Comparing Two Interventions Employed to Improve an Appropriate Conversation-Initiating Skill in Adults with Intellectual Disabilities

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Abstract

Individuals with intellectual disabilities (ID) often have deficits in social communication skills, such as initiating a conversation with others appropriately. These deficits tend to have negative impacts on their wellbeing and quality of life, including social participation and employment. Numerous behavioural interventions have been employed to remediate social communication deficits in people with ID, such as behavioural skills training (BST) and remote audio coaching (RAC). The current research aimed to use BST and RAC remotely via Zoom to teach an appropriate conversation-initiating skill to four adult participants with ID who worked in a café. A non-concurrent multiple baseline across participants design was used to evaluate the effects of BST and RAC on participants' conversation-initiating behaviour. Participants were allocated to either the BST or RAC intervention group using randomisation, or based on their preferences, to compare these two interventions to determine which led to better outcomes. Results indicate that RAC led to substantial improvements in appropriate conversation initiations in one of the two participants in the RAC intervention group and the improvements were maintained for 4 weeks upon the removal of RAC. In contrast, BST led to some improvements in appropriate conversation initiations in one of the two participants in the BST intervention group. The improvements became more significant after introducing an additional procedure, error correction (providing corrective feedback following incorrect responses), than those resulting from BST alone. Neither RAC nor BST resulted in skill generalisation across individuals in the natural vocational setting (the café). Potential limitations involved in this research and relevant implications are specified and directions for future research are discussed.

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Individuals with intellectual disabilities (ID) start to experience difficulties in both intellectual and adaptive functioning in their early developmental period (American Psychiatric Association [APA], 2013). These difficulties can hinder their acquisition of adequate life skills, including social communication skills related to initiating and maintaining interactions with others in appropriate situations (Belva et al., 2012; Marrus & Hall, 2017). As a result of the deficits in social skills, their development of interpersonal relationships with people around them, social participation in the community including employment, and quality of life, are adversely impacted (Huang & Cuvo, 1997). Behavioural interventions based on applied behaviour analysis (ABA) principles and approaches have been successfully used to teach and improve such skills deficits to yield positive changes in the social life and wellbeing of individuals with disabilities (e.g., Chezan et al., 2020; Mason et al., 2020).

The introduction of this paper begins with a discussion of ID, including its classification, aetiology, and prevalence. Next, two factors that can influence the quality of life of individuals with ID – conversational skills and employment – are reviewed and discussed. Finally, two behavioural interventions that have previously been effectively employed to enhance social communication skills in people with disabilities are introduced and summarised.

Intellectual Disability (ID)

ID is defined as a neurodevelopmental disorder characterised by difficulties or impairments in intellectual and adaptive functioning according to the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) (APA, 2013). The areas of impairment in intellectual functioning involve skills or capabilities such as learning, reasoning, planning, and problem solving. The areas of impairment in adaptive functioning include conceptual

skills (e.g., reading, writing, and memory), practical skills (e.g., self-care and performance of daily living activities), and social skills (e.g., communication and interpersonal skills).

Classification and Aetiology

ID can be classified as mild, moderate, severe, or profound according to the level of severity of the person's disability, which is measured based on their adaptive functioning; that is, the performance level of independent daily living skills (APA, 2013). For instance, individuals with mild ID are able to live independently and only require a minimum amount of assistance from others (e.g., parents, caregivers, and support staff) to achieve personal functioning in their everyday lives. In contrast, those with profound ID cannot live individually and need a maximum amount of support from others to be able to accomplish their ordinary routines.

The causes of ID are heterogeneous, involving genetic factors, acquired factors arising during the person's congenital and/or developmental period, and environmental and sociocultural factors (Iwase et al., 2017; Katz & Lazcano-Ponce, 2008). Examples of commonly known genetic factors are related to chromosomal abnormalities, such as Down Syndrome and Fragile X Syndrome (Maulik et al., 2011). Acquired factors that may lead to the development of ID during the congenital period include prenatal exposure to toxic substances (e.g., alcohol, lead, drugs, and mercury), infections, and neonatal hypothyroidism. Acquired factors that cause ID during the developmental period can be subdivided into three categories: prenatal, perinatal, and postnatal (Katz & Lazcano-Ponce, 2008; Simpson et al., 2016). Common prenatal causes are related to pregnancy complications, such as intrauterine malnutrition and uncontrolled diabetes; common perinatal causes are related to birth complications, such as asphyxia and traumatic brain injury; and common postnatal causes can include developmental delays or disorders and complications such as infections. Environmental and sociocultural factors positively associated with ID are primarily poverty

and the wide range of possible outcomes related to it (Katz & Lazcano-Ponce, 2008). For instance, due to poverty, access to relevant education and adequate caregivers and health professionals is limited. These lead to poor prenatal, perinatal, and postnatal health care, poor neonatal health care, and infant mistreatment, resulting in the potential causes of ID.

Prevalence

The prevalence rates of ID are relatively high across nations. A meta-analysis of 52 population-based studies conducted by Maulik and colleagues in 2011 found that the overall prevalence of ID across the populations assessed was approximately 1.04%. Within this population, the prevalence of ID in the child and adolescent population was about 1.83%, whereas the prevalence of ID in the adult population was around 0.49%. Also, according to a report by the Ministry of Health (MoH, 2011), around 0.75% of the 4.29 million study population in New Zealand (about 32,000 New Zealanders) were diagnosed with ID. Among these people with ID, the proportions of children, adolescents, and older people were relatively high compared to those without ID.

An increasing number of studies have revealed the high prevalence of multiple diagnoses in individuals with ID (e.g., Bratek et al., 2017; Einfeld et al., 2011). For example, people who had ID tended to be more vulnerable to experiencing or developing mental or affective disorders (e.g., anxiety and depression) compared to the general population (Carraro & Gobbi, 2012; Matson et al., 1999; Strømme & Diseth, 2000). Consistent with this finding, Cooper et al. (2007) conducted a population study and reported that approximately 40.9% of 1023 adult participants with ID had one type of mental health problem according to their clinical diagnoses. Also, individuals with ID were more likely to have poor health and more risks of receiving treatment or care for their mental health and other chronic health conditions, such as heart and respiratory diseases and cancer (MoH, 2011). Additionally, people with a diagnosis of ID may be likely to develop other developmental disabilities (DD),

such as autism spectrum disorder (ASD). The prevalence of diagnoses of ID and ASD tended to vary across studies and countries (Matson & Cervantes, 2013; Matson & Shoemaker, 2009). For instance, La Malfa et al. (2004), in Italy, reported that about 40% of 166 people with ID had an ASD, and another study by Bryson et al. (2008) in Canada revealed that approximately 28% of 171 individuals who had ID also evinced ASD. Furthermore, people with ID or co-occurring ID and ASD were more inclined to exhibit challenging behaviour, including self-injurious behaviour (SIB), physical aggression, repetitive or stereotypic behaviour, and property destruction (Rojahn et al., 2010). Two population-based studies by Emerson et al. (2001) and Bowring et al. (2017) found that the prevalence rate of individuals with ID having one or more forms of challenging behaviour varied from 10% to 18.1%.

Quality of Life of People with ID

Quality of life is referred to as the extent to which a person is satisfied with the eight core domains of their daily life (Schalock, 2000; Schalock et al., 2002). These eight domains include personal development and self-determination (reflecting a person's independence level), emotional, physical, and material wellbeing, interpersonal relationships, social inclusion, and rights (reflecting a person's social participation). The quality of life of individuals with ID is often rated and reported as poorer than those with typical development (Nota et al., 2007; Walsh et al., 2010). The underlying explanations for this phenomenon can be linked to the severity of ID and the prevalence of multiple conditions in people with ID as mentioned previously. Specifically, those who have more severe ID experience further impairments in their adaptive and intellectual functioning and hence require more support to accomplish daily living activities and become relatively more dependent on their caregivers (APA, 2013). In addition, research done in New Zealand and other countries has found that people with ID also tend to develop chronic health problems and mental and/or developmental disorders (Matson & Cervantes, 2013; Matson et al., 1999; MoH, 2011).

These multiple conditions can result in individuals with ID having decreased functioning and increased dependence, further hampering improvements in various core aspects of their quality of life (Watson & Keith, 2002). For instance, people with profound ID and ASD are more vulnerable to impairments in social interactions and communication and have more interpersonal communication problems compared to those with ID only (Wilkins & Matson, 2009). These impairments and problems can interfere with or constrain their abilities to experience or participate in social activities in the community (e.g., employment) and lead to social withdrawal, which puts them at a higher risk of social exclusion (Hendricks & Wehman, 2009; Shtayermmann, 2007). Social exclusion in turn results in adverse outcomes for their personal growth, interpersonal relationships, community participation, self-determination, and general wellbeing, which leads to poor quality of life (Nota et al., 2007; Walsh et al., 2010).

Diverse intervention approaches have been developed and employed to enhance the quality of life among individuals with ID and/or other disabilities, and reported in the existing literature. One approach is to teach and improve conversational or social skills using evidence-based behavioural techniques to facilitate positive social interactions with others, promote social connections and interpersonal relations, and boost social competence and wellbeing (e.g., Beauilieu et al., 2014; Hood et al., 2020; Peters & Thompson, 2015; Ryan et al., 2019). Another approach is to provide vocational skills support with behavioural intervention programmes to assist the individual in acquiring and maintaining better work performance and achieving independence, social participation, and personal development (e.g., Allen et al., 2012; Bennett et al., 2010; Bennett et al., 2013a, 2013b). A further approach is to train social skills for employment, or both social and employment skills, to improve interactions with co-workers and/or supervisors and job performance, encourage

relationship development and social inclusion within the workplace, and increase self-determination (e.g., Gilson & Carter, 2016; Park et al., 2020)

Conversational Skills

Conversations, which are a vital part of people's daily living, as well as an essential aspect of quality of life, are referred to as informal talks between two or more persons to express ideas, thoughts, or feelings, exchange news or information, or ask and answer questions (Schalock et al., 2002; Walter, 2008). A wide variety of basic verbal and non-verbal social skills are involved in a conversation. Examples of verbal social skills include initiating, reciprocating, sustaining, and ending a conversation and staying on and changing a conversational topic (Fichten et al., 1992; Hood et al., 2017; Nuernberger et al., 2013). Examples of non-verbal skills include approaching and standing next to the conversational partner at an appropriate distance, encoding and decoding emotional cues (e.g., expressions of interest and boredom), and making and maintaining eye contact (Fichten et al., 1992; Kornacki et al., 2013; Riggio, 1992). These skills are critical since they serve multiple functions, such as exchanging information, facilitating social interactions and connections, promoting social competence and participation, and establishing and maintaining interpersonal relationships and rapport with others (Beukelman & Mirenda, 2013; Money, 2016). Acquiring these skills becomes increasingly crucial as individuals with and without disabilities age and pursue more independent social situations, including education and employment (Nuernberger et al., 2013).

Conversational Skills in People with ID. In addition to having difficulties conveying information and understanding spoken and/or written language, previous research has also found that people with ID are more likely to display conversational skills deficits, such as inadequate conversation initiations, reciprocal interactions, and/or conversation preservation (Belva et al., 2012; Marrus & Hall, 2017; Smith et al., 2020). For instance,

individuals with ID may not start a conversation with others in socially available situations (e.g., when seeing a co-worker approaching them) (Chezan et al., 2020). They might also interrupt the conversational partner's response without waiting for their turn. Also, they may not respond to, or ignore, question(s) initiated by the conversational partner to show a withdrawal from the conversation (Silvera-Tawil et al., 2018). Similarly, people with ID can show difficulties demonstrating appropriate non-vocal social skills. For example, they tend to fail to recognise and interpret overt or subtle environmental cues (e.g., the peer is conversing with a friend) and respond appropriately (e.g., approaching the peer after they finish the conversation) in the given social contexts (Coppens-Hofman et al., 2016; Smith & Matson, 2010). They may also have limited or no eye contact with their conversational partner during the conversation (Ferguson et al., 2021). Likewise, they may not exhibit appropriate engagement with the partner, such as displaying attentive and active listening skills, including facing the partner and making and sustaining eye contact. Furthermore, people with ID can have deficits in verbal and non-verbal conversational skills in certain social situations. Specifically, they are less likely to show social or emotional empathy and provide assurance, such as "Oh dear, are you okay? Hope you get better soon", when hearing their conversational partner stating "I am sick" after asking how the partner is or seeing them showing they are feeling unwell by sneezing or coughing (Olçay Gül, 2016). These skill deficits can adversely impact various areas in the everyday lives of people with ID, leading to reduced social interactions with others, increased risks of social isolation, and poor long-term outcomes related to employment and quality of life (Huang & Cuvo, 1997; Nota et al., 2007).

Factors that Affect Conversational Skills in People with ID. Conversational skills deficits can be influenced by multiple factors, and some of these factors have been already mentioned in the previous sections. For instance, the person's severity of ID can affect the level of their conversational skills (Smith et al., 2020). People with mild ID tend to have

subtle impairments in their functioning involving conversational skills, and their conversational behaviours appear similar to those of typically developing peers (APA, 2013). In comparison, those with moderate, severe, or profound ID have greater impairments in these skills, and they have a limited ability or inability to independently hold and engage in a conversation with others and may require an increasing amount of support and assistance as the severity of these impairments increases. Another factor is related to co-occurring or multiple conditions in people with ID, including mental and/or developmental disorders, which can further hinder their development and maintenance of social skills (Matson & Cervantes, 2013; Matson et al., 2009; Strømme & Diseth, 2000; Wilkins & Matson, 2009). For instance, individuals with co-occurring ID and ASD tend to manifest more significant impairments in social skills compared to those with ID only, due to the shared core feature of both disabilities: impaired communication abilities and social interaction skills (APA, 2013; Matson et al., 2009; Smith & Matson, 2010). An additional factor is linked to the presence of challenging behaviour (e.g., aggression, SIB, and property destruction) (Smith et al., 2020). Challenging behaviour in people with ID or ID and ASD is relatively prevalent, particularly in those with more profound ID and more severe impairments in social communications (Bowring et al., 2017; Emerson et al., 2001; Rojahn et al., 2010). These people may use challenging behaviour as a means of communication, since other forms are not available for them due to their severe impairments (Marrus & Hall, 2017; Mirenda, 1997). This can have a further negative impact on establishing and sustaining social connections with others and developing adequate conversational skills through interactions with them (Kevan, 2003; Rojahn et al., 2010).

Environmental variables also play a vital role in conversational skills deficits in people with ID. One of these variables is related to restricted social environments and networks, despite resettling people with disabilities from living in more restrictive and

segregated institutions to less restrictive and community-based settings due to the deinstitutionalisation process that has operated since the early 1990s (Grant, 2008). For example, people with ID who live in a home with family, or a residential facility, have more interactions with people around them, including family members, support staff, and/or peers with similar disabilities, while having limited contacts with typically developing peers (Gilmore & Cuskelly, 2014; Huang & Cuvo, 1997). This can negatively affect their acquisition of adequate social skills by observing and modelling peers with typical development, given that these skills are well developed through interactions with those peers in natural sociocultural contexts (Gaylord et al., 1986). Another contributing variable is associated with the unpleasant experience of rejection by others (Gresham, 1986). Individuals with ID may end up having adverse interactions with those with typical development because of their poor social skills. As a result, they become more likely to avoid encountering similar situations by reducing or avoiding interpersonal interactions with others, leading to a lack of improvements in social skills and more social isolation.

Employment

Employment, considered another essential factor for quality of life, is generally defined as a person being paid to work for an organisation or company (Schalock et al., 2002; Walter, 2008). Employment is highly valued in society due to the wide range of benefits it can bring, both to society and individuals. These benefits include increasing socioeconomic growth and employment rates and reducing unemployment rates, poverty, and gaps in people's income and social and psychological measures (Schur, 2002). In addition, employment can result in the person obtaining a valuable social role as an employee, having a sense of purpose, and gaining greater financial independence, enhanced autonomy and self-determination, and better living conditions (Eggleton et al.,1999; Grant, 2008). It may also lead to greater achievement in personal development, including cultivating and improving a

variety of vocational, social, and civic skills, which are beneficial not only for the person's career but also in other areas of daily life (Schur, 2002). Similarly, it can provide more opportunities for social interactions in the workplace, developing interpersonal rapport, and expanding social networks. Employment also enables the person to integrate more into the community, advocate for their social rights, make valuable contributions to society, and increase their social inclusion and participation, all of which contribute to improvements in the person's overall wellbeing and quality of life (Grant, 2008).

Employment Among People with ID. According to Article 27 of the United Nations (UN) Convention on the Rights for Persons with Disabilities (CRPD) and its Optional Protocol (2015), individuals with disabilities have the right to work or employment on an equal basis with others in society. Also, it advocates for the realisation of their right to work by abiding by the Convention and acceding to its Optional Protocol regarding the promotion of employment opportunities, career advancement, and assistance in finding, obtaining, and maintaining employment in the labour market. Despite that, finding and sustaining employment is still a challenge for many people with disabilities. Research has revealed that individuals with disabilities (e.g., ID, ASD, and other DD) are more often unemployed and underemployed compared to the general population across a range of countries (Eurostat, 2017; Kraus, 2017; Turcotte, 2014). For instance, according to Statistics New Zealand (2022), only around 45.0% of individuals with disabilities who were of working age (15 to 64 years old) were participating in the New Zealand labour force (i.e., seeking employment or being employed) as compared to an 83.1% participation rate for those without disabilities within the same age group. In addition, 41.5% of those with disabilities were employed, while 80.4% of those without disabilities were employed. The unemployment rate for working-age people with disabilities was 7.9%, compared to a 3.3% unemployment rate for people without disabilities in the same age range.

Factors that Affect the Employment of People with ID. The lower participation and employment rates of individuals with ID and other disabilities in the labour market can be attributed to several factors associated with personal and societal barriers (Grant, 2008). Some of these factors are related to the severity of ID and other co-occurring conditions, which are consistent with those that influence conversational skills in individuals with ID as discussed previously (Jensen et al., 2005; Matson et al., 2009; Smith et al., 2020). For example, people with more severe ID, ID and ASD, or chronic illness (e.g., cardiovascular disease and diabetes) tend to have greater impairments in cognitive and adaptive functioning, independence, or health status (Bryen et al., 2007; Matson et al., 2009; McGuire et al., 2007; Su et al., 2008). These impairments can limit their abilities to learn, handle, and perform job tasks appropriately and the time and effort they can devote to work (Kiernan et al., 1988). Consequently, the likelihood of them gaining, securing, and retaining employment is relatively lower than those with less severe ID or without other co-occurring disabilities or health problems.

Another contributing factor is the lack of certain job prerequisites for employment success, such as adequate education and social skill levels (Bryen et al., 2007; McConkey & Mezza, 2001; Peterson & Jones, 1984). Research has shown that people with ID who have not attended an adult or postsecondary education programme at an institute of higher education are less likely to obtain integrated employment than their counterparts (Avellone et al., 2021; Grigal et al., 2011). Non-attendance at such adult education programmes, which provide projects involving education, employment, social relationships, supported living, and community participation, would inhibit individuals with ID from better transitioning from school to adult life in the community. Specifically, non-attendance at these adult education programmes could result in a lack of the required skills related to social life and employment, including self-determination skills to make their own choices and decisions, interpersonal and

communication skills to interact easily with other people, and vocational skills (Avellone et al., 2021). Moreover, social skills deficits in people with ID can impede them from performing work tasks related to such skills, understanding implicit workplace norms and expectations, and socially fitting in at their workplace, resulting in negative employment outcomes (Belva et al., 2012; Butterworth & Strauch, 1994; McConaughy et al., 1989). For instance, an employer in a café would expect their employees to be approachable, to be able to greet customers when they walk towards the counter and offer help to customers when needed, and to be collaborative, such as seeking assistance from and supporting co-workers (Salzberg et al., 1986). Failing to meet these social expectations and demonstrate socially validated social skills under vocational settings would likely result in unemployment or job loss (McConaughy et al., 1989).

The current societal circumstances also play a role in the employment of people with ID. Some of the key barriers are the limited employment opportunities and support resources, despite supported employment being in place and the general population's increased positive attitude towards the employment of people with ID (Agran et al., 2016; Burge et al., 2007). The availability and variety of vocational opportunities and choices provided for individuals with ID are limited and disproportionate in the open labour markets compared to those available to individuals without ID or with other disabilities (Grant, 2008; McDaniels, 2016). People with ID are often placed into occupations related to service provisions, such as food preparation, building cleaning and maintenance, gardening, and retail work, compared to other occupations related to finance, economics, and technology (Fillary & Pernice, 2006). Also, appropriate and available employment support, such as vocational skills training programmes designed for those with ID to acquire the required job skills under integrated workplace settings and obtain employment, is lacking (Burge et al., 2007; Grant, 2008). The lack of such support can be a major impediment to employment, as this support is deemed

one of the primary determinant factors for employment success. Correspondingly, according to IHC New Zealand online surveys (2017a, 2017b), around 75% of respondents (including people with ID and their families) reported that people with ID were still facing a challenge finding a job. Also, they felt that people with ID did not receive the appropriate and adequate employment support needed to participate in the labour market.

