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Measuring adolescents' beliefs in conspiracy theories: Development and validation of the Adolescent Conspiracy Beliefs Questionnaire (ACBQ)

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Four studies (total $n = 961$) developed and validated the Adolescent Conspiracy Beliefs Questionnaire (ACBQ). Initial items were developed in collaboration with teachers. An exploratory factor analysis (Study 1, $n = 208$, aged 11–14) and a student focus group ($N = 3$, aged 11) enabled us to establish the factor structure of a 9-item scale. This was replicated via confirmatory factor analysis in Study 2 ($N = 178$, aged 11–17), and the scale displayed good convergent (i.e., relationship with paranoia and mistrust) and discriminant validity (i.e., no relationship with extraversion). Study 3a ($N = 257$) further tested convergent validity with a sample of 18-year-olds (i.e., relationship with adult-validated measures of conspiracy beliefs) and demonstrated strong test–retest reliability. Study 3b ($N = 318$) replicated these findings with a mixed-age adult sample. The ACBQ will allow researchers to explore the psychological antecedents and consequences of conspiracy thinking in young populations.

Statement of contribution

What is already known on this subject?

- Conspiracy theories can have a significant impact on societal issues.
- Despite their social importance, it is difficult to examine conspiracy beliefs across the lifespan.
- Conspiracy belief measures are designed for adults and cannot capture the beliefs of adolescents.

What does this study add?

- We have developed and validated a novel measure of conspiracy beliefs suitable for adolescents.
- The measure will be invaluable for learning how conspiracy beliefs change across the lifespan.

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Background

Conspiracy theories are abundant on social media and the internet (Vosoughi, Roy, & Aral, 2018), ranging from those that are implausible to most people (e.g., that lizard aliens control the world) to those that people tend to find appealing (e.g., that governments spy on citizens). Around 60% of British people believe in at least one conspiracy theory (YouGov, 2019), and in an effort to explain this popularity, research on the psychology of conspiracy theories has grown significantly in recent years (Douglas & Sutton, 2018). However, this research to date has focused only on adult samples, and no studies have examined conspiracy beliefs amongst younger people. This is an important oversight because it means that we cannot know when and how conspiracy beliefs develop and how they may change as young people mature. This lack of research is perhaps understandable given that existing quantitative measures of conspiracy beliefs designed for adults cannot adequately capture the emerging conspiracy beliefs of younger people. The language in these measures is often too complex for a young audience. Such measures also often ask about events that are unlikely to be familiar to adolescents (e.g., the death of Diana, Princess of Wales), and the content may be upsetting (e.g., assassination and terrorism). It is therefore vital to develop a measure specifically targeted at young people which is easy to understand, familiar, and that considers the potential emotional impact of conspiracy theories. The current research therefore developed and validated a conspiracy belief questionnaire suitable for adolescent populations.

Conspiracy theories are explanations for events that implicate secretive and powerful groups who cover-up information to suit their interests (Douglas, Sutton, & Cichocka, 2017). Conspiracy theories tend to flourish in times of societal crisis (van Prooijen & Douglas, 2017), during which people need to make sense of a chaotic world (Franks, Bangerter, Bauer, Hall, & Noort, 2017). However, it is not clear whether conspiracy theories satisfy this, or other psychological needs (see Douglas et al., 2017). Instead, they appear to have a range of negative consequences, including reducing engagement with politics and climate-friendly behaviour (Jolley & Douglas, 2014a), increasing the likelihood that people engage in everyday crimes (Jolley, Douglas, Leite, & Schrader, 2019), and leading to disengagement in the workplace (Douglas & Leite, 2017). Conspiracy theories can also impact health behaviours, such as reducing people's intentions to vaccinate (Jolley & Douglas, 2014b), and their intentions to engage in other behaviours to stop the spread of diseases (e.g., COVID-19, Biddlestone, Green, & Douglas, 2020). Furthermore, conspiracy theories can fuel intergroup conflict and prejudice (Kofta, Soral, & Bilewicz, 2020), which can even generalize to other groups who are not involved in the alleged conspiracies (Jolley, Meleady, & Douglas, 2020).

Despite their significance, it is currently difficult to examine conspiracy beliefs across the lifespan. All of the existing research on conspiracy theories has been conducted with adult participants, which severely limits our understanding of how conspiracy beliefs emerge and evolve over the lifespan. There are good reasons to examine conspiracy beliefs in younger people. Specifically, stress is more common in adolescence than at other periods (Arnett, 1999). Adolescence is also characterized by perceived social vulnerability and threat (Bird, Waite, Rowsell, Fergusson, & Freeman, 2017). Furthermore, during middle adolescence (aged 13–15), young people are less likely to rely on emotion regulation strategies than at other points in their life (Zimmermann & Iwanski, 2014). Such low reliance on emotion regulation has been identified as a risk factor for general and social anxiety in adolescence (Lougheed & Hollenstein, 2012), and existential factors such as these are associated with conspiracy beliefs in adults (see Douglas et al., 2017). Adolescence is also a time where young people are developing into new roles within their families, communities, and wider society (Gowers, 2005). This increasing awareness of the broader social world and the uncertainty of their place within it may make adolescents more likely to be drawn to conspiracy theories. To date, however, without a focus on young people, such important questions have been neglected in research on conspiracy theories.

A significant barrier to studying conspiracy beliefs in adolescents is that questionnaires to measure conspiracy beliefs have, to date, been designed with only adults in mind. Some scales ask about events that are likely to be unfamiliar to young people, and others measure belief in complex abstract notions of conspiracy which are also likely to be challenging for younger people to understand (e.g., governments use mind-control technologies to control the population; Brotherton, French, & Pickering, 2013; Imhoff & Bruder, 2014). Others use items that are less suitable for a younger audience due to sensitive or potentially upsetting content (e.g., governments involved in the distribution of illegal drugs, Swami, Chamorro-Premuzic, & Furnham, 2010) and some use language that is too complex (e.g., 'The power held by heads of state is second to that of small, unknown groups who really control world politics', Brotherton et al., 2013). Taken together, existing measures are therefore less than ideal for measuring conspiracy beliefs amongst younger people.

