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Zoti's Social Toolkit: Developing and piloting novel animated tasks to assess emotional understanding and conflict resolution skills in childhood

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Abstract
Current methods used to investigate emotional inference and conflict resolution knowledge are limited in their suitability for use with children with language disorders due to a reliance on language processing. This is problematic, as nearly 8% of the population are estimated to have developmental language disorder (DLD). In this paper, we present 'Zoti's Social Toolkit', a set of animated scenarios that can be used to assess emotion inferencing and conflict resolution knowledge. All animated scenarios contain interpersonal situations centred around a gender-neutral alien named Zoti. Four studies investigated the face and construct validity of the stimuli. The final stimulus set can be used with children, who may or may not have language difficulties and is openly available for use in research.

KEYWORDS
developmental language disorder, experimental task, language, methods, social understanding, task development

BACKGROUND

Accumulating evidence suggests language skills are closely tied to social skills (Troesch et al., 2016). Developmental language disorder (DLD), while not well known, is a surprisingly common condition affecting approximately 7.6% of the population (Norbury et al., 2016). It is characterized by significant difficulties with receptive and/or expressive language, in the absence of any other diagnosed neurological condition, genetic condition associated with language difficulties, or history of hearing loss (Bishop et al., 2016). DLD is a highly heterogenous condition which can affect the comprehension and expression of many aspects of language including pragmatics, semantics, syntax, morphology, phonology and phonetics, and individuals have different combinations of difficulties across these areas leading to variable profiles (Rinaldi et al., 2021).

Statement of contribution

What is already known on this subject?

- Current methodologies for studying social understanding skills are often require participants to use their language skills to fulfil the requirements of the task.
- A significant proportion of the population (7.6%, according to research) have Developmental Language Disorder.
- Currently few experimental paradigms exist which can be deemed suitable for children with a language disorder.

What the present study adds?

- Zoti's Social Toolkit uses animations to ensure participants can fulfil the requirements of the task even if they have a language disorder.
- A series of studies were conducted to assess the face validity and construct validity of the tasks. The final toolkit is suitable for children with and without a language disorder.
- While Zoti's Social Toolkit has been developed for children with DLD, it has the potential to be used with a much wider population, which we describe in this paper.

Many children with DLD experience peer difficulties (Lloyd-Esenkaya et al., 2020). The precise reasons for this are still unknown, but research suggests these early social challenges can have a detrimental impact on mental health (Forrest et al., 2018). Importantly, while a significant proportion of children with DLD experience friendship difficulties, these difficulties do not seem to be universal (Mok et al., 2014). Moreover, the direction of causality between the social interaction difficulties observed in many children with DLD and their language and communication difficulties is yet unknown (Newbury et al., 2019). There is no evidence for a direct relationship between language difficulty severity and social behaviour among people with DLD, suggesting factors other than language profiles influence the ways children with DLD interact socially (Andrés-Roqueta et al., 2016; Charman et al., 2015). Co-occurring difficulties related to social understanding, including emotional competence, might result in the social difficulties seen in many children with DLD (Van den Bedem et al., 2018). For example, research to date finds children with DLD, compared to those without, are more likely to have difficulties with emotion understanding (Ford & Milosky, 2003; Spackman et al., 2006; Vendeville et al., 2015) and might have difficulties managing peer disputes independently (Bakopoulou & Dockrell, 2016; Marton et al., 2005; Stevens & Bliss, 1995; Timler, 2008).

While the current evidence base provides a useful foundation from which to gain an insight into the social understanding skills of children with DLD, it is important to look closely at the methods, which have so far been implemented to measure these skills. The difficulties children with DLD have in understanding and producing spoken narratives are well documented (Andreou & Lemoni, 2020; Bishop & Adams, 1992; Boerma et al., 2016; Govindarajan & Paradis, 2019; Peña et al., 2020). It is possible that the current literature has underestimated the ability of children with DLD to understand other's emotions and how to resolve social conflicts by failing to fully address the ways that language limitations impact on task performance. Possibly, children with DLD do not have social understanding difficulties after all, but evidence on the contrary stems from methodological issues due to their language barriers, as some suggest might be the case for the 'theory of mind' abilities of children with DLD (Miller, 2001).

To complete the emotion inference tasks and conflict resolution tasks in the aforementioned studies, children need to understand the narrative of a story read aloud to them about an imaginary character (Bakopoulou & Dockrell, 2016; Ford & Milosky, 2003; Marton et al., 2005; Spackman et al., 2006;

Stevens & Bliss, 1995; Timler, 2008; Vendeville et al., 2015). With a limited number of visual images accompanying the narratives, children are required to draw on the auditory narrative to imagine the sequence of events. Furthermore, in previous investigations of conflict resolution, researchers have either asked children to give a verbal description of how they would respond to a hypothetical situation of peer conflict (Marton et al., 2005) or have presented children with written strategies and asked them to select their preferred option (Bakopoulou & Dockrell, 2016; Timler, 2008). This is problematic because children need to use their language skills to fulfil the requirements of the task. Thus, it is imperative to create measures of social understand that can be understood and completed without reliance of verbal information within the task itself.

One study, however, did take an innovative approach to measuring the emotion inference skills of children with DLD by presenting different scenarios to children using animations, rather than static images (Ford & Milosky, 2008). Every stage in the auditory narrative is therefore illustrated by a series of moving images, allowing the child to visually process the entire scene. The results of this study suggest preschool children with DLD are less likely than preschool children without DLD to infer other's emotions during the time it takes to comprehend discourse, when a short animation is presented with audio and visuals. While Ford and Milosky's study overcomes some of the receptive language demands imposed by tasks used in other studies, not all the situations in the stimuli are specific to interpersonal situations. Rather, they involve general events to elicit different emotions, such as the character seeing a ghost to elicit fear. The skill with which children infer other's emotions during general situations will not necessarily generalize to their ability to infer other's emotions during social situations. At the present time, no tasks using animations exist which measure emotion inference during interpersonal situations.

Previous research has also found children with DLD perform less well on a task of emotion inferencing when a simple, short story is presented with visual stimuli only, compared to when the visual stimuli is accompanied by an audio recording, which tells the story (Ford & Milosky, 2003). This suggests that verbalized language can go some way to help children with DLD follow narratives, even if they experience difficulties with language comprehension.

More research into the links between language difficulties and social interaction skills is now needed to ensure the two in every thirty school children with DLD are supported to thrive. If research, for example finds those children with DLD who experience peer difficulties frequently misinterpret other's emotions during social situations, then disseminating this information to school staff could help teachers to understand why a child with DLD in their class is struggling to maintain friendships. Teachers could then work with clinicians, such as speech and language therapists, to give the child and their peer group explicit guidance on ways to handle social situations when misinterpretations of emotions arise.

The current paper describes the design and development of two novel tasks, one exploring emotion understanding within interpersonal situations and the other exploring conflict resolution within interpersonal situations (Lloyd-Esenkaya et al., 2024). Both tasks use animations depicting social interactions between a cartoon alien, named Zoti, and Zoti's peers. The task is called Zoti's Social Toolkit. The task has potential cross-cultural and cross-linguistic applications and could be used with many different groups of children with language difficulties outside of DLD, such as the deaf or individuals within multilingual contexts. Indeed, future research using this task could advance our understanding of the interrelationship between language competencies and social understanding within developmental psychology and related fields, such as education, language acquisition, Deafness/deafness and multilingual research.

Aims:

1. To develop a measure which assesses emotional understanding and conflict resolution with minimal reliance on receptive and expressive language skills.
2. To investigate the face and construct validity of the measure.

METHODS AND RESULTS

Zoti's Social Toolkit stimuli

The focal character of all the animations is a grey cartoon alien named Zoti (Figure 1a). In line with previous studies (Ford & Milosky, 2003, 2008), Zoti's character is gender neutral to ensure that gender is not a confounding variable in the tasks. Zoti has no facial features or expressions. The animations have a stop-motion style, with several digitally drawn image frames being combined to make each animation (Figure 2). Every animation involves other 'children' who are distinguished by different orientations of lines or dots on their bodies (Figure 1b), and only Zoti has a diamond above their head in every frame (Figure 2). The animated scenes are situated within environments familiar to primary school children in the United Kingdom: a school playground, a classroom, a home or a park. All visual content is coloured. The visual content in each animation is accompanied by a brief audio narrative, which describes the scene. Each event is visualized in the animation before it is described by the audio recording.

