

Reinforcement-Based Group Contingencies to Increase Prosocial Behaviour among At- Risk Children in Community Settings.

Ciara Brennan, BSc in Psychology

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School of Psychology

Dublin City University

Supervisors:

Dr. Sinéad Smyth, School of Psychology, Dublin City University

Dr. Jennifer Austin, Department of Learning Sciences, Georgia State University

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Declaration

I hereby certify that this material, which I now submit for assessment on the programme of study leading to the award of Doctor of Philosophy is entirely my own work, and that I have exercised reasonable care to ensure that the work is original and have conformed to the regulations on the use and declaration of Generative AI, and does not to the best of my knowledge breach any law of copyright, and has not been taken from the work of others save and to the extent that such work has been cited and acknowledged within the text of my work. I hereby certify that no Generative Artificial Intelligence (Gen AI) tools have been used in the creation of the thesis.

Signed: Ciara Brennan

ID No.: 21269622

Date: 17/12/2025

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List of Abbreviations

ABA	Applied Behaviour Analysis
ACEs	Adverse Childhood Experiences
ASB	Antisocial Behaviour
BIRS	Behaviour Intervention Rating Scale
CBGG	Caught Being Good Game
CIRP	Children's Intervention Rating Profile
DBR	Direct Behaviour Rating
DEIS	Delivering Equality of Opportunity in Schools
DCEDIY	Department of Children, Equality, Disability, Integration and Youth Government of Ireland
GBG	Good Behaviour Game
PND	Percentage of Nonoverlapping Data
PSB	Prosocial Behaviour
RCT	Randomised Control Trial
REC	Dublin City University's Research Ethics Committee
WWC	What Works Clearinghouse

Abstract

Student: Ciara Brennan

Thesis Title: Reinforcement-Based Group Contingencies to Increase Prosocial Behaviour among At-Risk Children in Community Settings.

Prosocial behaviours such as helping, cooperating and sharing have numerous positive impacts on children's social and emotional development. These behaviours can act as protective factors against the negative outcomes associated with antisocial behaviours, particularly amongst children at risk of adverse childhood experiences. While the use of behavioural supports, to promote prosocial behaviour, is well-established in formal school settings, our knowledge of their use in informal, community-based settings is limited.

This thesis addresses this gap by exploring how group contingency interventions, interventions in which a common consequence is delivered to a group of children based on the behaviour of one or more individuals within that group, can be implemented in afterschool settings to promote prosocial behaviours of children. This research combines a systematic review exploring the use of group contingencies for targeting prosocial behaviours and antisocial behaviours and four empirical studies exploring the use of reinforcement-based group contingencies, the Caught Being Good Game, to increase prosocial behaviour in afterschool centres serving at-risk children.

Aligned with participatory approaches and social validity, we strove to involve participants in meaningful ways through various novel methods. For example, in Chapter 4 the adult leader was involved in monitoring behaviour change using direct behaviour ratings and in Chapter 5, two studies are presented in which co-design methods were used to design the group contingency with adult leaders and children as key design partners.

Findings suggest that the Caught Being Good Game can be effectively implemented in afterschool settings to target prosocial behaviours. Moreover, evidence suggests that participatory approaches can have positive implications for social validity from both adult leader and child perspectives. By centring the voices of participants and embedding co-design and participatory approaches within intervention design, this thesis presents a novel framework for implementing socially valid, trauma-informed behavioural strategies outside the classroom.

Chapter 1: Introduction

The foundations of behaviour are established in early childhood (Denham et al., 2017; Walker et al., 2011), making this an important period for instilling core values and shaping future outcomes. Effective methods for promoting positive behaviour, for example, the implementation of structured routines, consistent behavioural expectations, and the reinforcement of positive behaviour, provide children with a framework for learning appropriate emotional, social and behavioural responses. These strategies not only promote behaviour change but also contribute to the development of self-discipline as well as adaptive coping skills, which are crucial for long-term success in academic, social, and professional settings (Gordeeva et al., 2017; Konaszewski et al., 2019). Early behavioural patterns can continue in adolescence and adulthood, highlighting the importance of proactive and preventative intervention from an early age (Hay et al., 2021).

Social support, social skills, and social behaviour play a fundamental role in the development and wellbeing of children (Sancassiani et al., 2015), influencing their emotional health (Chervonsky & Hunt, 2019), academic success (Rüppel et al., 2015), and future relationships (Kretschmer et al., 2017). Strong social support systems, including family, peers, and educators, provide a sense of security and belonging (Corrales et al., 2016), which is essential for healthy psychological development (Hungerford et al., 2025). Social skills can be defined as the social behaviours that provide individuals with the necessary skills for effective interpersonal interactions and tasks (Prette & Prette, 2021). Social skills enable young people to navigate interpersonal relationships successfully, contributing to their ability to form meaningful connections and collaborate with others (Eisenman et al., 2020). Furthermore, positive social interactions help reinforce behavioural norms, influencing how young people engage with their communities and develop a sense of social responsibility (Berger & Andaur, 2022). The presence of supportive relationships also acts as a protective factor against stress, anxiety, and other mental health challenges, highlighting the importance of fostering social competence from an early age (Triana et al., 2019). The development of strong social skills and positive social interactions serves as a foundation for shaping broader behavioural patterns (Sancassiani et al., 2015).

1.1 Social Context of Behaviour: Influences and Environmental Impact

Children's behaviour is influenced by a dynamic interaction between individual characteristics and a wide range of social and environmental factors (Donaldson & Austin, 2017; Fawcett, 2021) reflecting the long-recognised interplay of nature and nurture (Hart et al., 2021). While the family forms the initial nature and nurture context for development, broader social influences such as teachers (Abry et al., 2017), peers (Giletta et al., 2021), and the wider

community (Berkowitz et al., 2017) also play significant roles in shaping children's social experiences and behavioural patterns. Both the family and the wider social context play key roles in determining how children develop emotional and social competencies, which, in turn, impact their behavioural outcomes (Doyle, 2020).