The current research

Considering the importance of exploring the psychological antecedents and consequences of conspiracy theorizing in society, it is vital to develop a measure that is suitable for younger populations. In the current research, we developed and validated the Adolescent Conspiracy Belief Scale (ACBQ) in four studies. Study 1 involved bringing together current adult measures of conspiracy beliefs and working with a panel of experienced secondary school teachers to narrow these down and modify any which were thought to be inappropriate for young people. After modification, the items were tested with young people to examine the factor structure using exploratory factor analysis (EFA). Qualitative feedback was provided on the measure during a focus group. Study 2 was designed to replicate the factor structure through confirmatory factor analysis (CFA) with a further sample of young people and to examine the convergent and discriminant validity of the scale. Studies 3a and 3b provided an additional test of convergent validity with an adult sample and also allowed us to explore test–retest reliability of the ACBQ. In each study, we also examined whether there were age group differences in conspiracy beliefs. Studies have shown that middle adolescence is characterized by increased emotional instability (Soto, John, Gosling, & Potter, 2011), which increases rates of anxiety during this period (Lougheed & Hollenstein, 2012). Conspiracy beliefs may develop during this period of emotional instability. However, developmental trends in conspiracy beliefs have never been examined. We report all measures, manipulations, and exclusions in these studies either within the text or a footnote. Each study was conducted in accordance with the British Psychological Society Code of Ethics and Conduct and received ethical approval from the relevant university ethics panel.

STUDY 1

In Study 1, we reviewed existing questionnaires that measure conspiracy beliefs in adults and developed a long list of potential items suitable for the ACBQ. These items were then presented to, and discussed with, a panel of experienced secondary school teachers in a face-to-face meeting. Following this discussion, items were refined or removed. British school students in Years 7 and 9 (ages 11–12 and 13–14) were then invited to complete the preliminary items for inclusion in the ACBQ and the factor structure, and internal consistency of the scale was examined. A focus group with Year 7 students was also conducted to gain qualitative feedback on the measure, which helped to ensure that the wording of the items was appropriate for our youngest participants. We then examined age differences in responses to the ACBQ.

Method

Participants

Initially, 216 young people were recruited from a secondary school in the Midlands, UK. However, eight participants indicated at the end of the survey that they would like their data not to be included in the analysis, and they were therefore removed. Of the final sample (n = 208), 110 were recruited from Year 7 (age 11–12) and 98 from Year 9 (age 13–14). There were 103 girls, 94 boys, and 11 who did not say, with a mean age of 12.59 (SD = 1.12). Two hundred and two (97%) indicated that English was their first language and that they were born in the UK.[1] See Table 1 for a specific breakdown of participants per group. The focus group that took place after the survey completion comprised of three young people (one girl and two boys, all aged 11, who were British).

Materials and procedure

To create our initial pool of items, we began by listing the existing adult measures of conspiracy belief published up until 2018. After compiling 133 items from 14 existing questionnaires that measure conspiracy belief in adults, each item was reviewed independently by the first three authors. During a team discussion where each item and our comments were reviewed, an item was either kept without change, modified (e.g., due to complex language), or removed (e.g., due to repetition; examples can be found in the Supporting Information). A pool of 60 items remained as an outcome of this process. These items represented conspiracy theorizing (e.g., both specific to a theory such as concerning the Apollo moon landing, or broader such as the proposal that governments are involved in secret plots and schemes) and included both positive and negatively worded items. These 60 items were then given to an independent panel of teachers in December 2018, who were experienced secondary school teachers based in a town in the Midlands, UK (N = 3). We discussed each item and either a) removed items that the teachers identified as being unclear, potentially upsetting, or where they did not believe that students would know of the conspiracy (e.g., the financial crash of 2008) or b)

[1] *In each study, a non-parametric t-test (Kruskal–Wallis) demonstrated that there were no differences between participants with English as their first language (vs. first language was not English) on their ACBQ scores. This provides initial evidence that participants' first language did not impact comprehension.*

Table 1. Demographic characteristics of the young people in Study 1 (n = 208)

Year groups (UK)	Size	M_{age} (*SD*)	Age range	Genders	First language	UK born
7	110	11.63 (0.48)	11–12	56 girls, 46 boys, 8 who rather not say	98% English	96% UK born
9	98	13.66 (0.48)	13–14	47 girls, 48 boys, and 3 who rather not say	96% English	96% UK born

modified the language and the item was retained (example discussions and decisions can be found in the Supporting Information, Table S1). From this meeting, 36 items remained. These were tested on the sample of young people to explore the factor structure.

Parents/guardians provided (opt-in) informed consent. Data collection took place in a school IT classroom, and before beginning the questionnaire, the participants also gave their verbal assent. Participants responded to each item on a seven-point scale, with anchors 1 (*strongly disagree*) and 7 (*strongly agree*). Items were computed so that higher values represent greater belief in conspiracy theories. At the end of the study, the participants were asked to re-confirm that they were happy for their data to be used in the analysis. We then thanked them for their time, verbally debriefed them, and provided a written debrief for their parents/guardians. We also asked the participants to indicate if they would like to provide feedback during a focus group. Sixty-eight (33% of the sample) indicated they would be happy to provide further feedback, and three were chosen by a teacher to be involved in the focus group. During the focus group, which lasted 20 min, the participants were asked 10 questions about their experiences in answering the ACBQ (e.g., 'Was there anything in the questions that you had not heard of?', 'Did the rating scale make sense (i.e., from "strongly disagree" to "strongly agree")', 'Do you think answering questions like that would upset some kids'). At the end, the three participants were given an additional debrief sheet and thanked for their time.

Results and discussion

Focus group

Comments from the focus group were transcribed, and the content was reviewed by the team. Thematic analysis or another analytic strategy was not used as the aim of the focus group was to ensure that young people understood the questions and that they were not upset by any items. The participants indicated that the rating scale made sense to them and that they enjoyed completing the questionnaire on a computer (as opposed to hypothetically completing the questionnaire on paper). They also felt that the content of the questionnaire would not be upsetting to others in their age group (Year 7). However, they felt that some items were outdated (e.g., the participants said that they did not know who John F. Kennedy (JFK) was) and some words were confusing (e.g., 'manipulate'). They also noticed some items were about the same topic (e.g., aliens), and they found themselves reconsidering their answers when repeatedly asked.

