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Concept Mapping and the CO-OP Approach with Adolescents with Autism Spectrum Disorder: Exploring Participant Experiences

Abstract

Background: To explore the experiences of adolescents with ASD participating in a novel occupationally based intervention.

Methods: The intervention used concept mapping in combination with the CO-OP approach with 10 adolescents with ASD in a 4-week program focused on developing life skills they deemed as important in their transition to adulthood. A descriptive qualitative approach was employed using deductive thematic analysis informed by Self-Determination Theory and occupationally relevant theoretical frameworks. This study is part of a larger feasibility project and focuses on the analysis of participant reflections and researcher field notes.

Results: Five themes emerged: finding a sense of balance through negotiating tensions; a sense of "we" and a sense of "I"; selecting purposeful, meaningful, and authentic occupations; multimodal tools; and action through participating in doing.

Conclusion: This study highlights valuable participant insights into their involvement in a novel occupationally based intervention that will inform the program's on-going development and implementation.

Comments

The authors report no conflicts of interest to disclose.

Keywords

CO-OP, autism, adolescents, life skills, occupational therapy, concept mapping

Credentials Display

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Autism spectrum disorder (ASD) is a lifelong developmental disability characterized by difficulties in communication, social interaction, and repetitive and/or restricted behaviors. Approximately 1 in 68 individuals are diagnosed with ASD (Centers for Disease Control [CDC], 2017) and experience a range of occupational performance issues that negatively impact their ability to participate successfully in their chosen occupations (Miller-Kuhaneck, 2015).

Adolescence can be a challenging time for any individual because of changes that occur physically, cognitively, socially, and emotionally. But adolescence can prove to be even more difficult for individuals with ASD because of the interaction between factors that arise in typical development (i.e., puberty) and those that arise with a disability (Levy & Perry, 2011; Vroman, 2015). During adolescence emphasis is placed on socializing with peers, coping with academic demands, communicating in different contexts, and developing competence in life skills (Hartman, Geurts, Franke, Buitelaar, & Rommelse, 2016; Vroman, 2015).

Adolescents with ASD experience poorer postsecondary education outcomes and lower rates of employment and social engagement opportunities as compared to their typically developing peers (Shattuck et al., 2012). A recent national report about the transition into young adulthood for individuals with ASD (Roux, Shattuck, Rast, Rava, & Anderson, 2015) explored outcomes related to disconnection, mental and physical health, postsecondary education, employment, living arrangements, social and community participation, and personal safety. A trend emerged that highlighted a lack of services to support individuals and families during this important life transition, resulting in higher rates of disconnect from meaningful occupations for young people with ASD once they left high school. Approximately 37% to 50% of youth with ASD are reported to not be employed or to not be continuing their education after high school, and many struggle with managing mental health conditions, living independently in the community, and engaging in social activities (Miller-Kuhaneck, 2015; Roux et al., 2015; Shattuck et al., 2012).

Occupational therapists work with individuals with ASD and their families to support them in engaging in occupations that are necessary for an individual's transition to adulthood. Occupational therapists have expert knowledge and skills in addressing areas of occupational performance related to life skill development (grooming, meal preparation), social participation (making friends, relationships), independent living (budgeting, grocery shopping) and employment (Kuhaneck & Watling, 2015). However, concerns have been raised by the occupational therapy (OT) clinical and academic communities that highlight the confusion around the role and focus of OTinterventions with the ASD population (especially beyond sensory motor/sensory processing approaches) and our loss of an occupational focus to our interventions (Bagatell & Mason, 2015; Rodger, Ashburner, Cartmill, & Bourke-Taylor, 2010). As a result, there is a paucity in the current literature surrounding the implementation and qualitative evaluation of interventions focused on enhancing the occupational performance of individuals with ASD in their activities of daily living (ADLs) and instrumental activities of daily living (IADLs) during adolescence (Haertl, Callahan, Markovics, & Sheppard, 2013; Miller-Kuhaneck, 2015). It is important to address these domains with adolescents with ASD to facilitate successful life transitions and support their developing independence (Haertl et al., 2013; Miller-Kuhaneck, 2015).

The purpose of this paper is to examine the perspectives of adolescents with ASD during their participation in a novel occupationally based intervention. The researchers posed the question: What are the experiences of the adolescents who participated in the intervention and how do these perspectives

help to shape the future development and implementation of the program? The results from this research prioritize the voices and experiences of adolescents with ASD and will help to make the purposed intervention more relevant, meaningful, and client-centered.

Method

This paper is a part of a larger feasibility study that explored the development of an occupationally based intervention for adolescents with ASD, its implementation in a summer-camp format, and the evaluation of its effectiveness (outcomes) both through quantitative measures and qualitative methods. The purpose of this paper is to focus specifically on the participants' experiences with the intervention; therefore, a qualitative descriptive approach was employed (Sandelowski, 2000; Stanley, 2015). This methodology aligns with an interpretive paradigm and seeks to provide a pragmatic way of studying how people make sense of their experiences (Sandelowski, 2000; Stanley, 2015). Descriptive qualitative methodology seeks descriptive and interpretive validity by representing events and the meaning that participants give to those events (Sandelowski, 2000; Stanley, 2015).