Family is often considered the most influential factor in shaping a child's behaviour. When children have strong family relationships, it significantly buffers against emotional and behavioural problems. Children who experience supportive, nurturing family environments are more likely to demonstrate positive social behaviours, such as empathy, cooperation, and self-regulation (Vaughan et al., 2022). Conversely, children growing up in homes marked by conflict, neglect, or parental substance abuse face greater risks of developing disruptive or antisocial behaviours (ASBs; Doyle et al., 2020). In these contexts, the absence of secure attachment figures or positive role models often leads to difficulties in emotional regulation and interpersonal relationships (Brumariu, 2015).

Peer relationships also hold significant weight in influencing children's behaviour. Positive peer interactions are important for fostering emotional and social skills, including conflict resolution, sharing, and empathy (Van Ryzen & Roeth, 2019). Children who are accepted by their peers tend to exhibit higher levels of prosocial behaviours (PSBs) and lower levels of aggression (Ettekal & Mohammadi, 2020). On the other hand, peer victimisation and social exclusion can escalate the risk of behavioural problems. Research indicates that children who experience bullying are more likely to show signs of depression, anxiety, and aggression (Balluerka et al., 2023). These peer dynamics become especially pronounced in adolescence, where the influence of peer groups can either reinforce positive behaviours or lead to higher risk-taking and ASBs.

Teachers and other adults within the community also play a pivotal role in shaping children's behaviour. Studies have shown that children who perceive their teachers as supportive and caring tend to display better social skills and more PSBs (Wentzel et al., 2010). Positive teacher-child relationships foster a sense of security and belonging, which can mitigate the effects of external stressors (Coyle et al., 2021). In contrast, children who experience neglect or harsh discipline from authority figures are more likely to exhibit behavioural issues, including aggression and non-compliance (Wiggers & Paas, 2022).

The broader community context, including access to resources such as community centres, recreational spaces, and mental health services, also plays an essential role in shaping behaviour. Community resources provide children with safe spaces to engage in prosocial activities, reducing the likelihood of exposure to ASB and fostering a sense of belonging (Bartolo, 2023). However, these resources are often unequally distributed. Children living in disadvantaged neighbourhoods, where access to these services may be limited, face heightened risks of exposure to environmental stressors such as crime, poverty, and social disintegration. These

stressors increase the likelihood of behavioural problems, as children in these environments often lack the supportive structures that promote healthy social development (Vaughan et al., 2022).

In sum, children's behaviour is not solely the result of individual or family factors but is embedded within a broader social context. The quality of peer relationships, teacher support, community resources, and the socioeconomic conditions in which a child lives all contribute to shaping their social and emotional development. Understanding how these various elements interact can help identify the factors that contribute to both positive and negative behavioural outcomes, offering insights into effective interventions and support strategies.

While school is often the primary setting in which children's behaviour is observed and assessed, it is important to recognise that behaviour may vary across a variety of contexts. Less formal environments such as the home, afterschool programmes, community centres, and neighbourhood spaces offer different structures, expectations, and social dynamics than traditional classroom settings (Smith & Bradshaw, 2017). In these settings, children may interact with a wider range of peers and adults, experience more flexible routines, and engage in more autonomous decision-making, all of which can influence how behaviours are expressed (Leos-Urbel, 2015). For example, a child who exhibits strong self-regulation in school might behave differently in a loosely structured afterschool environment where supervision styles and social norms are different. These contextual differences highlight the importance of examining behaviour within and beyond the classroom, especially when working with children from diverse cultural backgrounds, marginalised communities, or those with additional needs (Kremer et al., 2017). Understanding how behaviour manifests across these varied environments can support more holistic and responsive approaches to behavioural support.

1.2 The Irish Context

In recent years there has been an increasing recognition within Irish policy (e.g., Department of Children, Equality, Disability, Integration and Youth [DCEDIY], 2023) and research (e.g., Nixon, 2021) of the importance of the relationship between children's behaviour and social development. Behavioural challenges among children in Ireland such as aggression, non-compliance and disruptive behaviours have been identified across both home (e.g., Whelan et al., 2025) and educational contexts (e.g., Leckey et al., 2016). Such behaviours have negative implications for individual well-being, peer relationships, and broader societal functioning (Moon & McCluskey, 2018). While much international literature explores behavioural development, understanding this within an Irish context is essential to ensure that the needs of Irish children are met within their unique sociocultural and systemic environments (Nixon, 2021).

The Growing Up in Ireland longitudinal study (Government of Ireland, 2025) has provided key insights into the prevalence and nature of emotional and behavioural difficulties among Irish children and adolescents. Findings from this nationally representative dataset indicate that more

than one in ten 13-year-olds in Ireland present with behavioural or emotional difficulties, with boys more likely to demonstrate externalising difficulties such as hyperactivity or conduct problems (Nixon, 2021). These behaviours are not isolated to adolescence. In early years settings, educators report increasing concern around challenging behaviours such as aggression, withdrawal, and non-compliance, particularly in communities facing socioeconomic disadvantage (O'Farrelly et al., 2020).