Factor analysis

EFA using principal axis factoring method was then conducted on the 36 items that comprised the preliminary ACBQ. The ratio of participants to items was six, which falls within the rule of thumb of five to 10 respondents to each one item for EFA (Comrey & Lee, 1992). Based on the scree plot, an eight-factor solution was initially extracted. Although they had been reverse-coded, all negatively worded items were shown to load onto a single factor. There was no clear conceptual grouping to these items other than the negative valence, so this factor was dropped (Greenberger, Chen, Dmitrieva, & Farruggia, 2003). Moreover, three items loaded onto the same factor where there was also no clear conceptual grouping ('Some viruses and diseases are spread on purpose by terrorist groups'; 'The European Union tried to take control of the UK'; 'Work bosses sometimes manipulate their workers to benefit themselves'), and so these items were also dropped. We then re-ran the EFA on the remaining 31 items. The significance of Bartlett's Test of Sphericity, $\chi^2(465) = 3{,}405.596, p < .001$, and the size of the Kaiser–Meyer–Olkin measure of sampling adequacy, KMO = .92, showed that the 31 items had an adequate common variance for factor analysis (Tabachnick & Fidell, 2007).

Six factors emerged with Eigenvalues larger than 1.00.[2] The six-factor solution explained 62.23 of the total variance. Promax oblique rotation was used based on the assumption that the factors should be related to one another. Following the rotation, the first factor accounted for the largest variance. To determine acceptable factors, the minimum eigenvalue of a factor must be one, and there must be a minimum of three items loading on each factor (Costello & Osborne, 2005; Tabachnick & Fidell, 2007). Item selection was based on the following criteria (see Tabachnick & Fidell, 2013): (1) If an item loaded below .63 on a factor (where > .63 is classed as a very good loading), it was removed, and (2) no cross-loads on another factor at around .32 or higher, otherwise it was discarded. As a result, four factors and 14 items remained (see Table 2 for the 14 items).

To explore the factor structure further, a parallel analysis of 1,000 data sets using a 95% cut-off was conducted (O'Connor, 2000). The first six eigenvalues extracted from the simulated data sets were equal to or less than 1.92, 1.77, 1.67, 1.59, 1.52, and 1.46, respectively. In the data set itself with 31 items, only the first three eigenvalues of 11.72, 1.96, and 1.84 exceeded chance values. The fourth factor (1.54) was below the simulated data. On inspection, the fourth factor focused on conspiracy theories involving aliens (e.g., Area 51), whereas the other three factors focused on more generic notions of conspiracy (see Brotherton et al., 2013). Since the alien conspiracy theories did not fit with the overall theme of the other factors, and the parallel analysis found that this factor did not exceed chance values, this factor was also dropped.

Considering that the scale was intended for use with young people where we aimed for a short measure, we then inspected the retained factors to ensure that the items were suitable. When inspecting factor 1, the research team agreed that item #1 was likely to be confusing as there is no clear conspirator and #2 and #4 were worded very similarly. Acting on the comments from the focus group in which the Year 7 participants were confused by poorly worded items and items being similar, #1 and #4 were therefore removed. We also changed the word 'manipulate' in item #10 to 'control' since the participants in the focus group found the word 'manipulate' to be confusing. Although we believed all items to be suitable at the time of data collection, this feedback from the participants highlights the importance of considering qualitative feedback alongside the

[2] *The scree plot (based on the EFA with 31 items) can be found in the Supporting Information (Figure S1).*

Table 2. ACBQ items and factor loadings obtained with exploratory factor analysis (EFA) including 14-items and the finalized 9-item scale (in bold) in Study 1 (n = 208)

			Factor			
#	ACBQ	Item	1	2	3	4
1	–	The real truth about events is often kept secret from the public	.869			
2	**ACBQ 1**	**The government deliberately hides important information from the public**	**.767**			
3	**ACBQ 2**	**The government monitors people in secret**	**.706**			
4	–	The government often changes, makes up or hides evidence from the public	.706			
5	**ACBQ 3**	**Some political groups have secret plans which are not good for society**	**.675**			
6	**ACBQ 4**	**Some diseases have been created by the government to be used as weapons**		**.774**		
7	**ACBQ 5**	**The government often knows about terrorist attacks and lets them happen**		**.739**		
8	**ACBQ 6**	**Governments have deliberately spread diseases in certain groups of people**		**.691**		
9	**ACBQ 7**	**Secret groups control people's minds without them knowing**			**.706**	
10	**ACBQ 8**	**Secret societies control politicians and other leaders**			**.675**	
11	**ACBQ 9**	**Secret societies influence many political decisions**			**.668**	
12	–	Aliens have visited earth and governments cover this up				.846
13	–	In "Area 51" in the USA, there is a secret base that contains evidence of aliens coming to earth				.798
14	–	The government have hidden evidence about the existence of aliens				.779

Note. 1 = Government secrets. 2 = Government complicity in violence. 3 = Secret Societies. 4. = Aliens. Bold type represents the items in the finalized 9-item ACBQ.

Table 3. Correlations between each of the factors and the overall mean (ACBQ) in Study 1 (n = 208)

	1	2	3	4
(1) ACBQ (9-items)	–	.88***	.81***	.81***
(2) Government secrets (Factor 1)		–	.61***	.66***
(3) Government violence (Factor 2)			–	.59***
(4) Secret societies (Factor 3)				–

Note. ***$p < .001$.

EFA. We re-ran the EFA with the two items omitted and a similar factor structure was reported (although two new items were now included in the sub-scales, see Supporting Information, Table S2). However, as the factor loadings were stronger in the previous EFA (with 31 items), we finalized the 9-item ACBQ based on those factor loadings.

