 items regarding character strengths exercised during their named art activity. Next, participants responded to the 17 items that were chosen to assess convergent validity of

598 the three dimensions of our scale namely: the five items of the Self-development Strategies
599 subscale of the ERS-ACA (Fancourt et al., 2019); the three Peer and three School
600 Belongingness subscale items from the MYBS (Slaten et al., 2019); and finally, the six
601 Epistemic Emotions subscale items from the AESTHEMOS (Schindler et al., 2017). All
602 items were presented to begin with "*In general, when I am doing the art activity I mentioned*
603 *above, I feel* ..." to ensure that state experiences were reported.

604 Following this, participants responded to scale items that were included to examine
605 levels of independence of what our scale sought to measure (namely states) from stable
606 personality traits, and levels of social and emotional adjustment; specifically, an amended
607 version of the TIPI (Gosling et al., 2003), which, to improve accessibility for adolescents
608 includes 2 additional synonyms for each of the 10 items (see Müllensiefen et al., 2015) and
609 the Pro-social Behaviour, Emotional Symptoms, Hyperactivity and Peer problems subscales
610 of the Strengths and Difficulties Questionnaire (SDQ; He et al., 2013).

611 The survey closed with a thank you note and a debrief page. As in Study 1, a prize
612 draw with the opportunity for participants to win £20 gift vouchers was used to incentivise
613 participation.

614 **Analysis.**

615 Data analysis was conducted using R Studio version 1.4.1717. The *cfa* function from
616 the *lavaan* package was used to carry out a CFA on the new data. To determine the fit of the
617 model to the data and following best practice in CFA goodness of fit evaluation (Brown,
618 2006), we estimated Standardised Root Mean Square of the Residuals (SRMR), Root Mean
619 Square of the Error Approximation (RMSEA), Akaike Information criterion (AIC),
620 Comparative fit index (CFI) and Tucker Lewis index (TLI), thus covering all types of model
621 fit evaluation (absolute, parsimony, comparative).

Pearson's correlation analyses were then carried out in order to explore the associations between the three dimensions of our scale and all other scales presented. To determine internal reliability of the scale, we computed Cronbach's alpha values, while to evaluate test-retest reliability, we submitted participants' test scores, at baseline and after a follow up of at least three weeks, to the *test-retest* function from the *psych* package.

Results

Study 2 analyses aimed to confirm and validate the 3-factor structure identified in Study 1, to determine the quality of internal and test-retest reliability of our scale, and finally, to use correlational analysis to establish both convergent validity of our scale on the one hand, and its relative independence from trait measurement, on the other.

CFA

We computed a CFA specifying three factors, where the 14 items from Study 1 were assigned to dimensions in line with the results of the EFA, and where the new Creativity-related item was additionally assigned to the Curiosity and Exploration dimension. Fit indices indicated a satisfactory fit of the model to the data ($\chi^2 = 202.6$, $df = 87$, $p < .001$; RMSEA = 0.069, SRMR = 0.053, TLI = 0.90, CFI = 0.92, AIC = 12220.04). Table 2 shows the 15 items, and their membership and loading, on to the three factors.

Insert Table 2 about here.

Measures of reliability

Reliability estimates indicate the consistency of measurement of a self-report Questionnaire, both across participants and over time (Wieland et al., 2017). Cronbach's alpha measures of reliability provided the following values: Self-belief $\alpha = 0.76$; Social Competence $\alpha = 0.81$; Curiosity & Exploration $\alpha = 0.78$. Further, a test-retest correlation of 0.72 was obtained for the Self-belief subscale, 0.75 for the Social Competence subscale and

0.69 for the Curiosity & Exploration subscale. Thus, taken together, results confirmed the scale to have largely acceptable reliability properties.

Construct validity

Table 3 shows the results of Pearson correlations between the three dimensions of our scale and subscales taken from the ERS-ACA (Fancourt et al., 2019), AESTHEMOS (Schindler et al., 2017), and MYBS (Slaten et al., 2019) scales. As predicted, all three factors of our scale demonstrated convergent validity (at least moderate correlation, $r > .5$) with the specific closely related subscales from other measures: specifically our Self-Belief dimension with the Self-Development Strategies subscale of the ERS-ACA ($r = 0.72$); our Social Competence dimension with both Peer Belongingness ($r = 0.63$) and School Belongingness ($r = 0.58$) subscale of the MYBS, and our Curiosity and Exploration dimension with the Epistemic Emotions ($r = 0.65$) subscale of the AESTHEMOS. Critically, these anticipated correlations were also the highest observed between our subscales and those selected for comparison.