Another barrier to employment is related to employers' attitudes. Employers in the labour market are often found to hold pessimistic views about the employment-related abilities of people with ID (Bendick & Nunes, 2012; Fillary & Pernice, 2006). They perceive those with ID as less competent, productive, and sociable, and hence have lower expectations of them compared to their counterparts. Likewise, employers tend to concern about not being able to handle the needs of people with ID due to a lack of experience of working with these people and knowledge about reasonable accommodations (Gustafsson et al., 2014; Mansour, 2009). As a result of these views and concerns, the chance of people with ID entering and being integrated into the labour market becomes smaller.

Relationship Between Conversational Skills and Employment in People with ID

Overall, conversational skills and employment tend to interact and influence the quality of life of individuals with ID. Both factors can be impacted by the severity of ID, co-occurring conditions, and limited access to relevant opportunities and choices in the community (Burge et al., 2007; Gilmore & Cuskelly, 2014; Jensen et al., 2005; Matson et al., 2009; Smith et al., 2020). Also, as discussed earlier, people with ID can face a challenge providing good service and being socially included in the workplace due to their deficits in conversational skills, given that such skills are considered valued prerequisites when interacting with customers and co-workers (Bryen et al., 2007; Butterworth & Strauch, 1994; Salzberg et al., 1986). Similarly, these deficits could also lead to a failure to secure and maintain employment – that is, unemployment – as conversational skills are directly related

to job performance, and are an essential determinant of employment success (Choren, 2015; McConaughy et al., 1989). Unemployment would hamper people with ID from participating in community-based activities (employment), engaging in interactions with a range of people in an expanded social network, and acquiring and improving relevant conversational and employment skill levels (Schur, 2002). Due to such a lack of opportunities of participating, interacting with others, and improving conversational and employment skills within the integrated workplace, the consequence could be continued unemployment, which affects their personal development, social inclusion, quality of life, and wellbeing in a long term (Grant, 2008; Schur, 2002).

Because of these interactive impacts and the importance of conversational skills and employment in the quality of life of people with ID, it is crucial to take relevant measures to produce favourable changes in their daily lives. One is to use effective approaches to help individuals with ID to address their conversational skills deficits, boost their job performance related to these skills and interpersonal relations in the workplace, promote independence and autonomy, and enhance their wellbeing and quality of life.

Behavioural Interventions for Teaching Conversational Skills

Applied behaviour analysis (ABA) is a scientific discipline that focuses on understanding and improving socially significant behaviours using research-based approaches and strategies based on the principles of learning and behaviour (Baer et al., 1968; Cooper et al., 2020). It can be used to address various behavioural concerns, such as behavioural excesses and deficits (Dillenburger et al., 2002). Behavioural excesses are referred to as behaviours that occur at a high frequency or intensity (e.g., aggression and stereotypic behaviour involving perseverative speech), which can lead to unfavourable outcomes for the individual and/or people around them (Mirenda, 1997; Nijhof et al., 1998; Stewart et al., 2007). In comparison, behaviour deficits are behaviours that occur at a low

frequency or intensity or behaviours that are non-existent (e.g., limited or no conversation initiations and/or conversation topic maintenance when interacting with others) (Hood et al., 2017; Hood et al., 2020). For instance, a person who does not know how to start a conversation appropriately might find it hard to interact and make friends with their peers. When they have been taught the appropriate conversation-initiating skill, they will become more confident to approach their peers and begin a conversation with them, which increases the chance of gaining social rapport and inclusion.

Various behavioural interventions have been used to successfully teach and enhance conversational skills in individuals with disabilities, including ID and other DD. Two examples of those interventions are behavioural skills training (BST) and covert audio coaching (CAC). In the following sections, previous research on these two intervention approaches will be reviewed and discussed.

Behavioural Skills Training (BST)

BST is described as a multi-component training package comprising instruction, modelling, rehearsal, and feedback (Poche et al., 1981). The first component, instruction, refers to an instructor delivering verbal and/or written explanations of the relevant behavioural components of the target skill or skillset to learners (Miltenberger, 2015). Following or during the instruction delivery, the instructor models the target skill via a visual demonstration, such as a role play or video modelling. Then the learners are given opportunities to rehearse performing the target skill being taught in a simulated or more naturalistic setting. Lastly, during or after the rehearsal, positive or supportive feedback (e.g., verbal praise) is delivered by the instructor when the learners perform the target skill accurately, or corrective feedback is provided if they perform the target skill inaccurately.

Since each of these four components of BST has been found to play a vital role in generating skill acquisition, past literature using BST as an entire package is generally

targeted (Kornacki et al., 2013). A large amount of research in the peer-reviewed literature has been found to use BST alone or an intervention package combining BST with other intervention components to train complex social communication skills in individuals with disabilities in different settings. These research studies are summarised and outlined in Table 1.

Table 1

Characteristics of Relevant Studies on Teaching Conversational Skills in Individuals with Disabilities Using Behavioural Skills Training (BST)

Author(s) & Year	Design	Participants	Settings	Behaviours	Interventions	Results	Procedural Integrity	Social Validity
Beaulieu et al. (2014)	A multiple baseline design across behaviours	• One student with learning disability NOS • Aged 21 years	An office at the university the student attended	Interrupting, content specificity, and questioning	BST and homework assignments	• Interruptions and content specificity decreased, while questioning increased during training • Improvements maintained for a few weeks after removing BST and generalised to novel conversational partners	No	Yes
Chezan et al. (2020)	A multiple baseline design across subjects	• Three adults with ASD and moderate ID • Aged 18-19 years	A classroom and an internship site located on the university campus	Conversations and self-initiated interactions including approaching, greeting, waiting for a response, asking a question, or making a statement, and ending the conversation	BST and CAC (with coaching prompts)	• All three participants acquired the skills to engage in conversations and two of them interacted with their co-workers more frequently • All maintained their performance on conversations across 2, 4, and/or 6 weeks at follow-up and two of them also maintained self-initiated interactions at a higher level	Yes	Yes

Hood et al. (2017)	A multiple baseline across behaviours	• Two teenagers and one child with ASD • Aged 8-16 years	A university-based clinic	Greeting and conversational skills including salutation, smiling, handshake, shifting and following the conversation, interrupting, eye contact, asking and answering questions, and ending the conversation	BST, textual prompt, and differential reinforcement	• Nearly all targeted conversational skills improved across participants • These improvements maintained after 1 month and generalised to novel conversational partners and settings	Yes	Yes
Hood et al. (2020)	A multiple baseline across subjects	• Three adolescents or young adults with DD • Aged 14-20 years	A university-based clinic or a university classroom	Accepting and giving compliments specific to performance, possession, and appearance	BST and textual prompt	• Improvements in target skills during the intervention were shown across participants • Only one participant maintained and generalised improvements across conversational partners in post-teaching across weeks, whereas the other two needed booster training to be able to do so	Yes	Yes

Kornacki et al. (2013)	A multiple baseline across subjects with a component analysis	• Three adults with ASD and/or ID • Aged 21-23 years	A living wing or break area and a private observation room in a university-based rehabilitation facility	A sequence of vocal and non-vocal behaviours emitted during a conversation (e.g., approaching (sitting or standing), making eye contact, greeting, posing a question or statement, waiting for a response, maintaining the topic, and ending the conversation)	Component analysis of BST, in situ training with feedback, and reinforcement	• The BST package resulted in acquisition of the target conversational skills • Components of BST were all required for such acquisition • Skill maintenance and generalisation across settings was found in two of the three participants at 1- to 4-week follow-ups	Yes	No
Nuernberger et al. (2013)	A multiple baseline design across subjects	• Three young adults with ASD or ASD and mild ID • Aged 19-23 years	A living unit and a private observation room in a rehabilitation facility	A sequence of vocal and non-vocal behaviours emitted during a conversation (e.g., standing/sitting with appropriate proximity, greeting, asking a question, waiting for a response, maintaining the topic, and ending the conversation)	BST, in situ training with feedback, and reinforcement	• All target conversational skills improved across participants • Intervention effects maintained across 1, 2, 4, 6, or 8 weeks at follow-up and generalised in the natural environment	No	No

Peters & Thompson (2015)	A multiple baseline design across subjects	• Experiment 1: four children with ASD and/or ADHD aged 5-9 years	A clinic for children with ASD	• Tacting non-vocal listener behaviour as interested or uninterested and asking a question of an uninterested listener	BST, token reinforcement, and prompting	• Participants learned to tact listener behaviour after tacting training, but did not ask a question to regain their interest; three of the four participants began asking a question after relevant training, while one needed additional BST training; and asking a question maintained across 14 to 200 days at follow-up across experimenters and locations, with some needing booster training	No	Yes
		• Experiment 2: six children with ASD aged 4-9 years		• Asking a question of an uninterested listener and changing a topic to regain listener interest		• Only one participant asked a question or changed the topic after tacting training; asking a question or changing the topic increased after participants received training, but one needed booster training; and two participants' skills were maintained across 28 or 83 days at follow-up, and one generalised the skills to a novel experimenter and location		

• Experiment 3: four children from Experiment 2 aged 5-9 years	• Producing the other taught response if their first response was ineffective to regain listener interest	• All maintained the skills taught in Experiment 2 in post-training across weeks; half of the participants learned to use the alternative response when the first one was ineffective without further training, whereas the other half learned to do so with further training

Ryan et al. (2019)	A multiple probe design across subject dyads	• Six adults with ASD or ASD with mild or moderate ID • Aged 19-20 years	A classroom and a private observation room in a rehabilitation facility	A sequence of vocal and non-vocal behaviours emitted during a conversation (e.g., approaching (sitting or standing), making eye contact, greeting, posing a question or statement, waiting for a response, maintaining the topic, and ending the conversation)	BST, in situ training with feedback, and reinforcement	• All participants showed an increase in their appropriate conversation interactions • Five out of six participants maintained appropriate conversations across 4 weeks at follow-up and generalised to the natural setting, while one needed booster training to do so	Yes	Yes
Stewart et al. (2007)	An AB design	• One child with ASD and ADHD • Aged 10 years	A university-based outpatient clinic	Making appropriate eye contact with conversational partner, soliciting input from the conversational partner regarding their interest in the topic, changing the topic when needed, and avoiding perseverative topics	BST	• Learned to label the target behaviours during modelling and display these behaviours during rehearsal • Target conversational skills improved after receiving BST from family compared to pre-treatment • Parent reported maintenance and generalisation at 3-month follow-up	Yes	Yes

Note. ADHD = attention deficit hyperactivity disorder, ASD = autism spectrum disorder, BST = behavioural skills training, CAC = covert audio coaching, DD = developmental disabilities, ID = intellectual disabilities, NOS = not otherwise specified.

Intervention Using BST Alone. Of nine studies reviewed in the contemporary literature, only Stewart et al. (2007) employed an AB design to evaluate the impact of BST alone on conversational skills training. During the study, Stewart et al. trained the mother and sister of a boy with ASD and ADHD to implement the BST procedures to teach him social skills (e.g., making eye contact with the conversational partner and asking if they were bored) in a clinic setting. Results regarding the efficacy of family-implemented BST were encouraging, but several limitations could have posed major threats to internal validity. First, the AB design, involving two phases, baseline (A) and intervention (B), has problems associated with poor experimental control due to the lack of replication of the baseline phase and weakness in determining the causal relationship between treatment effects and behaviour change (Kazdin, 2010; Kratochwill, 2014). Moreover, only one observation session in which a confederate was instructed to converse with the boy and look bored every 30 seconds was conducted during the baseline and following the family-implemented treatment to document the pre- and post-treatment levels of the target behaviours respectively. This lack of pre- and post-treatment data failed to establish data stability and reliability before and after the treatment, making it even harder to infer a direct functional relationship between the use of BST and changes in the target behaviours (Baer et al., 1968; Cooper et al., 2020; Kazdin, 2010). Third, Stewart et al.'s study is the only research that carried out the follow-up by phone rather than using direct observations and formal assessments. They arranged a phone consultation regarding treatment maintenance with the mother a few months later after the treatment. According to the mother, the boy's improvements in the target skills were also seen outside the sessions, suggesting both maintenance and generalisation of the treatment effects in the naturalistic contexts. Although intriguing, this information was based only on subjective measures (parental report), which tends to lack objectivity and reliability due to

social desirability and/or response bias in self-reports (Cooper et al., 2020; Van de Mortel, 2008).

Multi-Component Intervention Package Involving BST. In contrast to Stewart et al. (2007), the remaining eight studies all employed a multiple baseline or probe design across participants and/or behaviours, which is associated with strengthened experimental control and feasible replication compared to the AB design (Christ, 2007). Additionally, these studies taught individuals with disabilities conversational skills using an intervention package with multiple behavioural components, including BST and other technique(s) (e.g., reinforcement, in situ training with feedback, prompting, and homework assignments). Because of the use of multiple components during the intervention, the effectiveness of each individual component, such as BST, in the acquisition, maintenance, and generalisation of conversational skills was indistinguishable.

Of the eight studies, two (Beaulieu et al., 2013; Chezan et al., 2020) were carried out in university settings. Beaulieu et al. (2013) employed two intervention components, BST and homework assignments (practicing the skill learned outside of BST sessions), to successfully improve communication skills (e.g., interrupting and questioning) in an adult with a learning disability not otherwise specified (NOS), in a university office setting. They assessed and recorded the adult's performance on the target skills during BST training sessions but not during homework assignments. Therefore, it was impossible to determine the extent to which homework assignments would have interacted with BST and affected the target skills, and the sequential effects of both components may have contributed to the overall intervention outcomes. On the other hand, Chezan et al. (2020) effectively trained young adults with co-occurring ASD and ID to increase their conversations and self-initiated interactions with co-workers in both vocational (participants' internship site) and contrived (classroom) settings, using BST and CAC. Similar to Beaulieu et al., Chezan et al. introduced

these components sequentially; however, BST was not added until the participants first reached mastery with CAC (which will be explained in more detail in a later section) at their internship site during the intervention. Furthermore, compared to Beaulieu et al., Chezan et al. collected all the relevant behavioural measures during the implementation of CAC alone, and BST with CAC, to demonstrate how they interacted with each other and impacted the target behaviours.

Similar to Stewart et al. (2007), three other studies (Hood et al., 2017; Hood et al., 2020; Peters & Thompson, 2015) were also conducted within clinic settings, except for using a training package comprising BST, prompting, and/or reinforcement. The target population groups in these studies were children, adolescents, and/or young adults with ASD, ADHD, and/or other DD; the target conversational skills involved greeting, sustaining a conversation, giving and accepting compliments, and tacting non-verbal listener behaviour. Although these three studies all reported some positive findings on the effectiveness of the intervention package, one of them, Peters and Thompson (2015), and Beaulieu et al. (2014), which was discussed earlier, did not obtain procedural integrity measures. Procedural integrity refers to the extent to which procedures are implemented accurately and accordingly throughout the phases and conditions in the research (Cooper et al., 2020). These measures are essential as they provide insight into the functional relation between the intervention effects and behavioural outcomes (Fryling et al., 2012). High levels of procedural integrity can indicate a robust cause-effect relationship between the intervention used and the target behaviour change, as well as the enhanced efficacy of the intervention. A lack of procedural integrity data may suggest potentially low internal validity of the research and a high possibility that other irrelevant variables may have impacted the intervention outcomes (Cook & Campbell, 1979).

The remaining three studies (Kornacki et al., 2013; Nuernberger et al., 2013; Ryan et al., 2019) were done with young adults with ASD and/or ID in rehabilitation facility settings, including a classroom or living unit and a private observation room, to teach a sequence of conversational skills. These studies were linked with each other. To demonstrate, Kornacki et al. (2013) replicated and extended Nuernberger et al.'s (2013) research by addressing two major limitations identified in the latter's research (they added making eye contact into the target skills, and conducted a component analysis of BST to assess the effects of each component). Ryan et al. (2019) further extended both Nuernberger et al.'s and Kornacki et al.'s research by targeting the same set of conversational skills with the inclusion of making eye contact, and evaluating and implementing the entire BST training package using small group instruction. Despite comparable and favourable results regarding the effects of BST and other interventions (reinforcement and in situ training with feedback) across these studies, Kornacki et al. and Nuernberger et al. tended to underperform Ryan et al. due to some procedural limitations. For instance, both former studies did not assess social validity in terms of how participants and/or their relevant others perceived the effectiveness, feasibility, and appropriateness of the interventions used (Wolf, 1978). The absence of social validity data may influence the social significance of the interventions used and the maintenance of the interventions outside of the training environment (Bailey & Burch, 2002). Additionally, Nuernberger et al. lacked procedural integrity data as did the other two studies reviewed previously (Beaulieu et al., 2013; Peters & Thompson, 2015). Because of the absence of these data, the level of accuracy with which the intervention package was implemented could not be assessed, creating a probable threat to internal validity (Cook & Campbell, 1979).

Covert Audio Coaching (CAC)

CAC, which is also referred to as bug-in-ear (BIE) coaching, is a method involving an instructor delivering immediate coaching statements and/or feedback to the client based on

their performance using a BIE device (two-way radio with accompanying earpieces) in situ from a distance (Oliver & Brady, 2014; Randolph & Brady, 2018). Coaching statements include antecedent prompts and guidance (e.g., “Remember to say ‘Hello’ to that customer”) and performance feedback comprises praise (e.g., “Great job”) and corrections (e.g., “Say ‘Goodbye’ and ‘Have a nice day’ to that customer”) (Bennett et al., 2010; Gilson & Carter, 2016).

CAC has been receiving increasing attention due to its ability to enhance independence and reduce stigmatisation (Oliver & Brady, 2014; Randolph & Brady, 2018). Also, it has resulted in successful skill acquisition in individuals with disabilities (Allen et al., 2012; Bennett et al., 2010; Bennett et al., 2013a, 2013b; Gilson & Carter, 2016). For instance, Bennett et al. (2010) and Bennett et al. (2013a, 2013b) delivered coaching prompts and/or performance feedback via CAC to improve the accuracy and fluency of the participants’ skills, such as sweeping, window washing, trash collecting, and crate stacking, photocopy making, and laundry folding respectively. However, these promising effects of CAC have been predominantly explored in vocational or employment skills training. Therefore, there is only sparse research in the peer-reviewed literature on the impact of CAC with and without other intervention approaches on teaching conversational skills, compared to more empirical research on BST. Three relevant studies were found in addition to Chezan et al. (2020), which was reviewed earlier with the other studies on BST. These four studies are summarised in Table 2 and will be discussed in the following sections.

Table 2

Characteristics of Relevant Studies on Teaching Conversational Skills in Individuals with Disabilities Using Covert Audio Coaching (CAC)

Author(s) & Year	Design	Participants	Setting	Behaviours	Intervention(s)	Results	Procedural Integrity	Social Validity
Chezan et al. (2020)	A multiple baseline design across subjects	• Three adults with ASD and moderate ID • Aged 18-19 years	A classroom and an internship site located on the university campus	Conversation and self-initiated interactions including approaching, greeting, waiting for a response, asking a question or making a statement, and ending the conversation	BST and CAC (with coaching prompts)	• All three participants acquired the skills to engage in conversations and interacted with their co-workers more frequently • All maintained their performance on conversations across 2, 4, and/or 6 weeks at follow-up and two of them also maintained self-initiated interactions at a higher level	Yes	Yes

Gilson & Carter (2016)	A multiple probe design across subjects	• Three students with ID, ASD, and/or ADHD • Aged 20-22 years	Individual worksites	Social interactions including social-related (e.g., discussing hobbies or exchanging opinions), task-related (e.g., asking guidance regarding the given task), or unclear (e.g., interaction content cannot be discerned) and task engagement (e.g., performing the task when instructions were given)	Intervention package comprising CAC (with coaching prompts and performance feedback), reduced coaching proximity, and social-focused job coaching	• Social interactions increased and task engagement maintained across all students • Follow-up was only done with one participant and behavioural improvements were maintained across 2 weeks • Generalisation was not assessed	Yes	Yes
Joseph et al. (2021)	A multiple baseline across subjects	• Three students with ID and/or ASD or ASD and visual impairment • Aged 20-30 years	Online via Zoom	On-topic engagement in small talk conversations	RAC, a remote form of CAC (with coaching prompts)	• On-topic conversational exchanges increased, while off-topic ones decreased across all participants • Three performed above their baseline levels at the 1- to 2-week follow-up, but only two maintained at a near mastery level • Generalisation was not assessed	Yes	Yes

Mason et al. (2020)	A multiple baseline across subjects	• Four students with ASD • Aged 19-23 years	A dining hall in a community college	Independent question asking	A package involving online instructional modules (e.g., direct instruction, video modelling, comprehension check), CAC (with coaching prompts), and feedback with CAC (with coaching prompts)	• Three of the four participants showed increases in the frequency of question asking during intervention • Additive effects were found in two participants when adding feedback with CAC • Maintenance and generalisation effects were not assessed	Yes	Yes

Note. ADHD = attention deficit hyperactivity disorder, ASD = autism spectrum disorder, CAC = covert audio coaching, ID = intellectual disabilities, RAC = remote audio coaching.