There is growing awareness that behaviour cannot be viewed in isolation from its broader context. For example, Irish care professionals consistently highlight systemic limitations including insufficient behavioural support structures, lack of professional training, and long waiting times for specialist services (Dunworth et al., 2024). These challenges are exacerbated in schools that serve high-risk populations (Department of Education, 2017) and have led to increased calls for culturally responsive and context-specific approaches to behaviour change (Devine et al., 2024). In recent years, several national frameworks have sought to address these gaps and promote more inclusive and preventative models of behaviour support. The Supporting Parents policy (DCEDIY, 2022), for instance, outlines a coordinated model of parenting support across Ireland and recognises the foundational role of parenting in shaping behavioural development. Similarly, programmes such as DEIS (Delivering Equality of Opportunity in Schools) and the School Completion Programme represent targeted efforts to address educational inequalities at a systemic level. DEIS is a status designated to schools in the Department of Education's efforts to tackle education disadvantage (Department of Education, 2017). Schools are assigned DEIS status based on the proportion of students considered to be disadvantaged. This measure of disadvantage is based on an index score calculated using a number of indices including, for example, unemployment rate, type of profession, rate of individuals with second-level education, rate of individuals with third-level education (Pobal, 2023). The School Completion Programme is a targeted programme for Irish children considered at risk of early school leaving or children who are out of school and have not successfully transferred to employment or an alternative learning site (Smyth et al., 2025). Although there have been important policy developments, Irish research continues to point to the need for better coordination between sectors (National Council for Special Education, 2024), greater investment in early intervention, and ongoing professional development in behavioural support strategies (National Council for Special Education, 2024). In this regard, the Irish context reflects both shared international concerns (DCEDIY, 2021) and distinct national challenges, particularly in terms of equitable access to supports and services for children presenting with behavioural needs (Nixon, 2021).

1.3 Adverse Childhood Experiences

Adverse childhood experiences (ACEs) are potentially traumatic events experienced by children that may include experiences such as abuse, neglect, or household dysfunction (Boullier

& Blair, 2018). They are highly prevalent (Bellis et al., 2016), with research suggesting more than 60% of Irish adults have at least one ACE (McCutchen et al., 2022). Individuals who experience ACEs have been demonstrated to be at higher risk of negative outcomes in adulthood including mental health difficulties (Von Cheong et al., 2017), poor physical health (Hughes et al., 2017), substance abuse (Bellis et al., 2016). Children may be at an increased risk of experiencing ACEs for a variety of reasons including if they are of an ethnic minority, low socioeconomic status, and if they experience family unemployment (Merrick et al., 2018).

The importance of the consideration of vulnerability due to the experience of ACEs in practices working with at-risk populations has been highlighted (Goddard, 2021). ACEs can impact health and functioning across a number of important domains. There is increasing evidence that socio-emotional development may be significantly impacted by ACEs (Ray et al., 2020), with studies demonstrating that higher numbers of ACEs are associated with lower social wellbeing (Mosley-Johnson et al., 2019), and higher levels of ASBs (Hunt et al., 2017). ASBs are behaviours which can be defined as recurring violations of socially accepted patterns of behaviour (Mayer, 1995) and may include behaviours such as aggression, defiance, and lack of self-regulation (Walker et al., 1998). These behaviours are often linked to difficulties in emotional regulation, aggression, and poor interpersonal relationships, which may stem from disrupted attachment figures or neglectful family environments (Oshri et al., 2015). ASBs may create a cycle of negative outcomes, as children who struggle with emotional regulation often face academic challenges, difficulty in forming positive peer relationships, and mental health problems (Paradis et al., 2016).

However, recent research has demonstrated that social support, in the form of good peer-to-peer, parent-child or student-teacher relationships, can buffer against the experiences of ACEs (Vinh et al., 2024) and negative outcomes such as substance use (McCollum et al., 2024). Studies show that children who have supportive relationships are less likely to develop ASBs, as these connections help foster emotional regulation and empathy (Vinh et al., 2024). For example, positive teacher-child relationships foster emotional security and provide a stable foundation for learning and development (McNally & Slutsky, 2020) and supportive peer interactions promote empathy and regulation, even among children exposed to adversity (Vinh et al., 2024).

1.4 Supporting Children's Social Behaviours

While general behavioural risks associated with ACEs must be considered, the current thesis is concerned with the specific domain of social behaviour. Social behaviours refer to the ways in which children interact with others in accordance with societal and cultural expectations, including cooperation, empathy, and the ability to form and maintain relationships (Junge et al., 2020). These behaviours are an important component of broader behavioural development and are central to children's successful participation in peer groups, educational settings, and wider social contexts (Kuranchie & Addo, 2015).

While the risks associated with ACEs are substantial, the presence of protective factors can support resilience and help to buffer from the most harmful effects of adversity. Strong relationships with caregivers, consistent support from school environments, and access to quality early intervention services have all been identified as important factors in promoting adaptive outcomes (Walsh et al., 2020). Preventative measures, such as those aimed at providing stable emotional support and teaching emotional regulation skills, are essential in reducing the long-term negative impacts of ACEs and preventing the development of ASBs. For instance, interventions that focus on building supportive peer relationships, promoting empathy, and teaching conflict resolution skills are crucial in helping children from at-risk populations develop the skills needed for healthy social interactions (Vinh et al., 2024).

1.5 Prosocial and Antisocial Behaviours

Both nationally (Department of Justice, 2022) and internationally (United Nations, 2015) there has been a call to focus on creating more inclusive, prosocial societies. Although prosociality is widely studied, the conceptualisation of PSB remains ambiguous with many researchers failing to define the concept in their investigations (Pfafftheicher et al., 2022). For the purpose of this thesis, PSB is broadly defined as behaviour engaged in with the intention of benefiting others, even if this may at times come with a personal cost (Dunfield & Kuhlmeier, 2013). This may include helpful, considerate, and kind behaviours (Hartas, 2011) as well as sharing, cooperating and comforting behaviours (Jackson & Tisak, 2001). Research by Schonert-Reichl and colleagues (2012) suggested six dimensions of PSB for children including sharing, cooperation, helping others when they have a problem, kindness, understanding others' points of view and being fair.

PSBs have been associated with a wide range of both psychological and personal benefits (Wagaman, 2011) including greater peer relationships (Lee, 2016), less prejudice (Morselli & Passini, 2015), greater academic achievement (Lum et al., 2017), more inclusive attitudes (Cigala et al., 2015) and lower levels of aggression (Coyne et al., 2018). PSBs not only impact an individual personally, but PSBs have been shown to provide a basis for our understanding of citizenship and responsibility across the lifespan (Hope & Jagers, 2014). It has been suggested that a child's wider social context both influences and is influenced by a lack of inclusivity or prosociality (Moore et al., 2023).