Nevertheless, also in line with our acknowledgment of the inter-relatedness of our constructs as well as the inter-relatedness of those scales which we used to establish convergence validity, notable is *i)* that the three factors in our scale also correlated significantly with each other (all *r* between 0.5 and 0.56) and that *ii)* the scales we used for evaluating convergent validity also correlated fairly highly with each other (all *r* between 0.54 and 0.76).

Insert Table 3 about here.

Scale's independence from trait measures?

Table 4 shows the results of Pearson correlations between the three dimensions of our scale and subscales of the TIPI (Gosling et al., 2003; Müllensiefen et al., 2015), while Table 5 displays the correlations between our scale's dimensions and the SDQ (He et al., 2013).

With regard to correlations between our scale's dimensions and subscales of the TIPI, we observed a range of associations from non-significant to both small positive (*r* values ranging from 0.03 to 0.44) and small negative (*r* values ranging from -0.24 to -0.45) associations. Specifically, all three dimensions of our CAASA scale displayed *i)* small positive associations with Agreeableness, Conscientiousness and Openness (*r v*alues ranging from 0.24 to 0.44), *ii)* small negative associations with Neuroticism (*r* values ranging from -0.24 to -0.45), and *iii)* negligible associations with Extroversion (*r* values ranging from 0.03 to 0.22).

As we expected, Self-belief showed a small negative association with Neuroticism (*r* = -0.45). However, also expected, and speaking against the idea that Self-belief may simply therefore reflect trait emotional stability/ Neuroticism, positive correlations of Self-belief with Agreeableness, Conscientious and Openness were seen to be comparably high (*r* values up to 0.44). Similarly, while the Social Competence dimension's highest correlation was with Agreeableness (*r* = 0.43), we found this dimension to have comparably high correlation strengths with Conscientiousness (*r* = 0.38) and Openness (*r* = 0.35). Last but not least, Curiosity and Exploration correlated highest with Openness to Experience but as with all our other dimensions only at to a limited degree((*r* = 0.43).

With regard to comparisons with the SDQ, all three subscales showed small to moderate associations with the Pro-social scale (*r* values between 0.39 and 0.54) but just non-significant to negligible or small associations with Peer Problems (*r* values between -0.29 and -0.04), Emotion Problems (*r* values from -0.34 to 0.07) and Hyperactivity (*r* values ranging from -0.32 to -0.17). Critically, while Social Competence showed the highest correlation with Pro-social as may be expected (*r* = 0.54) and while Self-belief was the only dimension to show a significant relationship with Emotional Problems (*r* = -0.34), the relatively weaker correlations seen (*r* values up to -/+ 0.54) compared to when testing for convergent validity (*r*

values up to 0.72) suggest that our scale may generally measure character strengths exercised during arts activities rather than simply stable traits related to personality and strengths and difficulties in everyday life.

Insert Tables 4 and 5 about here.

Supplementary Table 3 shows descriptive statistics for scores on our final scale. There was no indication of floor or ceiling effects and apart from the Fairness item (which had only acceptable kurtosis (-1.12)), all items showed very good kurtosis and skewness (all values within +1 and -1). The final scale, with a description, and dimension details can be seen in Supplementary Table 4.

Summary of Study 2

Study 2 sought to establish support for the 3-dimension structure identified in Study 1 and to examine evidence of scale reliability, scale validity, and relative independence of our scale from more stable trait measures.

We were able to confirm the model structure from Study 1, and our results showed satisfactory internal reliability and test-retest estimates. Indeed, although it has been suggested that a reliability of .95 should be considered the desirable standard, our obtained scores ranging between 0.76 and 0.81, exceed the .70 cut-off that is commonly used (Lance et al., 2006; Nunnally, 1970)

Further, the observed relationships between our scale's three dimension and the subscales from the AESTHEMOS (Schindler et al., 2017), ERS-ACA (Fancourt et al., 2019), and MYBS (Slaten et al., 2019) corroborated the convergent validity of our scale's dimensions. Finally, the absence of high and exclusive correlations between our scale's dimensions and the most relevant TIPI (Gosling et al., 2003; Müllensiefen et al., 2015) and SDQ (He et al., 2013) dimensions provided support for the idea that when young people are

responding about artistic activities using our scale, they are likely reporting on the thoughts, feelings and behaviours related to the art activity itself, rather than merely on the personality traits or general strengths and difficulties that they experience in daily life.