Remote Audio Coaching (RAC). All four studies on CAC were conducted with adults with ID, ASD and/or ADHD using a multiple baseline design across participants to establish experimental control (Christ, 2007). However, none of them used CAC alone to teach social communication skills, except for Joseph et al. (2021), who used a modified format of CAC. Due to the spread of the COVID-19 pandemic (Unite Against COVID-19, 2020), Joseph and colleagues noticed the popularity, importance, and convenience of, and increasing demand for using technologies and remote applications to train skills in individuals with and without disabilities. Therefore, they developed remote audio coaching (RAC), a remote application of CAC using a collaborative online videoconferencing application named Zoom (Zoom Video Communications Inc., 2016) or other communication platforms (e.g., Skype). RAC consists of similar components to CAC (i.e., delivering coaching statements such as prompts and guidance and feedback including praise and corrections), but does not involve BIE technology.

Joseph et al. (2021) conducted all sessions virtually on Zoom. During the intervention phase, the coach turned off their camera while keeping the microphone on, whereas the participant and confederate had both their cameras and microphones on. Then the participant and confederate started a conversation, and the coach provided a coaching prompt at the first natural break in the conversation when the participant shifted to an off-topic discussion. These protocols simulated the real-life setup in which the coach delivered coaching statements remotely in an unobtrusive manner when the participant and the confederate were interacting. Although RAC led to some positive changes in the target skill (on-topic interaction exchanges) across participants during the intervention and follow-up as CAC, the generality of these changes across novel conversational partners and naturalistic environments was not assessed. This absence of generalisation measures could imply a lack of generalisation effects of RAC.

Multi-Component Intervention Package Involving CAC. The remaining three studies (Chezan et al., 2020; Gilson & Carter, 2016; Mason et al., 2020) all used a multi-component intervention package involving CAC with coaching prompts and/or performance feedback and other intervention approaches (e.g., BST and online instructional modules). As identified previously, such use of the intervention package often leads to a major limitation with regard to the inability to examine the contribution of individual components, such as CAC, to the overall intervention outcomes. In other words, conclusions regarding the functional relationship between a specific intervention component and the targeted behavioural change could not be drawn directly and firmly.

Gilson and Carter (2016) and Mason et al. (2020) carried out their research in vocational contexts (participants' worksites) and in a dining hall in a community college respectively, while Chezan et al. (2020) conducted their study in both vocational and classroom settings. Similar to Joseph et al. (2021), Mason et al. only targeted one conversational skill related to asking questions. In contrast, Gilson and Carter trained both social interactions and job task engagement, while Chezan et al. taught a set of skills relating to starting, sustaining, and ending a conversation. In addition, similar to Joseph et al., despite the efficacy of the interventions used in the acquisition of the target skills, Chezan et al., Gilson and Carter, and Mason et al. did not examine generalisation across various settings and people outside of the research. Moreover, differing from Joseph et al., Gilson and Carter were only able to do follow-up with one of the participants due to time restraints, while Mason et al. did not collect any follow-up data from their participants. Therefore, there is still limited evidence of the maintenance and generalisation effects of CAC with other interventions on improving the target conversational skills in the participants. Furthermore, compared to Gilson and Carter and Mason et al. not being able to demonstrate the effectiveness of CAC individually, Chezan et al. were able to achieve that, as CAC was first

introduced alone before combining with BST and was in place until the participants reached skill acquisition.

Conclusion

Despite promising results, numerous gaps and limitations regarding the intervention procedures, research settings, target skills, participants, procedural integrity, social validity, maintenance, and generalisation of the intervention effects were identified across the 12 studies discussed above. First, there was a lack of studies (Joseph et al., 2021; Stewart et al., 2007) on teaching conversational skills using BST, CAC, and RAC (a remote form of CAC) alone, which may suggest these components themselves cannot lead to socially significant changes in the target skills. Moreover, to date, no research has directly compared the efficacy of BST and CAC or RAC in training the same social skills, despite combining BST and CAC as a training package (Chezan et al., 2020). Additionally, the four studies on CAC and RAC investigated the effectiveness of coaching prompts or a combination of coaching prompts and performance feedback in promoting the acquisition of conversational skills, but they did not assess the effectiveness of performance feedback alone in such skill acquisition as in Bennett et al.'s (2010) and Bennett et al.'s (2013b) research. Second, only two studies (Chezan et al., 2020; Gilson & Carter, 2016) were conducted in a vocational setting or a combination of vocational and non-vocational settings. However, the conversational skills targeted in these two studies were about social- and/or task-related interactions with co-workers and/or others within the workplace (e.g., a coach and a supervisor) rather than those that were more vocational-specific with both customers and co-workers. Third, although several studies targeted a set of vocal and non-vocal social skills related to conversation initiations (approaching and greeting) (e.g., Chezan et al., 2020; Ryan et al., 2019), none of them explicitly focused on teaching the participants to identify appropriate situations in which they could start a conversation with the conversational partner. Fourth, the age range of the

participants with disabilities across the 12 studies, from 4 to 30 years, was relatively large, but it only covered younger population groups, indicating limited evidence on the generality of the intervention effects in the population aged over 30. Fifth, a third of the studies (i.e., four) did not obtain procedural integrity and/or social validity measures, which can threaten internal validity and/or impact the maintenance of the intervention outside of the research setting. Furthermore, compared to the empirical evidence for maintenance and generalisation when using BST, that for CAC was relatively limited, since maintenance and/or generalisation effects on conversational skills were lacking or not assessed across individuals and natural environments. Also, all the research reviewed introduced post-treatment sessions after the participants reached the mastery criterion during training to determine maintenance and/or generalisation of skill acquisition. However, the progress of such acquisition during training over time was unknown.

Research Aims

The present research aimed to extend the existing literature regarding the independent use of BST and CAC with performance feedback in teaching social skills related to conversation initiations in a vocational setting to adults with disabilities, involving four adults with ID in a café in New Zealand. Also, it aimed to examine and compare these two interventions to identify which was more effective and efficient in establishing the acquisition of conversational skills in people with ID. This research also aimed to determine learning progress over time using BST and CAC by running a sequence of pre-training, training, and post-training sessions across days during the intervention phase. Another aim was to assess whether the target conversational skill obtained from BST and CAC were maintained in the long term after withdrawal, and generalised across people in the café. Due to the spread of the COVID-19 pandemic (Unit against COVID-19, 2020) and concerns related to social distancing, health, and safety, the present research was designed to be

flexible so that it could be conducted either in an in-person or an online format when appropriate. This further extends the current literature on the use of BST and RAC in an online format, since most of the research reviewed was done on site, irrespective of the intervention(s) employed.

Method

Ethical Approval

Ethical approval for this research was granted by the University of Auckland Human Participants Ethics Committee (UAHPEC) on 27 August 2021, for 3 years, with a reference number of UAHPEC22337 (see Appendix A).

Participants

Recruitment Procedure

The café and service managers, on behalf of the café and residential teams (e.g., team leaders and support staff) respectively, provided consent for the student researcher to conduct her research with their employees or residents (see Appendix C). To reduce any potential pressure imposed by the student researcher, the café team was also asked to assist with the recruitment process by collaborating with the consenting residential service team (see Appendix B). Both teams first needed to nominate potential participants they believed would benefit from participation. Then they were given a relevant information package, which comprised an information sheet for support person(s), a documentation of consent form, a participant information sheet, and a consent form, for each nominated participant and their supported decision-making team (e.g., welfare guardians or support staff) (see Appendix D). Four participants were selected, and all provided informed consent, with decision-making support from their primary support staff in their residential homes.

Inclusion Criteria

To be included as participants in this research, employees had to meet all three inclusion criteria. First, they needed to be adults who had been clinically diagnosed with ID. Second, they had to be capable of communicating in English, at least using short statements, but to have shown difficulty starting a conversation with others appropriately. Third, they needed to be competent to give informed consent with appropriate decision-making support.

Unfortunately, one of the selected participants resigned from their role in the café before observation sessions started. However, they were still included in this research as they met all the inclusion criteria and wanted to take this opportunity to enhance their conversational skills further.

Participants

Due to the unique nature of the café, participant information was combined and described as a group to avoid any individual information being used to identify the participant in real life. Four participants, Andy, Bobby, Candy, and Dobby (pseudonyms), took part in the current research (three males and one female). They were aged between 31 and 47 years, with an average age of 40, and had a diagnosis of ID at a mild or moderate level. In addition to ID, most participants also had co-occurring ASD, William's Syndrome, epilepsy, or seizures. According to the support staff, all the participants had a good understanding of language and were able to hold conversations with others and communicate their desires and needs using phrases or sentences. These participants also had other relevant or different experience in various employment settings prior to working in the hospitality sector (i.e., the café). Some of them had previously held one or several jobs that required social interactions with people to provide service and assistance, such as receptionists and volunteers. In comparison, others had worked in cleaning, freight, or production industries that involved much more manual work and/or operation of machinery.

Setting

Initially, the current research was planned to take place with each participant in person during their usual working hours in the café, which consisted of indoor and outdoor spaces with dining tables and chairs, a counter, and a kitchen. However, it had to change from onsite to online due to the outbreak of the Delta variant of COVID-19, followed by lockdown in Auckland, and resignation of one of the participants prior to the research (Unit against COVID-19, 2020). To achieve this, Zoom, the same online videoconferencing application used in Joseph et al. (2021), was used (Zoom Video Communications Inc., 2016). The research was then done with each participant remotely, in real time, during available times at their residential homes, with the assistance of their support staff.

During the research period, the lockdown restrictions on workplaces were eased and the participants were allowed to resume their work routine but with reduced hours and days. However, to maintain consistency in the data collection procedure across all participants, the online research continued until the end of the follow-up phase. After the follow-up, generalisation probes were introduced and took place onsite in the café to assess the generalisation effects of the intervention used on demonstrating the target conversation-initiating skill with different people in the natural environment.

Materials

A questionnaire was used for the interviews conducted virtually via Zoom with each participant prior to the research, which lasted around 10 to 15 minutes. The questionnaire comprised six questions (see Appendix E). The first five questions were related to the participant's likes and dislikes about how they wanted to be approached during the research, learning habits, and preferred reinforcers. The final question asked for any additional information the participant would like to tell or share. Two sets of 12 photos were used to assist participants in learning and maintaining or generalising when and how to start a conversation appropriately with various people under contrived settings. One of the sets

related to their workplace, the café, was used for role plays during sessions in which no intervention was implemented, such as baseline and follow-up sessions. The other set contained photos of random cafés collected from the internet and was used as teaching material during sessions in which an intervention was in place, such as training sessions. Each of these two sets involved six distinct types of scenarios, which were characterised according to the availability or unavailability of both the participant and the customer(s) or workmate(s) and the availability of the participant and unavailability of the customer(s) or workmate(s) (see Table 3). These scenarios were designed to be naturalistic and as analogous as possible to those the participants generally encountered with customers and workmates in the café.

Behaviour Definitions

Participants' conversation initiations were the primary behavioural measures in the current research. An appropriate initiation was operationally defined as an intraverbal behaviour involving both greetings and relevant question-asking being emitted by the participant, which required a response from the other person and was suitable in terms of timing and form in the situation. Conversely, an inappropriate initiation was operationally defined as an intraverbal behaviour emitted by the participant that required or did not require a response from the other person and was unsuitable in the current scenario because of an incorrect use, a lack of a greeting and/or relevant question-asking, or a wrong timing. An inappropriate conversation initiation could also be defined as the non-occurrence of an intraverbal behaviour emitted by the participant when such a behaviour was socially expected in the current occasion. Examples of appropriate and inappropriate conversation initiations are outlined in Table 3.

Table 3

Examples of Appropriate and Inappropriate Conversation Initiations Under Six Different Scenarios in the Café

Scenario	Appropriate Conversation Initiations	Inappropriate Conversation Initiations
1. Both participant and customer(s) are currently unavailable (e.g., the participant is busy doing a job task, including doing dishes, drying off cutlery, serving food, and taking orders, while the customer(s) is chatting with friends or talking on their phone).	The participant stops drying off cutlery, approaches and greets customers, and asks a relevant question when seeing them finishing chatting, approaching, and looking at her or him. *e.g., "Good morning, ladies, how are you today?" or "Good morning, how can I help you today?"*	The participant stops drying off cutlery and approaches and asks customers a relevant question without greeting them first, or greets customers without asking a relevant question, when seeing them finishing chatting, approaching, and looking at her or him. *e.g., "How are you?" or "Hi, there."* The participant stops drying off cutlery and approaches and asks customers, who are still busy chatting with others, a relevant or irrelevant question with or without greeting them first when seeing the customers approaching her or him. *e.g., "Hi, how are you?", "Hi, do you have a girlfriend?", "How are you doing?", or "Do you have a partner?"* The participant ignores or stares at customers and then continues drying off cutlery when seeing them finishing chatting, approaching, and looking at her or him.

2. Both participant and customer(s) are currently available (e.g., not being busy doing something or having a break or free time).	The participant approaches and greets a customer, who is or looks free, during her or his work break and then asks them a relevant question. *e.g., "Good morning, John, how have you been?"*	The participant approaches and asks a customer, who is free, a relevant question without greeting them during her or his work break, or greets the customer without ask a relevant question. *e.g., "Did you enjoy our coffee and food?" or "Hi."*
	The participant stands up and greets customers when seeing them approaching her or his table during her or his break and asks a relevant question. *e.g., "Good afternoon, what can I do for you?"*	The participant continues her or his break and ignores customers when seeing them approaching her or him during their work break.

3. Participant is available (e.g., on their work break or having some free time), while customer(s) is unavailable (e.g., busy looking at the menu, working on their laptop, and reading a book).	The participant greets customers with a short and relevant question when seeing them approaching the counter and/or looking at her or him, gives the customers time when they start looking at the menu and deciding with friends, and then asks about customers' orders when they finish deciding and look back at the participant again. e.g., "*Hi, how are you?" then "What would you like to have today?"*	The participant greets or does not greet customers when seeing them approaching the counter and/or looking at her or him, and immediately asks for the customers' orders when they are still looking at the menu and deciding with friends. e.g., "*Hi, what would you like to have today?*" or *"What would you like to have today?"*
		The participant only stares at customers without greeting them or asking them a relevant question when seeing the customers approaching the counter and looking at the menu and deciding.
	The participant waits for a customer, who is working on their laptop, to finish working and look free (e.g., putting the laptop aside), approaches the customer's table, greets them, and asks a relevant question. *e.g., "Hi, sir, hope you enjoyed our food. May I please take your empty plate so you can have more space?"*	The participant approaches and greets a customer, who is still working on their laptop, and then asks or does not ask a relevant question, or asks the customer a relevant question without greeting them first. *e.g., "Hi, sir, may I please take your empty plate?", "Hi.", or "May I please take your empty plate?"*

4. Both participant and workmate(s) are unavailable (e.g., busy doing a job task, including doing training, doing dishes, drying off cutlery, serving food, and taking orders).	The participant approaches and greets a workmate and asks a relevant question after both finish doing their tasks and are on their lunch breaks. *e.g., "Hi, Sam, do you want to have lunch together?"*	The participant approaches a workmate, who is still doing the training, and asks them a relevant or irrelevant question without a greeting, or greets the workmate without asking a relevant question, after or without finishing her or his job tasks. *e.g., "How's the training going?", "Are you single?", or "Kia ora, Sam."*
5. Both participant and workmate(s) are available (e.g., having free time, a work break, or a lunch break).	The participant approaches workmates, who are currently free, and greets them and asks a relevant question during her or his work break. *e.g., "Hello, everyone, what a busy day today! How is everything?"*	The participant approaches workmates, who are currently free, and asks them a relevant question without greeting them first, or greets them without asking a relevant question, during her or his work break. *e.g., "How's going?" or "Hello, everyone."*
	The participant greets a workmate and asks a relevant question when seeing them approaching her or his table during her or his lunch break. *e.g., "Hello, Denny, are you alright? You look so tired."*	The participant asks a workmate a relevant question without greeting them first, or ignores or stares at the workmate when seeing them approaching her or his table, during her or his lunch break. *e.g., "Have you had your lunch yet?"*
6. Participant is available (e.g., having a work or lunch break), while workmate(s) is unavailable (e.g., busy doing a job task, including preparing food and drinks, wiping tables, and sweeping the floor).	The participant waits for workmates, who are currently wiping tables, to finish their job task and have a break, approaches them during her or his work break, greets them, and asks a relevant question. *e.g., "Hi, how did you guys get on today?"*	The participant approaches a workmate, who is still wiping tables, during her or his work break, and asks a relevant question with or without greeting the workmate first, or greets them without asking a relevant question. *e.g., "Hi Jono, how's it going?", "How's it going?", or "Hi."*

Measurements

Participants' conversation-initiating behaviour was measured across observation sessions using an event recording method and recorded on a data collection sheet (see Appendix F) using pen and paper. In each observation session, the target behaviour was first assessed and recorded as appropriate or inappropriate when it occurred under each evocative scenario. Then it was measured as a percentage (%) of appropriate conversation initiations within a session, which was calculated as the number of appropriate conversation initiations divided by the total number of evocative trials (i.e., 12) to start a conversation and multiplied by 100.

Interobserver Agreement (IOA)

IOA data were collected by three secondary observers who were graduate students. Prior to their first IOA observation, each secondary observer was asked to sign a Confidentiality Agreement form (see Appendix H) and then invited to attend an online observer training session organised by the student researcher. This training session first involved the student researcher providing instructions regarding the target conversing behaviour, including its definition and the relevant measurement system used to record it. Then the observer was asked to identify appropriate and inappropriate conversation-initiating behaviour based on examples and non-examples of the target behaviour the student researcher provided. The training was complete when the observer accurately differentiated all appropriate and inappropriate conversation initiations. Relevant documents (i.e., IOA training slides and data collection and procedural integrity sheets) were sent to the observer after the training for their reference.

During 89% of IOA sessions, the student researcher and secondary observer independently collected data on the target conversing behaviour. The former took data in real time, whereas the latter recorded data while watching the video recording in their own time.

In the rest of the IOA sessions, the observer attended the sessions remotely, stayed muted after greeting, and collected data live and simultaneously with the student researcher. An agreement occurred when both recorded the same incidence of the participant's conversation initiation as appropriate or inappropriate. A disagreement occurred when the observer recorded the participant's conversation initiation as appropriate, whereas the student researcher recorded the same conversation initiation as inappropriate or vice versa. IOA measures were calculated by dividing the number of agreements by the total number of agreements and disagreements and multiplying by 100 to convert it to a percentage.

IOA measures were collected for at least 35% of all sessions across participants. Overall, the percentage of baseline sessions in which IOA was collected was 33.33%, 50%, 40%, and 50% for Andy, Bobby, Candy, and Dobby respectively. The percentage of pre-training, training, and post-training sessions in which IOA was collected was identical across these three types of sessions during the intervention: 61.11% for Andy, 60% for Bobby, 57.14% for Candy, and 46.15% for Dobby. The percentage of follow-up sessions in which IOA was collected was 75% for Bobby. IOA data were not obtained for Bobby, Candy, and Dobby in the generalisation probes. Further information regarding the mean and range of IOA scores across sessions and participants is displayed in Table 4.

Table 4

Mean and Range Interobserver Agreement (IOA) Scores for Appropriate Conversation Initiations Across Participants and Sessions

Participant	Baseline		Pre-Training		Training		Post-Training		Follow-up	
	Mean	Range	Mean	Range	Mean	Range	Mean	Range	Mean	Range
Andy	75%	75%	89.39%	66.67%-100%	87.12%	91.67%-100%	86.36%	75%-91.67%	NA	NA
Bobby	87.5%	83.33%-91.67%	95.83%	83.33%-100%	98.61%	91.67%-100%	84.72%	66.67%-100%	88.89%	83.33%-100%
Candy	79.16%	66.67%-91.67%	89.58%	75%-100%	87.5%	75%-100%	93.75%	91.67%-100%	NA	NA
Dobby	100%	100%	83.33%	75%-91.67%	83.33%	75%-100%	79.17%	66.67%-100%	NA	NA

Note. NA = not available.

Research Design

Due to the nature of the current research, participants were observed online via Zoom independently throughout the research, except for the generalisation phase. The sequence of observations depended on the order in which the student researcher received the participants' informed consent and the observation time they chose. A non-concurrent multiple baseline across participants design was employed to examine and compare the effectiveness of BST and RAC in improving the participants' conversation-initiating skill used in the café (Watson & Workman, 1981). Prior to the intervention phase, the allocation of BST and RAC for Andy and Bobby, who first participated in the research, was based on their personal preferences. In contrast, the allocation for Candy and Dobby, who participated after the research with Andy and Bobby was concluded, was random using an automated randomisation system in Excel since they did not have any preference for BST or RAC. The selected or assigned intervention was introduced to the participant after at least three baseline sessions were conducted.

To motivate the participant to learn during the intervention, their most preferred reinforcer (e.g., coffee, soft drink, or movies) was made contingent on a continuous increase in their appropriate conversation-initiating behaviour but was delivered to the participant at the end of the research. Doing so tended to reduce the cumulative effects of the intervention in use and reinforcement on the participant's target behaviour since delayed reinforcers have a smaller impact on the behaviour than the immediate ones (Skinner, 1983). Moreover, during the intervention, the student researcher provided overall feedback on the participant's progress relating to how far away they were from reaching the mastery criterion and how close they were to receiving their most preferred reinforcer at the end of the last session during each day. Such overall performance feedback would also increase the participant's motivation and enhance their performance (Pavett, 1983). If the increase in participants'

appropriate conversation-initiating behaviour was unstable or not observed across time and sessions or the participant would like to change the current intervention, the alternative would be introduced to replace the one in use.

