



# Influence of a Brief Autism Education Intervention on Peer Engagement and Inclusion At Mainstream Day Camps: A Mixed-Methods Pilot Study

Sandy Thompson-Hodgetts<sup>1</sup> · Ashley McKillop<sup>2</sup> · Mélanie Couture<sup>3</sup> · Stephanie Shire<sup>4</sup> · Jonathan A. Weiss<sup>5</sup> · Lonnie Zwaigenbaum<sup>6</sup>

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## Abstract

To explore the benefits of a brief autism education intervention on peer engagement and inclusion of autistic children at day camps. A convergent, parallel, two-arm (intervention/no intervention), non-randomized, mixed-methods design was used. The individualized, peer-directed, 5–10 min intervention included four components: (1) diagnostic label, (2) description and purpose of unique behaviors, (3) favorite activities and interests, and (4) strategies to engage. A timed-interval behavior-coding system was used to evaluate engagement between each autistic camper and their peers based on videos taken at camp (days 1, 2, 5). Interviews with campers and camp staff explored why changes in targeted outcomes may have occurred. Percent intervals in which the autistic campers were jointly engaged with peers improved in the intervention group ( $n = 10$ ) and did not change in the control group ( $n = 5$ ). A large between group intervention effect occurred by day 5 ( $Z = -1.942$ ,  $\eta^2 = 0.29$ ). Interviews (5 autistic campers, 34 peers, 18 staff) done on the last day of camp in the intervention group garnered three themes: (1) *Changed behavioral attribution*, (2) *Knowledge facilitates understanding and engagement*, and (3) *(Mis)perceptions of increased inclusion*. A brief educational intervention that includes individualized explanatory information and strengths-based strategies might improve peers' understanding of and social engagement with autistic children in community programs such as camps.

**Keywords** Disclosure · Social inclusion · Peer engagement · Community inclusion · School-aged children · Autism

Social inclusion can be conceptualized as equal and active participation with others regardless of ability, during which

✉ Sandy Thompson-Hodgetts  
sandy.hodgetts@ualberta.ca

<sup>1</sup> Department of Occupational Therapy, Faculty of Rehabilitation Medicine, University of Alberta, 2-64 Corbett Hall University of Alberta, Edmonton, AB T6G 2G4, Canada

<sup>2</sup> Faculty of Rehabilitation Medicine, University of Alberta, Edmonton, Canada

<sup>3</sup> École de réadaptation, Faculté de médecine et des sciences de la santé, Université de Sherbrooke, Sherbrooke, Canada

<sup>4</sup> Department of Special Education and Clinical Sciences, College of Education, University of Oregon, Eugene, OR, USA

<sup>5</sup> Department of Psychology, York University, Toronto, Canada

<sup>6</sup> Department of Pediatrics, University of Alberta, Edmonton, Canada

differences are respected and valued and where one feels a sense of belonging (Woodgate et al., 2020). Social inclusion is recognized as a fundamental human right for everyone (Government of Canada, 2022; United Nations General Assembly, 1989), yet autistic<sup>1</sup> children are at high risk of experiencing social exclusion, including discrimination, bullying, peer rejection, loneliness and isolation, in school and community settings (Jones et al., 2022; Taheri et al., 2016; Woodgate et al., 2020). A diagnosis of autism is based on differences in social interaction and communication, and restrictive, repetitive and stereotyped patterns of behavior (American Psychological Association, 2022). These differences and behaviors coupled with peers' lack of awareness and understanding of autism might contribute to social exclusion (Humphrey & Symes, 2011; Mavropoulou et al., 2020; Woodgate et al., 2020).

<sup>1</sup> We acknowledge that consensus does not exist, but we have chosen to use identity-first language to align with the preferences of much of the autistic community (e.g., Bury et al., 2020; Kenny et al., 2016).

Given the complexity of social relationships in general, and the additional challenges experienced by many autistic children, comprehensive, multi-faceted interventions have been recommended to improve autism awareness and acceptance, decrease bullying and isolation, and improve social relationships, including engagement with peers, and inclusion of autistic children (Canadian Academy of Health Sciences (CAHS), 2022; Kasari et al., 2012). These outcomes are important because many of them imply a level of social connection with peers that goes beyond simple presence or proximity to others. Most research related to interventions to support these outcomes for children who experience disability, including autistic children, has occurred in school contexts (CAHS, 2022; Woodgate et al., 2020). This research has primarily focused on remediating perceived deficits by engaging autistic children in developing communication and social skills to ‘fit in’ with their non-autistic peers based on normative social expectations, and/or engaging peers or adults to facilitate skill development for autistic children and interaction between autistic children and non-autistic peers (Brock et al., 2021; Koller & Stoddart, 2021; Mavropoulou et al., 2020). While many of these interventions have shown improvements in peer engagement and social interactions at school, evaluating inclusion is rare. Furthermore, interventions described as “low dose” typically entail multiple sessions over time (e.g., 10 sessions over 2 weeks, plus six additional sessions over the next 6 weeks; Kretzmann et al., 2015). As such, these interventions are often not feasible in community and recreational settings.

Research related to peer engagement and social inclusion in community and recreational programs is needed because these contexts offer unique experiences compared to school, such as more temporary involvement of participants and staff unlikely to be trained in disability and inclusion. However, little is known about what influences peer engagement and social inclusion of autistic children in these programs or other non-school contexts (Woodgate et al., 2020). Additionally, relatively little research has focused on addressing environmental factors that might influence peer engagement and social inclusion, attitudes towards autism, and adult behaviors in promoting inclusion (Jones et al., 2022; Koller & Stoddart, 2021).