At this point, there were three factors, each containing three items (see Table 2, in bold for the 9 items retained) that reflect underlying aspects of conspiracy theorizing (see also Brotherton et al., 2013). Factor 1 included items focusing on government secrets ($\alpha = .71$). Factor 2 reflected conspiracy theories about government complicity in violence ($\alpha = .75$). Finally, Factor 3 included items that focused on secret societies ($\alpha = .70$). On further inspection, correlations between each of the factors were positive and moderate to strong, and each factor was strongly correlated with the overall mean of the scale (α = .85, M = 3.73, SD = 1.20), as shown in Table 3. Since the internal reliability was stronger when all items were considered as one scale than for each factor separately, and since each factor was positively correlated with the others, the three factors were combined to make a stronger unidimensional scale. The underlying factors being treated as one unidimensional measure is similar to adult conspiracy theory measures (Brotherton et al., 2013). In sum, the 9-item scale was shown to have very good internal consistency and provides a measure that represents conspiracy beliefs in young people.

Comparison of ACBQ means

We then explored whether there were any differences between younger (Year 7, aged 11–12) and older (Year 9, aged 13–14) participants. To do so, we assessed measurement invariance of the 9-item structure using a multi-group CFA (MSCFA). First, we examined configural invariance, followed by metric invariance and then scalar invariance (see Van de Schoot et al. (2012) for an outline of the process). We inspected the changes in model fit statistics; however, as $\Delta\chi^2$ is sensitive to sample size, Cheung and Rensvold (2002) suggest that invariance can be concluded if $\Delta CFI \leq .01$, and $\Delta SRMR \leq .01$ or $\Delta RMSEA \leq .015$. As shown in Table 4, ΔCFI, $\Delta SRMR$, and $\Delta RMSEA$ were within thresholds, which demonstrates metric and scalar invariance across ages.

As we found evidence of measurement invariance, a comparison of the ACBQ means was conducted. We found that participants in Year 9 (aged 13–14) had a significantly higher belief in conspiracy theories (M = 4.03, SD = 1.05) compared with participants in Year 7 (aged 11–12, M = 3.47, SD = 1.27), $t(206) = 3.480$, p = .001, d = 0.48. This provides an initial indication that conspiracy theorizing might be heightened for older than younger adolescents.

In summary, after developing a long list of potential items suitable for a younger population with a panel of teachers, a 9-item factor structure was shown to be evident

Table 4. Measurement invariance (configural, metric, and scalar) for each group comparison reported in Studies 1, 2, and 3a/b

Study	Model	χ^2 (*df*)	*CFI*	*RMSEA*	*SRMR*	Comparison	$\Delta\chi^2$ (*df*)	*ΔCFI*	*ΔRMSEA*	*ΔSRMR*	Decision
Study 1	ACBQ										
	Model 1: Configural invariance	108.567 (52)	.90	.073	.07	/	/	/	/	/	/
	Model 2: Metric invariance	114.882 (61)	.90	.065	.08	Model 1	6.315 (9)	.00	.008	.01	Met
	Model 3: Scalar invariance	137.362 (70)	.89	.068	.09	Model 2	22.48 (9)***	.01	.003	.01	Met
Study 2	ACBQ										
	Model 1: Configural invariance	135.865 (78)	.92	.065	.05	/	/	/	/	/	/
	Model 2: Metric invariance	150.505 (96)	.93	.057	.06	Model 1	14.64 (18)	.01	.008	.01	Met
	Model 3: Scalar invariance	175.597 (114)	.92	.056	.05	Model 2	25.092 (18)	.01	.001	.01	Met
Study 3a/3b	ACBQ										
	Model 1: Configural invariance	276.198 (50)	.91	.089	.06	/	/	/	/	/	/
	Model 2: Metric invariance	293.136 (59)	.91	.081	.06	Model 1	16.938 (9)	.00	.008	.00	Met
	Model 3: Scalar invariance	304.532 (68)	.90	.078	.06	Model 2	11.396 (9)	.01	.003	.00	Met
	General										
	Model 1: Configural invariance	541.848 (174)	.93	.061	.05	/	/	/	/	/	/
	Model 2: Metric invariance	550.130 (189)	.93	.058	.06	Model 1	8.282 (15)	.00	.003	.01	Met
	Model 3: Scalar invariance	605.158 (204)	.93	.059	.06	Model 2	55.028***	.00	.001	.00	Met
	Real-world										
	Model 1: Configural invariance	60.731 (28)	.97	.045	.03	/	/	/	/	/	/
	Model 2: Metric invariance	62.621 (35)	.98	.037	.03	Model 1	1.89 (7)	.01	.008	.00	Met
	Model 3: Scalar invariance	98.337 (42)	.96	.048	.03	Model 2	24.284 (7)***	.02	.011	.00	Not Met

Note. ***p = .001. General = measure of general conspiracy theorizing. Real-world = measure of belief in real-world conspiracy theories.

during EFA. Insightful comments gained from a focus group with Year 7 students also helped shape the final questions included in the ACBQ. In Study 2, we examined the convergent and discriminant validity of the scale and endeavoured to replicate its factor structure.

STUDY 2

Study 2 aimed to replicate the unidimensional factor structure of the ACBQ that was adopted in Study 1 through CFA and to examine both convergent and discriminant validity. Specifically, we examined the relationship between the ACBQ and other constructs (e.g., paranoia, mistrust in different contexts, extraversion), which have been shown in past research to correlate with conspiracy beliefs (i.e., paranoia, mistrust; Darwin, Neave, & Holmes, 2011; Goertzel, 1994; Kramer, 1994), or where no relationship has been shown to exist and there is no theoretical reason to predict such a relationship (i.e., extraversion, Brotherton et al., 2013; Goreis & Voracek, 2019). We also targeted a broader sample of adolescents from all stages of the UK national curriculum (also known as Key Stage) as opposed to just focusing on younger participants (i.e., aged 11–14 as in Study 1). In Study 2, therefore, we recruited a sample of participants from Key Stage 3 (aged 11–14, Years 7–9), Key Stage 4 (aged 14–16, Years 10 and 11), and Key Stage 5 (aged 16–17, Year 12 in our sample). We also conducted a comparison of ACBQ scores by age group (determined by Key Stage) to explore whether any age group differences existed.