Discussion

The current work outlines the development and evaluation of the CAASA scale, a novel self-reporting instrument able to measure the character strengths young people derive from engagement in artistic and creative activities. After reviewing literature examining the impact of arts engagement on young people, alongside the literature examining the presence, and development of character strengths in adolescence, we argued for the need to be able to *i)* use validated methodological approaches in arts engagement research and *ii)* measure the character strengths that are being exercised during arts engagement, if we are to better understand how arts engagement can promote wellbeing. Ultimately, we proposed that a validated scale that allows young people to report on the strengths they are exercising when engaging in the arts would allow a more nuanced understanding of the specific aspects of arts engagement that may influence specific forms of wellbeing.

Following administration of an initial 24-item version of our scale to an initial sample of young people, a reduced 14-item scale with a three-factor structure was obtained through EFA. The factor structure of our final scale (the reduced 14-item scale with one item added) was then confirmed in a CFA on data from a new sample of participants. Analysis of this data confirmed convergent validity and internal reliability of the scale, while analysis of data from participants who completed the scale again after a roughly three-week period allowed us to establish our test-retest validity. Finally, we managed to confirm relatively good independence of our scale from trait level scales that measure stable personality traits and trait level strengths and difficulties (rather than state experiences).

Many emotional, cognitive and behavioural processes, in relation to the self and others, are held to mature and develop around adolescence (Bono et al., 2019; Nelson et al., 2019). This period in life thus arguably presents as an ideal one in which to promote such processes even further through the use of carefully designed interventions. The main aim of the current work was therefore to provide a research tool that would allow mechanisms underlying the positive developmental effects of carefully designed arts interventions to be more thoroughly studied. Interestingly, the factor structure identified in our scale suggests that engagement in artistic activities in adolescence may be a constructive way to foster character development in three key ways. Specifically, both our exploratory factor analysis and confirmatory factor analysis presented what we called Self-belief, Social Competence and Curiosity and Exploration to be key dimensions of character strengths that show meaningful variations and covariations during engagement in the arts.

Self-belief as a key affordance of arts engagement

As expected, our Self-belief dimension showed highest correlation values with the Self-development subscale of the ERS-ACA, where the ERS-ACA is a scale used to measure the emotional regulation strategies employed when engaging in the arts (Fancourt et al., 2019). We expected this relationship because our scale's Self-belief dimension comprises items capturing experiences of Emotion regulation, Hope, Zest and Meaning amongst others while the ERS-ACA Self-development subscale includes items related to positive self-evaluation and world view from enhanced self-identify and improved self-esteem to increased agency (e.g., '*…I feel more confident in myself')*. Critically, the prominence of the Self-belief dimension is in line with the wide-ranging literature suggesting that the arts can be used to promote self-esteem and confidence in young people (e.g., Zarobe & Bungay, 2017; Mak & Fancourt, 2019; Rizzi et al., 2020; Mannay et al., 2021).

Described as an individual's set of thoughts and feelings about their worth and importance (Rosenberg, 1965), self-esteem is commonly associated with positive mental health more broadly (Newbegin & Owens, 1996; Boden et al., 2008; Henriksen, Ranøyen, Indredavik, & Stenseng, 2017). Thus, with the onset of puberty being associated with a large drop in self-esteem (e.g., Robins et al., 2002), it seems highly relevant to ask whether art activities are a useful intervention particularly at this stage of life. It has been argued that the creative outlets adolescents engage in become a part of their identity, in turn enhancing feelings of self-esteem (Barbot & Heuser, 2017). Against this backdrop, we argue that the subscale we describe as Self-belief (in comprising positive evaluative and affective considerations of the self-concept) may be useful in capturing such positive changes in self-evaluation in periods following arts engagement.