Brief educational interventions aimed at increasing peers’ understanding of autism without focusing on changing the behavior or skills of the autistic child might support the social inclusion of autistic children in a variety of contexts. Research suggests that disclosing a child’s autism condition (often termed descriptive information), and also providing peers explanatory information about autism (e.g., the purpose of unique characteristics or behaviors) leads to improvements in their attitudes towards autistic children, although the influence on inclusion is not clear (CAHS, 2022; Mavropoulou et al., 2020). However, many of the

studies that have evaluated outcomes related to brief educational interventions have used hypothetical vignettes, so, although promising, generalizability to real-life contexts might be limited (Thompson-Hodgetts et al., 2020).

## Study Aims

This study aims to address the gap in knowledge related to non-remediation-focused strategies that support social engagement and inclusion of autistic children in community contexts. In particular, we explored the influence of a brief, peer-directed autism education intervention on peer engagement and inclusion of autistic children in mainstream day camps (those claiming to be accessible to all children regardless of diagnosis or ability), including objective data coded from videos and perspectives of autistic children, non-autistic peers, and camp leaders. Specific objectives were (1) to understand if, to what degree, and in which direction (i.e., improves or worsens) the intervention influences peer engagement of autistic children in camps (quantitative component), (2) to understand children’s and camp staff’s perspectives on why changes in peer engagement occurred (qualitative component), and (3) to understand children’s and camp staff’s perspectives on if and why improvements in social inclusion occurred (qualitative component). We conceptualized social inclusion based on equal and active participation with others regardless of ability, respect and valuing of differences, and feeling a sense of belonging (Woodgate et al., 2020). Given the existing vignette-based research on outcomes of descriptive and explanatory information about autism, we hypothesized that peer engagement will increase following the disclosure protocol and continue to increase over the course of the camp week. Based on existing research related to stigma and social exclusion, we also hypothesized that peer engagement would decrease in the non-intervention group over the course of the camp week because peers would not understand unique characteristics of the autistic campers and would therefore not engage with or include them.

## Methods

A convergent, two-arm, parallel (intervention/no intervention), non-randomized mixed-methods design was used in which we collected and analyzed quantitative and qualitative data simultaneously, and then compared and integrated findings. To achieve integration of data, we designed both components of our study to obtain different, but complementary data on the same topic (Creswell & Plano Clark, 2011; Morse & Niehaus, 2009). Convergent, parallel mixed-methods designs are appropriate

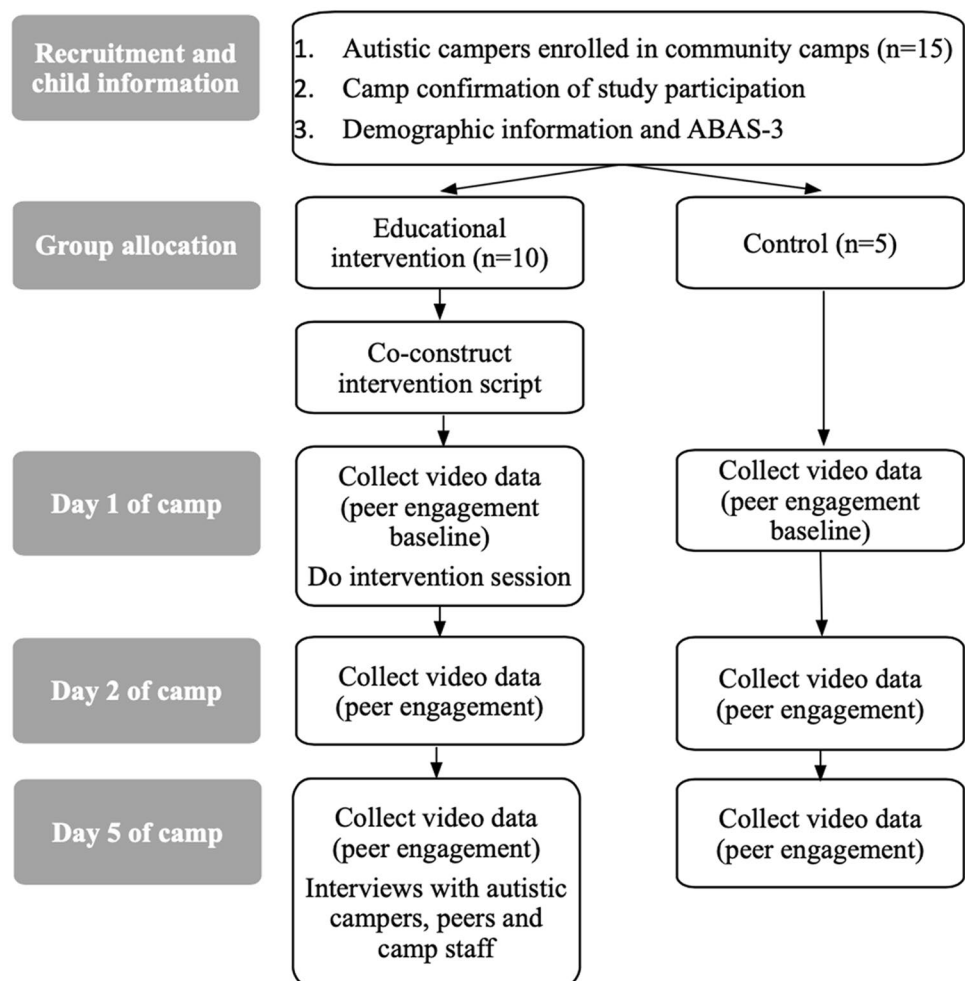
when limited time exists for collecting data (e.g., 1 week summer camps) and when there is value in understanding the nuances of a problem (Creswell & Plano Clark, 2011; Morse & Niehaus, 2009). In our case, we wanted to understand *if* the intervention influenced outcomes (quantitative component) and *why* it might influence outcomes (qualitative component). We believe that this approach is important to address discrepancies in previous research related to disclosure of an autism diagnosis. More specifically, previous research indicates that non-autistic people will increase understanding, engagement and inclusion of autistic people when diagnostic information is shared, yet autistic people report opposite outcomes based on lived-experience (Thompson-Hodgetts et al., 2020). We collected quantitative and qualitative data in parallel and merged these data during analysis to facilitate a more nuanced and deep understanding related to our research objectives (Fetters et al., 2013). Figure 1 shows the study flow for the intervention group and control group. Quantitative data collection was the same in both groups. We did not conduct interviews in the control group because

we did not disclose any information about autism or which camper was our primary participant.