The theoretical framework of Self-Determination Theory (SDT) (Deci & Ryan, 2012) and Wilcock's (1998) and Hammell's (2004) conceptualization of doing, being, belonging, and becoming was employed to inform the design of the study (construction and data analysis). SDT is closely linked with the theoretical constructs of the Cognitive Orientation to Daily Occupational Performance (CO-OP) approach (Poulsen, Ziviani, & Cuskelly, 2015), which is a framework that is well-supported in the current OT literature that has been shown to influence participant involvement in therapeutic interventions (Ziviani, Polatajko, & Rodger, 2015). SDT acknowledges the importance of motivation materialized through the universal needs of competence, relatedness, and autonomy (Deci & Ryan, 2012; Poulsen et al., 2015). Wilcock's (1998) and Hammell's (2004) work on doing, being, belonging, and becoming provides an additional occupational perspective to the development of the intervention and the data analysis process. Doing is experienced through participation in the intervention, which is occupationally focused and supported by client autonomy; being and belonging are sustained in the delivery of the intervention in a group format and is reflected in the SDT principal of relatedness; and becoming is fostered in developing a sense of competence in achieving their chosen goals and developing confidence in their transition to adulthood (Deci & Ryan, 2012; Hammell, 2004; Wilcock, 1998). These frameworks, which are important in engaging adolescents with ASD in meaningful occupations, informed the development of the occupationally based intervention piloted in this study and will lend important insights into the usefulness and meaningfulness of this program to adolescents with ASD (Poulsen et al., 2015).

Study Sample and Recruitment

This study was conducted with a group of 10 male participants, aged 15 to 21 years, with a diagnosis of ASD. The sample size of 10 was chosen based on the nature of a feasibility study, the characteristics and methods of descriptive qualitative methodology, and pragmatic considerations (Sandelowski, 2000). The inclusion criteria for this investigation were as follows:

- Intellectual Quotient (IQ) in normal range as indicated by a score of 90-109 as rated on the Wechsler Intelligence Scales for Children - Fourth Edition (Wechsler, 2003) or the Wechsler Adult Intelligence Scale - Fourth Edition (Wechsler, 2008) (or a similar assessment as provided by a qualified medical professional). This criterion was required because of the cognitive demands of the intervention. Participants' IQ scores were confirmed through a

review of their previous medical records (as disclosed by them) and a formal letter from their physicians (general practitioner or pediatrician), psychologist, or psychiatrist.

- Participants had to have a formal diagnosis of ASD. Diagnosis was confirmed through a formal letter from the participant's physician and/or paediatrician.
- Participants had to be between 15 and 21 years of age. The World Health Organization (WHO) defines an adolescent as someone who is between the ages of 10 and 19 years (2017). The age range for this study was extended to 21 years of age because the children's treatment centers in the province in which this study was conducted provide services to clients with ASD up to the age of 21 years.
- Participants had to be able to speak and comprehend English to participate in the study.

Participants were recruited via purposive sampling (Creswell, 2014; Sandelowski, 2000) through a not-for-profit organization serving individuals with ASD and their families. A screening interview was completed with both the participant and a family member prior to his participation in the study to ensure that he met the inclusion criteria. During this initial interview a letter of information was reviewed, and informed consent from the participants and their family member(s) was obtained. This study was approved through the Research Ethics Board.

Overview of Occupationally Based Intervention: Summer Camp Program

Goal Setting

The focus of the intervention was on supporting adolescents with ASD to improve their life skills to support their successful transition to adulthood. During the initial interviews with the participant and his family member(s), the participant selected three prioritized group and individual goals. For the purposes of this paper, only the group goals will be discussed and analyzed. The three group goals that each participant identified as important areas for improvement were: (a) learning to build and maintain meaningful social connections, (b) developing competence in meal preparation, and (c) independently budgeting and managing money.

The CO-OP Approach and Concept Mapping

The CO-OP approach is "a client-centred, performance-based, problem solving, intervention that enables skill acquisition through a process of strategy use and guided discovery" (Polatajko & Mandich, 2004, p. 2). It emphasises the importance of enabling the adolescent to identify, develop, and use cognitive strategies to manage his or her chosen occupational life skill goals more effectively (Polatajko & Mandich, 2004; Toglia, Rodger, & Polatajko, 2012). Unlike traditional remedial intervention approaches, the CO-OP approach is occupationally focused and uses domain specific strategies embedded in a global problem- solving framework (Goal, Plan, Do, Check) to augment ability and, in turn, produce skilled performance (Polatajko & Mandich, 2004). The global problem-solving framework of Goal, Plan, Do, Check is used in an iterative fashion, with frequent modifications to the PLAN and the supplementation of various domain specific strategies. There are six domain specific strategies (DSS) that are a part of the CO-OP approach and that are person, task, and context dependent (Mandich, Wilson, & Gain, 2015). DSS focuses on improving task performance by offering cues and prompts from the environment to enhance learning and support the execution of the individual's plan. DSS includes attention to doing, body position, verbal rote script, feeling the movement, verbal motor mnemonic, supplementing task knowledge, and task specification/modification (Polatajko & Mandich, 2004). The CO-OP approach is a well-supported intervention approach with both child and adult populations (Scammell, Bates, Houldin, & Polatajko, 2016), and literature is emerging supporting its

usefulness when working with children and young adults with ASD (Rodger, Ireland, & Vun, 2008; Rodger & Vishram, 2010).