Emotion inference task protocol and scoring

In each animation, something happens between Zoti and another 'child', which is intended to elicit a feeling of happiness, sadness, fear or anger in Zoti. The order of presentation of animations is counterbalanced, to prevent order effects. Fourteen animated scenarios were originally created for the emotion inference task, each depicting one of the four different emotions (see Table A1). The context for the situations were either based on similar stimuli (Ford & Milosky, 2008) or were invented by the first author. All emotion inference situations depict interpersonal scenes which primary school children will be familiar with.

Scripts are used to introduce the task to participants (see Tables A5 and A6). After each emotion animation is shown, participants are asked 'How does Zoti feel?' and to select their response from a coloured multiple-choice array of cartoon faces depicting four emotions happy, sad, angry and scared with corresponding emotion labels shown underneath (Figure 3). Responses are scored 0 for incorrect, or 1 for correct. The scores from each animation presented are summed to provide a total emotion accuracy score. Next, participants are asked 'Why did you pick that?' and their verbal responses are given a score of 0 for inappropriate, 1 for Retelling without consideration for other characters or 2 for Source of emotion with consideration of others (see Table A2). That is, responses which identify how Zoti's emotional reaction stems from an understanding of the other character's thought processes/intentions. To achieve a score of 2, a response will include words relating to thought processes, intentions or adjectives to describe how the characters are deliberately behaving. For example, a response such as, 'scared
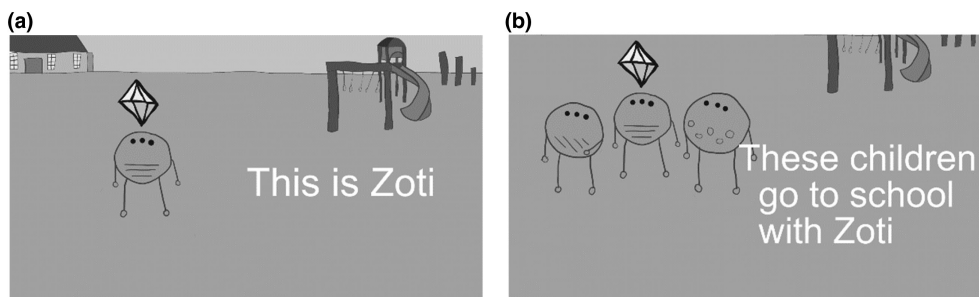

FIGURE 1 (a) Image with text that is shown to participants as an introduction to the focal character in the animations. (b) Image with text that is shown to participants as an introduction to the additional characters accompanying the focal character in the animations.
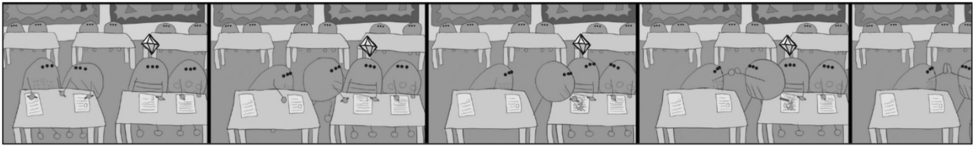
FIGURE 2 Image to illustrate the way the animations are constructed using a stop-motion technique. For every animation, several digitally drawn image frames are joined together using animation software. Participants view each image one by one, thereby creating the illusion of a moving image.
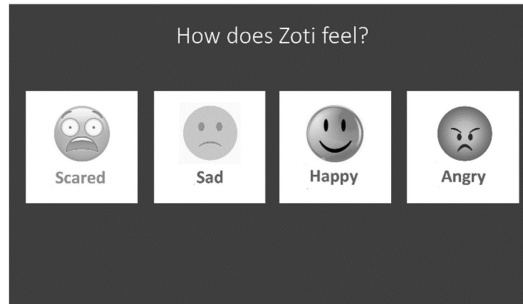

FIGURE 3 Image to illustrate the multiple-choice array participants view to choose Zoti's emotion resulting from each social situation in the emotion inference task.

because Zoti think others forget him and leave him', would receive a score of 2. Responses containing grammatical or syntactic errors are not penalized. Verbal response scores from each animation are summed to provide a total emotion understanding score.

Conflict resolution task protocol and scoring

A total of seven animated scenarios were originally created for the conflict resolution task. Each scenario depicts an interpersonal scene where something goes wrong: Either another child does something which should upset Zoti or there is a conflict of interests (see Table A3). The order of presentation of scenarios is counterbalanced, to prevent order effects. The content for most of the conflict scenarios are based on the hypothetical situations used in previous studies (Dodge et al., 1985; Marton et al., 2005; Rose & Asher, 1999). Each of these situations depict a commonplace conflict.

Scripts are used to introduce the task to participants (see Tables A7 and A8). After a conflict scenario is shown, participants are asked 'What should Zoti do?'. They are then shown a further five brief animations depicting possible conflict resolution strategies. One animation is adult seeking, one takes an assertive stance, one is hostile, one is passive, and another is prosocial. The order of presentation of strategies is counterbalanced. Each strategy animation is silent aside from a key phrase which is sounded at the end. Participants then view a multiple-choice array of five images, showing a pertinent scene from the five conflict resolution strategy animations, with the key phrase written underneath (Figure 4) and asked to select their choice. Their choice of conflict resolution strategy is recorded. Next, participants are asked, 'Why did you pick that?'. Responses to the 'why?' question are analysed for key words relating to the goal motivating the children's choice of conflict resolution strategy. Building on previous conflict resolution research (Rose & Asher, 1999), each verbal response on the conflict resolution reasoning task is matched to one of seven possible conflict resolution goal types, which comprises 'Revenge', 'Control', 'Instrumental', 'Relationship', 'Moral', 'Internal tension reduction' or 'Unable to Categorize' (see Table 1).
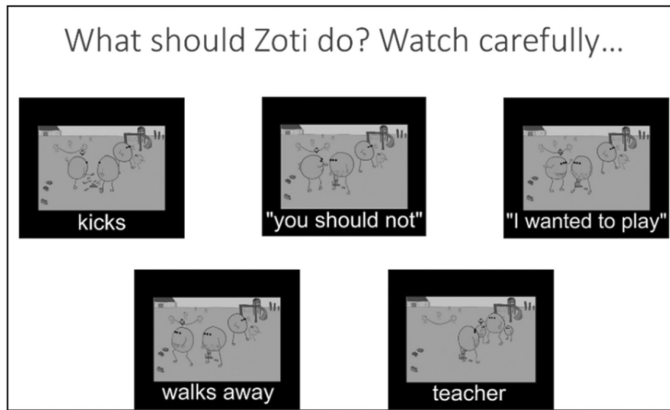
FIGURE 4 Image to show the type of multiple-choice array participants view to select a conflict resolution strategy in the conflict resolution task. All text is read aloud to participants by the experimenter.

TABLE 1 Coding scheme for scoring participant's verbal responses on the conflict resolution reasoning task, revealing the goal motivating participants' choice of conflict resolution strategy.

Goal type	Description for goal type
Relationship	Trying to maintain a relationship with the other characters is the motivation for the participant's choice of strategy. For example, 'Zoti would be trying to stay friends' Other keywords like friends which are appropriate here include kind, caring, nice
Moral	Trying to do the moral thing is the motivation for the participant's choice of strategy. For example, 'Zoti would be trying to be fair' Other keywords like fairness which are appropriate here include doing the right thing, being honest or making an explicit statement that the other child/children did something that was wrong
Tension reduction	Trying to calm down, or not getting too angry or upset is the motivation for the participant's choice of strategy. This includes trying to reduce worry or anxiety about the situation as the motivation for the participant's choice of strategy. For example, 'Zoti would be trying to stop themselves from getting upset'
Instrumental	Trying to find a solution for the sake of making the problem disappear or trying to obtain the object of the dispute is the motivation for the participant's choice of strategy. This includes trying to 'sort out' the situation with no explicit reference to the consequences this will have for one's mood, relationship or reputation. Each conflict scenario has a different object of dispute: Sweets: 'to try to get a sweet' Jacket: 'so they stop making fun of Zoti' Toy: 'so the toy can be fixed/replaced'
Control	Trying to maintain an assertive reputation is the motivation for the participant's choice of strategy. For example, 'Zoti would be trying to show them that they shouldn't push them around' Other key phrases associated with being assertive include: 'they shouldn't mess with me', 'show them who's boss', 'I'm the one in charge'
Revenge	The participant's response includes an explicit statement that trying to upset/hurt someone else, either physically or emotionally, in return for making Zoti feel upset/angry is the motivation for the participant's choice of strategy. For example, 'Zoti would be trying to get back at their friend'
Uncategorized	Participant explains their reasoning but none of the defined goals are described in their answer. Or, response is off topic, or not at all meaningful, or no answer