The research was carried out over a 6-month period. A total of 57, 34, 26, and 43 sessions were conducted for Andy, Bobby, Candy, and Dobby respectively. Four additional follow-up sessions were conducted with Bobby across several weeks following the intervention phase due to his completion of the intervention. Two additional generalisation sessions were carried out with all participants, excluding Andy due to his resignation from the café and withdrawal from participation. Each observation session lasted between 20 minutes and 3 hours. Based on participant availability, up to three sessions were carried out daily from 10:00 a.m., 12:30 p.m., 2 p.m., 3 p.m. or 4 p.m. and up to nine sessions were carried out per week.

Procedure

Baseline Phase

The baseline phase, in which no intervention was in place, started after the interview. In this phase, only one session was conducted across days or weeks with each participant, at suitable times for them, to determine the initial level of their conversation-initiating skill. At the beginning of a baseline session, the student researcher first conducted a volume check with the participant to ensure they could both hear from and speak to the student researcher at a comfortable volume. Then the session began with a role play involving the student researcher randomly presenting a set of 12 photos of the participant's workplace (the café) individually as a virtual background and stating a scenario while acting it out. The student researcher then asked questions about when and how to start a conversation under each scenario presented and the participant's behaviours of interest were assessed and recorded according to their responses to these questions. If the participant answered all questions

correctly, that would be marked as an appropriate conversation initiation. Conversely, if they answered all questions or one of them incorrectly or did not answer within 10 seconds, that would be perceived as an inappropriate conversation initiation. The sequence of displaying the 12 photos was randomised using an automated randomisation system in Excel in each baseline session. To avoid any extraneous factors, those sequences remained consistent across all participants.

Intervention Phase

Each observation session during the intervention phase was divided into three parts: pre-training, training, and post-training sessions. These three parts were conducted sequentially, with a 10- to 20-minute break between each, across days or weeks.

Pre-Training Session. Pre-training sessions were identical to the baseline sessions. If the generalisation effects of the intervention were unstable or not observed across different training sessions during the intervention, an error correction (EC) procedure was added to expedite learning acquisition and generalisation (Truscott & Hsu, 2008). During these sessions, the student researcher would immediately provide appropriate corrections when the participant's responses were incorrect. EC would be withdrawn automatically once the participant's responses reached 100% accuracy.

Training Session.

BST Intervention Group. Each participant in the BST intervention group was initially provided with both verbal and written instructions in an easy-to-read version with visual support (e.g., pictures) during training sessions. These instructions were related to what a conversation was, why it was important, and when and how to start a conversation in a good manner with customers and workmates that could both gain their attention and make the conversation flow naturally under various scenarios in the café. Next, the student researcher modelled appropriate and inappropriate ways of starting a conversation. Then another set of

12 photos of different cafés was randomly presented to the participant and questions about when and how to start a conversation with the customer or workmate were asked according to the scenario in each photo. Praise (e.g., "Well done! You got it right!" and "Excellent! What a nice start to a conversation with your customer/workmate!") was delivered contingent on an appropriate conversation initiation. Corrective feedback (e.g., "Nice greeting and question asking, but we should talk to your workmate later because right now they are having a conversation with others and we do not want to interrupt") was provided contingent on an inappropriate conversation initiation. In addition, as at baseline, the sequence of displaying the 12 training photos changed randomly in each training session, but those sequences remained the same across all participants, irrespective of the intervention used during the training sessions.

RAC Intervention Group. For participants assigned to the RAC intervention group, the training session started with the camera on the student researcher's side being turned off to mimic delivering feedback and instructions at a distance via audio only. The subsequent procedure relating to presenting the 12 training photos, asking relevant questions, and delivering praise and feedback remained the same as in the BST intervention group.

Post-Training Session. Post-training sessions began when the participant was directed back to the role play after the training session and break interval and the same procedure used in the pre-training sessions was applied.

When the participant reached a mastery criterion, achieving an 80% to 100% response accuracy for five successive pre-training sessions, the selected or assigned intervention was withdrawn and the follow-up phase began.

Follow-up Phase

To assess the maintenance of the participant's improvements in their conversation-initiating skill, follow-up sessions, which had the same procedure as the baseline sessions,

were conducted once a week for 4 successive weeks after the intervention phase. If the participant's percentage of appropriate conversation initiations was preserved at or close to the mastery level, scoring 80% to 100%, across these 4 weeks, the follow-up phase was completed.

Generalisation Probes

Two generalisation probes were taken in situ on two different days in the participant's workplace (the café) during their regular working time at the latter stage of the intervention or after the follow-up phase to determine whether the target conversational skill was generalised across people and settings. At the start of the generalisation probe, the student researcher approached the counter, greeted the participant, told them that she was there to visit and do some work, and then ordered a drink. In other words, the participant was deceived about the true purpose and did not know their behaviours of interest would be observed and assessed. Next, the student researcher chose a seat where she could see and hear the participant clearly to wait for her drink to be served, took out her laptop, and pretended to be working on the laptop. She waited for the 12 similar scenarios used in the baseline sessions to occur naturally and observed when and how the participant started a conversation with their workmates and customers under each of those scenarios. Then she assessed and recorded whether their conversation initiations were appropriate or inappropriate.

Following the generalisation probes, the participant was asked to complete a social validity survey regarding the intervention used. The research concluded when the completed survey was returned to the student researcher.

Procedural Integrity

Procedural integrity was assessed to ensure the procedure implemented by the student researcher was upheld across participants throughout the research. This was done by the three secondary independent observers who were present in the sessions or watched the recorded

sessions for at least 35% of all sessions during the research. During each of these sessions, they were asked to observe, assess, and record whether the student researcher performed each step accordingly and accurately, using a procedural integrity checklist form outlining all steps required in different sessions (see Appendix G). If the student researcher missed performing any step or made an error at any time, that step would be scored as incorrect overall. Procedural integrity was calculated by dividing the number of steps that had been scored as correct by the total number of steps and multiplying by 100 to convert it to a percentage. The procedural integrity scores in the current research were 100% across all participants and sessions.

Social Validity

The social validity of using BST and RAC interventions was assessed based on a simplified and shortened version of the Treatment Evaluation Inventory Short Form (TEI-SF) (Kelley et al., 1989). The survey employed in this research consisted of seven closed-ended questions evaluating an intervention's feasibility, acceptability, effectiveness, and appropriateness on a 5-point Likert scale (Wolf, 1978). The choices varied from an upsetting face representing strongly disagree to a smiling face representing strongly agree (see Appendix I).

All four participants were asked to complete social validity survey(s) after finishing the generalisation phase, or near the end of the research, using pen and paper and colouring in the face that best denoted the extent to which they felt the intervention(s) used benefited them.

Results

Overall results varied within and between intervention groups (see Figures 1 and 2). In other words, the intervention(s) used had different impacts across participants. On the one hand, Andy and Dobby in the BST intervention group started with BST, then EC was added,

and later BST and EC were changed to RAC due to a personal preference and/or a lack of improvements. Each of them responded differently to these intervention techniques. On the other hand, Bobby and Candy in the RAC intervention group continued using RAC throughout the study and responded positively to RAC but to different extents. Due to the different participation sequences and personal preferences regarding allocating and changing the intervention(s), randomisation and balance of variance were not rigorously controlled in the current research. Therefore, comparisons within and across intervention groups were essential to determine which was the superior intervention and reach a conclusion. The following sections will discuss these in more detail across pairs in the same and different intervention groups.

Comparisons Within the Same Intervention Group

BST for Andy and Dobby

During baseline, Andy had a high performance level for initiating a conversation appropriately, averaging 14.58% and ranging from 8.33% to 25%. In contrast, Dobby did not engage in appropriate conversation initiations and had a performance level of 0% across sessions. Following BST, Andy's overall performance showed a moderately increasing trend with an average of 39.58%, suggesting that BST was somewhat effective. Nevertheless, it fluctuated across pre-training, training, and post-training sessions, resulting in a more extensive range between 8.33% and 83.33%, which indicated a lack of generalisation and maintenance across different training sessions. In comparison, BST only led to limited increases in Dobby's overall performance, averaging 2.45% and ranging from 0% to 16.67%. These increases only occurred across certain training sessions (Session 9, 12, 18, and 21), while performance in pre- and post-training sessions was stabilised at 0% as in the baseline sessions, indicating that BST was relatively ineffective for Dobby.

After EC was added to pre-training sessions from Session 25 for Andy, he displayed more rapid and continuous improvements, especially across pre- and post-training sessions, averaging 78.33%, demonstrating the efficacy of EC. Although his performance declined in one training session, Session 38, it generally remained at a high level: 91.67%. Furthermore, variability in his performance across pre-training, training, and post-training sessions reduced across time, ranging from 41.67% to 100%, which showed some generalisation and maintenance across different training sessions. Upon the removal of EC in Session 40, Andy's performance in pre-training sessions first reached 100% and then dropped to 83.33%. His performance in post-training sessions reduced to 83.33% and stayed the same, while performance across training sessions was unchanged. Despite showing a slightly decreasing trend, his overall performance was still maintained at a high level with an average of 88.89% and a range from 83.33% to 100%, suggesting some maintenance effects of EC. Conversely, there was a decrease in Dobby's overall performance, averaging 1.39% and ranging from 0% to 8.33%, across sessions following the addition of EC, revealing the ineffectiveness of EC in his case. Despite Dobby's performance remaining at 0% from Session 28, some small increases were also observed. One was in the pre-training session (Session 23) when EC was initially introduced, and the other was in the second training session (Session 27) after EC was introduced.

When RAC replaced BST from Session 47 due to Andy's personal preference, he exhibited a moderately decreasing trend in his overall performance with an average of 85.42%, suggesting that RAC was less effective than BST with EC. His performance across sessions also became relatively more variable, ranging between 75% and 100%. Similarly, introducing RAC while withdrawing BST and EC did not result in any significant improvements in Dobby's performance, except for one increase being detected in the second training session (Session 39) after RAC was employed. His overall performance had the same

range, 0% to 8.33%, as when BST and EC were in use but with a minor decrease in the average score (0.93%).

No follow-up measures were collected since neither of them reached the mastery criterion (i.e., achieving 80% or above in five consecutive pre-training sessions) at the end of the intervention phase, despite Andy being close to reaching the goal but withdrawing from the research after Session 57. Generalisation measures across settings and people were taken for Dobby only as Andy no longer worked in the café and was unavailable for sessions due to his withdrawal. Dobby's performance on appropriate conversation initiations ranged from 0% to 8.33% with an average of 4.17% during the generalisation probes, showing a lack of generalisation of the target conversation-initiating skill in the café.

RAC for Bobby and Candy

At baseline, Bobby's performance level ranged between 0% and 16.67% with an average of 5%, while Candy's performance level had a relatively larger range, 0% to 25%, and an average score of 8.33%. Following RAC, both started to display an increasing trend, to different extents, in their overall performance across pre-training, training, and post-training sessions, demonstrating the efficacy of RAC. Specifically, Bobby's performance on appropriate conversation initiations increased rapidly across sessions from the start of the intervention phase, with an average of 72.71%, ranging between 0% and 100%. In contrast, Candy's increases in performance throughout the intervention phase were much more gradual and smaller, with an average of 26.25%. However, variability in her performance across sessions, ranging from 0% to 50%, was much smaller. Bobby maintained his performance level above 80% across sessions from Session 18 and reached the mastery criterion in Session 32. Compared to Bobby, Candy's performance remained relatively unstable across sessions and even declined in the later stages of the intervention phase, so she was unable to reach the mastery criterion.

Bobby's performance on appropriate conversation initiations was maintained above 80% with an average of 89.58% over a 4-week follow-up period, varying between 83.33% and 100%. During the generalisation probes, Bobby's performance ranged from 8.33% to 16.67% with an average of 12.5%, while Candy's performance was consistent across the two sessions with a level of 8.33%, indicating a lack of skill generalisation across people in the café.

Comparisons Across Different Intervention Groups

BST vs. RAC

Participants displayed different levels of performance at baseline. Specifically, Andy had the highest average level of performance (14.58%), whereas Dobby had the lowest average level (0%). In comparison, Bobby and Candy had relatively similar average levels (5% and 8.33% respectively).

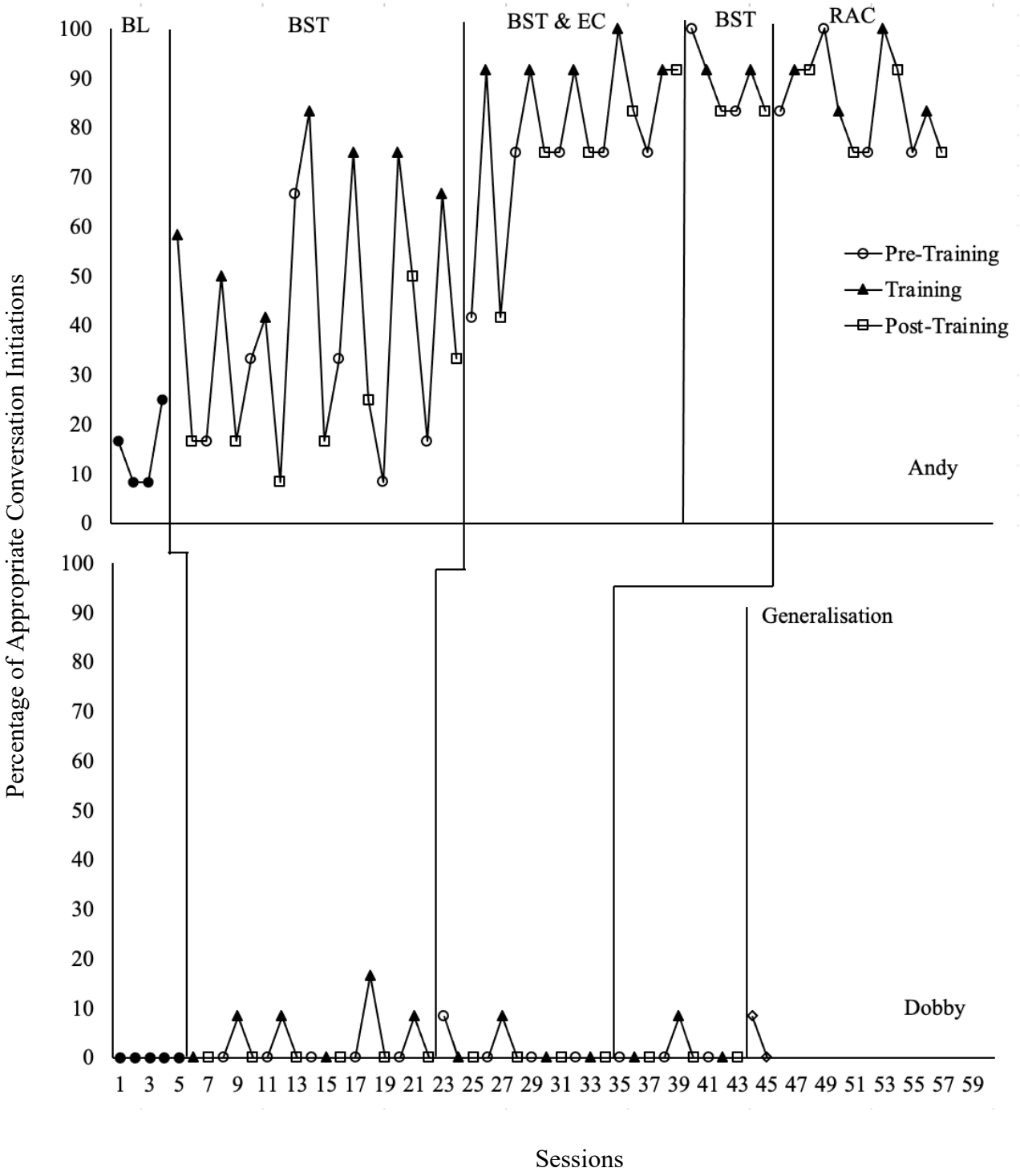
During the intervention, the use of RAC led to the fastest increase in Bobby's overall performance on appropriate conversation initiations across different types of training sessions (averaging 72.71%) compared to the other three participants. In contrast, the use of BST resulted in the smallest increase in Dobby's overall performance (averaging 2.45%). However, the increase in Candy's overall performance (averaging 26.25%), resulting from the same use of RAC, was relatively smaller than that in Andy's overall performance (averaging 39.58%), resulting from the use of BST. When adding and removing a supplementary procedure, EC, and exchanging BST for the alternative, RAC, the increase in Andy's performance (averaging between 78.33% and 88.89%) was much greater than the increase in his performance, resulting from BST alone. However, the increase in his overall performance throughout the intervention phase (averaging 66.51%) was still smaller than that of Bobby, but larger than that of Candy. In comparison, these similar alterations in the interventions resulted in minimal to null changes in Dobby's performance (averaging

between 0.93% and 1.39%), leading to the smallest increase in his overall performance throughout the intervention phase (averaging 1.75%) compared to the other three participants. Moreover, in contrast to the increase in Bobby's and Candy's performance resulting from RAC, the introduction of RAC led to a decrease in both Andy's and Dobby's performance, indicating RAC was less effective for Andy and Dobby.

Of the four participants, Bobby was the only one who reached the mastery performance level and maintained his performance after the withdrawal of the intervention. Excluding Andy, the remaining three participants all showed a low performance level during the generalisation probes; that is, they did not generalise the appropriate conversation-initiating skill in their workplace (the café), irrespective of the intervention(s) used. Bobby had the highest average performance level (12.5%); Dobby had the lowest (4.17%); and Candy had an average performance level of 8.33%.

Figure 1

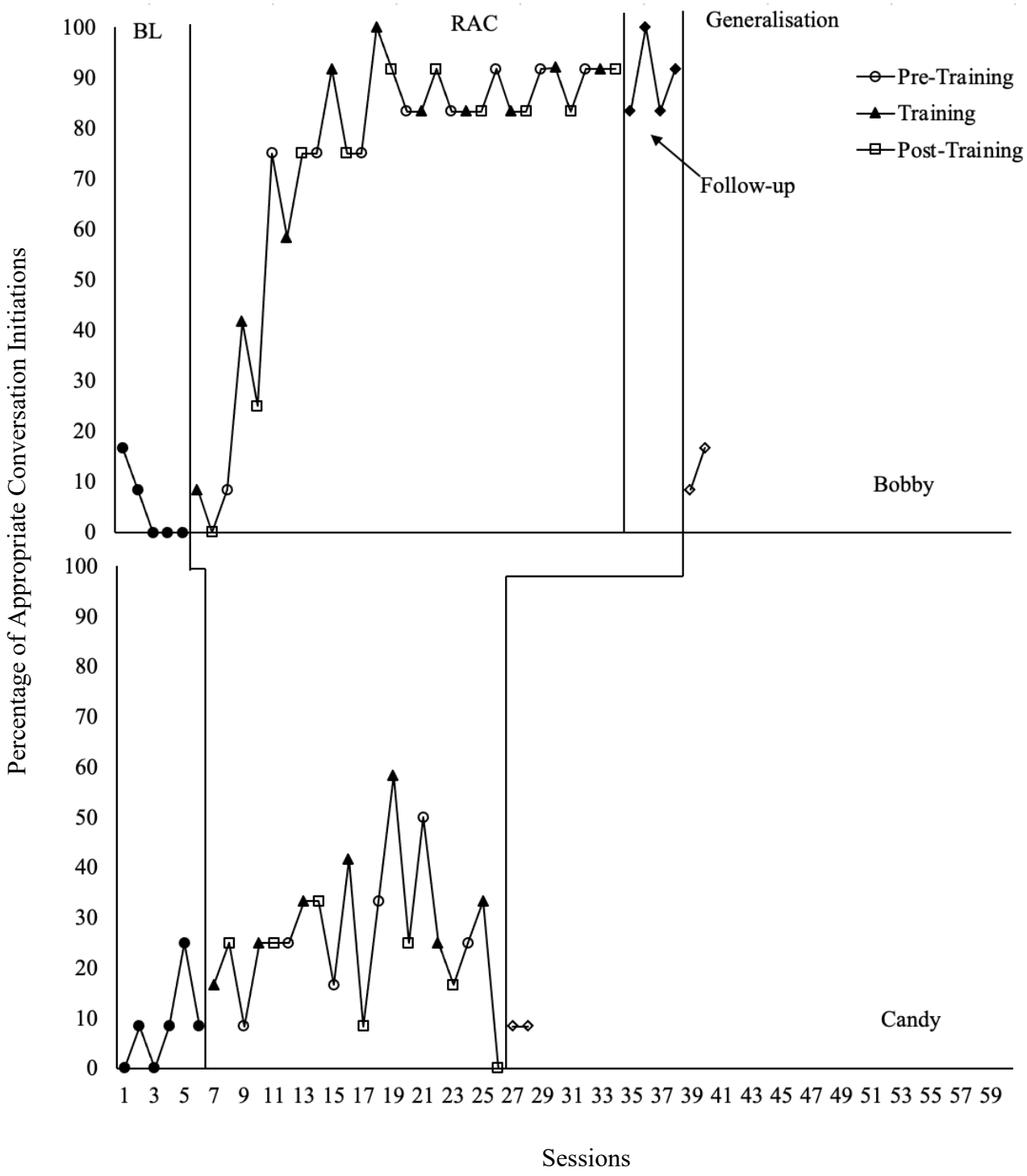
Percentage of Appropriate Conversation Initiations Across Sessions for Participants in the Behavioural Skills Training (BST) Intervention Group



Note. BL = baseline, BST = behavioural skills training, EC = error correction, RAC = remote audio coaching.