Method

Participants

One hundred and seventy-eight young people were recruited from secondary schools in Scotland and the Midlands, UK. Participants were recruited from a broader sample from Key Stage 3 (aged 11–14), Key Stage 4 (aged 14–16), and Key Stage 5 (aged 16–17). All participants confirmed that their data could be used in the analyses. In total, there were 110 girls, 58 boys and 10 who did not want to say, with a mean age of 14.05 (SD = 1.77). One hundred and forty-five of the participants (81.5%) indicated that English was their first language, and 146 (82%) said they were born in the UK. See Table 5 for a specific breakdown of participants per group.

Materials and procedure

As in Study 1, parents/guardians provided informed opt-in consent and participants also gave their verbal assent. Data collection took place in a school IT classroom. First, participants were asked to complete the 9-item ACBQ (α = .90), which was developed in Study 1. Participants then completed a measure of paranoid thinking that is suitable for young people (Ronald et al., 2014), which included 14 items (e.g., ‘I need to be on my guard against others’, α = .91). Participants indicated their agreement on a five-point scale (1 = *not at all*, 6 = *daily*). Next, participants were asked to complete the Extraversion sub-scale of the Big Five Questionnaire – Children version (BFQ-C, Barbaranelli, Caprara, Rabasca, & Pastorelli, 2003). There were 13 statements (e.g., ‘*I like to meet with other people*’., α = .86), and participants indicated their agreement with each on a seven-point scale (1 = *strongly disagree,* 7 = *strongly agree*). Finally, participants completed two independent items asking whether they trusted someone at school (‘Is there someone

Table 5. Demographic characteristics of the children separated by age range (i.e., Key Stage in the UK national curriculum) in Study 2 (N = 178)

Age range	Key stage (UK)	Year groups (UK)	Size	M_{age} (SD)	Genders	First language	UK born
11 – 14	3	7, 8 + 9	109	12.87 (0.86)	56 girls, 47 boys, 6 who rather not say	83% English	84% UK born
14 – 16	4	10 + 11	28	14.75 (0.65)	17 girls, 8 boys, and 3 who rather not say	79% English	71% UK born
16 - 17	5	12	41	16.71 (0.46)	37 girls, 3 boys, and 1 who rather not say	81% English	83% UK born

whom you can trust at school?') and at home ('Is there someone whom you can trust at home?') on a 3-point scale (*0 = No, 1 = Sometimes, 2 = Yes*, adapted from Wong, Freeman, & Hughes, 2014). Each of the scales, and the items within each scale, was randomized. At the end of the study, the participants were asked if we could use their data in the analysis. They were then thanked and verbally debriefed, and a written debrief was sent home for their parents/guardians.

Results and discussion

Factor analyses of the ACBQ

A unidimensional model with all items loading onto one factor was shown to be stronger in Study 1 (e.g., improved Cronbach alpha), rather than an alternative factor solution. We sought to replicate this using CFA and test the unidimensional scale against the alternative three-factor model. We compared the models using standard fit indices (χ^2/df, CFI, GFI, NFI, RMSEA). A χ^2/df ratio of fewer than three shows acceptable fit (Byrne, 2001), alongside CFI, NFI, and GFI indicate being above a value of .90 and RMSEA being below .08 (Bentler, 1992; Hu & Bentler, 1999). The ratio of participants to an item is 20:1, which falls within the rule of thumb of 10–20 respondents to each one item for CFA (see Schumacker & Lomax, 2015).

As expected, the three-factor model displayed poor fit according to the measured indices, $\chi^2(27, N = 178) = 265.279, p < .001$, $\chi^2/df = 9.83$, CFI = .69, NFI = .67, GFI = .76, RMSEA = .223, whilst the unidimensional model displayed better fit, $\chi^2(27, N = 178) = 106.357$, p <.001, $\chi^2/df = 3.939$, CFI = .90, NFI = .87, GFI = .87, RMSEA = .129. The unidimensional was further improved by freeing some parameters. Specifically, the model was re-modified adjusting one covariance path at a time (Schreiber, Nora, Stage, Barlow, & King, 2006). The re-modification resulted in adding covariance paths between the errors of items 8 and 9, 4 and 6. After freeing those parameters, model indices further improved and were above acceptable values as depicted in Figure 1, $\chi^2(27, N = 178) = 56.177$, p <.001, $\chi^2/df = 2.247$, CFI = .96, NFI = .93, GFI = .93, RMSEA = .084. Although the RMSEA is slightly above the threshold, the rule of thumb can be seen as overly strict when using