Overview of studies

Zoti's Social Toolkit was developed and investigated across four studies (see Figure 5) to consider face and construct validity. Face validity evaluates whether a measure appears to be reasonable in measuring a domain of interest (Kazdin, 2016). Face validity was considered during studies 1, 2 and 4. The outcomes of Studies 1 and 2 led to the alteration and later the removal of specific animations, while Study 4 assessed the face validity of the two qualitative scoring schemes described earlier; emotion inference and conflict resolution strategy. Construct validity evaluates whether a measure reflects the concept an investigator sets out to test (Kazdin, 2016). The construct validity of the emotion accuracy task was assessed in Study 3, which informed the subsequent removal of specific animations to refine the task. All the tasks and animations are openly available to download from https://doi.org/10.15125/BATH-00970 (see Data S1).

Ethics

Ethical approval was obtained from the Department of Psychology Research Ethics Committee at the University of Bath (REF: 18-340).
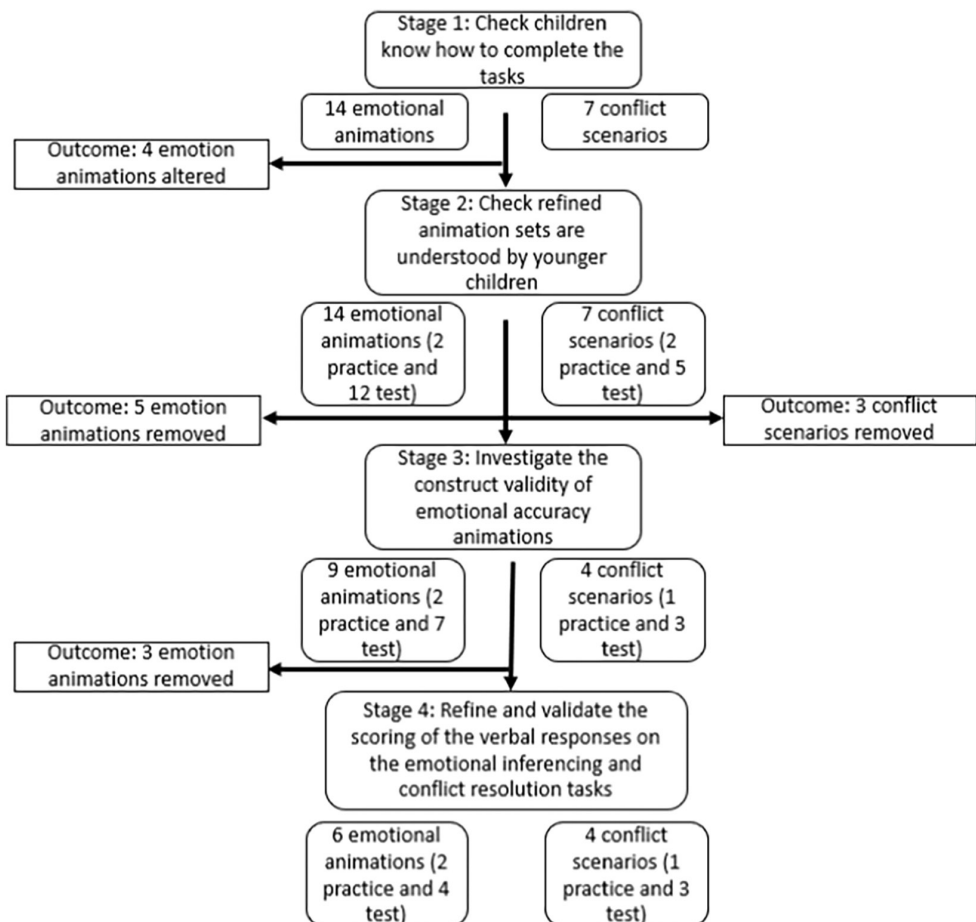

FIGURE 5 Flow chart showing the development process for Zoti's Social Toolkit.

Study 1—Check children know how to complete the tasks

Aims

This initial study aimed to:

(i) Find out whether children could understand the instructions for the two tasks and the sequence of events depicted in the animations, as shown by their ability to give multiple-choice responses and by analysing their verbal responses to the questions. (ii) Assess the face validity of the visual content in the emotion inference task by checking whether children could complete this task (i.e., choose a picture from the multiple-choice array and give a verbal response to the question) when the animations were presented without sound. The conflict resolution was presented with sound in this study, as the scenarios were thought more complex than the emotion inference animations so initial understand was assessed with audio for this task.

Participants

Children aged 9–11 took part in the emotion inference task ($N = 44$; m = 13; f = 31; M = 10 years, SD = 0.71) and conflict resolution task ($N = 47$; m = 31, f = 16; M = 9.9 years, SD = 0.75). An opportunity sample of 9 to 11-year-olds attending a science festival at the researchers' university was used. Taking part in the study was one of a range of science activities children had the opportunity to engage with in a large sports hall. No screening was made for neurodevelopmental conditions. All children were assumed to be typically developing. It should be noted that age data was missing for four children who completed the emotion inference task and five children who completed the conflict resolution task.

Procedure

Testing took place at a table in the science festival hall. Although a busy environment, there was sufficient space between exhibition stands to allow for relatively quiet testing conditions. Each participating child completed either the emotion inference task or the conflict resolution task. All the emotion inference animations were presented without sound. There was no counterbalancing of the order of presentation of the animations in the emotion inference task or of the conflict scenarios in the conflict resolution task. Multiple-choice responses on the two tasks were recorded. Participants' verbal responses on the two tasks were written down, and later discussed among the research team, if the researcher judged them to indicate that the child had not understood the intended sequence of events in any animation. Researchers also took notes on any other observations of the participants' understanding of the task(s).

Results

Researchers reported that it was clear participants understood how to complete both tasks since all participants gave multiple-choice responses and verbal responses without expressing confusion over how to complete the tasks. The researchers had recorded written comments which indicated that four emotion inference animations (The den, Ice cream, Ill for party, Chase in playground) were not fully understood by some participants when presented silently (Table 2). The image frames in these animations were altered to make their storylines more explicit. No comments recorded indicated that participants had not understood the storyline in any animation in the conflict resolution task.

TABLE 2 Table showing researcher's comments which indicated children had not fully understood the visual content of some of the animations in Study 1 and the subsequent plan of action to make the visual content clearer.

Animation title	Intended emotion	Description of content	Researcher's comment
The den	Happy	Children are playing a game and ask Zoti to join	One child thought Zoti was being punched so inferred that Zoti would feel scared
Ice cream	Happy	Another child buys Zoti an ice cream	One child inferred Zoti felt scared because a stranger who they did not know bought them an ice cream
Ill for party	Sad	Zoti is too ill to attend a peer's party	One child inferred Zoti felt angry. Child said Zoti did something that they should not have done
Chase in playground	Scared	Another child pushes Zoti and their friends chase Zoti	One child inferred Zoti felt happy because they thought Zoti was having fun

Study 2—Check refined animation sets are understood by younger children

Aims

Study 2 aimed to (i) assess whether younger children aged 7–8 years could understand what was happening in the emotion inference animations to the extent that they would infer the intended emotions. It was decided that any animations which were not assigned the intended inferred emotion by any participants would be removed from the stimulus set; (ii) confirm that younger children could understand the series of events in the emotion inference animations and conflict resolution animations from their visual content alone following the alterations made as a result of Study 1. This was key in ensuring the animations were suitable for children with language difficulties. By making sure the animations were easily comprehensible without reliance on the audio narration, children with language difficulties should be able to engage with the activities without their language difficulties being a limiting factor in their performance. A key purpose of Study 2 was to remove any emotion or conflict animations whose visual content was not adequately conveyed before further testing in Studies 3 and 4 as well as confirm children this age can complete the task as we intend to administer them.