Figure 2

Percentage of Appropriate Conversation Initiations Across Sessions for Participants in the Remote Audio Coaching (RAC) Intervention Group



Note. BL = baseline, RAC = remote audio coaching.

Social Validity

Two social validity surveys on the BST and RAC interventions and one social validity survey on the RAC intervention were delivered to each participant in the BST and RAC intervention groups respectively, near the end of the research. All six surveys were completed and then returned to the student researcher. The distribution of ratings for each of the seven questions in the survey is shown in Tables 5 and 6 for BST and RAC respectively.

The ratings differed across individuals and interventions. For the BST intervention, the two participants agreed or strongly agreed that BST helped them learn the appropriate conversation-initiating skill and they liked BST overall. Also, both agreed that they would choose BST again when acquiring new skills in the future. However, they had divergent opinions regarding the overall procedure acceptability and effectiveness of BST as one agreed while the other disagreed. On the other hand, overall, the RAC intervention had a higher level of social validity than the BST intervention since the four participants rated RAC relatively positively: they all agreed or strongly agreed with its overall acceptability and effectiveness. However, the four participants provided conflicting feedback on a question relating to the procedure, as half of them disagreed or strongly disagreed while the other half strongly agreed that the teaching method used by the student researcher was distressing. Additional written or spoken feedback relating to the long duration of different training sessions for both interventions was also received from some of the participants.

Table 5

Social Validity Survey Ratings for the Behavioural Skills Training (BST) Intervention

Statement	Number	Distribution 1-2-3-4-5	Mean
1. I found the way I was taught helped me know when and how to start a talk with someone	2	0-0-0-1-1	4.5
2. If I have to learn something else new, I would like to learn it the same way as Shao taught me	2	0-0-0-2-0	4
3. I like the steps that Shao used to teach me conversation	2	0-1-0-1-0	3
4. I think the way Shao taught me conversation was helpful and useful	2	0-1-0-1-0	3
5. The way that Shao taught me conversation made me upset, stressed or annoyed	2	0-1-0-1-0	3
6. I think that the way Shao taught me will help me keep talking with people at work	2	0-1-0-1-0	3
7. Overall, I like this teaching method	2	0-0-0-1-1	4.5

Note. A rating of 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree.

Table 6

Social Validity Survey Ratings for the Remote Audio Coaching (RAC) Intervention

Statement	Number	Distribution 1-2-3-4-5	Mean
1. I found the way I was taught helped me know when and how to start a talk with someone	4	0-0-0-2-2	4.5
2. If I have to learn something else new, I would like to learn it the same way as Shao taught me	4	0-0-0-2-2	4.5
3. I like the steps that Shao used to teach me conversation	4	0-0-0-2-2	4.5
4. I think the way Shao taught me conversation was helpful and useful	4	0-0-0-2-2	4.5
5. The way that Shao taught me conversation made me upset, stressed or annoyed	4	1-1-0-0-2	3.25
6. I think that the way Shao taught me will help me keep talking with people at work	4	0-0-0-3-1	4.25
7. Overall, I like this teaching method	4	0-0-0-2-2	4.5

Note. A rating of 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree.

Discussion

The current research used two behavioural interventions, BST and RAC, to teach an appropriate conversation-initiating skill to four adults with ID, in a café employment setting, while examining which intervention was more efficient and effective in the short and long term. Following BST, Andy in the BST intervention group showed a moderate increase in appropriate conversation initiations, while Dobby only showed a limited improvement. In comparison, following RAC, Bobby in the RAC intervention group displayed a rapid increase in his performance, whereas Candy displayed a slightly moderate increase. After adding EC, the increase in Andy's performance was more rapid and constant than the increase resulting from BST alone; however, his performance slightly decreased after EC and BST were withdrawn and RAC was introduced. Conversely, the same addition, withdrawal, and replacement of intervention procedures led to a decline in Dobby's performance, resulting in minimal improvements compared to the other participants. The maintenance effects of RAC after its removal were assessed and observed in Bobby in the RAC intervention group, while such effects of BST, EC, and RAC were unknown for Andy and Dobby in the BST intervention group. Participants in both intervention groups were unable to generalise the acquired conversation-initiating skill to their co-workers and customers in the café.

Based on these findings across participants and intervention groups, RAC tended to outperform BST in enhancing the participants' ability to initiate a conversation appropriately. However, prior to drawing any firm conclusions, these findings will be compared with those from previous literature reviewed earlier, according to the intervention approaches used and with consideration of potential limitations in the current research. Possible explanations and underlying implications will also be discussed in detail in the following sections.

Participants' Initial Level of the Appropriate Conversation-Initiating Skill

During baseline, all participants exhibited a relatively low performance level on appropriate conversation initiations regardless of their intervention group. This finding aligns well with past research on social communication skills deficits in individuals with ID or ID and other co-occurring diagnoses (APA, 2013; Wilkins & Matson, 2009). Also, it conforms to the support staff's recommendations for participation in the current research.

Of the four participants, Dobby showed a quite different behavioural pattern from others as his baseline performance consistently remained at the lowest level. One of the reasons is that he was insensitive to social cues indicating a person's availability or unavailability, and unable to identify appropriate situations in which to converse with his workmates and customers compared to others. For instance, when asking, "When will you start a talk with___? Now or later?" or "Will you start a talk with ___ later or now?", the other three participants were able to respond differently according to the scenarios provided and justify their answers spontaneously. In contrast, Dobby constantly provided the same response ("Talk now") without further justification, irrespective of the scenarios given, in the first two baseline sessions. To gain more precise responses from Dobby, an additional question relating to why he would start the conversation now was introduced after he answered when to converse in later sessions. He was taught to make a statement of "I don't know" or "I'm not sure" if that was the case. In the remaining baseline sessions, Dobby still responded with the same answer, "Talk now", but later changed his mind quickly to "Talk later" after asking why he wanted to start it now. When asking him again why he would start later, he answered, "I don't know". Based on the background information provided by the support staff, this behavioural disparity between Dobby and the other participants may have been correlated with variations in their prior work experience involving social interactions. In other words, due to his limited opportunities to interact with others in previous work settings,

Dobby's relevant social skills were not cultivated and developed as much as in those with more opportunities for social interactions.

Another reason is associated with Dobby's communication and language abilities. In contrast to the others' relevant responses about how to initiate a conversation, Dobby persistently misinterpreted the question and gave an irrelevant answer (e.g., "I enjoy working with people" and "I enjoy drinking coffee") across all baseline sessions. This was still the case even though the student researcher asked the same question in a different and easier way, namely, "What would you say to the customer/workmate to start the talk?". Such misinterpretation did not match with the support staff's description regarding Dobby's good language comprehension and communication, which evidences a lack of reliability and validity of subjective measures in contrast to objective ones (Jahedi & Méndez, 2014). An absence of objective measures, such as formal and direct social skill and language assessments, is deemed as a limitation of the current research.

These findings regarding Dobby's performance on appropriate conversation initiations during the baseline also revealed that the skill of recognising social cues in given contexts in the café and behaving accordingly was not in Dobby's repertoire but was somewhat present for the other three participants. This is consistent with research reporting that individuals with higher severity of ID and/or multiple diagnoses of disabilities including ID tend to have more social skills and communication impairments compared to their counterparts (APA, 2013; Matson & Cervantes, 2013; Smith & Matson, 2010). As a result of these impairments, it is predictable that Dobby would take more time to acquire the target conversational skill and reach mastery compared to the other participants during the training.

The Effects of BST, BST and EC, and RAC on Participants in the BST Intervention Group

BST Alone During the Intervention

Intervention outcomes regarding the use of BST differed between Andy and Dobby. For Andy, although his performance on appropriate conversation initiations varied across different training sessions after BST was introduced, overall, it showed a moderately increasing trend. The moderately increasing trend is consistent with past literature on the effectiveness of BST, while the performance variation across different sessions is inconsistent with research on the generalisation effects of BST across contexts (e.g., Kornacki et al., 2013; Nuernberger et al., 2013; Ryan et al., 2019). The lack of generalisation across sessions could be due to procedural differences regarding scenario presentations between training and pre- and post-training sessions, given that generalisation often occurs when the trained and untrained settings share numerous analogous features (Byrom & Murphy, 2014; Pearce, 1987). Also, it is possible that the generalisation effects were not as salient when the participant was still acquiring the conversation-initiating skill as they would be when the participant had reached mastery (e.g., Ryan et al., 2019).

In comparison, only limited and unstable improvements were found in Dobby's performance in certain training sessions following BST. These improvements were more likely due to chance, imitation, and overgeneralisation (using the same responses across questions associated with either similar or different scenarios) than to the efficacy of BST (Taylor, 1975). For example, Dobby would choose the right time to converse and briefly justify the reason only when the current scenario was analogous to the previous ones and he had received similar corrective feedback on his responses under those scenarios several times. Also, despite initiating a conversation more appropriately by stating "Hi, how are you?" instead of "I enjoy working with people" since the second training (Session 9), he used the same statement repeatedly across scenarios without taking feedback on using alternatives. Dobby's performance across pre- and post-training sessions remained at the lowest level during the intervention. Compared to his performance in training sessions, Dobby persistently

guessed the answer regarding the time and responded with a statement of "I don't know" when asked to explain further in pre- and post-training sessions. Likewise, he overgeneralised the statement of "Hi, how are you?" learned from training sessions across scenarios in pre- and post-training sessions. In other words, Dobby still could not accurately distinguish social cues and select an appropriate time to start a conversation, and tended to have a repeated pattern of speech when interacting with co-workers and customers, demonstrating that he did not acquire the target skill.

Dobby's results indicate null effectiveness of BST in teaching a conversation-initiating skill and null generalisation across different sessions during the intervention. The finding on null generalisation contradicts past research findings on the generalisation effects of BST, but it is analogous to the lack of generalisation effects of BST shown in Andy's performance across sessions (e.g., Kornacki et al., 2013; Ryan et al., 2019). The underlying reasons may be related to procedural differences between training and pre- and post-training sessions and limited learning acquisition during the training, which are identical to those seen for Andy. In contrast to the null generalisation, the finding on the null effectiveness does not align with the results seen for Andy, or with other research regarding the efficacy of BST (e.g., Hood et al., 2020; Nuernberger et al., 2013). One potential reason is associated with disparities in the participants' prior work experience and/or social skills and language impairments in the current and past studies. Compared to Dobby, Andy had more work experience involving social communication interactions with customers and/or co-workers. Also, Andy's social skills and communication abilities were less impaired than Dobby's as his initial level of the conversation-initiating skill was much higher. Andy was able to respond differently according to the social cues indicated in the scenarios and change his responses based on feedback received during the training. Similarly, participants in Ryan et al.'s (2019) study had a mild-to-moderate range of social skills impairments and the average

scores for their receptive and expressive languages were between four and five years. In other words, these participants were able to produce and understand language better and communicate with others using long and complex sentences (Conti-Ramsden & Durkin, 2012). Despite lacking formal screening measures for Dobby, his social skills and language abilities appeared to be much lower than those in Ryan et al.'s study, based on his repetitive and limited responses during the baseline and intervention phases.

Another potential reason is related to the occurrence of off-task behaviour, which negatively impacts efficient learning as it diverts the person's attention from the current task to other irrelevant stimuli (Sawyer et al., 2001). In contrast to Andy, Dobby sometimes became less attentive and started exhibiting off-task behaviour (e.g., orienting his head down or away from the computer screen and looking outside through the window) during the sessions. This is consistent with Taber et al.'s (1999) study reporting off-task behaviour displayed in a student with moderate ID and ASD when performing a task. This behaviour may be attributable to two factors. First, the training tended to be more difficult for Dobby than the other three participants as he had greater social skills and communication deficits and lacked vocational experience and opportunities to promote these skills and abilities. Also, due to these limited skills and abilities, the performance demands placed on him during the training (i.e., identifying and interpreting social cues and behaving accordingly) may have been burdensome. Second, the room in which Dobby attended his online training contained a major distractor: a window with a street view located next to the computer, despite being hidden by curtains during the intervention. When hearing people talking or other noises (e.g., engine noises and car horns), he would turn around, pull the curtains, and look outside through the window.

To decrease Dobby's off-task behaviour and regain his attention, verbal praise contingent on his on-task behaviour during the sessions was initially used but did not work

well. Hence, tangible reinforcement (i.e., playing his favourite movies) was introduced and delivered during the session break for 15 minutes. Also, the student researcher abbreviated the guidelines for determining a good time and way of starting a conversation, using short and simple phrases to facilitate learning. Likewise, she conducted intermittent quizzes by prompting Dobby to answer her questions using words or phrases displayed on slides to increase interactivity and maintain his attention (Cherrett et al., 2004; Schacter & Szpunar, 2015). Furthermore, according to the support staff, Dobby tended to be less motivated when the session lasted longer than 30 minutes. Thus, training sessions were divided into two parts. The first part finished after modelling and the second part commenced after a 15-minute break interval. These strategies effectively reduced Dobby's off-task behaviour but did not eliminate it. Hence, Dobby's off-task behaviour continued to affect his acquisition of the target skill and the maintenance and generalisation of such acquisition, but to a lesser extent.

BST with EC and RAC Alone During the Intervention

Upon the implementation of EC in pre-training sessions, Andy's performance across different sessions improved rapidly and continuously and became less variable over time. These results tend to align with those of past research on the effects of EC on improving target performance and facilitating learning (Santos et al., 2010; Truscott & Hsu, 2008). However, it may not be possible to distinguish whether these improvements resulted from EC or BST alone or the additive effect of BST and EC, due to the procedural arrangement. To illustrate, Andy's performance in training sessions could have been influenced by both EC and BST, given that his improvements became greater and more stable than those in previous training sessions when EC was not introduced in the pre-training sessions. His performance in post-training sessions also increased and this could be due to EC, given that pre- and post-training sessions were identical except EC was not used in the latter sessions and Andy's performance was relatively similar in these two types of sessions across time. However, there

was one exception. Andy's performance in Sessions 38 and 39 (training and post-training sessions respectively) was identical, while his performance in the corresponding pre-training session was much lower. It was unclear how much BST had affected the increase in the post-training session. Despite the ambiguities, these results also indicate that generalisation across different sessions became more salient as Andy reached acquisition mastery. Furthermore, after EC was withdrawn, Andy's performance remained high except for small decreases in some pre- and post-training sessions. This outcome tends to demonstrate some lasting effects of EC and support the idea that the increases in the pre- and post-training sessions were likely to be the result of EC rather than BST (Santos et al., 2010). However, it is not clear whether that was definitely the case, since BST was still in use during training sessions following the removal of EC and it may have also played a vital role in performance maintenance. These inabilities to determine the effects of individual intervention components are another limitation of the current research.

When RAC (with performance feedback) replaced BST, Andy's performance across sessions became rather unstable, but was still maintained at a reasonably high level, which is relatively consistent with the results of Bennett et al. (2013b) on the generalisation effects of CAC with performance feedback. However, because of the procedural arrangement, it is unclear whether such generalisation was due to RAC, the maintenance effects of BST and/or EC, or both. Furthermore, Andy's performance overall showed a slightly decreasing trend, which contradicts the findings of Joseph et al. (2021) and Bennett et al. (2010) and Bennett et al. (2013b) on the effectiveness of RAC with coaching prompts and CAC with performance feedback respectively. There may have been several reasons for these contradictions. First, only a small amount of data was collected in RAC training sessions compared to Joseph et al.'s, Bennett et al.'s (2010), and Bennett et al.'s (2013b) studies and such a lack of data would prevent a broader view of a behavioural trend under the impact of RAC (Cooper et al.,

2020). Second, RAC might not have been as efficacious as BST and/or BST and EC for Andy. Specifically, RAC only consisted of partial analogous procedures of BST (practice and feedback). BST alone did not lead to rapid and constant improvements across different training sessions as the collaboration of BST and EC. Third, some extraneous factors may also have had an impact on the results. For instance, Andy sometimes experienced poor internet connections during the sessions due to others' use of landlines in his residential home. Those sessions were intermittently interrupted as Andy had to sign out of Zoom and then sign back in multiple times with his support staff's assistance. Such unreliable internet access created some barriers to implementing training procedures and assessing Andy's learning, suggesting reliable internet service is essential when using RAC (Joseph et al., 2021). Similarly, a reduction in the frequency of conducting intervention observation sessions (i.e., pre-training, training, and post-training sessions) across weeks following RAC could also have led to the decreasing trend in the overall performance. The frequency, three times per week, remained constant when BST and EC were used, but was later reduced to twice or once per week when RAC was used, due to changes in Andy's weekly schedule. As a result, the interval between intervention sessions across weeks increased and may have had an influence on Andy's retention of the target skill learned (Anderson et al., 2019).

In comparison, EC only led to a small increase in Dobby's performance when it was first introduced in a pre-training session (Session 23) and it did not have any further impact on the subsequent pre-training sessions, or result in any significant improvements in training and post-training sessions. Likewise, exchanging BST and EC for RAC did not yield any significant changes in Dobby's performance across sessions. On the one hand, these results differ from those of Andy and past research on the efficacy of EC, RAC with coaching prompts, CAC with feedback, and the generalisation effects of CAC with feedback (Bennett et al., 2010; Bennett et al., 2013b; Joseph et al., 2021; Truscott & Hsu, 2008). The underlying

reasons for such null effects of EC or BST with EC and RAC may also have been related to Dobby's lack of relevant work experience, social skills and communication impairments, and off-task behaviour as explained before, given that there were no additional changes in his weekly observation sessions (APA, 2013; Matson & Cervantes, 2013; Sawyer et al., 2001). The reason for the lack of generalisation across different training sessions would be primarily associated with the null intervention effects on Dobby's learning acquisition (Byrom & Murphy, 2014; Pearce, 1987). However, on the other hand, these results were expected since BST only had minor to null effects on Dobby, and EC and RAC only involved single or partial components of BST (feedback on correct and/or incorrect responses). Additionally, these results may suggest that online training using BST, BST and EC, and RAC under contrived settings is not appropriate in helping some individuals with ID and limited experience, social skills, and language abilities to efficiently acquire a novel skill to be used in a specific vocational context.

BST, BST and EC, and RAC During the Follow-up

The efficacy of BST, BST and EC, and RAC after their removals was not assessed and measured at follow-up due to Andy's withdrawal from participation and Dobby's failure to reach mastery during the intervention phase. Therefore, the maintenance effects of sequentially introducing these components, as well as the effects of the individual components were unidentified, which are also limitations of the current study.

The Effects of RAC on Participants in the RAC Intervention Group

RAC During the Intervention

The findings regarding the efficacy of RAC in improving Bobby's and Candy's conversation-initiating skills in training sessions replicated those of Bennett et al. (2010), Bennett et al. (2013b), and Joseph et al. (2021). Also, demonstrations of appropriate conversation initiations were observed in numerous pre- and post-training sessions over time

in both participants, evidencing the generalisation effects of RAC as in Bennett et al.'s (2013b) study. However, compared to Candy, overall, Bobby showed more rapid and continuous improvements during the intervention; generalisation of these improvements across sessions was more prominent and constant as he reached mastery. These performance differences between Bobby and Candy could be due to several potential contributing factors associated with the procedural arrangements of the current research, since their baseline performance was relatively similar. First, the number of observation sessions (pre-training, training, and post-training sessions) carried out across weeks during the intervention varied between Bobby and Candy. Bobby consistently had three weekly observation sessions on three consecutive days, whereas Candy had one to two weekly observation sessions on different days. Given that training done at a higher frequency was more likely to result in faster learning acquisition and better retention than that done at a lower frequency, it is reasonable that Bobby outperformed Candy during the intervention (Anderson et al., 2019).

Second, the time of day at which observation sessions were conducted, and consequently fatigue levels, may also have played a role in their performance differences during the intervention phase. Bobby's sessions were regularly carried out at 10 a.m. during his days off, while Candy's were first done at 2 p.m. on her days off and then changed to 3 p.m. or 4 p.m. on days when she had work or activities due to changes in her schedule. When the observation sessions were conducted during Candy's days off, her performance in the post-training sessions was consistently the same or higher than that in the corresponding pre-training and training sessions. This changed in the opposite direction when running the sessions after she finished work or activities during the last four observation days: her performance in post-training sessions dropped to a lower level compared to that in the corresponding pre-training and training sessions. During those post-training sessions, Candy seemed quite fatigued even after giving her some breaks. She also behaved differently and

tended to rush to finish the session early by answering the questions without listening to and deliberating the scenarios. For instance, she gave random responses such as “Thank you” and “Have a nice day” when the current situation was about how she would start a conversation when a customer was approaching her or when she was serving food to a customer who was waiting at their table. She would insist on using the same responses despite the student researcher repeating the scenarios slowly and asking her the same questions again.