The CO-OP approach is theoretically founded on a verbally mediated approach to cognitive development (Missiuna, Mandich, Polatajko, & Malloy-Miller, 2001). The participants are traditionally required to talk to themselves (initially aloud, which then progresses to internal dialogue) through the global problem-solving framework and the application of domain specific strategies (Missiuna et al., 2001; Polatajko & Mandich, 2004). For adolescents with ASD who may struggle with articulating their problem-solving, due to associated difficulties with social communication, offering a different medium through which the CO-OP approach can be applied is essential.

Concept mapping is a method that changes words into pictures and visually represents their connections. The process of concept mapping "harnesses the power of our vision to understand complex information 'at-a-glance'" (Ricon, 2010, p. 685). The concept mapping process is dialectical in nature, and it can be used to help synthesize ideas that are developing in the process of learning but that are difficult to put into words alone (Bulter-Kisber & Poldma, 2010). The flexibility of applying the CO-OP approach through both visual and verbal-based mediums enhances its use when working with individuals who experience challenges with communication and who learn better through visual mediums.

Intervention Implementation

The intervention took the form of a summer camp that ran Monday through Friday for 4 weeks in July for approximately 6 hr a day. The CO-OP approach intervention format, program, and session structure outlined in the CO-OP manual were adhered to with minor adaptations to allow for supported group learning (Martini, Mandich, & Green, 2014; Polatajko & Mandich, 2004). The minor adaptations aligned with those recommended by Martini et al. (2014), which included increased time in sessions, supporting others as they worked on their identified goals, engaging in the evaluation of their performance, and developing new strategies through watching and modeling others in the group. To facilitate the use of concept mapping as the medium through which the CO-OP approach would be applied, iPads® were used throughout the intervention program. The use of mobile technologies with individuals with ASD draws on current literature highlighting the use of visual supports in helping to enhance the individual's independence, make abstract concepts more concrete, improve the cognitive processing and retention of new information, and facilitate the generalization of newly developed skills (Rao & Gagie, 2006; Roberts & Joiner, 2007). In addition, literature supports the use of technology in promoting the development of skills in young people with ASD because of its consistency in providing clearly defined tasks, the ability to use the device free from social, environmental, and sensory distractions and/or demands that are embedded in human interactions, and because it is motivating and engaging (Ayres, Mechling, & Sansosti, 2013; Bauminger-Zviely, Eden, Zancanaro, Weiss, & Gal, 2013). All of the participants in the camp had access to their own iPad® where they saved their concept maps and daily reflective accounts. For transfer and generalization of their learning, the participants could take their iPads® home to show their parents or caregivers what they had been working on and to use their maps to support their participation in their chosen occupations outside of the therapeutic context.

The participants took part in a training protocol adapted from Roberts and Joiner (2007), which consisted of two 1-hr sessions that demonstrated how to use the concept mapping software and how to construct maps with the global problem-solving framework of CO-OP (Goal, Plan, Do, Check). The

participants used the application Inspiration© (Inspiration Software Inc., 2017) to create their individualized concept maps. Inspiration© was chosen because of its current availability in the schools that our participants attended. Having access to this software outside of the camp facilitated the opportunity for the transfer and generalization of this intervention approach into the school environment. In addition, Inspiration© has been highlighted as an effective concept mapping application for children and adolescents in the current academic literature (Roberts & Joiner, 2007).

Every day during the camp the global strategy of Goal, Plan, Do, Check was reviewed by the participants and applied through the method of concept mapping to a weekly group goal. The global problem-solving strategy was used as a framework to support the participants as they expanded on their maps and individualized their plans to meet their unique needs. Plans took on various forms in each participant's map depending on his own unique learning needs. Some plans took on the form of a list while others incorporated images or organically arranged thought bubbles. After a plan was constructed, the participant then moved onto doing the activity and brought his iPad® to help guide him through the process. Once the activity was completed, the participant reflected on what went well and what did not go well and made changes to his plan (on his iPad®) using different colors or by deleting previous steps. The participants chose to make notes, take pictures, and/or add voice recordings to their maps to ensure that their plan worked and that it was individualized to their unique needs.

The weekly sessions were facilitated in a group format with the conscious involvement of all participants, and direct one-on-one instruction occurred when necessary (Martini et al., 2014). To help supplement task knowledge among the group members around a goal (or part of a goal), multimodal teaching materials were used throughout the intervention, such as YouTube clips, photographs, and popular media. These methods are in-line with the enabling foundations of the CO-OP approach and help to foster engagement and client-centered learning (Polatajko & Mandich, 2004). The program also incorporated daily community-based activities where the participants had the opportunity to apply their newly developed skills in a different environmental context. This was done to help aid in the process of transfer and generalization and to offer the adolescents the chance to foster meaningful social connections with their peers.