Participants

Five children aged 7–8 (M = 7.6 years, SD = 0.55; m = 4; f = 1) took part most of both tasks. We wanted to ensure the task would be valid for children at least as young as 7; therefore, a younger age range was selected for Study 2. Two teachers who taught students aged 7–8 at a local school agreed to help in recruiting children for this study by sending leaflets home to parents. Five parents agreed for their child to participate. No screening was made for neurodevelopmental conditions. All children were assumed to be typically developing.

Procedure

Testing took place in a private meeting room in a primary school. Each child completed both tasks. There was no counterbalancing of the order of presentation of the animations in the emotion inference task or of the conflict scenarios in the conflict resolution task. Participants viewed 40% of the emotion inference animations without sound and about 70% of the initial conflict resolution animations without sound (the normal audio is presented during the conflict resolution choices). As Study 1 already presented the emotion inference animations without sound, we wished to evaluate both the full version of the task with audio as well as do some additional testing of the animations without audio. As Study 1 did not present any of the conflict resolution animations without sound, the majority of the animations from this task were presented without sound, although some were presented with sound to evaluate the full version of the task.

The modality (audio narration vs. no audio narration) in which each animation was presented was counterbalanced across participants. On audio-narrated trials, participants' multiple-choice responses and verbal responses were recorded and transcribed verbatim. On these trials, two practice trials were introduced for the emotion inference task. In the first practice trial, children were shown an animation (Ice cream) were asked, 'How does Zoti feel?', and were asked to select an emotion. In the next practice trial, children selected an emotion for the next animation (Kite) and were then asked, 'Why did you pick that?', thus familiarizing themselves with the task. Test trials then followed and responses were recorded. On silent trials, participants were asked, 'What do you think is happening here?' and their responses were recorded and transcribed verbatim. As this was a very simple

instruction, we did not include any practice trials. In total, 12 test trials were presented across both types of presentation.

Two practice trials were introduced for the conflict resolution task. Children familiarized themselves with the task by selecting a strategy for the conflict scenario, microphone, and were asked, 'Why did you pick that?'. Next, they selected a strategy for the second practice conflict scenario, Lollipop, and were asked to explain their choice. Depending on the researcher's judgement of the children's attention levels, each child engaged with three to five conflict scenarios test trials. Responses were again recorded. Three of the five children viewed the conflict resolution task animations with sound and their multiple-choice responses and verbal responses were recorded and transcribed verbatim. Two of the five children viewed only the conflict animations which set the scene for the conflict scenarios. They viewed these without sound and were asked, 'What do you think is happening here?'. Their responses were recorded and transcribed verbatim.

Any indications that a child did not understand the events shown in the emotion animations or conflict animations based on their rationale for their multiple-choice option or their responses on the silent trials were later discussed among the researcher team.

Results

We removed four out of the 14 emotion inference animations (The den, Friend leaving, Ill for party, The corridor) and two out of the seven conflict resolution scenarios (Pushing in, The goalie) from the stimulus sets because their storylines were not adequately conveyed in the visual stimuli (Tables 3 and 4). We removed a further emotion inference animation (Stolen microphone) from the stimulus set because no children inferred the intended emotion (angry) from this animation (see Table A4). It was also noted that children became tired after approximately 10 min of settling into the room and engaging with the activities, so had difficulty completing more than five conflict scenario trials during the conflict resolution task. Therefore, one of the practice trials conflict scenarios (Lollipop) was removed to reduce testing time. In total, there were nine emotional inferencing trials and four conflict resolution trials retained after Study 2.

Study 3—Investigate the construct validity of emotion accuracy animations

Aims

The purpose of Study 3 was to assess whether the nine remaining emotion animation depicted its intended emotion contributing to an investigation of the construct validity of this aspect of the task. There needs to be an assumed 'correct' emotional response in the emotion inference task to allow for binary scoring. Any animations without adequate agreement between their intended emotion response and responses participants gave would be removed from the stimulus set.

Participants

Twenty adults (m = 10; f = 10) aged 18–25 took part in Study 3. Adults were chosen for Study 3 because their emotional functioning is more developed than 7–9-year-old children, therefore we make the assumption that there would be less variation in their emotion inference multiple-choice responses and their responses would be more accurate (Booker & Dunsmore, 2017; Tonks et al., 2007). University students at the host institution were recruited through advertising the study. No screening was made for neurodevelopmental conditions. All adults were assumed to be typically developing.

TABLE 3 Table showing researcher's comments which indicated children who viewed the emotion inference animations without sound in Study 2 had not fully understood the visual content of some of the animations.

Animation title	Intended emotion	Description of content	Researcher's comment
The den	Happy	Children are playing a game and ask Zoti to join	One child said, "Zoti was gunna leave, and then someone else told her to stay?', suggesting it was not obvious that Zoti was being asked to join a game
Friend leaving	Sad	Zoti and peers wave goodbye to a child leaving their school	One child thought Zoti was putting boxes in a van and then said goodbye to the driver. No mention was made of any friend moving house
Ill for party	Sad	Zoti is too ill to attend a peer's party	One child understood that Zoti couldn't go to a party but thought the other character, who was intended as Zoti's parent, was another child
The corridor	Scared	Another child jumps out at the Zoti in the corridor	Two children did not understand why Zoti fell over

TABLE 4 Table showing researcher's comments which indicated children who viewed the conflict animation which set the scene for the conflict scenarios without sound in Study 2 had not fully understood the visual content of some of the animations.

Animation title	Description of content	Researcher's comment
Pushing in	A peer pushes into the dinner line	One child did not understand that another character was pushing into the dinner queue
The goalie	Both Zoti and a peer want to be in goal	One child did not understand that both characters wanted to play in goal

TABLE 5 Table to show proportion of adult votes for each emotional reaction for every animation presented in Study 3.

		Proportion of responses (%)			
Animation name	Intended emotion	Happy	Sad	Angry	Scared
Ice cream	Happy	100.0	0.0	0.0	0.0
Kite	Sad	0.0	90.0	10.0	0.0
Ball game	Sad	0.0	75.0	25.0	0.0
Lost friends	Scared	0.0	15.0	0.0	85.0
Chase in playground	Scared	0.0	5.0	5.0	90.0
Birthday present	Happy	100.0	0.0	0.0	0.0
Sweets	Happy	100.0	0.0	0.0	0.0
Ruined picture	Angry	0.0	45.0	55.0	0.0
Scribble	Angry	0.0	25.0	75.0	0.0

Procedure

Testing took place at participants' homes, online, using their own computers. Only the emotion inference task was presented. There was one practice trial, whereby participants were told 'Let's have a practice', by the instructions on the screen, and selected an emotion for the practice animation (Ice cream), thus familiarizing themselves with the task. The order of presentation of the remaining animations was counterbalanced across participants. Emotion inference multiple-choice options were recorded for practice and test trials. Participants were not asked to explain their reasoning. It was decided a priori that any animation which did not reach at least 75% agreement with its intended emotion would need to be removed from the stimulus set.

Results

There was good internal consistency within the emotional response participants gave, and between the inferred emotions and the intended emotions for most of the animations (Table 5). We removed one animation (Ruined picture) from the stimulus set because fewer than 75% of participants selected the intended emotion (angry) (Table 5). Noticing how the children in Study 2 became tired after 10 min of engaging in the protocol, we were aware of a need to minimize fatigue effects as far as possible. We therefore also removed two of the valid emotion animations (Sweets and Ball game) from the stimulus set, to prevent fatigue effects, which had the subsequent effect of providing an equal number of happy, sad angry, and scared test animations for the test trials. In total, there are six animations for the emotional inference task retained for Study 4, two practice trial and four test trials. There are four conflict resolution trials retained for Study 4.

Study 4—Refine and validate the scoring of verbal responses on the emotion inference task and conflict resolution reasoning task

Aims

Study 4 was part of a larger study investigating differences in task performance between children with and without DLD and association with real-world social skills (manuscript in preparation). For the purpose of the present paper, data were collected about participants' verbalized rationales for their responses to the quantitative items on the emotion inference and conflict resolution tasks. Evidence that children's verbal responses could be differentiated using the two coding schemes would indicate that the qualitative aspect of the toolkit has a suitable level of face validity to be used in future studies.