Third, unlike Bobby, who continually stayed on task across sessions, Candy displayed off-task behaviour, similar to Dobby but in a different topography, namely, asking questions that were irrelevant to the current task (e.g., “What time is it now?” or “What day is it today?”). This disruptive behaviour influenced the implementation of the procedures and the process of effective teaching and skill acquisition during the sessions, resulting in a slow change in the target performance (Sawyer et al., 2001). Several approaches were introduced to decrease Candy’s off-task behaviour. For instance, a clear instruction about staying on-task and asking irrelevant questions later, after the session, was first delivered to Candy to direct her back to the task once she started drifting from the topic, as according to the support staff, this approach worked immediately to regain Candy’s attention. Also, verbal praise was provided contingent on her on-task behaviour during the session, and a choice of having a break right now was offered to her in case she wanted one. These approaches reduced Candy’s off-task behaviour, but they were not enough to eliminate it. Thus, it still impacted the delivery of training and Candy’s skill acquisition, although to a lesser extent than before.

RAC During the Follow-up

Bobby’s performance remained at the mastery level across four successive weeks after removing RAC, indicating the maintenance effects of RAC (with performance feedback). This result aligns with the findings of Bennett et al. (2010) and Bennett et al. (2013b) and Joseph et al. (2021) on the maintenance effects of CAC with performance

feedback and RAC with coaching prompts on the target behaviour, respectively. However, such effects were not measured with Candy as she did not complete the intervention phase due to time constraints, which can be seen as a limitation of the current research.

Based on the consistency of the effectiveness of RAC in both short and long term in the current study and in Bennett et al.'s (2010), Bennett et al.'s (2013b), and Joseph et al.'s (2021) research, numerous intriguing implications could be drawn. First, RAC with performance feedback is a promising online intervention approach to enhancing a conversational skill specifically used in a vocational setting (café) in individuals with ID. Second, performance feedback tends to be as effective as coaching prompts when used as part of a RAC procedure component. Third, RAC with performance feedback seems to be as efficacious as CAC with performance feedback despite being implemented in a different format. These findings and implications also contribute to the existing literature on the employment of RAC and CAC (Bennett et al., 2010; Bennett et al., 2013a, 2013b; Gilson & Carter, 2016; Joseph et al., 2021; Mason et al., 2020).

BST vs. RAC During the Intervention and Follow-up

On the one hand, when comparing all participants' overall performance during the intervention, across intervention groups, RAC appeared to outperform BST as the use of BST only resulted in positive behavioural changes in Andy but not in Dobby, while the use of RAC led to such changes in both Bobby and Candy. On the other hand, when comparing overall performance across participants with a similar average baseline performance level and intervention groups (Andy and Candy, and Bobby and Dobby), diverging results were observed across pairs. Within the pair of Andy and Candy, the introduction of BST yielded a greater increase in Andy's performance, whereas the introduction of RAC only led to a smaller increase in Candy's performance, suggesting that BST outperformed RAC. Within the pair of Bobby and Dobby, the results were the opposite. The increase in Dobby's

performance resulting from the use of BST was much smaller than the increase in Bobby's performance resulting from the use of RAC. In addition, RAC was introduced to Andy and Dobby in the BST intervention group because of the ineffectiveness of BST and EC or a change in the personal preference. The results were contradictory to those of Bobby and Candy in the RAC intervention group as the effectiveness of RAC demonstrated in Bobby's and Candy's performance was absent in Andy's and Dobby's performance.

In addition to the intervention effects of BST and RAC, these conflicting results across participants and/or intervention groups may also have been affected by several extraneous causes related to the individuals and to procedural differences, as specified in previous sections. For example, compared to Andy, Bobby, and Candy, Dobby had limited work experience involving social interactions with people and tended to also have more impaired social skills and language abilities, as evidenced by his responses to questions related to conversation initiations (Wilkins & Matson, 2009). Also, the number, days, and/or timing of weekly observation sessions conducted were constant for Bobby and Dobby, while these arrangements were varied for Andy and Candy because of changes in their schedules (Anderson et al., 2019). Furthermore, unlike Andy and Bobby, Candy and Dobby engaged in off-task behaviour in different topographies during the intervention. Such behaviour was reduced following relevant approaches but not removed (Sawyer et al., 2001). Moreover, Andy sometimes experienced unstable internet connections, and Candy started showing fatigue when the observation sessions were carried out on her working days. Additionally, compared to RAC being the first and only intervention introduced to Bobby and Candy, RAC was implemented for Andy and Dobby following the use of BST and EC. The sequential effects of using different intervention components (BST and EC) may have impacted the effects of RAC on Andy and Dobby to some extent, but such effects remained undetermined.

Furthermore, the maintenance effects of RAC were only assessed with Bobby, given that Candy did not reach mastery during the intervention. The maintenance effects of BST for Andy and Dobby were undetermined due to the failure to reach mastery, and procedural arrangements. Therefore, RAC could not be directly compared with BST in terms of its durability.

Although these findings provided some evidence regarding the efficacy of RAC and BST, conclusions on which intervention was more effective and efficient still cannot be drawn because of the diverging results across participants and intervention groups and various personal and environmental factors. This also reveals a major limitation of the current research: the lack of rigorous experimental control over internal and external factors across participants, which will be discussed more in the later section on limitations.

Generalisation Effects of BST/EC/RAC and RAC Across Settings and People

Generalisation effects of sequentially using BST, BST and EC, and RAC across contrived and naturalistic settings and different individuals were assessed for Dobby in the BST intervention group, but not for Andy due to his withdrawal from the research, which can be deemed another limitation. In contrast, generalisation effects of the use of RAC were examined with both Bobby and Candy in the RAC intervention group. However, regardless of intervention groups, none of the participants was able to demonstrate the target conversation-initiating skill consistently in their workplace, the café, with their co-workers and customers, other than in the online training setting. During the generalisation probes, Bobby greeted customers when seeing them approaching or approaching them, but he generally did not ask a relevant question to sustain the interaction. In comparison, Candy sometimes greeted customers and asked a relevant question, but sometimes she missed greeting or asked an irrelevant question, while Dobby often needed a prompt from the support staff to greet the customer and/or ask a relevant question. When interacting with

workmates, all seemed to ask a relevant question without a greeting. Also, they were more likely to choose the wrong time to interact with others, especially when customers or workmates were currently unavailable.

On the one hand, this lack of skill generalisation was unsurprising for Candy and Dobby, given that they had not yet attained skill acquisition during the intervention, compared to participants who had done so and displayed skill generalisation across contexts and/or persons after the intervention's removal (e.g., Bennett et al., 2013b; Kornacki et al., 2013; Ryan et al., 2019). On the other hand, this finding was unforeseen for Bobby, who reached and maintained skill acquisition at the intervention and follow-up phases respectively. Also, it is inconsistent with a previous study evidencing the generalisation effects of CAC with performance feedback on improving target performance across contexts (Bennett et al., 2013b).

One plausible explanation for the limited generalisation effects across settings and individuals relates to the use of generalisation-promoting strategies in previous and the present research. In research by Nuernberger et al. (2013), Kornacki et al. (2013), and Ryan et al. (2019), in situ training with feedback was conducted in the natural environment (a living unit in a rehabilitation facility) following participants' mastery during interventions carried out in a contrived environment (a private observation room). In comparison, no in situ training with feedback was arranged in the café following the intervention in the current research, although the intervention was also done in a contrived setting (online via Zoom). Such a lack of in situ training would be less likely to result in skill generalisation in the untrained café setting. Similarly, Beaulieu et al. (2014) arranged different confederates as both trainers and conversational partners to implement BST and converse with the participant during the intervention respectively. In contrast, participants in the current study only interacted virtually with the student researcher, who played the role of a trainer rather than a

conversational partner (workmate or customer). Such a monotonous arrangement may have made it unfeasible for the participants to generalise the target skill across a diverse group of people in the café.

Another explanation is associated with the type of conversational skills targeted in different circumstances in the past and current studies. As mentioned in the introduction, 10 of the 12 studies reviewed were conducted in non-vocational settings (e.g., clinics, universities, and rehabilitation facilities), while the remaining two (Chezan et al., 2020; Gilson & Carter, 2016) were entirely or partially done in vocational settings (e.g., worksites). However, irrespective of the research settings, the conversational skills taught across the 12 studies concerned general social interactions on broader ordinary topics with people in the community, except for Gilson and Carter (2016), who targeted both social- and task-related interactions. In comparison, the conversational skill targeted in the current study was more specific to the vocational context as they not only involved general social interactions with workmates and customers but also skills related to job performance on providing service with quality. For instance, in addition to interacting with workmates and customers regarding general topics (e.g., wellbeing, movies, and plans), the participants also needed to know what to do and say when providing service, such as taking customers' orders, serving food and drink, and helping customers solve problems. This skill appeared to be more context- and people-specific and hence it may be harder to be generalised compared to those skills that were more general and could be used in a wide range of contexts with various people.

The lack of skill generalisation across settings is also related to the similarity level between training and naturalistic settings in the past and current studies, given that generalisation is more likely to occur when an untrained setting is analogous to the trained one (Byrom & Murphy, 2014; Pearce, 1987). For instance, in Bennett et al.'s (2013b) study, the training and natural environments (a student lounge and a gift shop respectively) shared

several comparable features as both contained clothing items, such as different T-shirts, a table, and chairs inside the room. In contrast, the online training setting in the current study was more contrived than and differed from the naturalistic setting (the café) in various aspects regarding the setup. Specifically, during pre-training, training, and post-training sessions, the participant was first asked to respond to questions regarding conversation initiations with customers or workmates based on some hypothetical scenarios, which simulated naturally occurring ones encountered in the café, presented via role plays or photos. However, prior to the participant interacting with customers or workmates in the café, they would not be provided with information regarding the scenario, or asked the same questions as they were during the online sessions. They needed to consider what was an opportune moment to approach customers or workmates and what they should say to start a conversation according to their own perception of the current situation. Also, their responses would not include "(I would like to) start the conversation now/later" before greeting customers or workmates and asking them a relevant question. Furthermore, during training sessions, immediately following their responses on when and how to initiate a conversation, supportive or corrective feedback according to the level of appropriateness was delivered by the student researcher. This is not the case in real-life situations as the participant would get a corresponding response from customers or workmates based on what they have asked, rather than feedback on how they have started the conversation with them. Due to the significant differences between trained and untrained settings, the participants' generalisation of the target skill in an untrained setting would be less likely to occur.

Despite these potential factors affecting skill generalisation, several implications could be drawn based on Bobby's failure to generalise after attaining learning acquisition and demonstrating the appropriate conversation-initiating skill across sessions during the intervention and follow-up. First, Bobby seems to have learned the way of answering

questions related to when and how to initiate a conversation properly with customers and workmates in the café, rather than the way of exhibiting the target behaviour: starting a conversation appropriately. Second, RAC with performance feedback in a contrived context tends to be effective in improving the target conversational skill in adults with ID in both the short and long term, but it may lack generality across non-training contexts and people. Third, teaching vocational-related conversational skills under the contrived online setting with limited confederates might not be sufficient for individuals with ID to demonstrate the target skills across diverse groups of people in the vocational setting.

Limitations and Future Research

In spite of some encouraging intervention outcomes and intriguing implications, the current research has numerous potential limitations. Some have already been mentioned in the previous sections. For instance, the participants' language abilities and communication were not directly assessed using formal assessments, but based on the support staff's subjective evaluations. Future research should conduct relevant screening assessments and obtain more objective measures to gain a better understanding of the participants' initial level of abilities and skills and use them as guidance to tailor a more appropriate intervention programme. Also, due to the arrangements of the intervention implementation (i.e., adding, withdrawing, and exchanging interventions) in the BST intervention group, the individual effects of EC and RAC could not be determined. In addition, another intervention component, reinforcement, was also used in both BST and RAC intervention groups. Although some delayed reinforcers were contingent on continuous improvements in the target performance, other delayed and immediate ones were made contingent on a different behaviour (staying on task), and their effects on the participants during the intervention were ambiguous. Likewise, the overall performance feedback provided at the end of the last observation session during each day may have had some impacts on the participants'

performance; however, these impacts were also unknown (Pavett, 1983). To resolve this, future researchers should consider using an alternating treatment design or assessing each intervention component separately across participants with similar characteristics in terms of age, social communication skills, language(s), learning history, work experience, and cultural background. Moreover, due to the participation withdrawal and discontinuation of the intervention caused by time restraints, the maintenance effects of sequentially introducing BST, EC, and RAC, as well as of these individual intervention components, on the participants in the BST intervention group were not assessed and remained unknown. Similarly, the maintenance effects of RAC on one of the participants (Candy) in the RAC intervention group were unclear; the generalisation effects of using BST, EC, and RAC on the other participant (Andy) in the BST intervention group were undetermined. Future research should extend the research period and consider reducing participation attrition so that the research can achieve complete data collection.

Another limitation is the lack of rigorous experimental control associated with the experimental design in the current study. First, a randomised block design was not achieved due to the different participation sequence and the incomplete randomisation of intervention allocations across participants (Festing, 2014; Kim & Shin, 2014). Andy and Bobby first participated in the study and then Candy and Dobby joined following the conclusion of the research with the former pair. As a result, both pairs, Andy and Bobby and Candy and Dobby, with different baseline performance levels, had to be seen as blocks instead of pairs with a similar level as in a randomised block design. Also, Andy and Bobby in the first block were randomly assigned to an intervention group; Candy and Dobby in the second block were assigned to an intervention group based on their personal preferences. Thus, randomising intervention allocations was not accomplished across all four participants. Due to this failure to adhere to the requirements of the randomised block design, individual

variance within the same block and across intervention groups were not rigorously minimised and balanced out respectively (Festing, 2014). This also hampered direct and precise comparisons of the intervention effects across participants and intervention groups and prevented firm conclusions being reached regarding the more effective and efficient intervention. Second, a non-concurrent multiple baseline across participants design was used due to the nature of this study (Watson & Workman, 1981). With this design, data collection was not synchronized in real time for all participants. In other words, environmental conditions were not held constant across participants and the environmental differences would also have played a role in influencing the target behaviour in addition to the intervention effects. Examples of these differences across participants in the current study included unstable internet connections, changes in the number of weekly observation sessions and/or session times, distractions, and occurrence of off-task behaviour as described earlier.

These extraneous effects caused by the lack of experimental control over the individual and environmental variabilities posed major threats to internal validity of the current study. Future studies should consider using a combination of a randomised block design and a concurrent multiple baseline across participants design to reduce individual variance within and between the intervention groups and establish more rigorous experimental control. Also, they should make the number of weekly observation sessions consistent across all participants, choose a more controlled research setting with reliable internet access and limited distractions, and conduct the study with all participants in that controlled setting. Furthermore, they should select more suitable times, during participants' rest days rather than busy days, to carry out observation sessions to avoid internal factors such as exhaustion. Such actions will keep the environmental conditions across participants constant, extraneous causes impacting intervention outcomes can be avoided or minimised, and internal validity will be enhanced.

There are also some further limitations regarding the intervention procedures. First, two more scenarios – when the participant is unavailable (e.g., busy doing a job task), while the customer(s) or workmate(s) is available (e.g., having a break) – were excluded from the training due to the large number of scenarios and questions that had been selected for use. Despite encountering some similar scenarios when providing feedback on the participants' responses, these two were not systematically taught during the intervention. Second, as mentioned previously, the online setup of pre-training, training, and post-training sessions tended to be overly contrived compared to naturally occurring situations, being supported by the findings on the participants' lack of skill generalisation with customers and workmates in the café. Third, the duration of observation sessions (i.e., pre-training, training, and post-training sessions) during the intervention was lengthy and the performance demands placed on the participants were extensive. The three sessions, including between-session break intervals, took up to 2.5 hours and 3 hours to finish, for the RAC and BST intervention groups respectively. Also, during these sessions, the participants were required to stay attentive, including listening to instructions, answering questions, and/or receiving feedback to acquire the target skill for 20 to 50 minutes before a break. Such overlong and demanding sessions tended to cause potential distress for the participants. This was also evidenced in Bobby's and Andy's high ratings on the social validity surveys and written or verbal feedback regarding the distress they felt when RAC was in place during the intervention. They commented that the distress was due to the demands and overlong duration, despite perceiving RAC as relatively socially important, useful, and acceptable. Likewise, although Andy gave conflicting ratings regarding the importance, effectiveness, and acceptability of BST as his opinions differed on similar questions asked differently, he agreed BST made him feel distressed but still liked it. These contradictory ratings could be due to his misinterpretation of the questions or they may indicate there was both something he liked

(the BST procedure) and did not like (the lengthy duration and demands) about BST, but overall it was acceptable to him. In contrast, the ratings on the distress during the intervention were much lower for both Candy and Dobby, and both rated BST and/or RAC more favourably than Bobby and Andy in terms of importance, effectiveness, and acceptability. The main reason for such differences across participants could be related to the additional reinforcers (praise and/or movies) and breaks provided for Candy and Dobby to reduce their off-task behaviour during the sessions, which may have alleviated the potential distress caused by the lengthy duration and performance demands.

To address these three procedural limitations, future researchers should make numerous modifications. Firstly, the excluded two scenarios should be added into the existing six scenarios in the future research to teach participants to demonstrate appropriate conversation initiations under more comprehensive situations encountered in the café. Also, instead of arranging two trials for each of the eight scenarios and having 16 trials across each session, the number of trials could be reduced to one for each scenario, totalling eight trials in each session. Moreover, verbal praise for participants' on-task behaviour and a few additional breaks should be added and consistently provided during the sessions to engage them in the task and lessen some distress. If this does not work, some interesting video clips could be arranged during the session breaks. As a result, the amount of time needed, performance demands, and potential distress across sessions could also be minimised. Secondly, future researchers may consider changing this online study to a completely in-person one; that is, teaching participants the conversation-initiating skill in the café to promote skill generalisation across customers and workmates in the vocational environment. Specifically, during baseline, pre- and post-training, follow-up, and generalisation probe sessions, researchers would invite each participant and their actual customers and workmates to join in an in-person role play involving the eight scenarios in the café. During training sessions,

researchers would follow the same BST or RAC procedure with the participant, except for showing them eight photos rather than 12, and doing it in person in a private room. Alternatively, researchers could combine the online training with in-person sessions to shorten the duration, and reduce the amount of effort required for the participant to be attending to online material across sessions while increasing their exposure to naturally occurring situations in the in situ setting. For instance, instead of doing a role play in the café during baseline, pre- and post-training, follow-up, and generalisation probe sessions, the participant would carry on doing what they usually do at work. At the same time, researchers could stage the eight scenarios with the collaboration of different confederates and other support staff in the café, who act as customers and workmates respectively, when appropriate, to ensure each scenario is occurring as naturally as possible. During training sessions, the same online procedure could be used with the participant, except that the number of photos would be reduced to eight.

Moreover, there are some additional limitations in the current research. Due to time constraints, the maintenance effects of RAC were only examined over four weeks, so the effects across longer periods (e.g., months) were undetermined. Further investigation is required to assess the maintenance of the intervention effects in the longer term by conducting follow-up sessions across months or even years if feasible. Also, IOA measures were not collected across participants during the generalisation probes. These measures are essential, especially when onsite data collection could be relatively challenging due to uncertainties and distractions posed within the natural environment. During busy hours in the café, the participants had to be interchangeably working in the kitchen and interacting with customers at the counter and tables while taking orders, serving food, or collecting cutlery. As a result, some of the conversations between the participants and workmates or customers could not be seen and/or heard by the student researcher, given that she needed to keep a

distance from the participants to avoid evoking reactivity (i.e., knowing one's behaviour is being observed by others) (Repp et al., 1988). In addition, the onsite data collection also tended to be overlong and labour intensive as the student researcher had to stay alert to observe and assess each conversation the participants had and wait for the targeted scenarios to occur naturally in the café to be able to record the target behaviour. To resolve these barriers, future researchers are recommended to recruit confederates and support staff in the café to complete a few relevant tasks during the onsite data collection. One task is to solicit those confederates and support staff to help the researcher to stage all the scenarios by acting them out as naturally as possible to minimise the time and work required for observations, as mentioned briefly earlier. The confederates would act as customers, while the support staff would act as the participants' workmates as usual to ensure the situations do not appear too contrived. Another task is to ask the support staff to carry a recording device in their pocket to record the participants' conversation initiations with customers and workmates, as their presence would not evoke reactivity providing that they are familiar to the participants and sometimes help the participants perform tasks in close proximity. The last task is to ask one of the confederates to do IOA with the researcher to ensure the accuracy and reliability of onsite data collection.

Conclusion

To conclude, the findings in the current study support the short- and long-term efficacy of RAC, while providing limited evidence for BST in teaching an appropriate conversation-initiating skill in a vocational setting, and no evidence on skill generalisation using either RAC or BST. Both interventions were perceived relatively positively by the participants, except for the overlong and demanding intervention sessions. Although it appears that RAC outperformed BST, this is not conclusive, given that numerous limitations may have impacted the functional relationship between the intervention(s) used and the

changes in the participants' conversation-initiating skill. Future research with improvements in the research design and procedure and the removal of relevant drawbacks is warranted before RAC is deemed a more efficient and effective behavioural intervention than BST.