Relatedly, an important question our scale can help address is what aspects of an art activity may make it confer positive feelings towards one's self. Evidence that an activity like music listening drives empowerment, agency, self-determination and self-esteem (Elvers, 2016; Elvers, 2019; Saarikallio, 2019; Saarikallio et al, 2020) begs the question that creative engagement is a decisive ingredient for positive feelings towards the self. Barbot (2020), previously noted that understanding how creativity is related to self-esteem would help optimise the design of creativity-based interventions that seek to improve self-esteem. Here we similarly argue that knowing what aspects of an arts activity make it confer positive feelings towards one's self (our self-belief dimension) would help optimise arts-based interventions that seek to improve young people's mental health.

Curiosity and Exploration and Social Competence as further affordances of arts engagement.

Our findings that the feelings and behaviours related to Curiosity and Exploration reflect a key group of strengths afforded by art engagement is interesting given findings *i)* of a bidirectional relationship between Openness to Experience and arts engagement (Schwaba et al., 2018) and *ii)* that asking questions, a primary expression of curiosity, tends to decrease with years of formal schooling (Vidler, 1977; Engelhard & Monsaas, 1988). Creative and artistic activities have been argued to allow young people to explore the outcome of different processes while placing less focus on the quality of the output (Karkou & Glasman, 2004). It is also thought to be important both in the formation of creative identity and in the formation of identity in general. Indeed, Barbot and Heuser (2017) suggest that practice with both divergent and convergent forms of creative thinking helps the individual explore possibilities regarding how to mould their unique identity. However, the extent to which experiences of creativity and learning during arts engagement, in particular, may be positively reinforcing and have positive outcomes in adolescents requires deeper examination. Our scale affords opportunities in this regard.

Our scale also offers the opportunity for researchers and practitioners to identify which arts activities or interventions may be particularly high in inducing curiosity and exploratory behaviours in young people; this, at a time when the schooling system seems to discourage curiosity-related behaviours (Vidler, 1977; Engelhard & Monsaas, 1988). Relatedly, the curiosity and exploration subscale may also be useful in helping to provide insights into the relationship between intellectual strengths and self-esteem– the nature of which is still under debate. For example, while a number of studies have suggested that self-esteem tends to be high in creative people (Deng & Zhang, 2011), at least some evidence of negative relationships between general creativity and self-esteem are also present in the literature (e.g., Lau, Li, & Chu, 2004). In our scale, the self-belief dimension was distinct from the curiosity and exploration dimension to which the creativity related item was

clustered. An interesting question, therefore, is under what conditions these dimensions nevertheless co-vary.

Finally, with regard to the dimension of the CAASA that we named Social Competence, it is once more interesting to consider the resonance observable with previous literature: specifically, the growing number of studies showing that arts engagement may help young people to develop social skills (Karkou & Glasman, 2004; Wolf & Baker, 2012; Boer & Abubakar, 2014; Ennis & Tonkin, 2018). Our Social Competence dimension includes items that describes feelings and behaviours related to building interpersonal relations: from trying to see things from others' perspectives to treating others well with the aim of getting on better with them. It is likely that opportunities to engage with, and show consideration of others, along with the reciprocation that adolescents may receive, may account for the increases in the social skills and wellbeing described by many authors as key benefits of arts engagement (Harkins et al., 2016). Critically, our scale's ability to measure the extent to which such behaviours are being exercised, precisely as arts activities are being engaged in, could be powerful when seeking to examine longer-term wellbeing outcomes related to social interactions.

Arts engagement and self-beliefs

At this point, it is worth noting how character strengths development through the arts may be influenced by young people's beliefs about their ability to achieve their goals in general (termed self-beliefs, Bandura, 1995), and in a creative realm, (termed Creative self-beliefs, Beghetto & Karwowski, 2017). Creative self-efficacy -a person's confidence that they can be creative in a task under a given context - is held to be a key factor influencing levels of engagement with the arts (Karwoski & Barbot, 2016). As such, creative self-efficacy can be seen as a bottle neck for character strength development through the arts. In other words, in the absence of explicit pressure from parents and teachers to engage in the arts,

high creative self-efficacy in adolescents may be necessary for arts engagement to occur and, in turn, in order for character strengths to develop through said art engagement.

Finally, an important question that our scale can help to address is the extent to which positive general self-beliefs (e.g., high self-efficacy and high self-esteem) may emerge from creative self-beliefs (e.g., creative self-efficacy and creative self-esteem; Barbot, 2020). Indeed, as an underlying assumption of our research is that the character strengths exercised during arts engagement are relevant in the context of non-art activities; this question presents itself as a highly relevant one that the scale should be used to address.