To help minimize participant anxiety and to aid in the transfer and generalization, information booklets about the CO-OP approach, home program suggestions, and the day-to-day timetables of the camp were given to families on the first day of camp (Polatajko & Mandich, 2004). The parents and caregivers were given permission to observe any or all of the camp sessions in order to gain a deeper understanding of how to implement the CO-OP approach, use the iPads®, and facilitate their children's skill acquisition through the method of concept mapping (Polatajko & Mandich, 2004).

Data Analysis

Data Collection

Various methods were used to collect both qualitative and quantitative data during the research project. For the purposes of this paper the participants' personal reflective accounts were collected and thematically analyzed. At the end of each day the participants were asked to reflect on the strengths and weaknesses of the day using their iPads®. An open-ended question was provided to help support the participants in engaging in the reflective process; however, the participants could select to write about something else regarding the intervention, if they chose. The research team then met with the participants either in a group or one-on-one and discussed their reflections to ensure a better understanding of the meaning behind their experiences (Ravenek & Rudman, 2013). Additional notes

were recorded in a field journal to ensure rigor in the data analysis process. In addition, all members of the research team kept field notes and engaged in reflexive journaling to ensure trustworthiness and contextualization of the data analysis (Creswell, 2014). The field notes and observations evaluated the activities used, the strategies that the individuals discovered, the group interactions among the participants, and the changes or challenges that occurred during each session. The field notes aided in developing a deeper understanding of how the intervention was being delivered and received and provided descriptive detail about the research team's emerging interpretation(s) (Creswell, 2014). Reflexive journaling consisted of in-depth narrative accounts of the research team's thoughts, perceptions, values, and beliefs, and how these aspects changed during the delivery of the intervention and throughout the data analysis process (Creswell, 2014). The data collection occurred daily over a 4-week period, with the participants completing daily reflections on their experiences of participating in the intervention (approximately 20 reflective accounts per participant).

Overview of the Data Analysis Process

Deductive thematic analysis as outlined by Fereday and Muir-Cochrane (2006) was applied to analyze the participants' reflections. Deductive thematic analysis is an approach to data analysis that is commonly used in descriptive qualitative studies (Kim, Sefcik, & Bradway, 2017; Vaismoradi, Turunen, & Bondas, 2013). Thematic analysis examines narrative data for common threads in and across data sets. Thematic analysis does not count the most prevalent concepts, however, and instead seeks to develop "a purely qualitative, detailed, and nuanced account of the data" (Vaismoradi et al., 2013, p. 400). The research team took a deductive approach because the frameworks of SDT (Deci & Ryan, 2012) and Wilcock's (1998) and Hammell's (2004) conceptualization of doing, being, belonging, and becoming informed the development and implementation of the intervention and the study's research question. Therefore, by creating a flexible codebook that is specifically attuned, these underlying frameworks provide detailed data about the participants' experiences from a transparent and cohesive theoretically driven perspective (Braun & Clarke, 2006).

There were three stages of the data analysis that occurred in this iterative and reflexive process. Stage 1 consisted of developing an a priori manual of codes, which was established from the theoretical framework of SDT (Deci & Ryan, 2012) and explicitly linked to the framework of doing, being, belonging, and becoming developed by Wilcock (1998) and Hammell (2004) to ensure the relevance of the codes to the OT profession. Following the completion of the coding manual, the coauthors reviewed and agreed on the codes for clarity and reliability (Fereday & Muir-Cochrane, 2006). The development of an a priori codebook aligns with descriptive qualitative methodology (Kim et al., 2017; Sandelowski, 2000; Vaismoradi et al., 2013), and through use of reflexive journaling and regular research team meetings, the authors remained open to the addition and/or alteration of codes during the data analysis process. This provided transparency in the theoretical orientation of data analysis process, while ensuring that the researchers were not limiting their findings to align only with the a priori codes (Sandelowski, 2000). Table 1 depicts the coding manual for the deductive thematic analysis approach used throughout the data analysis process. Because of the broad definition of each code, no new overarching codes were created during the data analysis process. The primary author coded the participants' reflective journals, and confirmation was sought with the rest of the research team to ensure the credibility of the findings (Tracy, 2010). Each one of the participant's daily reflective accounts was analyzed individually and then as a collection across his participation in the intervention. The reflections were initially printed off and organized in chronological order (days of the intervention) and

read individually, and then as a complete set to become familiarized with the data. Line-by-line coding occurred where sentences, phrases, and quotes were coded and then organized under each of the a priori overarching codes (competence, relatedness, and autonomy). This two-stage coding process allowed for the nuances of the individual data to be highlighted to ensure rigor, credibility, and resonance in the generation of themes (Tracy, 2010), while aligning the findings with the study's theoretical underpinnings. Throughout the data analysis process, the research team's daily field notes and reflexive journals were reviewed in an iterative fashion while immersed in the data analysis process to help further contextualize the data and ensure rigor throughout the process (Creswell, 2014). Stage 2 of the data analysis process involved connecting the codes (under and between each of the a priori codes) and uncovering patterns across the participants' data sets to develop emerging themes (Fereday & Muir-Cochrane, 2006). In Stage 3, corroborating and legitimizing the themes was completed, which confirms the findings and ensures the authenticity and rigor of the themes and the overarching data analysis process (Fereday & Muir-Cochrane, 2006). This occurred through reviewing and refining the themes as a research team to ensure coherence in and between themes to demonstrate authenticity in describing the phenomenon under investigation.