By contrast, ASBs are understood as outcomes of various risk factors and have been associated with numerous negative outcomes including current and future social and health problems (Paradis et al., 2016), increased anger, poor executive control, poorer empathetic responding, and greater display of negative emotions (Ensor et al., 2010). Recently published Irish research has suggested that ASB affects not only the individual and their families but also their peers, neighbourhood, school and wider society (Vaughan et al., 2022), similarly to the impact of PSBs on broader social groups. Previous research has identified key effective methodologies for

decreasing the risk of the development of ASBs and encouraging PSBs in children (Aljadeff-Abergel & Ayvazo, 2020), including, for example, the promotion of positive peer relationships (Pilling et al., 2013) or behaviour management interventions (e.g., Kellem et al., 2011; Troncoso et al., 2024; Wiskow et al., 2021).

In exploring what is considered appropriate social behaviours, PSBs may be considered as the goal state and ASBs as the anti-goal state (e.g., Wiskow et al., 2021). However, it must be noted that these behaviours do not necessarily occur on a continuum and are distinct constructs, meaning that a rise in PSBs does not necessarily mean we will see a decrease in ASBs (i.e., Wiskow et al., 2021). The development of PSBs, however, has been said to act as a protective factor against the negative outcomes of ACEs (Vinh et al., 2024) and therefore reduce the risk of engagement in ASBs (Hunt et al., 2017).

1.6 Promoting Behaviour Change through the use of Behavioural Contingencies

Promoting behaviour change, based on behavioural approaches in psychology, focuses on observable behaviours or “responses” as well as environmental influences or “stimuli”. Operant conditioning, a term coined by Skinner, describes the process by which the likelihood of future occurrences of a behaviour are either strengthened or weakened through stimuli following the behaviour in the past (Skinner 1965; Skinner, 1971; Skinner, 2019). Behaviour can be modified through two core behavioural principles - reinforcement and punishment (Miltnerberger, 2015; Skinner, 1965, Skinner, 2019). Reinforcement strengthens or increases a behaviour, whereas punishment weakens or decreases a behaviour (Cooper et al., 2020). More specifically, positive reinforcement involves the presentation of a positive stimulus to increase the likelihood of future occurrences of a behaviour whereas negative reinforcement involves the removal of a negative stimulus to strengthen behaviour. Similarly, in the case of punishment, positive punishment involves the presentation of a negative stimulus to decrease the likelihood of future occurrences of a behaviour and negative punishment involves the removal of a positive stimulus to weaken behaviour (Cooper et al., 2020).

Principles of reinforcement or punishment to target behaviour in behaviour intervention may be referred to as a contingency. A “contingency” in the case of behaviour analysis describes the potential for a future consequence based on reaching a certain criterion. For example, a contingency might be that a child will receive a gold star (conditioned reinforcer) *if* they have finished all their homework (target behaviour). Contingency-shaped behaviour such as this is different from other forms of learning such as rule-governed and observational learning, coverage of which is beyond the scope of the current thesis. A number of behaviour management strategies derived from these behavioural principles are commonly used with children including performance feedback, seating plans, token economies, peer tutoring and group contingencies (Parsonson, 2012). The focus of the current thesis is on the latter of these, group contingencies.

Punishment procedures such as verbal reprimanding, giving a time out, removal of privileges, suspension and expulsion are commonly used in school settings (McNeill et al., 2016). Literature exploring children's preferences for punishment or reinforcement procedures is mixed. Some studies indicate children's preference for reinforcement (e.g., DeJager et al., 2020; Wahl et al., 2016; Wiskow et al., 2021) and others suggest some children prefer an intervention which combines both reinforcement and punishment (e.g., Jowett Hirst et al., 2016). However, some research has indicated that punishment procedures, although effective at managing behaviour, can have negative implications for the individual (Mathur & Corley, 2014; Roache & Lewis, 2011). More recently, there has been a shift to focusing on more positive forms of behavioural support (DeJager et al., 2020; LaVigna & Willis, 2012), and it has been suggested that reinforcement-based behaviour change techniques should be used in educational settings over punitive or punishment-based ones where possible (Korpershoek et al., 2016; McDaniel et al., 2022; Osher et al., 2010).

1.7 Promoting Group Behaviour Change

Although behaviour change is often conceptualised and addressed at the individual level, there are specific circumstances where a group-level approach is both necessary and advantageous. In educational and community-based settings, practical constraints such as limited resources, time pressures, and the need for ecological validity often require interventions that target collective behaviour rather than individualised strategies (Simonsen et al., 2015). Additionally, certain behaviours, such as disruptive behaviours, rule-breaking, or PSBs, can be considered social in nature (Busching & Krahé, 2020; Müller et al., 2016). These behaviours may benefit from group-based behaviour change mechanisms. Considering behaviour at the group level also allows practitioners to explore the social dynamics that influence how young people act within their peer contexts (Farmer et al., 2018). This perspective is particularly relevant in less structured environments such as afterschool or community programmes, where individual monitoring may be more difficult and peer influence more pronounced.

Promoting behaviour change in group settings presents distinct challenges, as individual behaviour is often influenced by peer dynamics, shared norms, and environmental factors (Farmer et al., 2018). In classrooms, for instance, disruptive behaviours can be reinforced by peer attention, making traditional individual-focused interventions less effective. Instead, strategies that promote collective responsibility and positive peer influence have been shown to enhance behaviour management outcomes (Chow & Gilmour, 2016). Effective approaches include establishing clear behavioural expectations, fostering a positive group culture, and utilising peer modelling, where PSBs are demonstrated and reinforced by other group members (Gage et al., 2018). Additionally, teacher-led reinforcement strategies, such as praise, token economies, and structured routines, contribute to the development of a supportive classroom environment that encourages appropriate behaviour (Hieneman, 2015). These foundational strategies allow for

more structured interventions, such as group contingency interventions, which apply behavioural principles to manage group dynamics systematically (Dillenburger & Coyle, 2019).