Independence from trait measurements?

In addition to aiming to establish our scale's validity and reliability, we also sought to evaluate the degree of independence of our scale (as a measure of state experiences related to arts engagement) from trait level characteristics related to personality and strengths and difficulties in everyday life. Here, even though we expected to see the highest correlations emerging between our scale's dimensions and the most relevant trait level construct (since those individuals who possess higher levels of a trait would be more likely to express it in everyday contexts), we predicted that our scale dimensions would fail to show the kinds of strong and exclusive associations with other trait dimensions that would suggest our scale was merely measuring stable traits.

In line with these predictions, we were able to confirm that any correlations between personality traits and the three specific dimensions of our scale were largely non-exclusive. Specifically, while Self-belief showed its highest correlation with Neuroticism, Social Competence with Agreeableness, and Curiosity and Exploration with Openness to Experience, many comparably-sized less intuitive relationships were also seen (e.g., Self-belief with Conscientiousness and Agreeableness). A similar pattern was observable with regard to associations between our scale's dimensions and subscales of the SDQ. Thus, taken

together, while the patterns of relationships between our new scale and trait level factors were seen to be highest where they might be expected (given that trait level characteristics may be expected to influence propensities for feelings and behaviours in everyday life), there was sufficient evidence that our scale does not merely measure trait level individual differences.

Limitations and future outlook

Alongside the strengths of the current work lie a number of limitations that are important to consider. One issue lies in our not collecting information on participants' parental socio-economic status (pSES). Previous research shows there is a strong association between pSES and Openness to Experience (Ayoub et al., 2018). Without being able to test for this relationship within our data, the observed correlations between the CAASA and TIPI scores should be taken with caution, and we recommend future research acquire pSES data to investigate any impact of pSES on CAASA scores. Relatedly, we did not collect information on the level of expertise the young people had in the activities they reported on. Consequently, we are unable to comment on how or whether this variable may influence the exercising of character strengths during arts engagement. While it may be expected that expertise levels spanned the whole possible range, it would be useful to know whether character strengths development from the arts varies as a function of previous experience and expertise levels.

A further important thing to note is that while it will be beneficial to be able to use our scale to evaluate both passive, aesthetic and active, creative types of arts engagement, inclusion of both types of activities during scale development, with the range of experiences they entail, may have compromised CAASA's psychometric properties. Relatedly, we suggest that some aspects of our validation process could be improved on in future work. For instance, while lower strength associations may be taken to reflect divergent validity to some degree, our failure to try to more directly establish divergent validity presents as a limitation

of our studies. Finally, re-evaluating the test-retest reliability of our scale with a larger sample than we managed here is recommended in future work.

In any case, we suggest our final Creative Artistic Activities Strengths Affordances scale (CAASA) has wide-ranging potential for future use in research contexts. Firstly, the scale offers itself up as invaluable in research designs seeking to show the particular aspects of arts engagement (e.g., the opportunity to be creative, to derive reward from novelty, to work non-competitively alongside others), that may lead to reported benefits on different aspects of adolescent wellbeing (e.g., emotional wellbeing often related to interpersonal strengths). Such nuanced links between arts affordances and specific aspects of wellbeing, while important, still need careful exploration.

Secondly, our scale promises advantages in use in intervention designs. Specifically, just as for the intervention study from Proyer and colleagues (2013) -whereby participants underwent training in strengths that are strongly or weakly tied, to a wellbeing outcome- our scale could be used to pre-select appropriate main and comparison arts-related interventions, that would in turn allow powerful experimental and randomised controlled designs (more powerful than cross-sectional designs) to be used in future research. In such studies, young people could be tasked with reporting on experiences of artistic and creative activity that they engage in at regular intervals; this in order to see how any changes in the different dimensions of the CAASA may be associated with concomitant changes in specific wellbeing measures.

Thirdly, our scale promises great impact outside research contexts, where such a tool is much needed. Indeed, arts educators and practitioners would benefit greatly from being able to robustly evaluate the role of their arts-related programmes in adolescent development and wellbeing, and, in doing so, to grow both their, and decision-makers', confidence in art engagement's putative benefits in this regard.