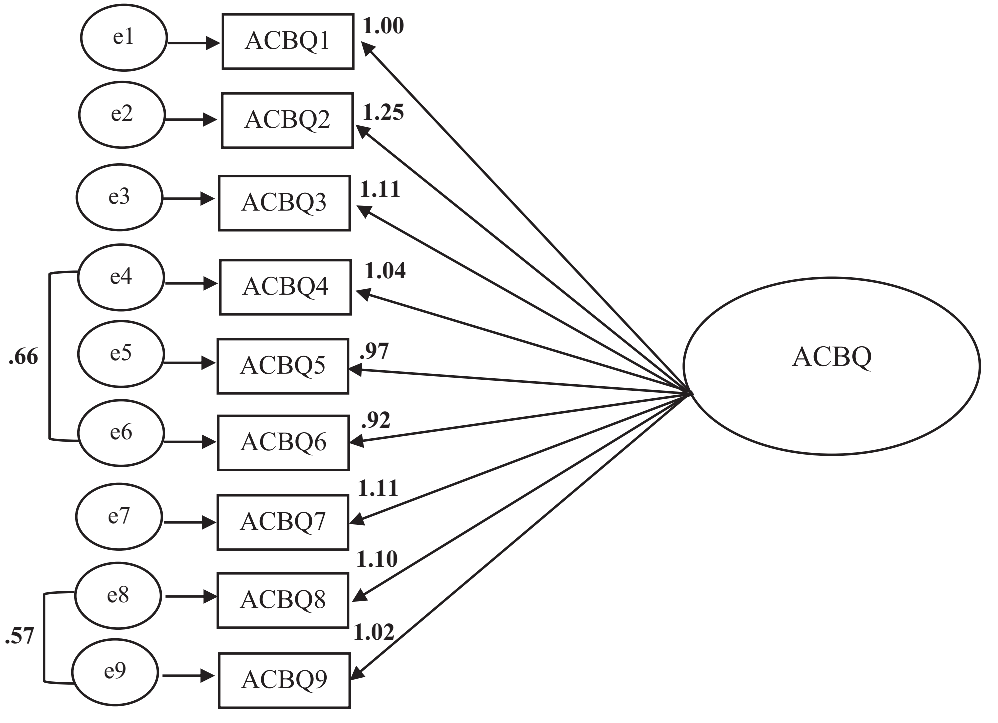

Figure 1. The ACBQ confirmatory factor analysis path diagram loading onto a single factor in Study 2 (N = 178). Standardized regression weights and covariances are shown in the diagram.

small sample sizes (N < 250), where values approximating the threshold can be considered satisfactory (Marsh Wen, & Hau, 2004). In sum, the unidimensional ACBQ scale is superior to the alternative three-factor model.

Convergent and discriminant validity of the ACBQ

To examine whether the ACBQ has convergent validity, we examined constructs that have been found to positively correlate with belief in conspiracy theories in adults. As expected, mean scores of the ACBQ (M = 4.00, SD = 1.29) were positively correlated with paranoia (r = .29, p < .001, M = 2.27, SD = 0.94) and feelings of mistrust at home (r = .15, p = .042, M = 2.84, SD = 0.39). However, there was no correlation with scores on the ACBQ and feelings of mistrust with someone at school (r = .02, p = .762, M = 2.57, SD = 0.63). Next, to examine discriminant validity, we explored the relationship with a construct where no relationship is expected. As anticipated, the ACBQ was not correlated with a measure of extraversion (r = .11, p = .135, M = 5.03, SD = 1.00).

Comparison of means of the ACBQ between age groups

As in Study 1, an MSCFA was conducted to examine measurement invariance of the 9-item structure. As shown in Table 4, all model fit statistics were within thresholds; thus, metric and scalar invariance was demonstrated for the scale across ages. Due to unequal sample sizes between age groups in school, we conducted a non-parametric Kruskal–Wallis test and found that participants' age grouping (based on UK's national curriculum Key Stage) influenced ACBQ scores, $H(2) = 11.72$, $p = .003$. We conducted Dunn's pairwise tests comparing the three groups. Specifically, belief in conspiracy theories was significantly lower in children aged 11–14 years (Key Stage 3, *Mrank* = 79.01 [$M = 3.72$, $SD = 1.28$]) than children aged 14–16 (Key Stage 4, *Mrank* = 107.54 [$M = 4.67$, $SD = 1.27$], $p = .017$) and aged 16–17 (Key Stage 5, *Mrank* = 105.06 [$M = 4.39$, $SD = 1.12$], $p = .027$). There were no significant differences between children aged 14–16 and 16–17 (Key Stage 4 and 5, $p = 1.00$). By the age of 14 (Key Stage 4), conspiracy beliefs appeared to remain constant.

Taken together, the CFA confirmed the factor structure of the ACBQ with 9-items, and we can be satisfied that the measure comprises one unidimensional construct. The convergent and discriminant validity on the construct level was good, as was the internal consistency reliability. However, although scores on the ACBQ were correlated with feelings of mistrust at home, there was no correlation shown for mistrust at school. Nonetheless, when taken together, this provides evidence that the ACBQ is an effective measure of conspiracy belief in young people.

STUDIES 3A AND 3B

In Studies 3a and 3b, as a further test of convergent validity, an older group of participants completed adult measures of conspiracy belief (e.g., the Generic Conspiracist Beliefs scale; Brotherton et al., 2013) and the newly formed ACBQ. We recruited a sample of 18-year-olds (Study 3a) who have recently left adolescence and a second sample that is more diverse in age (Study 3b). Utilizing a sample of 18-year-olds allows the opportunity to examine whether the ACBQ is associated with established forms of conspiracy measurement that only exist for adult samples. Using adult measures to test convergent validity is not suitable for younger populations (e.g., due to problematic wording such as '*government is involved in the murder of innocent citizens*' [Brotherton et al., 2013]). In addition, participants in both studies were asked to complete the ACBQ a second time to provide an examination of test–retest reliability. We also explored whether there were any differences of conspiracy beliefs between 18-year-olds and mixed-age adults.

Method

Participants[3]

Study 3a

Two hundred and fifty-seven 18-year-old participants (172 women, 80 men, three trans, and two indicated they would rather not say, 96.9% born in the UK, 97.3% English being their first language) were recruited online via a UK-based online participant database, *Prolific* (Time 1). All 257 participants were re-invited 14 days later to complete the ACBQ a second time, and 175 participants responded (68.09% retention rate, 119 women, 53 men, two trans, and 1 who would rather not say, 96% born in the UK, 96% English being

[3] *As Study 3a and Study 3b were advertised at the same time on* Prolific *and were methodologically identical, other than the inclusion criteria (3a: 18 years old; 3b: > 19 years), participants who failed the inclusion criteria (3a:* n = *24 participants; 3b:* n = *6 participants) were included in the respective study. Although the results were unchanged when these participants were included, increasing the sample size strengthens the power of the studies.*

their first language). Participants were all residents of the UK and received a small fee for taking part in the research.

Study 3b

Three hundred and eighteen participants aged 19 and over (M_{age} = 34.34, *SD* = 12.82, 243 women, 75 men, 98.7% born in the UK, 99.4% English being their first language) were recruited from *Prolific* at Time 1. As in Study 3a, participants were re-invited 14 days later to complete the ACBQ a second time, and 251 responded (78.93% retention rate, M_{age} = 35.17, *SD* = 12.09, 199 women, 52 men, 99.2% born in the UK, 99.6% English being their first language). All participants were residents of the UK and received a small fee for their time.