Overall, the current research extends the existing literature on teaching conversational skills to individuals with ID online, using BST and RAC, in a New Zealand workplace, and comparing the effectiveness of these two intervention approaches. It shows that the way of acquiring new skills tends to differ across people with ID, as some can rapidly achieve learning acquisition with online training, whereas others cannot do so easily. Prior to the intervention, the individuals' prior learning history and preference for online or in-person training should be considered and used as guidance to help researchers tailor more optimal programmes. Then the appropriate programmes can be put in place to assist the individuals in developing or enhancing relevant repertoires and social skills promptly, boosting their job performance and interpersonal relations, securing employment and social participation in the community, and improving their quality of life.

Appendix A: Ethical Approval

Office of the Vice-Chancellor

Office of Research Strategy and Integrity (ORSI)

UNIVERSITY OF AUCKLAND HUMAN PARTICIPANTS ETHICS COMMITTEE (UAHPEC)

27/08/2021

Dr Katrina Phillips

Re: Application for Ethics Approval (Our Ref. UAHPEC22337): Approved

The Committee considered your application for ethics approval for the study entitled "**Comparing two interventions employed to improve an appropriate conversation initiating skill in adults with intellectual disabilities**".

We are pleased to inform you that ethics approval has been granted for a period of three years.

The expiry date for this approval is **27/08/2024**.

Completion of the project: In order that up-to-date records are maintained, you must notify the Committee once your project is completed.

Amendments to the approved project: Should you need to make any changes to the approved project, please follow the steps below:

- Send a request to the UAHPEC Administrators to unlock the application form (using the Notification tab in the Ethics RM form).
- Make all changes to the relevant sections of the application form and attach revised documents (as appropriate).
- Change the Application Type to "Amendment request" in Section 13 ("Submissions and Sign off").
- Add a summary of the changes requested in the text box.
- Submit the amendment request (PI/Supervisors only to submit the form).

If the project changes significantly, you are required to submit a new application.

Funded projects: If you received funding for this project, please provide this approval letter to your local Faculty Research Project Coordinator (RPC) or Research Project Manager (RPM) so that the approval can be notified via a Service Request to the Research Operations Centre (ROC) for activation of the grant.

The Chair and the members of UAHPEC would be happy to discuss general matters relating to ethics approvals. If you wish to do so, please contact the UAHPEC Ethics Administrators at humanethics@auckland.ac.nz in the first instance.

Additional information:

Do not forget to fill in the 'approval wording' on the PISs, CFs and/or advertisements, using the date of this approval and the reference number, before you use the documents or send them out to your participants.

All communications with the UAHPEC regarding this application should indicate this reference number: **UAHPEC22337**.

Appendix B: Participant Information Sheets

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Auckland 1142 New Zealand

PARTICIPANT INFORMATION SHEET

(Café Manager)

Project Title: Comparing two interventions employed to improve an appropriate conversation initiating skill in adults with intellectual disabilities
Name of Principal Investigator/Supervisor (PI): Katrina Phillips
Name of Student Researcher: Shao Wang

To the café manager,
My name is Shao Wang and I am a masters student in Applied Behaviour Analysis (ABA) programme in School of Psychology in Faculty of Science at The University of Auckland. As part of this degree, I am undertaking a research project, which will lead to a written report and may later be used for conference presentations and research publications, with the supervision of Katrina Phillips.

Adults with intellectual disabilities (ID) are often found as having deficits in conversational skills such as initiating a conversation appropriately. These deficits would impact their social interactions and relationships with others and their quality of life and wellbeing. Our research aims to teach these people the conversation initiating skill and make positive changes in their lives using evidence-based intervention strategies. Also, we aim to investigate an intervention that has both more instant and long-lasting effects on improving such a skill in people with ID. Thus, we will employ two interventions and compare each other. The two interventions are behavioural skills training (BST; a training package including instruction, modelling, rehearsal, and feedback) and covert audio coaching (CAC; a

method involving the delivery of coaching statements and feedback from an instructor to a client from a distance using a device like earphones).

I am writing to you regarding the possibility of conducting our research with your trainees in your place, the café. One reason is that one of our aims tends to align well with your one of establishing the café, namely, assisting individuals with ID learning and enhancing relevant skills to improve their quality of life. Also, the conversation initiating skill is deemed essential for those with ID who have a lack of such a skill to acquire when working in the hospitality sector. Moreover, participating trainees could receive multiple potential benefits from our research. For instance, they would become competent to interact with customers and colleagues in the café in a more appropriate manner. Also, they would provide better services and build a good rapport with these people, which will boost their morale in working in the café and improve their social functioning and quality of life. There are no potential risks involved as we will make the intervention environment enjoyable, minimise the time required for each session, and arrange a break between sessions during the research. However, if the participating trainee becomes distressed at any time, they can ask us to stop and we will do so immediately and give them a five- to 15-minute break. If they are still distressed after the break, we will seek expert advice from my supervisor, Katrina Phillips, a Board Certified Behaviour Analyst, and she will follow up with them and their support person(s) to check on their wellbeing. If this happens twice or they refuse to start the session for two consecutive trials, we will take it as withdrawing consent. Moreover, although unlikely, if they get injured, we will ensure they receive immediate care.

If you agree for us to conduct our research with your trainees in the café including the private meeting rooms, we would first like to ask you to help with our recruitment process with the residential home team. Specifically, we would like you to identify and select up to six potential participants from the current trainees who satisfy all our inclusion criteria. The inclusion criteria are 1) being adults with ID, 2) can communicate in English at least using short statements but having shown difficulty starting a conversation appropriately, and 3) can give informed consent themselves with decision-making support. Then we would like you to send an information package including an ***Information Sheet***, ***Participant Information Sheet***, ***Consent Form***, and ***Documentation of Consent*** form to each selected trainee and their supported decision-making team (e.g., parents, welfare guardians, friends, and support staff). When these trainees have agreed to take part in our research, we would like you to

allow us to access each of them for two to three hours of their normal training or working time per week over a period of four to five months. The details of their involvement in our research will be explained later in the procedure section. Also, we would like to have your permission to use and arrange seats in the café and outside parking spaces for participating trainees' support people when they want to come in during the research and see what we are doing with the trainees. Moreover, as participation in our research is completely voluntary, we would like to attain your assurance that the decision of these selected trainees on participating or not will not influence their training or employment in the café.

Project Procedures

Overall, our research will be conducted in four phases. Before phase one, we will ask each participating trainee some questions (e.g., their likes and dislikes) to ensure their comfort and safety during the research.

In phase one, we will first run several sessions in the café/online via a videoconferencing application, Zoom, across days to observe and assess when and how the participating trainee generally starts a conversation at work. Then we will randomly assign BST or CAC to them unless they prefer one over the other and introduce the assigned intervention in phase two to teach them the conversation initiating skill.

In phase two, we will run pre-training, training, and post-training sessions in order across days. In the pre-training and post-training sessions, we will observe and assess the participating trainee's conversation initiations as in phase one. In the training session, we will use BST or CAC with them in the private meeting room(s)/via Zoom. If BST is used, we will first provide instructions about when and how to start a conversation appropriately and model how to do these. Then we will do a task (i.e., showing them pictures and asking when and how to start a conversation with a certain person in each picture) with them and provide relevant feedback. If CAC is used, we will just do the same task and provide them with feedback after the training session starts. If their conversation initiating skill is improving across these three sessions and days, they will receive their preferred reward. However, if their skill is not improving over time, we will change to the intervention that works better or combine BST and CAC if neither of them works. Once their skill has reached a certain mastery level, the intervention used will be withdrawn and phase three will begin.

In phase three, we will do a follow-up session once a week for four successive weeks to see if the participating trainee's conversation initiating skill stays at the mastery level over time. If it stays across these four weeks, we will ask them to complete a survey regarding how they feel about the intervention used and then the research ends. They will later receive their preferred reward again for their participation. However, if it drops to a certain level in the first week, we will start phase four.

In phase four, we will run the same procedures including using the same intervention that has worked for the participating trainee as in phase two. When their conversation initiating skill reaches the same mastery level again, we will return to phase three and follow the same procedures.

Data Storage and Destruction

All the information obtained from the café and participating trainees is only accessible to the researcher and principal investigator. The electronic and physical copies of this information will be stored in a University of Auckland (UoA) hard drive and inside of a locked file cabinet on UoA premises respectively for a six-year period. After this period of time, all the relevant documents and data will be subsequently deleted from the device used or shredded and destroyed.

Right to Withdraw from Participation

Participation is completely voluntary. Each participating trainee has the right to withdraw themselves from the research at any time without giving a reason and the right to remove their data within three weeks since we have started our research with them. Also, the café has the right to withdraw their permitted support and access at any time without giving a reason but cannot withdraw the data participating trainees have already contributed to that point.

Anonymity and Confidentiality

We cannot provide anonymity due to the nature of the research. However, all the information obtained from the café and participating trainees will remain confidential by not referring to its name and using pseudonyms for their identities respectively. This information may also be used for conference presentations and research publications and we will not contain any other information that could be used to link back to the café and participating trainees in real life to ensure confidentiality. However, there is a potential risk of your café being identified as the research setting despite not being named in the research due to its rareness in New Zealand. Also, trained graduate students will be

observing a small portion of sessions to assist in data collection during the research. Confidentiality of the café and participating trainees will be preserved with a related confidentiality agreement with these students.

Contact Details

For any questions or concerns regarding this research, you would like to contact the researchers or the academic head. The contact details are:

Title	Name	Email	Phone
Student Researcher	Shao Wang	swan669@aucklanduni.ac.nz	09 373-7599 ext. 84468
Principal Investigator /Supervisor	Dr. Katrina Phillips	kj.phillips@auckland.ac.nz	09 373-7599 ext. 84468
Head of School	Prof. Suzanne Purdy	sc.purdy@auckland.ac.nz	09 923-2073

UAHPEC Chair Contact Details:

For any concerns regarding ethical issues you may contact the Chair, The University of Auckland Human Participants Ethics Committee, Office of Strategy Research and Integrity, University of Auckland, Private Bag 92019, Auckland 1142. Telephone 09 373-7599 ext. 83711. Email: humanethics@auckland.ac.nz

Approved by the University of Auckland Human Participants Ethics Committee on 27th August 2021 for three years. Reference Number UAHPEC22337.

THE UNIVERSITY OF AUCKLAND
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Auckland 1142 New Zealand

PARTICIPANT INFORMATION SHEET
(Service Manager)

Project Title: Comparing two interventions employed to improve an appropriate conversation initiating skill in adults with intellectual disabilities
Name of Principal Investigator/Supervisor (PI): Katrina Phillips
Name of Student Researcher: Shao Wang

To the service manager,
My name is Shao Wang and I am a masters student in Applied Behaviour Analysis (ABA) programme in School of Psychology in Faculty of Science at The University of Auckland. As part of this degree, I am undertaking a research project, which will lead to a written report and may later be used for conference presentations and research publications, with the supervision of Katrina Phillips.

Adults with intellectual disabilities (ID) are often found as having deficits in conversational skills such as initiating a conversation appropriately. These deficits would impact their social interactions and relationships with others and their quality of life and wellbeing. Our research aims to teach these people the conversation initiating skill and make positive changes in their lives using evidence-based intervention strategies. Also, we aim to investigate an intervention that has both more instant and long-lasting effects on improving such a skill in people with ID. Thus, we will employ two interventions and compare each other. The two interventions are behavioural skills training (BST; a training package including instruction, modelling, rehearsal, and feedback) and covert audio coaching (CAC; a method involving the delivery of coaching statements and feedback from an instructor to a client from a distance using a device like earphones).

I am writing to you regarding our research that will be conducted in the workplace of some of your residents, the café, as we would love to seek your assistance to recruit participants. The reason is that we believe you are in a good position to identify potential trainee participants who could benefit from acquiring the conversation initiating skill we aim to teach. There are several potential benefits participating trainees could receive from our research. For instance, they would become competent to interact with customers and colleagues in the café in a more appropriate manner. Also, they would provide better services and build a good rapport with these people, which will boost their morale in working in the café and improve their social functioning and quality of life. There are no potential risks involved as we will make the intervention environment enjoyable, minimise the time required for each session, and arrange a break between sessions during the research. However, if the participating trainee becomes distressed at any time, they can ask us to stop and we will do so immediately and give them a five- to 15-minute break. If they are still distressed after the break, we will seek expert advice from my supervisor, Katrina Phillips, a Board Certified Behaviour Analyst, and she will follow up with them and their support person(s) to check on their wellbeing. If this happens twice or they refuse to start the session for two consecutive trials, we will take it as withdrawing consent. Moreover, although unlikely, if they get injured, we will ensure they receive immediate care.

If you agree to help us with recruitment, we would like you to work with the café team to first identify and select up to six potential participants from the current trainees who satisfy all our inclusion criteria. The inclusion criteria are 1) being adults with ID, 2) can communicate in English at least using short statements but having shown difficulty starting a conversation appropriately, and 3) can give informed consent themselves with decision-making support. Then we would like you to send an information package including an ***Information Sheet***, ***Participant Information Sheet***, ***Consent Form***, and ***Documentation of Consent*** form to each selected trainee and their supported decision-making team (e.g., parents, welfare guardians, friends, and support staff). The details of participating trainees' involvement in our research will be explained in the following section. Moreover, since participation is completely voluntary, we would like to attain your assurance that these selected trainees' decisions on participating or not will have no consequences on their care or placement in the residential facility.

Project Procedures

Overall, our research will be conducted in four phases. Before phase one, we will ask each participating trainee some questions (e.g., their likes and dislikes) to ensure their comfort and safety during the research.

In phase one, we will first run several sessions in the café/online via a videoconferencing application, Zoom, across days to observe and assess when and how the participating trainee generally starts a conversation at work. Then we will randomly assign BST or CAC to them unless they prefer one over the other and introduce the assigned intervention in phase two to teach them the conversation initiating skill.

In phase two, we will run pre-training, training, and post-training sessions in order across days. In the pre-training and post-training sessions, we will observe and assess the participating trainee's conversation initiations as in phase one. In the training session, we will use BST or CAC with them in the private meeting room(s)/via Zoom. If BST is used, we will first provide instructions about when and how to start a conversation appropriately and model how to do these. Then we will do a task (i.e., showing them pictures and asking when and how to start a conversation with a certain person in each picture) with them and provide relevant feedback. If CAC is used, we will just do the same task and provide them with feedback after the training session starts. If their conversation initiating skill is improving across these three sessions and days, they will receive their preferred reward. However, if their skill is not improving over time, we will change to the intervention that works better or combine BST and CAC if neither of them works. Once their skill has reached a certain mastery level, the intervention used will be withdrawn and phase three will begin.

In phase three, we will do a follow-up session once a week for four successive weeks to see if the participating trainee's conversation initiating skill stays at the mastery level over time. If it stays across these four weeks, we will ask them to complete a survey regarding how they feel about the intervention used and then the research ends. They will later receive their preferred reward again for their participation. However, if it drops to a certain level in the first week, we will start phase four.

In phase four, we will run the same procedures including using the same intervention that has worked for the participating trainee as in phase two. When their conversation initiating skill reaches the same mastery level again, we will return to phase three and follow the same procedures.

Data Storage and Destruction
All the information obtained from the residential facility is only accessible to the researcher and principal investigator. The electronic and physical copies of this information will be stored in a University of Auckland (UoA) hard drive and inside of a locked file cabinet on UoA premises respectively for a six-year period. After this period of time, all the relevant documents and data will be subsequently deleted from the device used or shredded and destroyed.

Right to Withdraw from Involvement
Your involvement is completely voluntary. As an organisation, the residential facility has the right to withdraw their permitted support at any time without giving a reason but cannot withdraw the data participating trainees have already contributed to that point.

Anonymity and Confidentiality
We cannot provide anonymity due to the nature of the research but all the information obtained from the residential facility will remain confidential by not referring to its name.

Contact Details
For any questions or concerns regarding this research, you would like to contact the researchers or the academic head. The contact details are:

Title	Name	Email	Phone
Student Researcher	Shao Wang	swan669@aucklanduni.ac.nz	09 373-7599 ext. 84468
Principal Investigator /Supervisor	Dr. Katrina Phillips	kj.phillips@auckland.ac.nz	09 373-7599 ext. 84468
Head of School	Prof. Suzanne Purdy	sc.purdy@auckland.ac.nz	09 923-2073

UAHPEC Chair Contact Details:
For any concerns regarding ethical issues you may contact the Chair, The University of Auckland Human Participants Ethics Committee, Office of Strategy Research and Integrity, University of Auckland, Private Bag 92019, Auckland 1142. Telephone 09 373-7599 ext. 83711. Email: humanethics@auckland.ac.nz

Approved by the University of Auckland Human Participants Ethics Committee on 27th August 2021 for three years. Reference Number UAHPEC22337.

Appendix C: Consent Forms

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Private Bag 92019
Auckland 1142 New Zealand

CONSENT FORM
(Café Manager)

THIS FORM WILL BE HELD FOR A PERIOD OF 6 YEARS

Project Title: Comparing two interventions employed to improve an appropriate conversation initiating skill in adults with intellectual disabilities
Name of Principal Investigator/Supervisor (PI): Katrina Phillips
Name of Student Researcher: Shao Wang

I have read the Participant Information Sheet and have understood that the nature of the research and why the research is to be conducted in our café. I have had the opportunity to ask questions and have them answered to my satisfaction.

- I, the manager, on behalf of the café team, agree for the researcher to access the café including private meeting rooms and conduct their research there with our trainees who have consented to take part in this research.

- I agree that we will assist the researcher with recruitment with the residential facility team including identifying up to six potential trainee participants and sending an information package to each of them and their supported decision-making team.

- I give the researcher permission to access each participating trainee in the café/via Zoom for two to three hours of their normal training or working time per week over a period of four to five months.

- I give my assurance that the potential trainee participants' decisions on participation or non-participation will not affect their employment or training in the café.

- I permit the researcher to use and arrange seats and parking spaces inside and outside the café respectively for each participating trainee's support person(s) when they want to come in and see what the person they support is doing with the researcher.

- I recognise that a third party, graduate students, will observe a small portion of sessions to assist in data collection during the research and understand these students are bound by a related confidentiality agreement.

- I understand that all the information collected in the café during the research will be kept confidential and that the electronic and physical copies will be stored in a University of Auckland (UoA) hard drive and a locked cabinet on UoA premises respectively for six years and then deleted and destroyed afterwards.

- I acknowledge that the information collected from the participating trainees in the café might be used for conference presentations and research publications and this will not be used to link back to these trainees and the café in real life.

- I recognise that there is a potential risk of the café being identified as the research setting despite not being named in the research due to its rareness in New Zealand.

- I understand that participation in this research is completely voluntary and we have the right to withdraw our support and access at any time without giving a reason but cannot withdraw the participating trainees' data they have already contributed to that point.

- I wish/do not wish to receive a summary of the research findings and this can be emailed to me at _____

Name: _____

Signature: _____ Date: _____

Approved by the University of Auckland Human Participants Ethics Committee on 27th August 2021 for three years. Reference Number UAHPEC22337.

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Auckland 1142 New Zealand

CONSENT FORM
(Service Manager)

THIS FORM WILL BE HELD FOR A PERIOD OF 6 YEARS

Project Title: Comparing two interventions employed to improve an appropriate conversation initiating skill in adults with intellectual disabilities
Name of Principal Investigator/Supervisor (PI): Katrina Phillips
Name of Student Researcher: Shao Wang

I have read the Participant Information Sheet and have understood that the nature of the research and why our residential facility is invited to be involved. I have had the opportunity to ask questions and have them answered to my satisfaction.

- I, the service manager, on behalf of the residential facility team, agree to assist the researcher with recruitment with the café team including identifying up to six potential trainee participants and sending an information package to each of them and their supported decision-making team.

- I recognise that all the information obtained from the residential facility will be kept confidential and that the electronic and physical copies will be stored in a University of Auckland (UoA) hard drive and a locked cabinet on UoA premises respectively for six years and then deleted and destroyed afterwards.

- I understand that our involvement in this research is completely voluntary and that we have the right to withdraw our support at any

time without giving a reason but cannot withdraw the participating trainees' data they have already contributed to that point.

- I give my assurance that the potential trainee participants' decisions on participation or non-participation will not affect their care or placement in the residential facility.

- I wish/do not wish to receive a summary of the research findings and this can be emailed to me at _____

Name: _____

Signature: _____ Date: _____

Approved by the University of Auckland Human Participants Ethics Committee on 27th August 2021 for three years. Reference Number UAHPEC22337.

Appendix D: Participant Information Package

SCIENCE
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The University of Auckland
Private Bag 92019
Auckland 1142 New Zealand

INFORMATION SHEET
(Support Person(s))

Project Title: Comparing two interventions employed to improve an appropriate conversation initiating skill in adults with intellectual disabilities
Name of Principal Investigator/Supervisor (PI): Katrina Phillips
Name of Student Researcher: Shao Wang

To the support person(s) of_____,
My name is Shao Wang and I am a masters student in Applied Behaviour Analysis (ABA) programme in School of Psychology in Faculty of Science at The University of Auckland. As part of this degree, I am undertaking a research project, which will lead to a written report and may later be used for conference presentations and research publications, with the supervision of Katrina Phillips.