1.8 Group Contingency Interventions

A group contingency is a behavioural intervention in which a common consequence is delivered to a group of participants based on the behaviour of one or more individuals in the group (Little et al., 2015). Group contingencies can take one of three forms, each form distinguished by how access to the reinforcer is achieved: independent, dependent, and interdependent (Chafouleas et al., 2012). In independent group contingencies, each member of a group is held to the same criterion; however, an individual's access to reinforcers is based on their own behaviour (i.e., if an individual satisfies the intervention's criteria, they will receive a reward following the intervention) (Joslyn et al., 2023; Pokorski et al., 2017). In dependent group contingencies, access to the reinforcers is reliant on the behaviour of a select few individuals in the group (Sloman et al., 2014). In interdependent group contingencies, the group's access to reinforcers is reliant on the behaviour of the whole group (Lum et al., 2019). Please see Figure 1.1 for a visual representation of the different types of group contingency interventions.

Group contingency interventions have been used with a wide range of populations including, for example, adults (Fuhrmann-Knowles et al., 2024), undergraduate students (e.g., Ostrosky et al., 2022), second-level students (e.g., Bohan et al., 2021; Joslyn, Vollmer et al., 2019), primary-level students (e.g., Ennis et al., 2016) and preschoolers (e.g., Donaldson et al., 2020; Pokorski et al., 2017). The focus of the current thesis is on the use of interdependent group contingencies with primary-level children.

Interdependent group contingencies, as used throughout this thesis, are considered to provide an effective, evidence-based method for managing group behaviour, whether for decreasing disruptive behaviours (Maggin et al., 2012; Maggin et al., 2017) or for increasing positive behaviours (e.g., teamworking; Sewell, 2020). Minimal research has explored the use of the interdependent group contingencies for increasing PSBs and decreasing ASBs of children (e.g., Aljadeff-Abergel & Ayvazo, 2020; Dillenburger & Coyle, 2019; Grasley-Boy & Gage, 2020). Typically group contingency interventions involve monitoring behaviour change at a whole group level (e.g., Sewell, 2020), however, individual target participants may also be observed (e.g., Aljadeff-Abergel & Ayvazo, 2020). A "target" in the case of a group contingency refers to an individual who has been chosen to have their behaviour monitored separately to the whole group. Choosing individual targets also provides an opportunity to explore the potential for non-responders to an intervention (Bohan & Smyth, 2022; Donaldson et al., 2017).

1.9 Behavioural Contingencies in Group Contingency Interventions

Group contingency interventions, by their nature, involve game-based elements (i.e., reaching a criterion to win a prize). Moreover, during the intervention, they typically incorporate the assignment of points (e.g., Caught Being Good Game; CBGG; Wright & McCurdy, 2012) or fouls (e.g., Good Behaviour Game; GBG; Barrish et al., 1969) depending on whether the participants are considered to be following the behavioural expectations or the game rules. As a result of the prize given to winning participants at the end of the intervention for satisfying the game criteria, group contingencies are generally seen as reinforcement-based behaviour management strategies (Maggin, Johnson, et al., 2012, Maggin et al., 2017). Despite this general perception, some group contingency interventions incorporate punishment procedures during the intervention (Bohan & Smyth, 2023; Joslyn et al., 2020; Wahl et al., 2016). Specifically, participants are allocated “fouls” or “marks” for engaging in undesired behaviour or breaking game rules. Other interventions use only reinforcement-based contingencies (e.g., Bohan et al., 2021; Wright & McCurdy, 2012). It could therefore be argued that group contingencies impose two separate contingencies on a group of participants, a short-term contingency and a long-term contingency (e.g., Schonewille et al., 1978). The short-term contingency focuses on either punishing or reinforcing instances of target behaviours via points or fouls, and the long-term contingency typically rewards the participants for successfully satisfying the game criteria (e.g., less than X fouls or more than X points; Little et al., 2015).

Figure 1.1

The Three Types of Group Contingency Interventions

	Behaviour During Intervention Period	Post-Intervention
Independent Group Contingency		
		
Interdependent Group Contingency		
		
Dependent Group Contingency		
	 selected dependent	
Note: Each row represents a different possible outcome for each of the three types of group contingency. Key  Satisfies Game Criteria  Does not Satisfy Game Criteria  Receives reward post-intervention		

Note: The blue row represents the independent group contingency in which an individual's access to reinforcers is based on their own behaviour. The yellow row represents the interdependent group contingency in which the group's access to reinforcers is reliant on the behaviour of the whole group/team. The green row represents the dependent group contingency in which an individual's access to the reinforcers is reliant on the behaviour of a select few individuals in the group (those circled in the figure). Green figures in the "Behaviour During Intervention Period" are considered to have satisfied the behavioural criteria of the group contingency intervention. Yellow figures in the "Post-Intervention" column are those who receive a reward after the intervention has ended.