Participants

To check that the qualitative scoring schemes could be applied to the verbal responses of children with and without language difficulties, children with and without DLD were included in this study. Twenty-two children with DLD (m = 16; f = 6; M = 8 years, SD = 0.73) and 20 children without DLD (m = 9; f = 11; M = 7.7 years, SD = 0.98) aged 7–9 took part in the study. There were 38 families in total, with one pair of siblings in the DLD group and four pairs of siblings in the non-DLD group. This age range was chosen as we wanted to assess the face validity of the toolkit for use with children as young as 7. Study 4 used opportunity sampling and a snowball method to recruit participants. The study was advertised through social media pages, including Twitter and parent support groups on Facebook and through school newsletters and leaflets in leisure centres, schools and the researcher's university. Private speech and language therapists were also emailed and asked to share details of the study with families of children with DLD on their caseloads.

Only children who had learned English as a spoken language from birth were invited to participate. Children in the DLD group had been referred to a Speech and Language Therapist and already had a diagnosis of DLD, or receptive/expressive language disorder. No children in either group had an autism diagnosis, or a known genetic condition associated with language difficulties. No children in the non-DLD group had any diagnosed or suspected neurodevelopmental conditions or learning difficulties.

Procedure

Testing took place in participants' own homes. To assess the face validity of the tasks, the full protocol for emotion inference and conflict resolution tasks were administered, that is participants were asked to select a response from the multiple-choice array for each item and participants then asked to explain their response with the 'why did you….?' question. All participants completed all tasks (emotional inferencing: two practice and four test trials; conflict resolution: one practice and three test trials). All tasks were complete with the visual and audio components. This time, the experimenter used scripts to introduce the emotion inference and conflict resolution tasks (see Tables A5 and A7, respectively). The order was consistent across all participants, with the emotional inferencing task being presented first. The emotion inference task included two practice trials. In the first practice trial, children were shown an animation (Ice cream) and were asked to select an emotion, to gain familiarity with the task. Next, children selected an emotion for another animation (Chase in playground), were asked to explain their reasoning, and this time a script was used to give an example of how they could respond verbally (see Table A6). The conflict resolution task included one practice trial, whereby children were asked to select a strategy for the practice conflict scenario (Microphone) and explain their reasoning, and then were given an example by the experimenter of how they could respond verbally, using a script (see Table A8). Researchers should follow the scripts and the description within this study for any further use of Zoti's Social Toolkit.

The order of presentation of the remaining four test trial animations in the emotion inference task (Birthday present, Kite, Scribble and Lost friends) and the remaining three test trial conflict scenarios in the conflict resolution task (Broken toy, New jacket and Sharing sweets) was counter-balanced across participants. Verbal responses for test trials were recorded and transcribed verbatim to be analysed with the coding schemes by independent raters (see Table 1 and Table A2). Multiple-choice responses for test trials on the two tasks were recorded but will be reported in full as a key aspect of the larger study. Only children's overall responses to the quantitative test items on the emotion inference task will be reported here to give context, since emotion accuracy test item responses are either correct or incorrect. For the present paper, Study 4 is concerned with assessing validity of the qualitative scoring schemes.

Analysis plan

Emotion inference accuracy scores from each test item animation are summed across participants to provide a total accuracy score for each of the four emotions (happy, sad, angry and scared).

Emotion inference reasoning transcripts were scored using a template scoring scheme, which was refined during the scoring process (see Table A2). Two raters, blind to participant identity, independently scored a random selection of 15% of the transcripts from the emotion inference task. Inter-rater agreement was 75%.

The same two independent raters scored a random selection of 10% of the transcripts from the conflict resolution reasoning task, as training to learn to use the template coding scheme, which was refined during the scoring process (see Table 1). Following this, both raters independently coded a further randomly selected 15% of the transcripts. The inter-rater agreement was 66.7%. Since agreement was relatively low, both raters independently coded the remaining transcripts, with 75.9% agreement. The first author settled any disagreements. Responses were only coded with a specific goal type if there was enough explicit information to be certain that the response met the goal criteria.

Results

Emotion inference accuracy task

Overall, more than 60% of children accurately inferred the intended emotion depicted in each of the emotion inference animations (see Figure 6). There were no floor effects; however, children did perform at ceiling level for the happiness animation. There was substantial variability across children, with some children only identifying 25% of the emotions correctly (these children only identified the happy condition correctly) while others identified 100% of the emotions correctly.

Emotion inference reasoning task

The emotion inference response types that were specified in the coding scheme (see Table A2) could be identified in children's verbal responses, showing the qualitative dimension of the emotion inference task has good face validity. The most common emotion inference response children gave was to restate the events they had seen without mentioning the thoughts or intentions of the other characters, which meets the criteria for a score of 1 (see Figure 7 and Table A2).

Conflict resolution reasoning task

Adult seeking, followed by assertive, were the most common conflict resolution strategies chosen (see Figure 8). A number of the conflict resolution goal types specified in the coding scheme (see Table 1) were rarely included in participants' responses, that is Revenge, Control, Internal tension reduction and Relationship (Figure 9). Only one child described a seeking revenge goal, albeit for all three of the conflict scenarios.
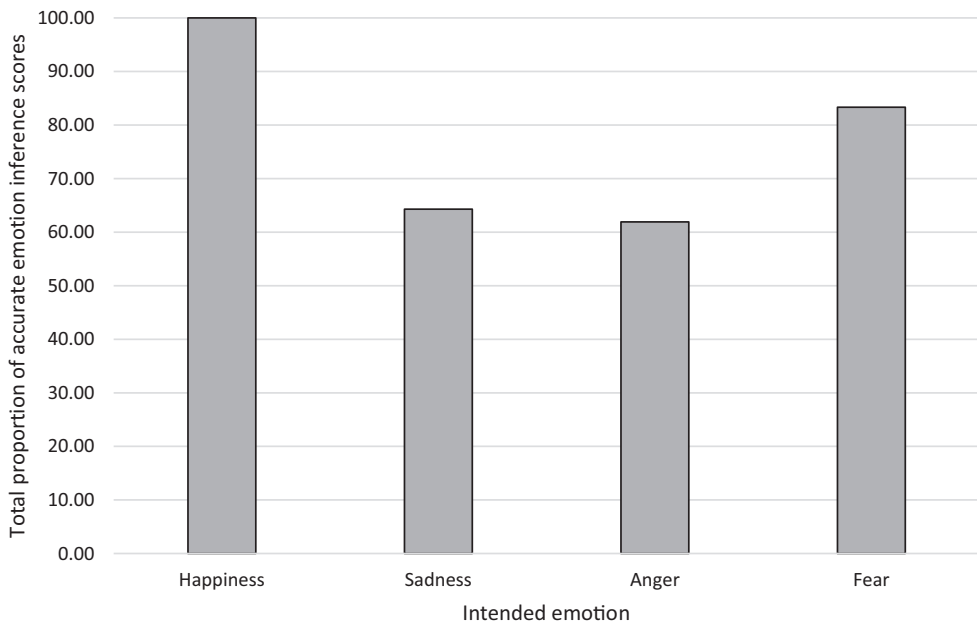
FIGURE 6 Bar chart to show total proportion of children (*n* = 42) who selected the 'correct' emotion for each of the test animations in the emotion inference task. There were four test animations in total, one for every intended emotion.
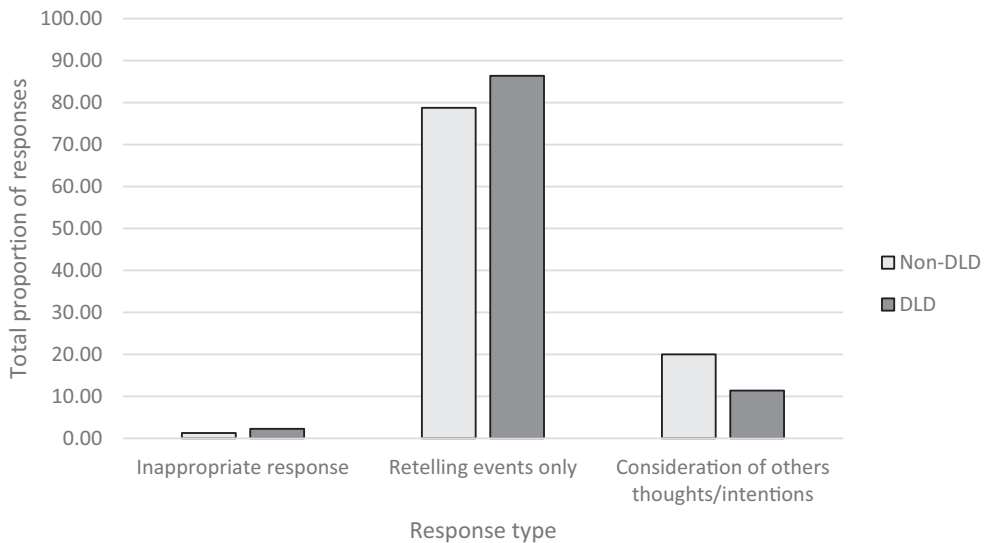

FIGURE 7 Bar chart to show the level of sophistication of the emotion inference reasonings given by children with and without DLD.