## Recruitment

The primary participants were autistic campers who were enrolled in a mainstream, 1-week summer camp for elementary school-aged children. As such, the minimum age was 4 years old, and we capped our age-range at 12 years because our previous research demonstrated that parents and teenagers often differ in perspectives on sharing their autism diagnosis with others (Hodgetts et al., 2018). Participants (autistic campers) were recruited through an email circulated to listservs and a poster distributed on social media of local autism advocacy and service organizations in Edmonton, Alberta and Sherbrooke, Quebec. All correspondence in Edmonton was in English, and all correspondence in Sherbrooke was in French. Parents contacted the researchers to learn more about the study, provide consent for their child's participation, and provide information about the camp in which their child was registered. Our previous research

Fig. 1 Study flow



suggests that disclosure decisions, especially in community contexts are a very personal decision for families (Hodgetts et al., 2018). Given the lack of knowledge about sharing one's diagnosis through interventions such as that studied here, we chose to not randomize families into the intervention or control group for this pilot study. A researcher then contacted each camp to discuss the study, obtain permission to collect data at the camp, and obtain informed consent from all camp staff involved in the study. Verbal and/or written assent was obtained from the autistic campers when possible, and team members were sensitive to behavioral indicators of lack of assent during camp (e.g., covering of camera), although no indicators were noted. Opt-out ethics approval was granted for peers. Researchers were prepared to grey-out the faces of any peers who did not want to appear in the videos, but this was not required.

### Participant Information

Once permission from the individual camps was obtained, a parent of each autistic camper ( $n = 15$ ) completed a basic demographic form (name, age, identified gender) and the Adaptive Behavior Assessment System, third edition (ABAS-3; Harrison & Oakland, 2015). The ABAS-3 describes a child's functioning across three major adaptive domains (conceptual, social, practical) and 10 skill areas (communication, community use, functional academics, health and safety, home or school living, leisure, motor, self-care, self-direction, social), and provides global adaptive composite (GAC) score. Based on a four-point Likert scale, a parent indicates whether, and how frequently, their child does each activity. The ABAS-3 takes approximately 15–20 min to complete. At the time of study design, the American Association on Intellectual and Developmental Disabilities (AAIDD) recommended the ABAS-3 as the gold-standard for evaluation of adaptive functioning, and it was available in both English and French to support our recruitment sites. For participants in the educational intervention group, each parent and child (when able) then completed a "Getting to know you" form, which was used to help the researcher prepare for co-writing the intervention script with a parent and each autistic camper when able. This form asked four questions, and had examples provided: (1) my experience with autism means that I might...; (2) some of my favourite activities and interests are...; (3) things that you can do or say to help us play together are...; and (4) I communicate best using (select all that apply): words, gestures/actions, low tech device, high tech device, other.

Autistic participants included 15 campers across 15 different 1-week summer camps (one autistic child per camp; 10 intervention group, 5 control group; 14 male; median age = 9 years, range 4–12 years; Adaptive Behavior ABAS-3 GAC score median = 68, range 52–82). These

summer camps were all publicly available camps offered through city programs, local universities, or the YMCA, and were designed around different themes (e.g., sports and games, cooking, nature, science, coding, space). The specific activities varied based on the camp theme, but each camp involved daily games, craft and snack times. Each camp had 12–15 children. We do not have demographic data for peers, but know that they were all within the age range for their respective camps, spanning 4–12 years old across camps. Five out of the 10 campers in the intervention group were interviewed on the last day of camp. The other five campers in the intervention group were not interviewed because they did not use verbal communication, which was our only method of collecting qualitative data for this study ( $n = 3$ ), or did not want to participate in an interview ( $n = 2$ ). Additionally, 34 peers, and 18 camp leaders participated in interviews, which focused on peer engagement and inclusion of the 10 campers in the intervention group (we still interviewed peers and camp staff in the intervention group, even if the autistic camper did not participate in an interview). Demographic data are summarized in Table 1.

### Description of the Intervention

The intervention was a brief autism education session comprised of four key components related to the autistic camper: (1) diagnostic label (autism), (2) a description and purpose of unique behaviors, (3) favorite activities, interests and strengths, and (4) strategies that peers can use to engage the autistic camper. The first two intervention components were informed by previous vignette research related to outcomes of diagnostic disclosure (see Thompson-Hodgetts et al., 2020). The third intervention component was based on the authors' desire to counteract often prevalent misconceptions and stigma related to autism and provide a strengths-based perspective of the autistic camper. The fourth component was designed based on discussion within our research team about how to enhance the likelihood of improving outcomes in a feasible way. Each intervention script was co-constructed by a researcher, the child's parent, and the autistic camper when possible. It was read by or out loud to the autistic camper prior to reading it to peers, with the researcher paying attention to any signs of assent or lack of assent. The script was read to peers by whoever the parent, child, and camp staff agreed was optimal, which was a researcher for eight children, and a camp staff member for two children. The intervention took between five to 10 min, including time for questions. It was done on the afternoon of the first day or the morning of the second day of camp. An example script is provided below.