Table 1

Codebook for Analyzing Participant Reflections

Code	Definition	Description
1 - Competence	Engaging in doing occupations to facilitate occupational competence, which contributes to a sense of purpose and meaning in everyday life (Deci & Ryan, 2012; Hammell, 2004; Wilcock, 1998).	Meeting new challenges and development of knowledge, skills, and abilities to meet performance expectations (Deci & Ryan, 2012; Hasselkus, 2011).
2 - Relatedness	A universal need of belonging, contributing, and connecting to others that fosters perceptions of self-worth, value, competence, and social inclusion.	Development of relationships between people that allows for an opportunity to interact and connect; can be in a state of change/process of evolving and involve mutual support and reciprocity (Deci & Ryan, 2012; Hammell, 2004; Wilcock, 1998).
3 - Autonomy	A causal agent in choosing and engaging in occupation that one needs and wants to do. Acting in harmony with one's integrated self that reflects continuity, hope, and coherence.	Making choices and building intrinsic motivation. Taking a place in the group community and evoking authenticity in choices and actions (Deci & Ryan, 2012; Hammell, 2004; Wilcock, 1998).

Note. References assisted in forming the a priori template of codes for data analysis, linking SDT and occupational therapy.

Quality Criteria

The 8-point conceptualization of qualitative quality developed by Tracy (2010) was used throughout this research study to ensure methodological rigor. This framework was chosen because it "delineates eight *universal* hallmarks for high quality qualitative methods across paradigms" (Tracy, 2010, p. 837). Although all eight criteria were achieved through the research process, the criteria that are relevant to this study were rich rigor, credibility, and meaningful coherence (Tracy, 2010). Member reflections and individual/group discussions were used throughout this research study, which align with

the quality criteria of credibility. Member reflections extend beyond member checks by presenting an opportunity for collaboration and reflexive elaboration between the researcher and the participant instead of simply testing for accuracy of interpretation (Ravenek & Rudman, 2013; Tracy, 2010). This approach to maintaining the credibility of findings can be particularly useful for individuals with ASD, who may experience a heightened level of anxiety when they are asked to complete readings of transcripts for accuracy of accounts, which can be an unfamiliar and lengthy process. It is necessary to achieve a balance between ensuring rigor in the data collection process and the ability to obtain the insights (hear the voice) of individuals who are unrepresented in the academic literature because of the challenges that exist when conducting research with them (Autism CRC, 2016). Rich rigor was maintained through regular weekly (or more frequently, as required) debriefing sessions between the primary author and the broader research team, both during the intervention and throughout the data analysis process to seek a level of agreement and authenticity in the emerging themes (Tracy, 2010). Finally, meaningful coherence was sustained through the design, implementation, and analysis stages of the study through clear and consistent reporting of the paradigmatic position of the research team, the methodology chosen, the methods of data collection, and the analysis procedures (Tracy, 2010).

Findings

Five themes were discovered in this study: Finding a sense of balance through negotiating tensions; a sense of "we" and a sense of "I"; selecting purposeful, meaningful, and authentic occupations; multimodal tools; and action through participating in doing.

Finding Comfort in Negotiating Tensions

This theme describes the process of the individual negotiating tensions with the purpose of finding an optimal personal balance that fosters occupational competence in learning, connections with others, and building individual autonomy. Experiences of tension can be found embedded in all three codes of competency, relatedness, and autonomy. During the process of developing and finding balance in their occupational competence, the participants had to recognize and effectively use their current task knowledge and supplement the gaps in their current understanding through meaningful learning. Participant 2 reported, "Reflecting helps me look back and think about positives and negatives and what I should do differently."

The participants reflected on the discrepancy between their perceived skills and the task demands of participating in the goal of making social connections with their peers. This was evidenced when the participants became cognizant that their previous social behaviors (like telling a sexually suggestive joke), which they believed were helping them to connect with their peers, may instead be socially isolating them. In addition, awareness of the multitude of verbal and nonverbal cues that peers provide through social interactions could act as clues to how to behave differently in various social contexts. Participant 6 recalled, "I learned today that being social is harder than I ever could have predicted, so I think I want to be a hermit. Just kidding. But I think that I should be watching more of the autism TV."

The process of learning to identify and accept their own weaknesses opened the possibilities to start engaging in activities, learning new skills, and working toward achieving their full occupational potential. Participant 3 reflected, "It also helped [in reference to the camp program] me see my own weaknesses and how to work with them instead of against them." Finding comfort in negotiating tensions was also an important theme, as the participants navigated the building and maintaining of connections with their peers. Recognizing areas of disconnect and tension in trying to build a friendship and being able to react appropriately by changing their behavior facilitated opportunities for learning

and growth. Because of the intensity of the intervention and the group approach to learning, the participants had the opportunity to manage the tensions that arose in the everyday interactions with their peers. Whether it was supporting a peer who was experiencing difficulties in following directions, or negotiating what video games they would play during their free time, naming, framing, and managing their disagreements was a valuable learning experience. Participant 7 observed that "Some people were really freaking annoying to the point where I had to walk away or literally would have called them on it."