Approximately 25% participants' responses could not be categorized according to any one goal type (Figure 8). These verbal responses were analysed in more detail (see Table A9). The most common reasons for being unable to categorize the children's verbal responses was that they were too ambiguous or did not include enough detail to justify categorization of one goal type over another. At times, the response appeared to imply one specific goal, but there was not enough explicit information to be certain of this decision. Some of the children with DLD appeared to misinterpret the
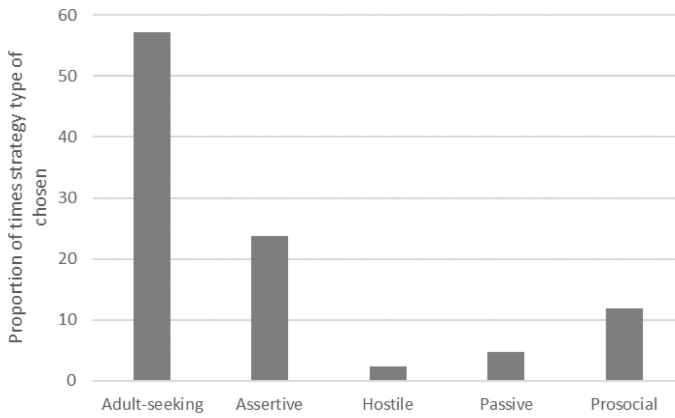
FIGURE 8   Bar chart to show the conflict resolution choices that were chosen by the participants ($N = 42$).
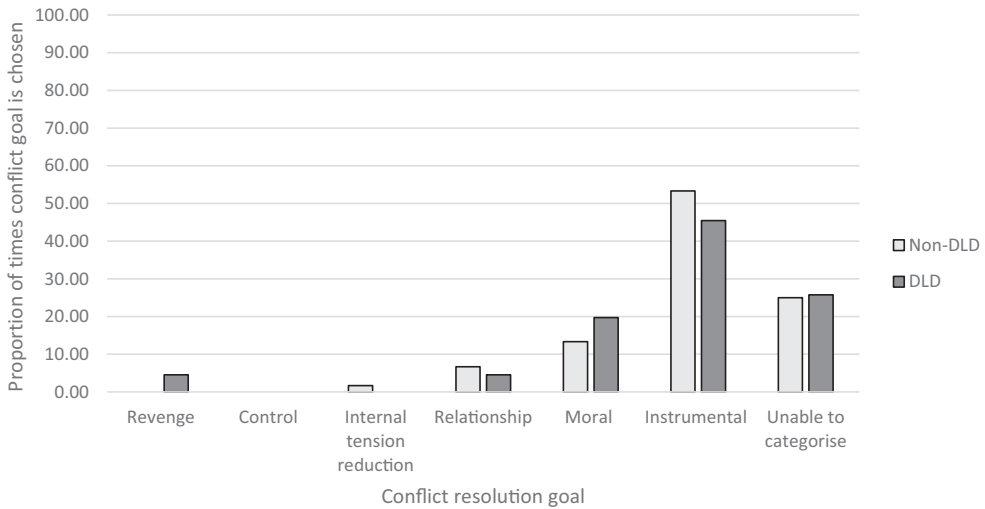

FIGURE 9   Bar chart to show the total proportion of times each composite conflict resolution goal was described by children with and without DLD.

question when asked why they selected their chosen strategy, and some gave no or an incomplete response. This could be reflective of their receptive and expressive language difficulties. The face validity of the qualitative aspect of the conflict resolution task, as it currently stands, could be improved.

DISCUSSION

Summary and interpretation of results

This paper has presented findings about the development of a novel assessment tool with considerable potential for future research and professional practice, particularly with children who have disordered language skills. Unlike other instruments which use images to assess emotion inference or conflict resolution skills, the tasks are unique because while the visual elements can be stand-alone, accompanying

audio presentation provides a second modality to enhance the chances of full comprehension of the task materials (Bakopoulou & Dockrell, 2016; Ford & Milosky, 2003; Marton et al., 2005; Spackman et al., 2006; Stevens & Bliss, 1995; Timler, 2008; Vendeville et al., 2015). The task design includes multiple-choice quantitative responses with elaboration via qualitative justification of responses. All elements of the assessment tool have been subject to iterative development across four separate studies involving distinct participant groups across a range of ages and language abilities.

Studies 1 and 2 demonstrated that the emotion inference and conflict resolution animations could be understood by typically developing children without the accompaniment of spoken language providing some evidence of face validity. There are however caveats here, which are addressed in the limitations below. The findings of Study 3 indicated a high level of agreement between the emotions selected by expert adults and intended emotions for the animations included in the final stimulus set, thus supporting the construct validity of this aspect of the toolkit. In Study 4, we were able to demonstrate good face validity for the qualitative scoring scheme for the emotion inference task. The qualitative scoring scheme for the conflict resolution task will need further refining by researchers, in part due to a constrained range of responses by participants.

We were surprised by this latter finding. All participants, regardless of language levels, gave responses which restated the events in the animation but provided no consideration of the thought processes or intentions beyond the central character. Furthermore, many participants' responses were difficult to categorize, that is it was unclear which of the conflict resolution goal types their verbal responses most closely described. Our findings suggest that, at least with regard to hypothetical situations depicted in short animations, children between the ages of 7–11 may not explicitly include the views and thoughts of others when resolving a conflict. It is also possible that the very nature of the task stimuli meant that the participants did not consider the full range of strategies as available to the cartoon character 'Zoti'. Further evaluation of this aspect of the assessment is needed with a broader range of children to consider age-related effects.

Limitations

The task development is not without limitations. At present, there is only limited evidence to indicate children could understand the sequence of events in the animations from their visual content alone. Children in Study 1 were able to complete the emotion inference task when it was presented silently. Similarly, children in Study 2 showed they understood the sequence of events in the emotion inference animations and the retained conflict resolution scenario animations through their verbal descriptions. Although this evidence strengthens our argument that these are suitable animations for children with language difficulties, further work, particularly in Study 2, showing silent animations to a larger sample would have further strengthened this conclusion. Further research is now needed whereby a larger sample of children is asked to describe the sequence of events in every animation retained in the toolkit. Furthermore, the development of Zoti's Social Toolkit addressed only content and construct validity. Before using the toolkit in experimental studies, researchers are therefore recommended to first assess children's understanding of the visual content of the animations using larger sample sizes and to address other aspects of validity, as well as reliability, using large groups of children with differing language profiles.

The toolkit itself does not currently evaluate more nuanced emotions, such as jealousy. However, the research indicates that children with communication difficulties may struggle with basic emotions, which was the basis of our current focus. While future research using Zoti's Social Toolkit could provide new insights into the ways children with language difficulties infer happiness, sadness, fear or anger, additional work is needed to evaluate the relationship between language difficulties and the inference of other emotions, such as jealousy, grief and regret, whose concept acquisition seems to be associated with more sophisticated linguistic comprehension (Streubel et al., 2020).

Additionally, the final stimulus set was greatly reduced from 14 emotion animations to 6, and 7 conflict scenarios to 4. This was done to ensure the construct validity of the materials as well as ensure

age-appropriate length task length. However, there is a limit to how far the toolkit will be able to demonstrate children's social understanding skills with the limited animations. In Study 3, adult responses for the sad, angry and scared animations in the emotion inference task had less than 100% consistency. This is not unusual for emotion perception research, for example data reported in a meta-analysis finds emotion perceptions from photographs of facial expressions finds 79% agreement for facial expressions of sadness, 73% for anger and 72% for fear (Barrett et al., 2019). However, coupled with the ceiling effect for children responding to the happy animation in Study 4, there may be a limit to how far the emotion inference task can differentiate children's skills. Study 4 involved a small sample size, and a larger study, which is now needed, might find greater variation in children's responses.