**Table 1** Data summary by participant

Group <sup>a</sup>	Autistic camper		Camp age range (years)	Activity in video	% intervals JE day 1	% intervals JE day 2	% intervals JE day 5	Autistic child interviewed	# peers interviewed	# Camp staff interviewed
	Age (years)	ABAS-3 GAC score								
		Primary communication								
EI	4	78	Short phrases, gestures	Snack time	50	53	47	No	3	2
EI	7	82	Full sentences	Snack time	0	0	33	Yes	2	4
EI <sup>b</sup>	7	52	Gestures	Games	60	100	100	No	3	1
EI <sup>b</sup>	8	76	Full sentences	Games	30	100	100	No	3	1
EI	8	68	Short phrases	Games	Excluded due to confounding data (environment changed from outdoor playground day 1 to inside days 2 & 5)			Yes	7	3
EI	9	67	Short phrases	Snack time	27	50	87	Yes	5	2
EI	9	65	Full sentences	Snack time	70	80	90	Yes	4	2
EI <sup>b</sup>	9	58	Gestures	Games	10	60	80	No	4	1
EI	9	66	Full sentences	Craft	66	93	100	Yes	0	1
EI <sup>b</sup>	10	61	Gestures	Games	0	0	30	No	3	1
<i>Median</i>	<i>8.5</i>	<i>66.5</i>			<i>30</i>	<i>60</i>	<i>67</i>			
Control	9	65	Full sentences	Baking	80	67	60			
Control	9	70	Short phrases, gestures	Craft	60	20	13			
Control <sup>b</sup>	11	76	Full sentences	Games	100	80	Missing data			
Control	11	80	Short phrases	Craft	40	47	47			
Control	12	68	Gestures	Games	0	0	7			
<i>Median</i>	<i>10</i>	<i>69</i>			<i>50</i>	<i>33.5</i>	<i>30</i>			

<sup>a</sup>EI=educational intervention group; Control =no-intervention group<sup>b</sup>Data collection in French and subsequently translated into English

“This is [name]. He loves to make new friends. Sometimes it is hard for him to make new friends because he has autism.<sup>2</sup> His autism makes him a bit shy to talk to new people. He does understand everything you say, and wants to be with you, but he might not come close and talk with you. Instead, he might yell at you from a distance. You might not know that he is trying to talk to you, so if you hear him yell you can look at him and see if he is looking at you. That means he is trying to get your attention. [name]’s favorite game is tag and he likes to talk about electronics. He will like it if you invite him to play tag with him. He likes to play other things too, so you can take turns playing tag and the games that you like to play together. Sometimes when he is excited [name] might get really close to your face. You can just calmly tell him ‘too close, it makes me uncomfortable’, and he should back away. You will see him getting squishes on his hands from a camp leader because that helps him calm down. It might help you calm down too if you are over-excited or upset. [name] is very excited to be at camp and hopes to have fun with you. Do you have any questions about [name] or about autism?”

## Quantitative Data Collection and Analyses

### Video Observations

Videos (10–15 min) were taken on days 1 (Monday), 2 (Tuesday), and 5 (Friday) at each camp and occurred during an activity deemed most appropriate based on discussion between the researcher and camp leader. In the intervention group, the education intervention was done between the first and second videos. A researcher subtly held a cellphone in their arms, and attempted to be far enough to not disrupt any activities, but close enough to capture dialogue between peers if relevant. Feedback from camp leaders indicated that the researchers were not disruptive to any camp activities. The context was consistent within each camper over time. In other words, the videos were taken at the same time of day, during a consistent activity, within each camp. The specific activities varied between camps, but were all unstructured (e.g., snack time) or semi-structured (e.g., craft or baking) activities that provided some opportunity for peer-to-peer interaction and engagement. All activities in the camps that were in Edmonton were indoors, and all activities in the camps that were in Sherbrooke were outdoors. Only the children within each camp were present in the location at

the times we collected video data. If a camper asked what the researcher was doing, they were told that the researchers were researching how children played at camp.

### Video Analysis

A timed-interval behavior-coding system, the Playground Observation of Peer Engagement (POPE; Kasari et al., 2005, 2011) was used to evaluate engagement between each autistic camper and their peers based on the recorded videos. The POPE has traditionally been used to focus on the behavior of autistic children, but has also been used to evaluate the behavior of peers (Locke et al., 2016). Consistent with previous research (e.g., Chang et al., 2016; Locke et al., 2016), engagement states were dichotomized into jointly engaged/not jointly engaged, and coding represented the engagement state that the child was in for the *majority* of the interval. Joint engagement was operationally defined as “the autistic child and peer(s) engage in direct social behavior with one another that involves reciprocity, connection and/or a collaborative goal (e.g., the child and peer(s) offer objects, have a conversation, exchange turns in an activity like reading a comic book or drawing)”. Non-engaged states included solitary, parallel, and onlooker activities.

All videos were coded in one-minute intervals, with raters blinded to intervention/no intervention condition and to the day of the week (videos taken on day 1, 2 or 5). Previous research (Kasari et al., 2005, 2011; Locke et al., 2016) has demonstrated high inter-rater reliability using the POPE. Three raters were initially trained by a team member with expertise in using the POPE (S.S.) using three, 15-min videos from a previous feasibility trial. These raters were deemed to be reliable when they achieved an overall percent agreement of 80% or more with the expert rater (at least 12/15 intervals; mean agreement = 87%; range 80–100%). Then, all study videos were coded, with two videos for each participant coded by one trained rater and one video for each participant coded by two raters to monitor ongoing reliability (mean agreement = 92%; range 80–100%). A third rater coded each disagreement (n = 15 intervals) and their coding was used, which always agreed with one of the initial raters. Percent intervals jointly engaged were calculated for each video.

### Statistical Analyses

Descriptive statistics were used to characterize the sample and to report median percent intervals jointly engaged each day (see Table 1). The Mann–Whitney U test was used to ensure that joint engagement was not statistically different between groups at baseline, and Eta-squared statistics were calculated to describe the magnitude of difference between groups, interpreted based on the following criteria:  $\eta^2 = 0.01$

<sup>2</sup> We have kept the person-first language that we used in the script co-constructed with the child’s mother.