When the participants were engaging in the intervention sessions they not only had to negotiate tensions with their peers, but also with the researcher(s) and volunteers. Participant 8 reported:

> Today we started off with meal prep again and we did the whole spiel where [volunteer] made soup and salad and we had to hit the buzzer when she did something wrong. I think it went better today though, since [volunteer] did not get annoyed visibly.

A Sense of "We" and a Sense of "I"

This theme reflects the importance of the individuals developing an understanding of themselves ("I") to contribute positively to the building of a collective "we" (group). At the beginning of the summer camp the participants typically participated in one-sided connections facilitated by an externalized locus of control. They lacked an understanding around who they were and what they could contribute to a communicative partnership. Embedded in finding oneself and contributing to a larger whole is a sense of developing autonomy and self-efficacy, which positively affects all areas of the participants' lives. Participant 4 reflected, "My music [referring to a musical preference] would change depending on the social situation." This quote highlights how some of the participants' lack of self-confidence affected their level of comfort when entering a new social connection. Their sense of who they were was fluid and changed depending on who they associated with, making it a challenge to engage in and sustain an authentic friendship. Participant 4 also commented that "The activities and the OTs helped me to feel more comfortable about my personality, and I am going back to school with some new tips for my life."

As the mapping process continued, many of the participants' maps began to become more complex and individualized. This demonstrated an increase in the participants' ownership over their learning experiences and a newly developed confidence in their evolving occupational competencies.

Building a sense of "we" was an important theme that permeated the data analysis process. As the participants began to engage in occupations in a group format and develop a connection with themselves and with their peers, a sense of "we" started to emerge in the data. Participants 6 and 4 reported, respectively, "We had lots of fun today" and "I feel more open when I know other people I meet are going through the same thing I am." Connecting and building a space and a place of understanding and relatedness can help to build meaningful connections with oneself and others.

Selecting Purposeful, Meaningful, and Authentic Occupations

Selecting purposeful, meaningful, and authentic occupations to engage in during the intervention was a theme that was found in all three codes of competency, relatedness, and autonomy. Providing individuals with the opportunity to choose the occupations (goals) that they wanted to work on throughout the intervention enhanced their motivation to participate and, in turn, facilitated their learning and offered them opportunities to connect with peers over similar interests. The participants began to see how different aspects of their goals were reflected in their peers' goals. Participant 4 reported, "Today I learned that working in groups can help you socially by giving you a common goal."

The participants highlighted the importance of being able to choose the occupations they shared during their participation in the camp program. They displayed thoughtful and perceptive insights into the underlying meanings behind the relevance of participating in meaningful occupations with others. Participant 11 reflected:

> Playing music can connect people on a deep level because just by simply picking up a piece of wood with some string you can create beautiful music and you can relate to other people who share the same passion about music, even with such different tastes in music spanning hundreds of years we all understood each other.

Authenticity in engaging in occupations related to the skills that are taught and the relevance of the occupations to the population of adolescents with ASD is also meaningful. Occupations were not chosen based on parental expectations or societal norms, and therefore the participants were allowed the opportunity to connect with one another and develop authentic relationships based on shared interests. Participant 8 reported, "There was the ps2, and 3 as well as an xbox and the wii. Today was really fun and it made me feel more as part of the group."

The participants started to gain insights into the importance of structuring the environment and the occupations in a way to facilitate positive interactions with their peers. These insights developed as the participants became more confident in negotiating tensions and developing a sense of who they were individually and as a member of the larger group. Participant 8 observed, "I found out that it's much harder to become friends with someone if you are just throwing preset questions at someone than it is to maintain a social conversation."

Multimodal Tools

The use of multimodal tools to build occupational competence, relate to others, and express one's own voice is a theme that emerged throughout the data analysis process. Inspiration© software was used to facilitate the organization, construction, and sharing of the participants' concept maps. This technology offered the opportunity to use different colors, shapes, pictures, and text to engage the participants in the construction of new knowledge. The participants expressed their connection with the multimodal tools used throughout the intervention both in their reflections and in the different ways they chose to create and share their concept maps. Participant 4 expressed that "Concept mapping is a cool way to take notes and get ideas down. I think that it makes it more interesting to make notes and interesting to read. It also is a fun way to map out what I am thinking." Participant 10 reflected, "We learned inspiration, you listen with your brain and eyes."

The use of peers as supports, popular media and music as learning tools, and doing through actively participating in occupations were all multimodal tools that seemed to impact the engagement and learning of the participants. Participant 3 recalled, "I really liked the clips from BBT [Big Bang Theory] and The Social Network. It helped me visualise what not to do during a conversation." Recognizing his own unique ways of learning and the positive impact of engaging with new information in a different way began to emerge among the participants' reflections. Participant 6 reported, "I also want this program to continue because I love this. It teaches me things in ways most people won't teach them."