Materials and procedure

Participants in both Study 3a [18-year-olds] and Study 3b [mixed-age range of adults] completed the same materials. First, participants provided their informed consent before beginning the study. Participants were then asked to complete the ACBQ as developed in Study 1. The internal reliabilities of the ACBQ were good at Time 1 (Study 3a: $\alpha = .87$; Study 3b: $\alpha = .88$).

Next, to provide an additional measure of convergent validity, we included two measures of belief in conspiracy theories that have been validated with adult participants. First, we included a measure of general conspiracy theorizing (Generic Conspiracist Beliefs scale, Brotherton et al., 2013), which contains 15 statements (e.g., ‘The government is involved in the murder of innocent citizens and/or well-known public figures, and keeps this a secret’, 1 = *definitely not true*, 7 = *definitely true*; Study 3a: $\alpha = .93$; Study 3b: $\alpha = .95$). The second measure assessed belief in real-world conspiracy theories (Douglas & Sutton, 2011), and there were 7 statements (e.g., ‘There was an official campaign by MI6 to assassinate Princess Diana, sanctioned by elements of the establishment’, 1 = *extremely unlikely*, 7 = *extremely likely;* Study 3a: $\alpha = .83$; Study 3b: $\alpha = .85$). Presentation of the two scales was counterbalanced. At the conclusion of the first part of the study, participants were briefly debriefed, paid, and thanked for their time.

Fourteen days later, participants were re-invited to the study, where they completed the ABCQ measure for a second time. The internal reliabilities of the ACBQ were also good at Time 2 (Study 3a: $\alpha = .88$; Study 3b: $\alpha = .90$). Afterwards, the participants were fully debriefed, paid, and thanked again for their time.

Results and discussion

Descriptive statistics of the conspiracy theory belief measures in Study 3a (18-year-olds) and 3b (mixed-age adults) can be found in Table 6.

Convergent validity of ACBQ

In the sample of 18-year-olds (Study 3a), ACBQ mean scores correlated strongly in the expected directions with general conspiracy theorizing ($r = .84$, $p < .001$) and belief in real-world conspiracy beliefs ($r = .67$, $p < .001$). These effects were replicated with mixed-

Table 6. Descriptive statistics of the conspiracy theory belief measures in Study 3a (18-year-olds) and 3b (mixed-age adults) (Study 3a: full sample $N = 257$, test-retest $n = 175$; Study 3b: full sample $N = 318$, test–retest $n = 251$)

	Full sample						Test–retest sample			
	Time 1 (Day 0)						Time 1 (Day 0)		Time 2 (Day 14)	
	ACBQ		General		Real-world		ACBQ		ACBQ	
Studies	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
18-year-olds (Study 3a)	4.06	1.18	3.59	1.27	3.05	1.33	4.04	1.15	3.98	1.17
Mixed-age adults (Study 3b)	3.81	1.23	3.15	1.31	2.64	1.27	3.82	1.22	3.83	1.21

Note. General = measure of general conspiracy theorizing. Real-world = measure of belief in real-world conspiracy theories.

age adults (Study 3b: $r = .84$, $p < .001$; $r = .65$, $p < .001$, respectively). This provides supporting evidence that the ACBQ is capturing belief in conspiracy theories.

Test-retest reliability of the ACBQ

Within the test-retest sample, the mean ACBQ score at Time 1 (Day 0) and Time 2 (Day 14) for each study is shown in Table 6. The intraclass correlation coefficient (ICC) was calculated and demonstrated a strong degree of reliability in test–retest for both studies (see Table 7). Similarly, the correlation between ABCQ Time 1 and Time 2 was positive and strong for both studies (Table 7). We also conducted a paired samples' *t*-test to confirm the scale's repeatability; there were no significant changes in either study over the two-week interval (Table 7).

Comparison of means

As in Study 1 and Study 2, an MSCFA was conducted to examine measurement invariance of the 9-item structure (see Table 4). We found that ΔCFI, $\Delta SRMR$, and $\Delta RMSEA$ were within thresholds for the ACBQ and general conspiracy theorizing measure. However, the fit indices were not within range for the belief in real-world conspiracy theory measure, which means measurement invariance cannot be concluded for this measure. We therefore only explored differences between 18-year-olds (Study 3a) and the mixed-age adults (Study 3b) on the ACBQ and general conspiracy theorizing measures (see Table 6 for comparison of means at Time 1). Belief in conspiracy theories was shown to be significantly higher for 18-year-olds (Study 3a) than mixed-age adults (Study 3b) across both conspiracy theory measures (ACBQ [$t(573) = 2.267$, $p = .014$, $d = 0.21$], general conspiracy [$t(573) = 4.065$, $p < .001$, $d = 0.34$]). In these data, conspiracy theorizing therefore appears to be higher during early adulthood in particular.

In sum, the pattern of results in both studies provides further evidence of convergent validity of the ACBQ. The ACBQ was correlated with two adult measures of conspiracy beliefs, belief in real-world conspiracy theories and general notions of conspiracy theorizing. In addition, the ACBQ was shown to have strong test–retest reliability, demonstrating that it can measure conspiracy theorizing and is consistent across a 14-day time window.

Table 7. Correlation between ACBQ (Time 1) and ACBQ (Time 2), paired sample *t*-test and ICC results for Study 3a (18-year-olds, test–retest $n = 175$) and Study 3b (mixed-age adults, test–retest $n = 251$)

	ACBQ (time 2)		Paired sample *t*-test				Interclass correlation coefficients			
ACBQ (time 1)	*r*	*p*	*t*	95% CI	*p*	*d*	ICC	95% CI	*F*	*p*
18-year-olds (Study 3a)	.83	<.001	1.21	−0.05 to 0.16	.227	.00	.91	0.87−0.93	10.70	<.001
Mixed-age adults (Study 3b)	.79	<.001	−0.29	−0.11 to 0.08	.774	.00	.89	0.85–0.91	8.68	<.001

GENERAL DISCUSSION

The current research has developed and validated a novel measure of conspiracy beliefs that is suitable for younger populations. The ACBQ was constructed with a panel of experienced secondary school teachers, and the 9-item factor structure was first uncovered in Year 7 and 9 participants (ages 11–12 and 13–14) using EFA (Study 1). This study also indicated that young people did not find the measure upsetting and that they generally were familiar with the language and conspiracy theories presented. In Study 2, the adopted unidimensional factor structure was replicated via CFA with a sample of participants from Year 7 (aged 11–12) to Year 12 (aged 16–17). The scale displayed good convergent (i.e., relationship with paranoia and mistrust) and discriminant (i.e., no relationship with extraversion) validity. As a further test of convergent validity, in a sample of 18-year-olds (Study 3a), the ACBQ was shown to correlate with adult-validated measures of conspiracy beliefs, alongside strong test–retest reliability. These effects were replicated in a sample of mixed-age adults (Study 3b).