**Table 2** Example interview questions

Interviewee	Example questions
Autistic camper	<ol style="list-style-type: none"> <li>1. Do you remember when I came the other day and we talked to your friends about autism? What did you think of that?</li> <li>2. Do you think that sharing that information changed anything? Did it change how anyone played with you?</li> </ol>
Peer	<ol style="list-style-type: none"> <li>1. Did you know about autism before I talked with you the other day? What did you learn about autism?</li> <li>2. Did knowing [autistic camper's name] experiences autism change how (you/others) played with them? How so?</li> </ol>
Camp staff (leaders and volunteers)	<ol style="list-style-type: none"> <li>1. How do you think the autism educational intervention influenced peers' perception of (name)?</li> <li>2. How do you think the brief intervention influenced how peers interacted with (name), or included him, if at all? Can you describe some examples of how you think it helped (if relevant)?</li> </ol>

indicates a small effect;  $\eta^2 = 0.06$  indicates a medium effect;  $\eta^2 = 0.14$  indicates a large effect (Stevens, 2001 as cited in Norman & Streiner, 2014, p. 95). The Friedman test (non-parametric equivalent of a one-way within-subjects ANOVA) was used to evaluate if there were statistically significant differences in the percent intervals jointly engaged within each group between days 1, 2 and 5 of camp. If significant differences were found, the Wilcoxon signed rank test was used for post-hoc analysis to determine where differences between days existed. The significance level was adjusted for multiple comparisons using Bonferroni correction ( $0.05/3 = 0.017$ ). IBM SPSSv26 (Chicago, IL) was used to complete all statistical analyses.

## Qualitative Data

### Data Collection

Semi-structured interviews were done by the lead author, a postdoctoral fellow, or graduate students trained in conducting qualitative interviews with children (Rogers et al., 2021). Participants were informed that they were going to discuss how they perceived that the intervention done earlier in the week influenced their perceptions of the autistic camper, and how the autistic camper was included at camp. Consent/assent to participate in an interview was confirmed verbally at the start of each interview, and participants were encouraged to ask any questions regarding the study and the interview. All interviews were audio-recorded for subsequent transcription. Interviews done in Edmonton were conducted in English by an English-language speaker. Interviews done in Sherbrooke were conducted in French by a French-language speaker. French-language interviews were transcribed verbatim by a fluently bilingual research assistant prior to data analysis.

Interviews with the autistic campers lasted five to 10 min. They were done individually at camp, in a quiet space. Each autistic camper who was interviewed was asked if they wanted a staff member with whom they were familiar

present for the interview. Two campers agreed, and this staff member stayed quietly throughout the interview. Interviews with peers lasted four to 15 min. They were also done in a quiet space at the camp, in groups of one to three campers as per the campers' comfort. Researchers did not have contact information for peers (we had opt-out consent). Therefore, peer interviews needed to be done during camp. Camp staff were asked to nominate peers who they felt would be would feel comfortable with, and who would contribute to, an interview. These campers were subtly brought to the researchers without drawing the attention of all campers in an attempt to not disrupt the camp. Interviews with camp staff lasted 15–25 min and occurred individually, except for one camp where three staff were interviewed together and one camp where two staff were interviewed together. Table 2 provides example questions from each interview guide, which covered the same topics, but differed slightly in how questions were worded for the autistic campers, their peers, and camp staff.

Researchers also maintained a reflexive journal throughout data collection and analysis, documenting observations and impressions of peers at camp in relation to the research questions, researcher thoughts and feelings during the interviews, and personal assumptions and biases acknowledged throughout the process. These journal entries were considered data.

### Data Analysis

The methodological approach for the qualitative component of this study was interpretive description, which is often used to guide qualitative inquiry in applied settings and with the goal of informing clinical practice (Thorne, 2008). Qualitative inquiry was deemed ideal to address this research question to allow for depth of exploration and because complex, social constructs, such as inclusion, often fit poorly in positivist frameworks (Gibson, 2016).

Analysis followed the reflexive qualitative thematic analysis approach outlined by Braun and Clarke (2006). This type of analysis is appropriate when the focus is to generate

themes across the data set, for research that desires actionable outcomes, and when analysis considers how experiences are situated in broader socio-cultural contexts (Braun & Clarke, 2021). This approach included an in-depth, iterative process of data familiarization, coding, and generation of themes. Data familiarization occurred through two team members independently reading each transcript multiple times. Coding was initially done individually by these two team members, staying close to the data and, when appropriate, incorporating words and phrases used by the participants (semantic). Then, codes that were interpreted to represent similar observations or experiences were compiled. This more conceptual (latent) coding involved a collaborative and reflexive process by the two researchers. Theme generation was also a collaborative process, initially between these two researchers, with three rounds of theme revision and refinement, and then one more round of discussion and refinement with the larger research team. At a later date, the data were revisited and theme two was further refined. All team members approved the final themes. Our conceptualization of themes aligns with Braun and Clarke's (2019) definition "as stories about particular patterns of shared meaning" with a central organizing concept (p. 592). A critical perspective was taken to examine underlying assumptions about inclusion and autism.

### Integration of Quantitative and Qualitative Data

Findings from the quantitative and qualitative strands were initially analyzed separately, then results were merged for comparison during subsequent analysis and integration (Creswell & Plano Clark, 2011). The study was designed to facilitate merging of databases at this stage by aligning qualitative interview questions with the targeted outcomes of our quantitative analysis (e.g., asking directly about how the intervention influenced peer engagement). We also integrated data from our reflexive journals at this stage, which garnered researchers observations of peer engagement and inclusion beyond the data captured in videos. To enhance readability, we have presented results from the quantitative and qualitative strands separately in the results, and then integrated these findings in our discussion to provide a more complete understanding of if and how the educational intervention influenced peer engagement and inclusion of autistic children in summer camps. In other words, we dove deeply into the qualitative data to gather depth of understanding about how quantitative and qualitative findings aligned, and why changes in peer engagement and inclusion may or may not have occurred. We consider the quantitative and qualitative data to have equal importance in our interpretation of study findings.