1.9.1 The Good Behaviour Game

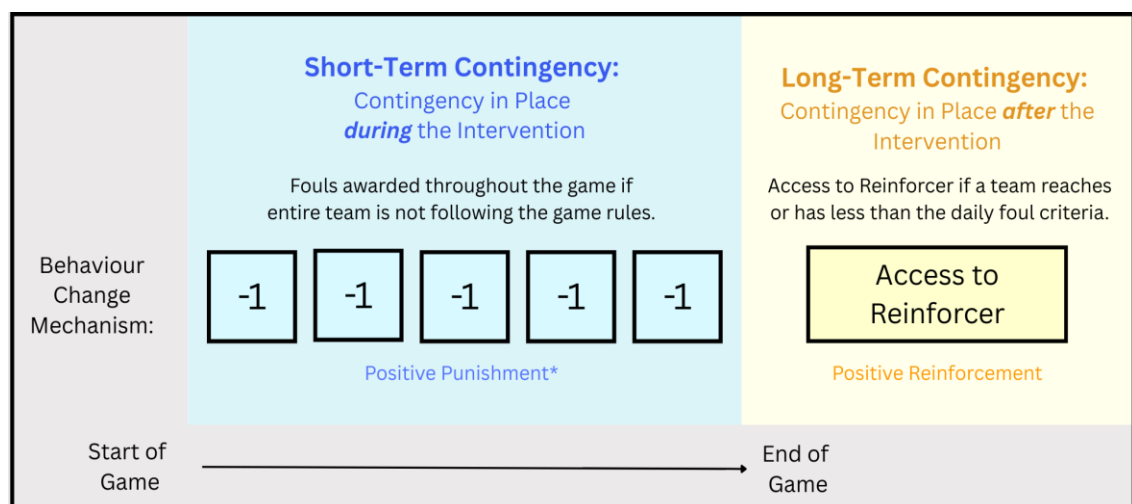
The GBG, the most widely used group contingency intervention, utilises positive punishment in the short-term contingency of the intervention. The GBG was originally developed by Barrish et al., (1969), and provides the earliest description of a group contingency intervention (Maggin et al., 2012). Barrish et al., (1969) introduced the GBG with the aim of reducing disruptive behaviour in a 4th grade classroom. The original GBG involved splitting the children into teams and, in the short-term contingency, giving teams a “mark” (or a foul) if any member of the team broke a rule. The teams would then be considered to have satisfied the game criteria and therefore eligible to receive privileges or prizes, in the long-term contingency, if they remained under 5 marks throughout the game. In a case where both teams remained under the criteria, the team with the fewest marks was named the winning team (Joslyn, Donaldson et al., 2019). Please see Figure 1.2 for a visual representation of the short- and long-term contingencies of the GBG.

The GBG has since been used to successfully target a variety of behaviours including, for example, being out of seat (Ortiz et al., 2017), aggression (Leflot et al., 2013), verbal disruption (Mitchell et al., 2015), swearing (Flower et al., 2014) and inappropriate physical contact (Kleinman & Saigh, 2011). Research has provided evidence supporting longitudinal effects of the GBG on the long-term developmental trajectories of disruptive behaviours (e.g., Troncoso et al., 2024; Wilcox et al., 2022), meaning that children introduced to the game in childhood demonstrated reduced levels of disruptive behaviour over time. Some research has even referred to the GBG as a behavioural vaccine (Embry, 2002), describing it as a simple practice that has the potential to reduce morbidity and mortality with widespread use.

The GBG has been used with mainstream samples (Wiskow et al., 2021) as well as those in special education (Breeman et al., 2016; Joslyn, Vollmer et al., 2019). The use of the GBG has been explored in primary-level classrooms (Flower et al., 2014), secondary-level classrooms (Ford et al., 2020), and outside of the education setting in an afterschool centre (Smith et al., 2018). More recently, there has been a shift to focusing on more positive forms of behavioural support (LaVigna & Willis, 2012) and it has been suggested that positive techniques should be used in educational settings to modify student behaviour over punitive ones where possible (Korpershoek et al., 2016; McDaniel et al., 2022; Osher et al., 2010).

Figure 1.2

The Short-term and Long-term Contingencies of the Good Behaviour Game



KEY: *Based on a game with 5 behavioural checks (e.g., 20-min game with a behaviour check every 4 minutes).

1.9.2 Reinforcement-based Group Contingencies

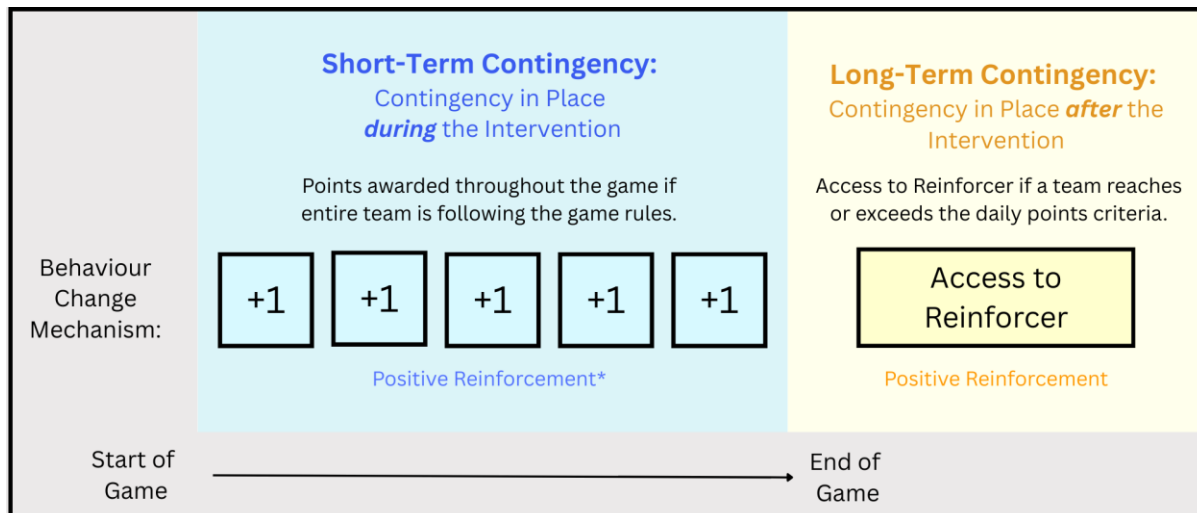
Since its initial exploration, a number of variations of the GBG have been presented including versions which replace the use of punishment with reinforcement (Wright & McCurdy, 2012). Research began to explore positive variations of the GBG shortly after the publication of Barrish and colleagues (1969) original study (e.g., Robertshaw & Hiebert, 1973; Fishbein & Wasik, 1981). Positive variations of the GBG involve using positive reinforcement in both the short- and long-term contingencies, replacing the traditional use of positive punishment (fouls), to increase children's positive behaviours. In these reinforcement-based versions, individuals must meet or exceed a points criterion to satisfy the game requirements and be eligible for reward in the long-term contingency. Figure 1.3 provides a visual representation of the short- and long-term contingencies of the CBGG.