The ACBQ is a brief measure that is accessible to adolescents as young as 11 years of age (i.e., Year 7 participants in the UK). Moreover, because the final items measure more general conspiracy theorizing as opposed to representing current events (akin to some existing adult measures, e.g., Brotherton et al., 2013 for a discussion), the ACBQ is not time-dependent. This new measure is a validated resource that will enable researchers to explore the psychological antecedents and consequences of conspiracy thinking in younger populations. It will also enable researchers to explore the origins of conspiracy beliefs. Such an investigation has not yet been possible because there has not been a psychologically validated measure of conspiracy thinking suitable for younger people.

In our data, we have also uncovered that conspiracy thinking appears to be heightened as adolescents join Year 10 at age 14 (i.e., Key Stage 4 in the UK national curriculum). Specifically, in Study 2, older children (aged 14–16) reported higher conspiracy belief than their younger counterparts (aged 11–14). Interestingly, we also found that participants who were 18 years old in Study 3a had higher conspiracy belief than mixed-age adults (Study 3b), further demonstrating that adolescence could be a peak time for conspiracy theorizing. The ACBQ will be invaluable in efforts to further understand why this is the case. One contributor could be social media use, which is known to be prevalent amongst adolescents (Best, Manktelow, & Taylor, 2014) and is likely to shape young people's beliefs about the world. Furthermore, we know that young people prefer to get their news from social media as opposed to traditional news (Marchi, 2012) and that the majority of young people do not consider the credibility of news stories on social media (Ofcom, 2018). Since social media are rife with conspiracy theories (Vosoughi et al., 2018), this could be the perfect storm for conspiracy beliefs to flourish in younger populations.

Future research could also examine the psychological factors that are associated with conspiracy theorizing in adolescents. We have begun to explore links between conspiracy beliefs and psychological factors as part of our scale construction, and initial evidence suggests that paranoia and mistrust are associated with conspiracy beliefs in young populations (i.e., showing similar relationships to those shown in adults). Other factors such as critical thinking abilities could be explored (Stanovich & West, 2000), alongside anxiety and stress (Bird et al., 2017). Psychological stressors could be particularly important, as middle adolescence is a time when young people appear to rely less on emotional regulation (Zimmermann & Iwanski, 2014), which has been linked to increased rates of anxiety (Lougheed & Hollenstein, 2012). It is possible that conspiracy theories are appealing to young people in middle adolescence because they promise to satisfy existential needs (cf. Douglas et al., 2017). Future research could explore this possibility. Understanding the consequences of conspiracy theorizing in young populations is also important – we know that conspiracy beliefs in adults can lead to potentially significant consequences, such as an increase in prejudice and disengagement in social issues such as climate change (see Jolley, Mari, & Douglas, 2020). Research using the ACBQ could therefore lead to a deeper understanding of the consequences of conspiracy theories in young people.

Although the current work offers a valuable contribution to the conspiracy theory literature, it is important to acknowledge some limitations. Specifically, our focus has been on validating the ACBQ on young people living in the UK, and this may limit the generalizability of the results. However, the varying adult measures have been successfully applied in a range of different countries and contexts (see Douglas et al., 2019 for an interdisciplinary review), and the validity of these measures has not been compromised. We are confident that similarly, our novel measure will not be country-specific or time-dependent, especially as the measure focuses more on general beliefs and not those which may be more specific to one country or time (e.g., the death of Princess Diana). Furthermore, whilst we found that the ACBQ was associated with mistrust at home, there was no relationship found with mistrust at school. This finding was unexpected and merits further exploration to examine how different dimensions of trust might be associated with adolescent conspiracy beliefs and ways in which these relationships might differ to relationships observed in adult samples.

In summary, across four studies, we have developed and validated a novel measure of conspiracy beliefs that is suitable for younger populations. The unidimensional ACBQ comprises nine items, which is accessible to adolescents as young as 11 years old. As the ACBQ does not focus upon current events, this ensures the measure is not context or time-dependent. The ACBQ opens up new possibilities for research exploring the psychological antecedents of conspiracy thinking in younger populations. It will be invaluable for efforts to understand how conspiracy beliefs emerge and change across the lifespan, in addition to exploring the consequences of conspiracy beliefs for younger people.

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Conflicts of interest

All authors declare no conflict of interest.

Author contributions

Daniel Jolley (Conceptualization; Formal analysis; Funding acquisition; Investigation; Project administration; Resources; Writing – original draft; Writing – review & editing) Karen M. Douglas (Conceptualization; Funding acquisition; Investigation; Resources; Writing – review & editing) Yvonne Skipper (Conceptualization; Funding acquisition; Investigation; Resources; Writing – review & editing) Eleanor Thomas (Investigation;

Resources; Writing – review & editing) Darel Coookson (Investigation; Writing – review & editing).

Data availability statement

The data that support the findings of this study are openly available on the Center for Open Science: Open Science Framework at https://osf.io/7f3qc/

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Supporting Information

The following supporting information may be found in the online edition of the article:

Table S1. Example items that were reviewed by the research team for suitability for younger people (Step 1) and then considered by experts during a teacher panel (Step 2).
Table S2. ACBQ Items and factor loadings obtained when the Exploratory Factor Analysis (EFA) was re-ran with 14-items, alongside the finalised 9-item scale (in bold) (Study 1, n = 208).
Figure S1. Scree plot from the EFA based on 31 items in Study 1 (n = 208).