## Results

### Quantitative Results

Baseline (day 1) engagement states were similar across the intervention/no intervention groups ( $U = 14.5$ ,  $N_1 = 5$ ,  $N_2 = 9$ ,  $p = 0.298$ , two-tailed). Overall, median percent intervals in which the campers were jointly engaged improved from 30% on day 1 to 87% on day 5 in the intervention group and decreased from 50% on day 1 to 30% on day 5 in the control group (see Table 1 and Fig. 2). These changes were statistically significant within the intervention group ( $\chi^2(2) = 10.75$ ,  $p < 0.01$ ), but not the control group ( $\chi^2(2) = 0.14$ ,  $p = 0.931$ ). Post hoc Wilcoxon analyses for the intervention group found significant differences between days 1 and 5 ( $p = 0.011$ ), but not days 1 and 2 ( $p = 0.018$ ) or 2 and 5 ( $p = 0.028$ ). A medium between-group intervention effect was noted on day 2 ( $Z = -0.940$ ,  $\eta^2 = 0.06$ ) and a large effect on day 5 ( $Z = -1.942$ ,  $\eta^2 = 0.29$ ).

### Qualitative Findings

Participants discussed their positive perceptions of the influence of the brief, peer-focused autism education intervention on peer engagement and inclusion at the mainstream summer camps. There were many similarities in perceptions and language used between participants across stakeholder groups (campers, peers, camp staff). As such, the three themes that were generated integrate data across stakeholder groups, with themes 1 and 2 representing peers and camp staff, and theme 3 representing all stakeholder groups.

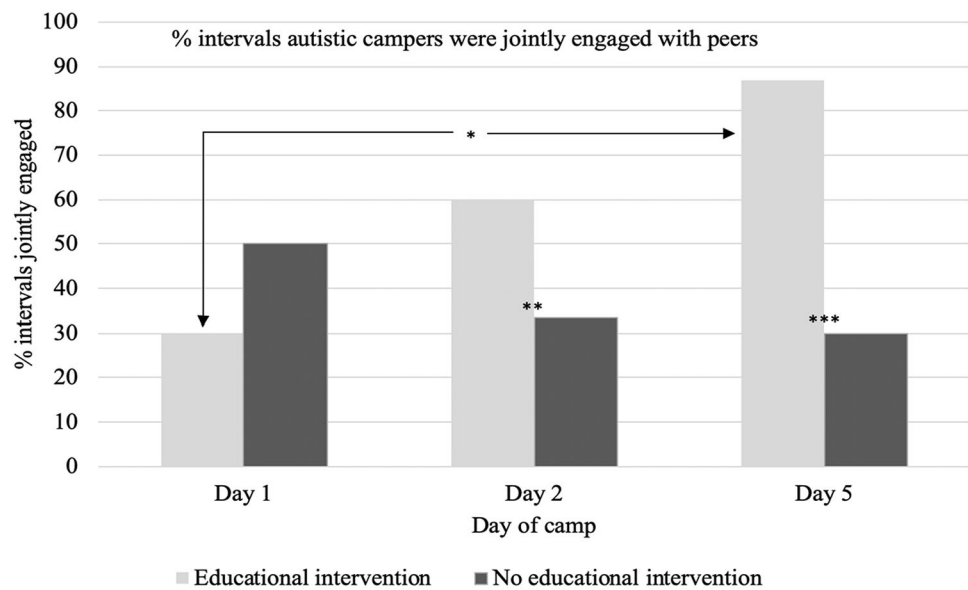
Theme 1: "It's not his fault": Changed behavioral attribution

The first theme reflected increased tolerance for and understanding of behaviors that were originally seen as unusual, malicious, or socially undesirable. Behavioral attribution changed once peers and camp staff learned that the camper was autistic, because these behaviors were reframed as part of "autism". In other words, the behaviors were caused by autism and not controllable by the autistic camper. This was apparent in almost all interviews across peers and camp staff. For example, one peer stated,

"it was helpful to learn a bit more information about him. I understand now why he does some things. Like, he kind of bothered me because he was getting in my personal bubble. He stuck by us, and I didn't like that. Now I get it. He's actually just trying to play with us but might not quite know how to ask."



**Fig. 2** Median percent intervals in which children on the autism spectrum were jointly engaged with peers across the week of camp (\* $p < .01$ ; \*\*medium between group effect; \*\*\*large between group effect)



Another peer reflected on a specific shoving behavior that they initially perceived as too physical, “*They have their own way of being, talking and stuff. Like, that [hand gesture to push on shoulder] is their way of saying ‘hi’ and stuff. Like, it seems like they’re being rude, but actually they’re just trying to play with you*”. Peers also talked about how knowing about the purpose of stereotyped mannerisms changed how they would treat the autistic camper:

“If I didn’t know he had autism, I would have treated him differently and think ‘why is he doing this stuff? [rocking, finger/hand movements, noises]’... Now I know. It’s not his fault. There is nothing he can do about it. They just do random stuff.”

Camp staff also discussed changes in their perceptions of the campers’ behavior due to the intervention: “*you know he’s not being annoying on purpose*” and “*it’s hard to tell if the kid is just being weird or something. It’s a different story when you know he has autism*”. Camp staff also discussed changes in peers’ understanding, for example:

“the big change I noticed was when we said that, if there was ever any one-on-one issues, if he ever got in someone’s face or he was being really loud beside someone, there was never an angry reaction any more...Once everyone knew that [he was autistic], it was just like ‘okay, I’m not going to have any usual reaction, I’m going to try harder’. It was definitely, like, I need to, it’s [autistic camper]. I need to try harder.”

Theme 2: “It was helpful to know”: Knowledge facilitates understanding and support

The second theme relates to peers’ and camp staff’s perceptions that being given explicit knowledge of the function of behaviors and strategies to engage the autistic camper enhanced their comfort with the autistic camper, ability to relate to the autistic camper, and gave them a starting point to initiate interactions. For example, after the intervention, peers felt that generally, “*now we know we can just ask him about stuff he likes and then we could just start a full conversation with him*”, and “*It was easier to relate to him. If you know that he liked something...that he liked something just like me, I could do that*”. Many of the peers’ comments related to appreciation of knowing that their autistic peer understands what they say even if they do not respond with spoken language. For example, peers’ stated “*it was helpful to know. Before I knew he had autism I was shy to talk to him, because I didn’t know. Now I know that he does understand me, but may just take some time to understand*”, and “*once I learned, I thought, ‘okay, he’s one of us, I’ll talk to him normally*”. Peers also talked about how specific recommendations were helpful, “*his ears can hurt, so if he covers his ears that means it’s too loud so we have to stop yelling and talk quieter*”.