Although different contingencies are at play in the traditional, punishment-based and positive reinforcement-based GBG, there is no consensus in how such interventions are distinguished by name in the literature. For example, some still refer to it as the GBG (e.g., Groves & Austin, 2019), some state that it is a positive GBG (e.g., Fishbein & Waskik, 1981; Moore et al., 2022; Sewell, 2020) while others refer to it as the Caught Being Good Game (CBGG; e.g., Bohan & Smyth, 2022; Crook et al., 2023). The CBGG, a term originally coined by Wright and McCurdy (2012), is a positive variation of the GBG. Only positive contingencies are used in the CBGG and may remain more aligned with a current focus on using reinforcement-based contingencies in place of punishment where possible (LaVigna & Willis, 2012). Wright and McCurdy's research (2012) involved a comparison of the traditional GBG and the CBGG across 4 classroom settings. Results indicated that the CBGG and GBG were equally effective at decreasing disruption and

increasing on-task behaviour. Research comparing the use of the GBG and CBGG has found that children prefer the positive variation (e.g., Wahl et al., 2016; Wiskow et al., 2021). Throughout this thesis, positive versions of the GBG will be referred to as the CBGG.

Figure 1.3

The Short-term and Long-term Contingencies of the Caught Being Good Game



KEY: *Based on a game with 5 behavioural checks (e.g., 20-min game with a behaviour check every 4 minutes).

1.10 Settings in which Group Contingencies are used with Children

Group contingency interventions are commonly used with children in educational settings (Hulac & Benson, 2010; Maggin et al., 2012; 2017) as they provide a method for teachers to simultaneously capture the behaviour of individual students whose behaviour may be of concern as well as the behaviour of the whole group. Group contingency interventions have been successfully used in educational settings to increase academic engagement (Bohan et al., 2022), increase academic achievement (Weis et al., 2015), decrease disruptive behaviours (Bohan & Smyth, 2022) and increase social interactions (Pokorski et al., 2019). Group contingencies have been used in all levels of education including preschool level (Donaldson et al., 2020; Pokorski et al., 2017), primary level (Naylor et al., 2018), secondary level (Bohan et al., 2022) and even third level (Walker et al., 2022).

Explorations of the use of group contingencies have been conducted with both mainstream (Bohan & Smyth, 2022) and special education (Groves & Austin, 2017; Joslyn et al., 2023) populations. While most commonly used within the classroom (e.g., Wiskow et al., 2021), group contingencies have also been used during physical education classes (e.g., Aljadeff-Abergel & Ayvazo, 2020), or over lunchtime break (e.g., Grasley-Boy & Gage, 2020). Some additional, but more limited research has explored the use of group contingencies for children outside the school. This includes the home (Brown et al., 2020), residential summer camps (Bloomfield, 2022),

residential care home (Sloman et al., 2014), the workplace (Kozorez, 2019) and afterschool services (Smith et al., 2018).

Group contingency interventions are commonly implemented in structured environments such as classrooms, where routines, expectations, and supervision are clearly defined. These settings allow for consistent reinforcement and monitoring, often meaning the implementation of behaviour management strategies is more straightforward (Maggin et al., 2012). By contrast, unstructured environments, such as afterschool programmes, community clubs, or recreational activities, present unique challenges. These settings often involve mixed-age groups, varying supervision levels, and less rigid behavioural expectations, which can impact the consistency of group contingency interventions (Smith et al., 2018). As a result, adaptations, such as increased flexibility in reinforcement schedules (e.g., Bohan & Smyth, 2022; Joslyn et al., 2023) or peer-mediated interventions (e.g., Donaldson et al., 2018), may be necessary to ensure the effectiveness of such interventions outside of the classroom (Brown et al., 2020).

1.11 Targeting Prosocial and Antisocial Behaviours using Game-Based Group Contingencies

Previous research has used game-based group contingencies to target PSBs and ASBs in child populations. The GBG has been used to target a number of ASBs including aggression (Kleinman & Saigh, 2011; Maggin et al., 2012; Saigh & Umar, 1983) and negative interactions (Wiskow et al., 2021). The CBGG has also been adopted by researchers to target PSBs such as positive interactions (Groves & Austin, 2019; Wiskow et al., 2021; Sewell, 2020), teamwork (Sewell, 2020) and supportive behaviours (Sewell, 2020). While some of the literature exploring the use of punishment procedures in a group contingency has indicated effectiveness of such methods for decreasing ASBs (e.g., Kleinman & Saigh, 2011; Saigh & Umar, 2012), others had mixed findings (Wiskow et al., 2021, Jones et al., 2009). Other interventions using wholly positive reinforcement mechanisms in both the short-term and long-term contingencies found the intervention to be effective at targeting both PSBs and ASBs (e.g., Groves & Austin, 2019; Hansen & Lignugaris/Kraft, 2005). A more complete review of some of this literature is presented in Chapter 2.

1.12 Exploring the Effect of Group Contingency Interventions

There are two key research designs by which the effectiveness of group contingency interventions are explored. The first, and most typical exploration, through the use of single case experimental designs (e.g., Bohan & Smyth, 2023; Groves & Austin, 2019). The second, through the use of randomised control trials (RCTs; e.g., Smith et al., 2018; Smith et al., 2021).