Action: Doing and Connecting with the Present

Doing, acting, and engaging in the present is an important theme that emerged through the data analysis process. Connecting over doing through the engagement and participation in an occupation was a vital component to the participants' successful learning. Participants 6 and 5 commented, respectively,

"In small group, we looked at different organization examples, which was a really big help to show me each organization ideal in a better way than just talk about it" and "Learning better by seeing and doing."

With a focus on doing, different opportunities arise and exposure to new experiences can occur. This facilitates occupational competence, strengthens connections with others, and enhances self-efficacy. Participant 7 recalled, "On the way back, we forgot where to find the bus stop and had to take directions from a stranger. We had to run to catch the bus! That was pretty funny. Overall, I think that today was pretty awesome." It was through the doing of an occupation that the most valuable learning experiences unfolded. Through making mistakes, problem-solving as a group, and developing a shared experience of an event, the participants moved beyond talking about the steps to complete a task successfully to developing a sense of competence in completing an occupation. Participant 11 observed, "The geocaching was amazing and I had a lot more fun than I expected myself to have." The participants identified the importance of opening doors to new occupational possibilities through the process of doing. In turn, through active participation in an occupation, they learned more about themselves and their place in the group.

Discussion

Throughout the participants' personal reflections, they all identified the importance of finding comfort in negotiating tensions. Aligning with current research, individuals with ASD often require support in recognizing and understanding their personal strengths and weaknesses because of their difficulties with theory of mind, executive functioning, and central coherence (Happé & Frith, 2006; Pellicano, 2010). Because of difficulties in social communication and interaction across contexts (American Psychiatric Association, 2013), individuals with ASD may have limited exposure to social opportunities and may lack the ability to use concepts and language that help to advance their knowledge of themselves by internalizing other's perceptions of them (Schriber, Robins, & Solomon, 2014). Challenges in these areas inhibit individuals with ASD in developing occupational competence and meaningful social connections due to difficulties in recognizing and appropriately managing conflicts between their needs and those of their peers. Offering the participants multiple opportunities to engage in active reflection and applying the global problem-solving framework of the CO-OP approach throughout the course of the intervention supported the participants in clarifying their current skill level and actively acknowledging potential areas for growth. Through the process of visually breaking down a task (concept mapping), constructing a plan, enacting the plan, and consciously checking their occupational performance, the participants experienced autonomy in how they resolved their performance problems and developed competence through their active participation. The intervention piloted in this study provided an overt and realistic problem-solving process to support the participants in navigating complex occupational performance issues.

Interventions that focus on supporting individuals to find their unique sense of self are important when working with adolescents with ASD. Adolescence is a time when young people develop a sense of self and experiment in forming and reforming their own unique identities (Cridland, Caputi, Jones, & Magee, 2015). Research has shown that individuals with ASD may struggle with identity development because of this process being largely reliant on participating in social interactions across different contexts (Cridland et al., 2015). In addition, individuals with ASD often demonstrate lower levels of social determination and make fewer choices in their everyday lives as compared to their typically developing peers (Mehling & Tassé, 2015). Allowing adolescents with ASD to participate in

interventions that target their unique occupational performance issues by facilitating group learning, building on their strengths (using and applying technology), and allowing them to have control over the environment and the occupations in which they participate, can enhance the meaningfulness of the intervention and enhance their motivation to participate.

Many of the participants described that using multimodal learning tools helped them to develop their occupational competence, relate better to others, and more easily describe their problem-solving processes. It became apparent in the intervention that the participants are able to use and apply technology, therefore fostering both a sense of belonging and a sense of connection among the group. The participants reported in their reflective accounts that the various mediums and modalities that were used to apply the CO-OP approach and/or supplement their task knowledge offered them the opportunity to engage with the information and consolidate their problem-solving skills and develop new knowledge in a way that fit their unique learning needs. The use of popular media, personal supports, and visual methods as learning tools throughout the intervention all helped to gain and maintain the participants' involvement. Research has shown that individuals with ASD learn more efficiently and effectively with technology and visual supports (Bauminger-Zviely et al., 2013; Grynszpan, Weiss, Perez-Diaz, & Gal, 2014; Rao & Gagie, 2006; Roberts & Joiner, 2007). This intervention used a strength-based approach by building on the participants' current abilities to help facilitate their learning of more challenging life skills. Strength-based approaches are widely used in occupational therapy interventions for children and adolescents to optimize their occupational performance by supporting the development of self-determination and self-efficacy (Case-Smith, 2015).

Developing a sense of belonging is an important concept that has been supported in the current literature when ensuring the mental health and facilitating engagement of adolescents with ASD (Haertl et al., 2013; Shochet et al., 2016). Many of the individuals in the camp developed a sense of "we" by being a part of a peer group and expressed a desire to build a sense of belonging through friendships. A study completed by Ekelman, Bazyk, and Bazyk (2013) explored the relationship between occupational engagement and well-being from the perspective of university students with disabilities. The study highlighted that students with disabilities have a strong desire to belong, which is reflected in their desire to connect with others, have fun, and not feel like an outsider (Ekelman et al., 2013). The participants in this study reinforced this notion of wanting to be engaged in meaningful and authentic social connections through their increased interactions over time, the sharing of their free time playing music or videogames, and spontaneously exchanging phone numbers at the end of the intervention.