Multiple camp staff discussed how the intervention empowered campers to open dialogue about autism and the autistic camper to facilitate their knowledge and understanding: “*I think it lets the kids kind of be like, ‘oh it’s okay to talk about, like it – we can talk about this, like I can ask questions and not be judged, or told, you know, you shouldn’t ask that’*” and “*there’s a stigma around autism...so when someone’s able to tell the kids ‘this is what’s going on, do you have any questions?’*”. Some camp leaders perceived that the safe environment to discuss things led to increased peer engagement.

“So, you could tell that, like their initial reactions were confusion, like some were a lot more apprehensive to him... They weren’t telling him anything, like, ‘oh, you can’t hang out with me’ but I noticed they were giving non-verbal cues, turning away from him and making sure there was enough distance between [autistic camper] and them. After I gave the talk I noticed it changed ‘cause then we gave them words to describe it, and included them in it... getting the kids included, talking about it, really made them more empowered to [interact with him]. They saw him more like themselves.”

Theme 3: “Kids were nicer to me”: (Mis)perceptions of increased inclusion

This theme, which includes data from autistic campers, peers, and camp staff, reflects perceptions that peers were more inclusive of the autistic camper following the intervention. However, although many camp leaders used the term inclusion, and some peers used the term included, the influence of the intervention on the relational aspects of belonging was less apparent. Rather, the data suggest that the intervention improved tolerance more than true inclusion for the campers. Many instances of ‘othering’ that marginalized the autistic camper as inferior, such as “*he’s not acting the way that normal people would*”, were apparent.

Peers talked about how it was important to include all children, regardless of differences, even if they are not perceived as friends: “*It doesn’t mean that you got to be friends with him. It’s just, like, it just is good to learn about. Just because he is different doesn’t mean we should disclude him, even if they are different*”, and, “*I probably would have played with him even if I didn’t know that he was born with a condition. I probably would have been playing with him if I didn’t know that*”. However, our observations at camp reinforced that these peers did not play with their autistic peers at camp. Other peers did feel that their actions changed following the intervention. They reported “*other people hung out with him more*”, “*he was in it more*”, and “*it changed how I interacted with him. He was nice for the most part, but sometimes he did wrong, and I didn’t do anything about it, because I didn’t want to make him sad once I knew*”. One of the campers also felt that “[*peers*] *did treat me different. They were nice. Kids were nicer.*” after the intervention.

Camp staff also perceived that peers were more inclusive after the intervention, for example:

He would definitely scream and shout, and I think it kind of made the other kids laugh a little bit. So I think that’s what they were trying to do, is get under his skin and just see if they could get a reaction out of him. But, after we disclosed the information with them, everyone was more inclusive, like ‘do you need help with this? Do you want help with that? Do you want to play?’

Another camp staff was emotional because she had known the autistic camper for 2 years, and perceived the development of authentic friendships at camp for the first time, “*I think there was some inklings of authentic friendships that he started to make. I think the intervention empowered [him] to talk to people, engage more authentically, and they’re engaging with him authentically and very kindly*”. However, this autistic camper did not portray a similar experience in his interview on the last day of camp, stating “*I don’t like coming to camp here. I like the autism camp. I like those camps because I have friends.*”

## Discussion

This pilot study explored how a brief, peer-directed, educational intervention was perceived to influence peer engagement and inclusion of campers at mainstream summer camps. Our hypothesis for the intervention group was partially confirmed: children in the intervention group spent more time jointly engaged with peers by the end of the camp week. However, contrary to our hypothesis, no difference in joint engagement over the camp week was noted in the control group. Our qualitative findings suggest that the improvements in peer engagement in the intervention group was influenced by changed behavioral attribution, improved knowledge and understanding, and concrete strategies to engage with their autistic peer. Integrating this qualitative data with objective quantitative findings significantly adds to current research because we explored whether changes in behavioral attribution, and reports of improved knowledge and understanding *actually* lead to improvements. This is novel because most previous research was based on participant reports without objective evaluation of outcomes in a real-life context.

Our brief, peer-directed, educational intervention was novel in multiple regards, including the brevity of the intervention, the ability to construct and deliver the intervention without specialized training or qualifications, the focus on strengths and abilities of the campers, and the delivery of the intervention in a real-life context (as opposed to vignettes) within the community, which has been under-represented in research related to social inclusion (Woodgate et al., 2020). Although Cremin and colleagues (2021) suggest that more than one intervention session is necessary to influence attitude and/or behavioral change, our results suggest that just one session led to changes for some peers. Stakeholders, including camp leaders, non-autistic peer campers, and some autistic campers, overwhelmingly perceived positive outcomes of the intervention. These findings also align with previous research that suggests that educational interventions can improve peers’ knowledge of autism, including awareness and understanding of core symptoms and social

difficulties, and improve attitudes and decrease stigma towards autistic peers (Mavropoulou et al., 2020; Mazumder & Thompson-Hodgetts, 2019).