Finally, developing the CAASA for use with younger children, older adolescents and young and older adults would allow for the same kinds of research to be undertaken across different stages of development. Understanding the ways in which arts engagement may promote the development of character strengths is highly relevant across the lifespan, given the need for effective (wellbeing) interventions at all stages of life.

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Figure Captions

Figure 1

Item Loadings and Inter-factor Correlations following EFA.

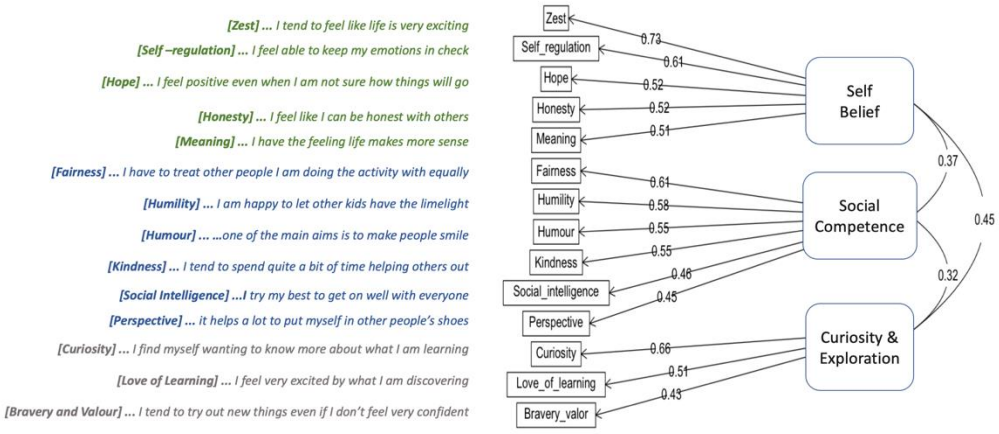

Table 1

Questionnaire items and loadings of CAASA after Study 1

Item	Factor loadings			
	Self-Belief	**Social Competence**	**Curiosity & Exploration**	**Uniqueness**
Zest- I tend to feel like life is very exciting	0.726			0.484
Self-Regulation -I feel able to keep my emotions in check	0.608			0.637
Hope - I feel positive even when I am not sure how things will go	0.524			0.61
Honesty - I feel like I can be honest with others	0.517			0.654
Meaning - I have the feeling life makes more sense	0.507			0.586
Fairness - I have to treat other people I am doing the activity with equally		0.612		0.643
Humility - I am happy to let other kids have the limelight		0.585		0.684
Humour - one of the main aims is to make people smile		0.549		0.557
Kindness -I tend to spend quite a bit of time helping others out		0.548		0.581
Social intelligence - I try my best to get on well with everyone		0.458		0.56
Perspective - it helps a lot to put myself in other people's shoes		0.448		0.663
Curiosity - I find myself wanting to know more about what I am learning			0.657	0.548
Love of learning- I feel very excited by what I am discovering			0.510	0.523
Bravery and Valour- I tend to try out new things even if I don't feel very confident			0.433	0.698

Table 2

Questionnaire items and loadings of CAASA after Study 2

	Factor loadings			
Strengths	**Self-Belief**	**Social Competence**	**Curiosity & Exploration**	**Uniqueness**
Zest - I tend to feel like life is very exciting	0.466			0.633
Self-Regulation -I feel able to keep my emotions in check	0.611			0.691
Hope - I feel positive even when I am not sure how things will go	0.634			0.516
Honesty - I feel like I can be honest with others	0.549			0.55
Meaning - I have the feeling life makes more sense	0.538			0.613
Fairness- I have to treat other people I am doing the activity with equally		0.671		0.511
Humility - I am happy to let other kids have the limelight		0.669		0.631
Humour - one of the main aims is to make people smile		0.695		0.449
Kindness -I tend to spend quite a bit of time helping		0.574		0.473
Social Intelligence - I try my best to get on well with everyone		0.396		0.586
Perspective - it helps a lot to put myself in other people's shoes		0.495		0.636
Curiosity - I find myself wanting to know more about what I am learning			0.776	0.455
Love of learning - I feel very excited by what I am discovering			0.662	0.429
Bravery and Valour -- I tend to try out new things even if I don't feel very confident			0.546	0.540
Creativity - I tend to think of new and different ways of doing thing			0.511	0.628