Adults with intellectual disabilities (ID) are often found as having deficits in conversational skills such as initiating a conversation appropriately. These deficits would impact their social interactions and relationships with others and their quality of life and wellbeing. Our research aims to teach these people the conversation initiating skill and make positive changes in their lives using evidence-based intervention strategies. Also, we aim to investigate an intervention that has both more instant and long-lasting effects on improving such a skill in people with ID. Thus, we will employ two interventions and compare each other. The two interventions are behavioural skills training (BST; a training package including instruction, modelling, rehearsal, and feedback) and covert audio coaching (CAC; a

method involving the delivery of coaching statements and feedback from an instructor to a client from a distance using a device like earphones).

I am writing to you regarding our research that is being conducted in the workplace of the person you support, the café, as we would like to invite them to participate in our research. The reason of this invitation is that they have been identified as someone who could benefit from acquiring the conversation initiating skill we aim to teach. For example, they would become competent to interact with customers and colleagues in the café in a more appropriate manner. Also, they would provide better services and build a good rapport with these people, which will boost their morale in working in the café and improve their social functioning and quality of life. There are no potential risks involved as we will make the intervention environment enjoyable, minimise the time required for each session, and arrange a break between sessions during the research. However, if the person becomes distressed at any time, they can ask us to stop and we will do so immediately and give them a five- to 15-minute break. If they are still distressed after the break, we will seek expert advice from my supervisor, Katrina Phillips, a Board Certified Behaviour Analyst, and she will follow up with them and you to check on their wellbeing. If this happens twice or they refuse to start the session for two consecutive trials, we will take it as withdrawing consent. Moreover, although unlikely, if they get injured, we will ensure they receive immediate care.

The person's participation is completely voluntary. The café and service managers have given their assurance that the person's training or employment in the café and their care or placement in the residential facility respectively will not be affected by their decision on whether or not to participate. To help them make an informed decision, we would like you to read through this information sheet. It provides required information to help you support the person to understand all the information in their ***Participant Information Sheet*** and give their informed consent to take part in our research. The informed consent can be done either by providing written consent by signing the ***Consent Form*** or providing oral consent by telling you and at least one other witness that they agree to participate in this research. If oral consent is provided, you need to record that has occurred in the relevant sections on their ***Documentation of Consent*** form. Also, we would like you to complete the ***Documentation of Consent*** form as a formal record of who were present during the person's decision making and their roles or relationships to the person. Once the person has agreed to take part, we would love to invite you to come in and see what we are doing with them

in the café/online via a videoconferencing application, Zoom, during the research. Seats and parking spaces/the Zoom link will be provided with advance arrangements. If you want to know more about our research, we would like you to engage in conversations started by the person before and after watching how we teach them the conversation initiating skill using BST or CAC. By doing so, you could see the changes in their ways of communicating directly. Also, we will provide you and the person with feedback on their progress during the research and you are welcome to ask questions. The details of the person's involvement in our research will be explained in the following section.

Project Procedures

Overall, we would like to the person to contribute two to three hours of their normal training or working time per week over a period of four to five months for our research, which has four phases. Before phase one, we will ask them some questions (e.g., their likes and dislikes) to ensure their comfort and safety during the research.

In phase one, we will first run several sessions in the café/via Zoom across days to observe and assess when and how the person generally starts a conversation at work. Then we will randomly assign BST or CAC to them unless they prefer one over the other and introduce the assigned intervention in phase two to teach them the conversation initiating skill.

In phase two, we will run pre-training, training, and post-training sessions in order across days. In the pre-training and post-training sessions, we will observe and assess the person's conversation initiations as in phase one. In the training session, we will use BST or CAC with them in the private meeting room(s)/via Zoom. If BST is used, we will first provide instructions about when and how to start a conversation appropriately and model how to do these. Then we will do a task (i.e., showing them pictures and asking when and how to start a conversation with a certain person in each picture) with them and provide relevant feedback. If CAC is used, we will just do the same task and provide them with feedback after the training session starts. If their conversation initiating skill is improving across these three sessions and days, they will receive their preferred reward. However, if their skill is not improving over time, we will change to the intervention that works better or combine BST and CAC if neither of them works. Once their skill has reached a certain mastery level, the intervention used will be withdrawn and phase three will begin.

In phase three, we will do a follow-up session once a week for four successive weeks to see if the person's conversation initiating skill stays at the mastery level over time. If it stays across these four weeks, we will ask them to complete a survey regarding how they feel about the intervention used and then the research ends. They will later receive their preferred reward again for their participation. However, if it drops to a certain level in the first week, we will start phase four.

In phase four, we will run the same procedures including using the same intervention that has worked for the person as in phase two. When their conversation initiating skill reaches the same mastery level again, we will return to phase three and follow the same procedures.

Data Storage and Destruction

All the information obtained from the person is only accessible to the researcher and principal investigator. The electronic and physical copies of this information will be stored in a University of Auckland (UoA) hard drive and inside of a locked file cabinet on UoA premises respectively for a six-year period. After this period, all the relevant documents and data will be subsequently deleted from the device used or shredded and destroyed.

Right to Withdraw from Participation

Participation in this research is completely voluntary. The person has the right to withdraw themselves from the research at any time without giving a reason and the right to remove their data within three weeks since we have started the research with them.

Anonymity and Confidentiality

We cannot provide anonymity due to the nature of the research but all the information obtained from the person will remain confidential by using a pseudonym for their identity. This information may also be used for conference presentations and research publications and we will not contain any other information that could be traceable back to them in real life to ensure confidentiality. However, there is a potential risk of the café in which they are currently working being identified as the research setting despite not being named in the research due to its rareness in New Zealand. Also, during the research, trained graduate students will be observing a small portion of sessions to assist in data collection and the person's confidentiality will be preserved with a related confidentiality agreement with these students.

Contact Details

For any questions or concerns regarding this research, you would like to contact the researchers or the academic head. The contact details are:

Title	Name	Email	Phone
Student Researcher	Shao Wang	swan669@aucklanduni.ac.nz	09 373-7599 ext. 84468
Principal Investigator /Supervisor	Dr. Katrina Phillips	kj.phillips@auckland.ac.nz	09 373-7599 ext. 84468
Head of School	Prof. Suzanne Purdy	sc.purdy@auckland.ac.nz	09 923-2073

UAHPEC Chair Contact Details:

For any concerns regarding ethical issues you may contact the Chair, The University of Auckland Human Participants Ethics Committee, Office of Strategy Research and Integrity, University of Auckland, Private Bag 92019, Auckland 1142. Telephone 09 373-7599 ext. 83711. Email: humanethics@auckland.ac.nz

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DOCUMENTATION OF CONSENT

THIS FORM WILL BE HELD FOR A PERIOD OF 6 YEARS

Project Title: Comparing two interventions employed to improve an appropriate conversation initiating skill in adults with intellectual disabilities
Name of Principal Investigator/Supervisor (PI): Katrina Phillips
Name of Student Researcher: Shao Wang

The Participant Information Sheet and Consent Form for the trainee participant were both explained to:

_____
(Name of Person Providing Consent – Trainee Participant)

The person stated above has provided their **written/verbal consent (please circle one)** to take part in this research project. This person understands that they can withdraw their consent at any time without giving a reason. If they decide to withdraw their consent after the end of the third week since the research has started, the data collected up to that point will still be available for the researcher to use.

The Participant Information Sheet and Consent Form were explained to the trainee participant by:

(Name of the person who explained the Participant Information Sheet and Consent Form)	(Relationship to Trainee Participant /Role)

Please include those who were present during the time of this decision making.				
a)				
	(Name of witness)	(Relationship to Trainee Participant /Role)	(Signature)	(Date)
b)				
	(Name of witness)	(Relationship to Trainee Participant /Role)	(Signature)	(Date)

If the consent was **written,** please fill this section out:		
(Name of Trainee Participant)	(Trainee Participant's Signature)	(Date)

If the consent was **verbal**, please write down who witnessed, recorded, and agreed to this.				
a)				
	(Name of witness)	(Relationship to Participant/Role)	(Signature)	(Date)
b)				
	(Name of witness)	(Relationship to Participant/Role)	(Signature)	(Date)

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PARTICIPANT INFORMATION SHEET
(Trainee Participant)

Project Title: Comparing two interventions employed to improve an appropriate conversation initiating skill in adults with intellectual disabilities
Name of Principal Investigator/Supervisor (PI): Katrina Phillips
Name of Student Researcher: Shao Wang

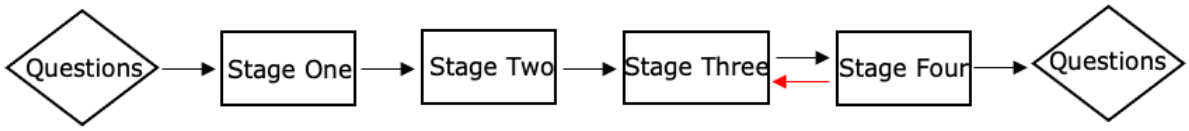
Hi, _____
My name is Shao Wang. I am a student from The University of Auckland and currently doing a study with the help of Katrina Phillips.

People sometimes find it difficult to know when and how to start a talk with others. This can make their life a bit harder when they want to get on with someone. The goal of our study is to help people learn the ways of starting a talk in a good manner and timing to make their life easier using useful teaching methods. Also, we want to know if there is a method that makes this learning faster and lead to a long-term change. Therefore, we will use two methods and compare each other. The two methods are behavioural skills training (BST; a training package including instruction, modelling, practice, and feedback) and covert audio coaching (CAC; a method involving an instructor providing teaching statements and feedback to a client from a distance using a device such as earphones).

I am writing to you because I would like to invite you to take part in our study that is being carried out in your workplace, the café.

What is involved in this study?
Overall, we want you to provide two to three hours of your normal

working or training time each week for four to five months for our study. There are four stages in our study. Before stage one, we will ask you some questions (e.g., your likes and dislikes) so that we can arrange things in the way you prefer.

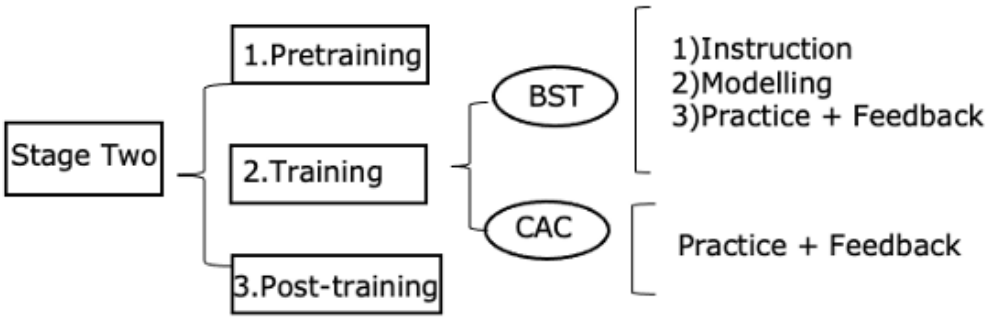


At stage one, we will run a few sessions in the café/online using a tool called Zoom for several days to watch when and how you usually start a talk with others (e.g., customers and workmates) at work. Then we will randomly select one of the two teaching methods, BST or CAC, for you or select the one you like and use it at stage two to teach you the skill of starting a talk.

At stage two, we will run pre-training, training, and post-training sessions in order each day. In the pre-training and post-training sessions, we will watch when and how you start a talk as at stage one. In the training session, we will do some teaching with you using BST or CAC in the private meeting room(s)/via Zoom. If BST is used, we will follow these steps:

1. Instruction: explaining about when and how to start a talk,
2. Modelling: showing you how to do these,
3. Practice **+** Feedback: doing a task with you: showing you pictures & asking when and how to start a talk with a given person in each picture **+** telling you whether you are right or wrong & why.

If CAC is used, we will just do the same task and give you feedback.



If your skill of starting a talk is improving in these three sessions for several days, you will get your preferred treat. However, if it is not

improving over time, we will choose the method that works better or add BST onto CAC if neither of them works. Once your skill has met a certain level, we will remove the method used and begin stage three.

At stage three, we will run a follow-up session once a week for four weeks in a row to see if your skill stays at the same certain level over time. If it stays in these four weeks, we will ask you some questions about how you feel about the method used and the study ends. You will later receive your preferred treat again for your time and hard work. However, if it drops to a particular level in the first week, we will move onto stage four.

At stage four, we will follow the same steps including using the same method that has worked for you as at stage two. Once your skill meets the same certain level again, we will return to stage three and follow the same steps.

During the study, we will also give you and your support person(s) feedback on your progress over time.

How can I benefit from this study? Would there be any risks?
One possible benefit is that you can easily get on with people around you such as customers and workmates in the café once you know when and how to start a talk with them. Also, you can provide better services and form a good relation with these people and this will help you become more confident in working in the café and make your life more joyful.

There are no possible risks being involved within our study since we will make the learning fun and the time spent in each session as short as we can. We will also give you a break between sessions at each stage. However, if you become upset at any time during the study, you can ask us to stop and we will do so immediately and give you a five- to 15-minute break. If you are still upset after the break, we will talk to my supervisor, Katrina Phillips, about this. She will later check with you and your support person(s) on your wellbeing. If this happens twice or you say "No" to us twice in a row when we ask if you are happy for us to start the session, we will take it as you want to stop the study. Also, although unlikely, if you get hurt, we will make sure you receive the care needed as soon as possible.

Do I have to take part in this study?
You can either agree or not agree to take part in this study. The café and service managers have assured that your training or job in the café and

your care or placing in the residential home will not be affected by your decision. Once you agree to take part, you can ask the researcher to stop the study at any time and remove your information within three weeks since the study has started.

Will my information be protected?

All the information you provide can only be seen by the researcher and principal investigator. This information will be stored safely for six years and then deleted afterwards. It may also be used publicly but people will not know it is about you since we will be using a fake name. However, because your workplace, the café, is quite rare in New Zealand, it is possible people will know the study is done in the café although we will not name it. Also, during the study, some students will come in and watch what you do such as talking and doing tasks and your information will also be protected by them.

Contact Details

If you have any questions about this study, you can contact:

Title	Name	Email	Phone
Student Researcher	Shao Wang	swan669@aucklanduni.ac.nz	09 373-7599 ext. 84468
Principal Investigator /Supervisor	Dr. Katrina Phillips	kj.phillips@auckland.ac.nz	09 373-7599 ext. 84468
Head of School	Prof. Suzanne Purdy	sc.purdy@auckland.ac.nz	09 923-2073

UAHPEC Chair Contact Details:

For any concerns about ethical issues you may contact the Chair, The University of Auckland Human Participants Ethics Committee, Office of Strategy Research and Integrity, University of Auckland, Private Bag 92019, Auckland 1142. Telephone 09 373-7599 ext. 83711. Email: humanethics@auckland.ac.nz

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CONSENT FORM

(Trainee Participant)

THIS FORM WILL BE HELD FOR A PERIOD OF 6 YEARS

Project Title: Comparing two interventions employed to improve an appropriate conversation initiating skill in adults with intellectual disabilities
Name of Principal Investigator/Supervisor (PI): Katrina Phillips
Name of Student Researcher: Shao Wang

I have read the Participant Information Sheet and have understood that the nature of this study and why I have been invited to take part. I have had the chance to ask questions and have them answered.

- I agree to take part in this study and provide two to three hours of my normal working or training time per week for four to five months.

- I understand that I will need to do some tasks (e.g., following instructions & answering questions) in the café/online via a tool called Zoom when taking part in this study and I am okay with that.

- I know that I am free to decide whether or not to take part in this study and the café and service managers have assured that my decision will not affect my relationships with the café and the residential home.

- I understand that I can ask the researcher to stop the study whenever I want to and remove my information within three weeks since the study has started.

- I know that the information collected from me will be stored safely for six years and then will be deleted afterwards.

- I understand that sometimes some students will come in and watch what I do (e.g., talking & doing tasks) and know that my information will also be protected by them.

- I know that the information I provide might be used publicly but people will not know it is about me since the researcher will be using a fake name.

- I understand that people might know this study is done in the café even though it will not be named because it is quite rare in New Zealand.

- I wish/do not wish to receive the summary of the study findings and this can be emailed to: _____

Name: _____

Signature: _____ Date: _____

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Appendix E: Interview Questionnaire

Interview

(Trainee Participant)

Name (coded): _____ Date of Birth: _____ Age: _____
Gender: F / M

1. Is there anything you would like us to know that would make you more comfortable during the study (e.g., liking others to talk in a soft voice or not liking others to stand/sit next to you too closely or people asking you too many questions at once)?

2. How will we know that you are stressed, upset, or annoyed? What can we do to help you if you feel this way (e.g., is it a good idea to have a break? OR would you like a glass of water?)?

3. When you learn new things, do you like to see someone else do it first before you start or would you prefer to do it yourself straight away and learn from your mistakes?

4. Sometimes we like to hear we are doing well (e.g., "Well done! You did it!" & "Good job! You got it!"), is this something that you like?

5. Sometimes we need more than just to hear we have done well and we want to treat ourselves. What are your top three treats?

6. Anything else you would like to add/tell us?

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Appendix F: Data Collection Sheet

Study Phase: _____ Intervention Type: _____ Session Type: _____
Participant: _____ Observer: _____ Date: _____

Session Number: _____		
Trial Number of Initiating a Conversation	APPROPRIATE Conversation Initiation	INAPPROPRIATE Conversation Initiation
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
Number of Count		
% of Appropriate/Inappropriate Conversation Initiations		

Study Phase: _____ Intervention Type: _____ Session Type: _____
Participant: _____ Observer: _____ Date: _____

Session Number: _____		
Trial Number of Initiating a Conversation	APPROPRIATE Conversation Initiation	INAPPROPRIATE Conversation Initiation
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
Number of Count		
% of Appropriate/Inappropriate Conversation Initiations		

Appendix G: Procedural Integrity Checklist for Secondary Observer

Study Phase: _____ Intervention Type: _____ Session Type: _____

Participant: _____ Observer: _____ Date: _____

	YES (√) / NO (×)
1. **Prior to the session:** The researcher checks in with the participant (*including checking volume and sound)* via Zoom / in person in the café.	
2. **During the baseline / pre-training / post-training / follow-up session**: The researcher introduces 12 scenarios to the participant & observes their conversation initiations via Zoom **OR** observes the first 12 conversation initiations in person in the café **AND** no programmed consequences (e.g., praise & feedback) are provided **EXCEPT** EC was used in pre-training sessions.	
3. **During the training session**: For the participant in the **BST** group, the researcher 1) provides written & verbal instructions regarding the conversation initiating skill, 2) models appropriate & inappropriate conversation initiating behaviours, 3) introduces a task of conversation initiations including 12 trials & provides supportive and corrective feedback when required in each trial via Zoom / in person in the café.	
For the participant in the **CAC** group, the researcher 1) introduces a task of conversation initiations including 12 trials & provides supportive and corrective feedback when required via audio from a distance in each trial via Zoom / in person in the café.	
4. **During the session:** The researcher gives the participant a break / stops the session when the participant feels distressed or asks to do so.	
5. **After the session:** The researcher gives feedback on the participant's progress when appropriate and / or gives them a break before starting the next session.	
OVERALL	/
PERCENTAGE	%

Appendix H: Confidentiality Agreement

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CONFIDENTIALITY AGREEMENT
(Third Party Graduate Student)

Project Title: Comparing two interventions employed to improve an appropriate conversation initiating skill in adults with intellectual disabilities
Name of Principal Investigator/Supervisor (PI): Katrina Phillips
Name of Student Researcher: Shao Wang

Graduate Student's Name: _____

I have signed consent to participate in the above research project. I understand that the data I record and the information I obtain during the observation sessions is confidential and must not be disclosed to or discussed with anyone other than the researcher and their supervisor. I agree that I need to hand in all the data collection sheets used to the researcher immediately after the observation sessions and do not keep any copies of them to myself.

Name: _____

Signature: _____

Date: _____

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Appendix I: Social Validity Survey

Intervention Evaluation Inventory Short Form (TEI-SF)

Please complete each of the following **Seven** items by colouring **ONE** face that best shows how you feel about the way that Shao helped me improve my conversations

1. I found the way I was taught helped me know when and how to start a talk with someone.

Strongly Disagree Disagree Neutral Agree Strongly Agree

2. If I have to learn something else new, I would like to learn it the same way as Shao taught me.

Strongly Disagree Disagree Neutral Agree Strongly Agree

3. I like the steps that Shao used to teach me conversation.

Strongly Disagree Disagree Neutral Agree Strongly Agree

4. I think the way Shao taught me conversation was helpful and useful.

Strongly Disagree Disagree Neutral Agree Strongly Agree

5. The way that Shao taught me conversation made me upset, stressed or annoyed.

6. I think that the way Shao taught me will help me keep talking with people at work.

7. Overall, I like this teaching method.

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