Stigma and discrimination are very commonly experienced by autistic people, potentially influenced by the discrepancy between “abnormal” behaviors despite a physically “normal” appearance (Mazumder & Thompson-Hodgetts, 2019). Almost all camp leaders and peers discussed how the intervention positively changed the attribution of behaviors exhibited by the autistic camper. Camp staff also felt that the intervention gave non-autistic campers permission to ask questions about the autistic camper, further increasing their understanding. Based on our quantitative findings, it appears that this increased understanding contributed to increased engagement with autistic peers at camp to some extent for all participants in the intervention group. While it is possible that increased engagement could be a function of behavior change by the autistic camper (e.g., increased confidence to engage with peers following the intervention), our qualitative data suggests that increased peer engagement was primarily a function of behavior change by the non-autistic campers. This represents an approach different from most interventions that target peer engagement between autistic and non-autistic peers, which often focus on remediating perceived deficits or developing social skills of autistic children (Brock et al., 2021; Koller & Stoddart, 2021; Mavropoulou et al., 2020).

Many participants discussed that they thought that the intervention led to increased inclusion (often using the term inclusion); however, much of our data does not align with the conceptualization of inclusion as involving equal participation, valuing differences and a sense of belonging (Woodgate et al., 2020). Even when peers talked about increased understanding and acceptance of the autistic camper, ‘othering’ still occurred. For example, some peers discussed allowing “inappropriate” behaviors because they did not want to make their autistic peers unhappy, and that they would always let him win at a game. Although support and accommodations may be appreciated, disabled children do not appreciate being pitied or seen as fragile, or disabling practices such as lowering expectations below their ability level (Woodgate et al., 2020). While some of these practices were likely well-intentioned, they may have increased exclusion by positioning the autistic camper as “other”. It is also possible that our intervention added to the “otherness” because our script was only done for the autistic camper, ultimately singling them out. An activity that took on a more universal approach (e.g., highlighted unique aspects of all children) may have better outcomes related to inclusion as this approach could celebrate many types of diversity.

Many of the camp leaders also used discriminatory and stigmatizing language about the campers, such as “annoying” and “weird”, and some camp leaders also talked about

“the inclusion kids”. This language also identified the campers as “other” and did not portray an appreciation or valuing of difference and diversity. Camp leaders often used the word inclusion during their interviews, but their observations actually reflected experiences of tolerance of behaviors and of the autistic camper being present at camp. There was potentially more peer interaction, but the campers were not positioned as equal. Perhaps this finding is not surprising given the context of mainstream summer camps and that our intervention did not provide education on the concept of inclusion. Extensive research has shown that educator attitudes and behaviors are very important in promoting social inclusion (Laumann et al., 2020), which may also apply to camp leaders. As such, we believe that all camps that identify themselves as inclusive should include staff education about inclusion, including critical reflexivity of disabling and othering practices, as a first step in promoting an inclusive culture at camp.

### Study Limitations and Directions for Future Research

Research that prioritizes the perspectives of autistic people, including children, is critical to understand their experiences of inclusion, and to optimize social inclusion (Koller & Stoddart, 2021; Leadbitter et al., 2021). However, only five of ten campers in the intervention group chose or had sufficient verbal communication skills to participate in our interviews. We did not offer alternative ways to gather qualitative information from campers due to time constraints of conducting interviews during the camps. Not offering ways for these campers to share their perspectives reinforces ableism and assumes that their perspectives and experiences are represented by the “voice” of others (Lebenhagen, 2020). Future research should endeavor to use creative participatory methods to engage autistic children who communicate in a variety of ways to share their experiences and perspectives of peer engagement and inclusion in community and recreation contexts.

Opt-out consent for peers was important for the feasibility of conducting this study within a variety of camps. Therefore, we do not have demographic or other information about peers, other than the age-range of the camp and their verbal responses to our questions about previous knowledge of autism. Factors such as age, previous exposure to disability, parental attitudes and practices, and child’s personality can influence attitudes toward autism, which can influence perception of disability, acceptance, and inclusion (Babik & Gardner, 2021). Future research should evaluate how these factors intersect with this type of intervention to influence peer engagement and inclusion in community contexts.

Our findings provide important and unique insights into the relationship between the educational intervention and perceived outcomes related to peer engagement and inclusion. However, we cannot unpack the active ingredients of our intervention because the scripts for each child incorporated the same four components. Stigma and social exclusion are commonly experienced by autistic people, so the management of personal information including one's diagnosis is important (Thompson-Hodgetts et al., 2020). Future research should compare outcomes of a similar intervention that isolates various intervention components, including scripts that do and do not include the specific diagnosis. Future research should also randomize families into intervention and control conditions to control for potential selection bias.

Finally, like much research done in the past few years, restrictions in place due to the COVID19 pandemic significantly influenced recruitment and data collection. Although pilot studies do not need large sample sizes, especially when moderate to large intervention effects are likely (Hertzog, 2008), our study had a smaller sample size than we had hoped. Recruitment was successful during the first summer of data collection (2019), but summer camps were cancelled in the regions in which this study took place during the second year of our funding (2020), and physical distancing protocols were in place during the final year of funding (2021), so garnering a valid representation of peer engagement was not possible. However, despite our relatively small sample size, we obtained a large intervention effect and rich qualitative data, and are still able to make meaningful and novel contributions to this important area of research.

## Conclusion

Healthy social relationships and social inclusion are critical to health and wellbeing for everyone, including autistic children (Currie et al., 2012). However, autistic children are at high risk of social exclusion (Jones et al., 2022; Taheri et al., 2016; Woodgate et al., 2020). Our findings suggest that a brief educational intervention that includes individualized diagnostic and explanatory information and strengths-based strategies might be a feasible, simple, and cost-effective way to improve peers' understanding of and social engagement with, autistic children in community programs such as summer camps. However, although campers and camp leaders used the terms 'inclusion' and 'inclusive', and our data do suggest less overt exclusion, the campers were still often positioned as 'other'. Participants' dialogue did not reflect a valuing of difference and diversity and a true sense of belonging, often recognized as core components of inclusion (Woodgate et al., 2020). Although the continued evolution of educational interventions such as the one introduced here might be one element in supporting a shift towards social

inclusion for autistic children, clearly more work needs to be done to actualize inclusion that is centered around belonging, and appreciation and celebration of diversity.

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## Declarations

**Conflict of interest** The authors have no financial or non-financial interests to disclose

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