Table 3

Means, standard deviations, and correlations of CAASA dimensions and measures used to test convergent validity

Variable	*M*	*SD*	CAASA-Self -Belief	CAASA-Social Competence	CAASA-Curiosity & Exploration	ERS-ACA Self-Development	MYBS Peers	MYBS School
CAASA-Self-Belief	3.16	0.85						
CAASA-Social Competence	3.46	0.87	.56** [.48, .64]					
CAASA-Curiosity & Exploration	3.22	0.90	.50** [.41, .58]	.52** [.43, .60]				
ERS-ACA Self-Development	3.17	1.06	.72** [.66, .77]	.47** [.37, .55]	.56** [.48, .64]			
MYBS Peers	3.22	1.08	.59** [.51, .66]	.63** [.55, .69]	.37** [.27, .47]	.61** [.53, .68]		
MYBS School	3.33	1.05	.56** [.48, .64]	.58** [.50, .65]	.41** [.31, .50]	.64** [.57, .70]	.76** [.71, .81]	
AESTHEMOS Epistemic emotions	3.29	0.92	.56** [.48, .64]	.53** [.44, .61]	.65** [.57, .71]	.76** [.70, .80]	.54** [.45, .62]	.58** [.50, .65]

Note. M and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. * indicates $p < .05$. ** indicates $p < .01$.

Table 4

Means, standard deviations, and correlations of CAASA dimensions and Personality

Variable	*M*	*SD*	CAASA-Self-Belief	CAASA-Social Competence	CAASA-Curiosity and Exploration	TIPI Agreeableness	TIPI Extroversion	TIPI Neuroticism	TIPI Conscientiousness
CAASA-Self-Belief	3.16	0.85							
CAASA-Social Competence	3.46	0.87	.56** [.48, .64]						
CAASA-Curiosity and Exploration	3.22	0.90	.50** [.41, .58]	.52** [.43, .60]					
TIPI Agreeableness	3.69	0.88	.40** [.30, .50]	.43** [.33, .53]	.26** [.15, .37]				
TIPI Extroversion	3.04	1.06	.22** [.10, .33]	.03 [-.08, .15]	.11 [-.00, .23]	.14* [.02, .25]			
TIPI Neuroticism	2.64	0.94	-.45** [-.54, -.35]	-.24** [-.35, -.13]	-.24** [-.35, -.13]	-.36** [-.45, -.25]	-.35** [-.45, -.25]		
TIPI Conscientiousness	3.53	0.94	.40** [.29, .49]	.38** [.28, .48]	.24** [.12, .35]	.55** [.47, .63]	.19** [.07, .30]	-.37** [-.46, -.26]	
TIPI Openness	3.62	0.84	.44** [.35, .53]	.35** [.25, .45]	.43** [.33, .52]	.43** [.33, .52]	.29** [.18, .39]	-.31** [-.41, -.20]	.45** [.35, .54]

Note. *M* and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. * indicates $p < . .05$. ** indicates $p < .01$

Table 5

Means, standard deviations, and correlations of CAASA and strengths and difficulties.

Variable	*M*	*SD*	CAASA Self-Belief	CAASA Social Competence	CAASA Curiosity and Exploration	SDQ Pro-social	SDQ Peer problems	SDQ Emotional problems
CAASA-Self Belief	3.16	0.85						
CAASA-Social Competence	3.46	0.87	.56** [.48, .64]					
CAASA - Curiosity and Exploration	3.22	0.90	.50** [.41, .58]	.52** [.43, .60]				
SDQ Pro-social	6.90	2.28	.40** [.29, .49]	.54** [.45, .62]	.39** [.28, .48]			
SDQ Peer problems	2.78	1.88	-.29** [-.39, -.17]	-.12* [-.24, -.01]	-.04 [-.16, .08]	-.13* [-.24, -.01]		
SDQ Emotional problems	4.09	2.69	-.34** [-.44, -.23]	-.05 [-.17, .07]	-.07 [-.18, .05]	.02 [-.10, .14]	.47** [.37, .55]	
SDQ Hyperactivity	4.38	2.43	-.32** [-.42, -.21]	-.30** [-.41, -.19]	-.17** [-.28, -.05]	-.29** [-.39, -.17]	.21** [.10, .32]	.38** [.28, .48]

Note. *M* and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. * indicates $p < .05$. ** indicates $p < .01$.