Implications of the study

Issues with face and construct validity were the reason for reducing the number of stimulus items, and this reveals broader challenges with creating suitably controlled assessments of social understanding. It is difficult for research teams to create cartoon moving images representing social situations which are interpreted by children in the same way as was intended by the creators, and which can represent sadness, anger and fear distinctly. This has important implications for researchers wanting to move the field forwards. Recent research suggests we know much less about emotion perception than we once thought we did and our understanding of the relationship between language disorders and emotion perception is in its infancy (Barrett et al., 2019; Griffiths et al., 2020). As our paper has identified, finding ways to systematically assess emotion inference skills and conflict resolution knowledge, which place minimal demands on language skills, will continue to challenge future researchers. Relatedly, in Study 4, during the administration of the qualitative dimension of the conflict resolution task, a significant proportion of all participants offered a response that was 'uncategorized'. It was difficult to categorize many of the responses that children gave, regardless of their DLD status, because their verbal descriptions were too ambiguous or lacked detail. These problems with the qualitative scoring raise important questions around which methods are best suited to tell us about children's own perspectives on how they understand social situations.

Although the limited item set size is not ideal, the small item size also means the toolkit is fast to administer and can therefore form part of a broader battery of assessments that explore children's social skills. For example, the emotion inference task could be used in combination with tasks of emotion recognition from facial expressions and from vocal cues, to give a more complete insight into children's emotion perception abilities (Dalrymple et al., 2013; Sauter et al., 2013). Recent research calls for more assessment tools that directly assess specific social information processing dimensions in children, rather than rely on teacher rating scales, which are unable to give an accurate insight into children's lines of thinking during social situations (Russo-Ponsaran et al., 2021). Therefore, despite the small stimulus set and the requirement for further reliability and validity testing on larger populations, this toolkit still fills a crucial gap in the existing range of direct-assessment research tools available.

In addition, we strongly suggest researchers use more facilitative methods to gain a deeper insight into children's own thinking. Children are active agents in their own lives who have a right to share their unique viewpoints (Lyons et al., 2022). If we want to understand the thought processes underpinning children's performance on controlled multiple-choice tasks, we likely need to integrate qualitative research methods. However, this study has shown we need to go further in finding research design solutions which capture children's views without relying on verbal means of self-expression. The issues that Study 4 uncovered, regarding children aged 7–9 giving vague verbal responses on the qualitative component of the conflict resolution task, are relevant to the wider historical context of excluding children from research due to the belief that children lack the competence to express their views (Kellett, 2010). However, children as young as 6 years are shown to express opinions around complex topics like subjective experiences of nature, when given the opportunity to describe a drawing, photograph or sand

tray that they created in response to an event (Linzmayer & Halpenny, 2014). In Study 4, had we allowed children to draw their response, or invited children to bring to the session a photograph representing their friendships from which to prompt further questioning, children's verbal responses may have been richer, and we could have coded the visual imagery as part of the analysis. Eliciting a participant's *voice* applies to all forms of communication, not merely verbal expression (Spiteri, 2020). Progress is starting to be made in finding suitable techniques for making qualitative research accessible for people with communication needs (Dee-Price, 2020). We recommend researchers exploring children's thinking around social situations to capitalize on alternative techniques implemented in qualitative research with young children and people with communication difficulties, to facilitate conversations and gain more detailed data from which to draw conclusions. Regardless of whether the child has a communication impairment, these multi-modal methods can support children to share their views.

Future uses of the assessment

Zoti's Social Toolkit has been designed to investigate emotion inference skills and conflict resolution understanding primarily in children with DLD, but there is potential to use this toolkit to study other populations too. The tasks could be used as they are, or in combination with other established tasks, with children who have language difficulties associated with other conditions, such as those with Down syndrome, fragile X syndrome and autism (Rice et al., 2005) or with children with D/deafness. This tool may have additional research interest in other fields, such as education, language development, D/deafness, multilingual language development and developmental psychopathology fields. Additionally, given that at least 7.6% of children in the United Kingdom are thought to meet the criteria for DLD, but language difficulties are often undetected and hence undiagnosed (Norbury et al., 2016; Norbury & Sonuga-Barke, 2017), using tasks that make minimal demands on language skills should be a priority for any child development researcher investigating emotion understanding and conflict resolution skills.

Those wishing to use Zoti's Social Toolkit should also be aware that the conflict task only asks children what they think Zoti should do. Building on from previous studies, we use this task to find out what the children's preferred strategies are for managing conflicts (Chung & Asher, 1996). We believe that this task will provide an insight into how children think they should react to conflict situations and will thus provide a measure for their level of understanding of effective methods for resolving peer conflicts. While there is evidence to show that children who select more effective strategies for managing hypothetical peer conflicts also tend to have more success in building positive social relationships (Noakes & Rinaldi, 2006), we recognize that the present task does not necessarily reflect the strategies that children would implement themselves during a real conflict situation. The current task does not measure children's abilities in successfully resolving conflicts with peers. Instead, it provides a way to objectively investigate which strategies children believe are effective ways to manage peer conflicts. Those seeking to investigate how effectively children resolve peer conflicts may wish to utilize Zoti's Social Toolkit alongside observational techniques or parent/teacher reports of the child's conflict resolution skills.

Future research directions

Researchers who wish to use Zoti's Social Toolkit to learn more about the social interaction difficulties experienced by children with DLD are recommended to obtain detailed data about children's language profiles. It is important to recognize that children with DLD who experience grammatical difficulties, for example might perform differently on the tasks, and indeed in real-life social situations, to children with DLD who experience lexical difficulties. Furthermore, current research is

starting to suggest that certain DLD language profiles may make children more susceptible to experiencing social interaction difficulties. For example, children with DLD who have pragmatic language impairments are more likely to experience friendship problems and bullying (Mok et al., 2014; Van den Bedem et al., 2018). Therefore, new research using Zoti's Social Toolkit to better understand peer problems experienced by children with DLD should obtain detailed information on children's specific language profiles.

CONCLUSION

This paper has presented a series of studies that provide evidence of the construct and face validity of a new measure of how children understand emotions in social situations as well as their understanding of and response to social conflicts. These measurements were designed to be understood without additional narration, making these tools specifically important for children with DLD. Overall, Zoti's Social Toolkit has the potential to be used to assess skills associated with social development in a wide range of children, who may experience challenges using or understanding language. However, difficulties in obtaining construct validity and ensuring understanding without additional audio narration has led to a more limited number of test items than anticipated. However, Zoti's Social Toolkit can still be used as part of a wider assessment of children's emotional and social understanding. We discuss lessons learned and provide recommendations for future research with this toolkit and for the field in general.

CONFLICT OF INTEREST STATEMENT
No authors have any conflicts of interest to declare.

DATA AVAILABILITY STATEMENT
Ethical permission was not gained to publicly archive data supporting the results of this study; however, the data sets are available from the corresponding author upon reasonable request.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

APPENDIX A

T A B L E   A1   Table to describe the visual content in all the original emotion inference animations.

Animation title	Intended emotion	Description of content
The den	Happy	Children are playing a game and ask Zoti to join
Sweets	Happy	Zoti is given sweets
Ice cream	Happy	Another child buys Zoti an ice cream
Birthday present	Happy	Zoti is given a birthday present
Friend leaving	Sad	Zoti and peers wave goodbye to a child leaving their school
Ball game	Sad	Other children do not throw the ball to Zoti during a game
Ill for party	Sad	Zoti is too ill to attend a peer's party
Kite	Sad	Another child falls over and lets go of a kite Zoti lent them
Ruined picture	Angry	Another child rips up Zoti's painting
Stolen microphone	Angry	Another child snatches the microphone Zoti was playing with
Scribble	Angry	Other children scribble on Zoti's work
Chase in playground	Scared	Another child pushes Zoti and their friends chase Zoti
The corridor	Scared	Another child jumps out at the Zoti in the corridor
Lost friends	Scared	Zoti can't find their peers when it gets dark during a game of hide-and-seek

TABLE A2 Coding scheme for emotion inference task's qualitative responses.