The nature of what social interactions look like and/or how they are carried out (context, frequency) for adolescents with ASD might be interpreted differently by neurotypical peers and family members (Calder, Hill, & Pellicano, 2013; O'Hagan & Hebron, 2017). This is an important concept to consider because how adolescents with ASD understand the meaning of friendships and how they engage in social connections with others might not align with our clinical expectations of typical occupational performance. Applying outcome measures, standards, and expectations that evaluate the quantity and quality of social relationships against standard norms may not necessarily reflect the wants and needs of this neurologically diverse population.

Participation in purposeful, meaningful, and authentic occupations was found to be important in the participants' development of occupational competency and in helping to facilitate the development of social connections and a deeper understanding of themselves. Hasselkus (2011) identifies this concept as doing, which is enacted through the engagement in meaningful and relevant occupations.

Doing fosters deeper connections among individuals and in oneself, therefore enhancing a person's task motivation and overall well-being (Hasselkus, 2011). Taking action through doing and connecting with the present was reflected in all of the participants' reflections. This highlighted the importance of allowing the participants the choice of occupations in which to engage, and is also reflected in the client-centered goal setting key feature of the CO-OP approach (Polatajko & Mandich, 2004). Through doing (as a part of the global problem-solving framework of CO-OP), the participants moved from talking about what to do, as often represented in abstract concepts, to enacting their plans and evaluating the outcomes. This concept is also supported by the work of Wilcock (1998) and Kielhofner (2008), who describe the power of doing as an interconnected construct necessary in building competence, identity, and connections to oneself and others. The participants emphasized the importance of moving beyond talking about an occupation to doing it, and highlighted through their reflective accounts the essential nature of this stage in their learning process.

Limitations

The use of a descriptive qualitative methodology was carefully selected to explore the participants' qualitative experiences of participating in a novel occupationally focused intervention. For this paper, the textual (as completed on an iPad®) reflective accounts produced by the participants were analyzed in conjunction with the research team's field notes using a deductive thematic analysis approach guided by SDT (Deci & Ryan, 2012) and Wilcock's (1998) and Hammell's (2004) framework on doing, being, belonging, and becoming. Different results may have been uncovered if an inductive approach was used and/or another theoretical framework was used to guide the analysis of the data. The sample was limited to 10 male participants; therefore, caution must be taken when transferring the findings from this study to the broader population. The primary author of this paper constructed and delivered the intervention; therefore, bias could exist in the manner that the data was analyzed and interpreted. However, to ensure rigor and transparency throughout this process, the primary author debriefed with other members of the research team who were not a part of the intervention and other group facilitators. In addition, the primary author kept a reflexive journal throughout the development, implementation, and evaluation of the intervention to ensure transparency and rigor throughout the process. Additional notes summarizing and clarifying the participants' reflective accounts were confirmed with each of the participants at the end of each session acting as an on-going form of member checking as aligned with the study's paradigmatic approach (Creswell, 2014; Ravenek & Rudman, 2013; Tracy, 2010).

Conclusion

The purpose of this paper was to examine the personal experiences of adolescents with ASD who participated in a novel occupationally based intervention that combined the CO-OP approach with the visual method of concept mapping. Focus was placed on examining their insights related to the development of their occupational competence, their connectedness with others, and the building of their personal autonomy throughout their participation in the intervention. This study's findings add new perspectives and depth to the current research and the evidence supporting the use of the CO-OP approach with individuals with ASD in improving their occupational performance in both motor-based and psychosocial goals. Combining concept mapping with the CO-OP approach offers individuals with ASD a method to develop and enact their problem-solving through a visually supported medium.

The participants' reflective accounts add important insights to the current body of knowledge regarding how to develop meaningful and effective intervention programs to meet the needs of

adolescents with ASD as they transition to adulthood. Developing interventions that encourage and support group-based learning opportunities offers participants a chance to practice and develop social connections with others. Ensuring autonomous choice in goal development, how the environment is structured, and building on skills from a strength-based perspective support the development of self-efficacy and enhance participant motivation. Finally, providing adolescents who have ASD with the opportunity to voice their experiences of participating in an intervention is necessary to ensure the meaningfulness of future developments of this study's piloted program and of other interventions aimed at improving occupational performance.

Future Directions

Additional studies are needed to add depth and breadth to these preliminary findings. Exploring the use of mixed method research designs to highlight the holistic changes to the occupational performance of adolescents with ASD when participating in the piloted intervention is necessary. Transparently reporting on changes and alterations made to the program based on the participants' experiences will add valuable knowledge to the processes surrounding the development and evaluation of authentic and meaningful occupationally based interventions for adolescents with ASD. In addition, future studies should explore the effectiveness of this combined CO-OP and concept mapping intervention approach for other populations beyond those with ASD.

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