Decision	Description that best fits response	Score awarded
Inappropriate	Either no answer given, un-interpretable utterance or off topic. For example, '*Um, the children sort of do something, and, yeah*'	0
Retelling without consideration for other characters	Restate something that happened in the animation but no additional information to explain their reasoning. The participant makes no reference to the thoughts or intentions of the other characters. The participant refers to the outcome of the actions seen in the animation: that Zoti feels a certain emotion, without explaining how this outcome results from the intentions of the other characters towards Zoti. The answer is either: 'Because (x) happened'. **Present:** Because someone gave Zoti a present. **Scribble:** Because Zoti worked really hard and then they scribbled on Zoti's work. **Kite:** Because Zoti had a kite and then the kite went away. **Park:** Because Zoti can't find the others and it's dark and Zoti doesn't like the dark. Or, 'I think Zoti feels (z) because I would feel (z) too'. Here, the participant only talks about the outcome of the events seen in the animation ('I would feel (z)') with no reference to the thought processes or intentions of the other characters leading to the actions which caused this emotional reaction. For example, 'Because they gave Zoti a present, and I would feel happy too if someone gave me a present'	1
Source of emotion with consideration of others	The participant gives an insight into their reasoning behind their choice of emotional response by considering the minds of the other characters. In this way the participant demonstrates that they recognize that Zoti's emotional reaction stems from Zoti's understanding of the other character's thought processes or intentions which led to the actions seen in the animation. (A) The participant makes a suggestion about the *thought processes* of the characters in the animation (e.g., the other character wants to, the other character knows) And/or (B) The participant makes an inference about the other character's *intentions* towards Zoti (e.g., they tried, they tricked, betrayal, they were planning to, they told someone to do something, they did something on purpose, they did something by mistake/accident) And/or (C) The participant uses an *adjective to describe* how the characters are deliberately behaving (e.g., mean, kind, considerate, friendly, nasty). This can also be used in the following way: They were doing (x) to Zoti, which is very different to being (y) to Zoti, for example, 'They were being mean to Zoti, which is very different to being kind' Some examples- **Present:** Because they were very kind to remember it was Zoti's birthday and buy Zoti a present for it. **Scribble:** Because the other children made a plan to purposely ruin Zoti's work and they were proud of themselves for it, which is really mean. **Kite:** Because the kite flew away but the other child dropped it by mistake so I don't think Zoti would be angry at them. **Park:** Because Zoti thinks the other children have forgotten about Zoti and have gone home already, and Zoti can't find their way out of the park by themselves	2

TABLE A3 Table to describe the visual content in all the original conflict resolution scenarios.

Conflict scenario title	Description of content for conflict situations
Broken toy	Another child breaks Zoti's toy
Pushing in	A peer pushes into the dinner line
Lollipop	Another child takes a lollipop from Zoti
The goalie	Both Zoti and a peer want to be in goal
New jacket	Other children make fun of Zoti's new jacket
Sharing sweets	Another child ignores Zoti when handing out sweets
Microphone	Both Zoti and a peer want the microphone

TABLE A4 Table to show proportion of votes for each emotional reaction per animation presented with sound in Study 2.

Animation name	Intended emotion	Total *N* who viewed animation with sound and had their multiple-choice response recorded	Total proportion of responses			
			Happy	Sad	Angry	Scared
Ice cream (practice)	Happy	5	100%	0	0	0
Kite (practice)	Sad	5	0	80%	20%	0
Birthday present	Happy	2	100%	0	0	0
Sweets	Happy	3	100%	0	0	0
The den	Happy	2	100%	0	0	0
Friend leaving	Sad	3	0	100%	0	0
Ball game	Sad	2	0	50%	50%	0
Ill for party	Sad	3	0	100%	0	0
Ruined picture	Angry	2	0	50%	50%	0
Microphone[a]	Angry	2	0	50%	0	50%
Scribble	Angry	3	0	0	100%	0
Chase in playground	Scared	3	0	33.3%	0	66.7%
The corridor	Scared	3	0	33.3%	0	66.7%
Lost friends	Scared	3	0	0	0	100%

[a]Will be removed from stimulus set since no participants inferred the intended emotion.

TABLE A5 Script to introduce the emotion inference task to children.

Researcher: 'We're going to be watching some animations about an alien called Zoti. This is Zoti, and Zoti goes to school, and these children go to school with Zoti. Zoti is the one with the diamond on their head. You are going to see different things happen to Zoti. How does Zoti feel? You decide. Let's have a practice'

TABLE A6   Script to introduce the qualitative part of the emotion inference task following the second practice trial, with two options depending on the child's choice of emotional reaction.

Researcher: 'Now I'm going to ask you, why did you choose that one?'

Option (1) If child chooses Scared
Researcher: 'Ok yes. So just to give an example of what you could say, I might say scared because the child pushed Zoti over in a way that was rough and unkind. The other children have formed a gang and have chased Zoti across the playground to make Zoti feel frightened. So that's just an example of what you could say. What you said was good too and there's no right or wrong'

Option (2) If child chooses any other emotion
Researcher: 'Ok yes. So just to give an example of what you could say, I might say (emotion child chose), or I might say scared. I might say scared because the child pushed Zoti over in a way that was rough and unkind. The other children have formed a gang and have chased Zoti across the playground to make Zoti feel frightened. So that's just an example of what you could say. What you said was good too and there's no right or wrong'

TABLE A7   Script to introduce the conflict resolution task to children at two time points during the practice trial.

At the start of the conflict resolution task:

'So this time, we've got Zoti again. So this is Zoti, and Zoti goes to school, and these children go to school with Zoti. This time, you are going to see different things happen to Zoti. What should Zoti do? You decide. The way this one works is a bit different. So we'll have a practice so you get the idea'

After child sees first conflict animation and is shown the visual array of conflict resolution strategy options: 'What should Zoti do? Next you'll see each of these play as their own animation' (point to each image in turn), 'and at the end, you can choose which one you think'

TABLE A8   Script to introduce the qualitative part of the conflict resolution task following the practice trial, with two options depending on the child's choice of conflict resolution strategy.

Researcher: 'Now I'm going to ask you, why did you pick that?'

Option (1) If child chooses Gives microphone
Researcher: 'Ok yes. So just to give an example of what you could say, I might say Gives microphone because the child might be a guest at Zoti's house. Zoti might want to make sure the other child gets a go. Then the child might come over again on another day. So that's just an example of what you could say. What you said was good too and there's no right or wrong'

Option (2) If child chooses any other conflict resolution strategy
Researcher: 'Ok yes. So just to give an example of what you could say, I might say (strategy child chose), or I might say Gives microphone. I might say Gives microphone because the child might be a guest at Zoti's house. Zoti might want to make sure the other child gets a go. Then the child might come over again on another day. So that's just an example of what you could say. What you said was good too and there's no right or wrong'

TABLE A9 Analysis of responses by children with and without DLD which do not meet the criteria for any conflict resolution goal.

Reason unable to categorize response by any goal type		Number of responses		Example
		Non-DLD	DLD	
Not enough information	Multiple categories described	6	5	Cause he's probably saying, 'that kid won't give me a sweet'
	Answer is incomplete so unclear what is implied	0	2	Because, because it's your…when there's a problem
No reason for chosen strategy	Give a response but it is not an explanation	3	1	He's explaining why he didn't want him to do that. Not by kicking, walks away, tells the teacher, or by saying, 'I wanted to play'
	No response given	0	2	I don't know
Reasoning is ambiguous	Could be moral, but reasoning is not explicit enough	4	1	Um, because, because um maybe if um Zoti doesn't really want um anyone to laugh at him then they shouldn't actually do it. And um, and if someone does something to him, then he can just tell them that they shouldn't really do it
	Could be instrumental, but reasoning is not explicit enough	3	0	I think he should get out the book. Because if you tell the teacher she probably just say, 'Oh he's just giving it to his friends'
	Could be relationship, but reasoning is not explicit enough	1	0	Because, then they might understand how you're feeling
New goal described		0	1	Because he might really like the jacket on him…might keep him warm. And, if he carries the jacket away they won't need to laugh at him
Participant seems to misinterpret the question		0	2	Researcher: 'That isn't very nice. Okay. And why that one?' Child: 'Because the teacher's very mean for doing that' Researcher: 'Mmm. Yeah. Good, okay. Anything else?' Child: 'Teacher' Researcher: 'Okay. So anything else for why you would pick That isn't very nice?' Child: 'No'