1.12.1 Single Case Experimental Designs

Both the original GBG (Barrish et al., 1969) and the original CBGG (Wright & McCurdy, 2012) used single case experimental designs to assess the effectiveness of their intervention.

Single case experimental design, is a method in which the participant(s) act as their own control (Kazdin, 2020). Single case designs, the methodology adopted throughout the current thesis, involve repeated measures and the manipulation of an independent variable (a behavioural intervention). The independent variable is manipulated in order to assess its effect on a number of dependent variables (the target behaviours). A variety of single case experimental designs exist including, for example, withdrawal/reversal designs, multiple baseline designs, alternating treatment designs or a combination of any of the previous. It is important to note, that regardless of the design chosen, they all work on a similar premise. Single case experimental research involves monitoring the behaviour of a single case (i.e., group of participants or target individuals as discussed previously) when an intervention is not in place (baseline phase) and when it is in place (intervention phase). Single case experimental designs are useful as they can be conducted with as little as one participant (Smith, 2012). Another key benefit of such designs is that they are highly flexible and therefore extremely useful in applied settings such as those discussed throughout this thesis (Maydew & Atkinson, 2022).

1.12.2 Randomised Control Trials

RCTs can also be used to assess the effectiveness of a behavioural intervention. RCTs involve research designs in which participants are randomly assigned to either a control or intervention group in order to assess the effect of the intervention (Hariton & Locascio, 2018). RCTs, given the high level of control required, are more rigid and not always flexible as needed in applied settings (Styles & Torgerson, 2018). Though not the focus of the current thesis, it is important to note that the effectiveness of group contingencies has previously been explored using RCT designs. For example, Smith et al., (2019) collated research exploring the use of the GBG through RCTs. Their review found that GBG interventions using RCT designs demonstrated lower effect sizes (Smith et al., 2019) than the effect sizes reported in previous reviews of single case studies (Bowman-Perrott et al., 2015). Longitudinal studies exploring the effect of the GBG have typically adopted RCT designs (e.g., Wilcox et al., 2022) and collected and evaluated behaviour change differently than studies collecting data on directly observed behaviour (i.e., using multi-item rating scales; Wilcox et al., 2022).

1.12.3 Differences between Single Case Designs and Randomised Control Trials

The core differences between single case designs and RCTs are the way the effect of an intervention is assessed and the type of outcome measures used. Typically, RCTs effect is assessed by exploring increases or reductions of an outcome measured through either self-report or report by a professional or other stakeholder. For example, using The Teacher Observation of Classroom Adaptation-Checklist (Koth et al., 2009) to assess changes in disruptive behaviour as a result of the GBG (Troncoso et al., 2024). In the case of Smith et al., (2018), data relating to PSBs and disruptive

behaviours of the children in the afterschool centre were collected using a child-administered version of the Strengths and Difficulties Questionnaire (Goodman et al., 2003). Single case designs focus on observable behaviour (Grahame et al., 2015). RCT designs do not capture changes in actual observable behaviour and therefore no definitive conclusions can be drawn about the effect of an intervention on behaviour.

1.13 Social Validity

While both single case designs and randomised control trials contribute valuable insights into the measurable impact of behavioural interventions, effectiveness cannot be determined by observable change alone. Quantitative outcomes, such as reductions in disruptive behaviour or increases in prosocial acts, are central to evaluating intervention success (Grahame et al., 2015; Troncoso & Humphrey, 2021). However, they do not fully capture the extent to which an intervention aligns with the values, expectations and lived experiences of those involved. In applied contexts, particularly those situated within community and afterschool environments, understanding how an intervention is perceived by children, practitioners and other key stakeholders becomes equally important. Social validity offers a complementary lens through which the impact of an intervention can be assessed, extending beyond statistical or behavioural measures to consider questions of relevance, appropriateness and meaningfulness (Kazdin, 2020; Wolf, 1978).

Social validity refers to the extent to which behavioural interventions are considered by stakeholders to be acceptable, appropriate, and effective (Wolf, 1978). Social validity can be likened to content validity, acceptability or adherence metrics employed in RCT studies in health or cognitive psychology fields (e.g., Kessler et al., 2025; Namisango et al., 2022). As a foundational principle in Applied Behaviour Analysis (ABA), social validity places emphasis not only on whether an intervention achieves its intended outcomes, but also on whether it targets behaviours that are meaningful, adopts procedures that are considered acceptable, and results in changes that are valued by those affected (Foster & Mash, 1999). From its inception, ABA has advocated for a focus on socially significant behaviours and person-centred outcomes (Baer et al., 1968), encouraging practitioners to prioritise the values, preferences, and lived experiences of the individuals and communities they serve.

This emphasis on social relevance is particularly important when interventions are implemented in naturalistic or community-based settings, such as afterschool services, where rigid or highly structured approaches may not align with the dynamic and relational nature of the environment. In such settings, stakeholder perceptions of fairness, respect, and cultural appropriateness can heavily influence engagement and sustainability (Kujala et al., 2022). This is especially relevant when working with populations who may have experienced adversity or social marginalisation, where sensitivity to context and lived experience is essential.

Despite the prominence of social validity as a concept, research suggests that its application in practice remains inconsistent. Leif et al. (2023) found that less than 20% of studies published in leading behaviour-analytic journals included a formal assessment of social validity. Where social validity is measured, it is often limited to post-intervention satisfaction surveys or anecdotal feedback, rather than integrated throughout the intervention process (Huntington et al., 2023; Huntington et al., 2024; Snodgrass et al., 2018). This represents a missed opportunity to better understand the acceptability of procedures, the relevance of goals, and the real-world impact of outcomes.

Long-established best practices for social validity measurement recommend evaluating social validity across three domains: the social importance of the goals, the acceptability of the procedures, and the perceived effectiveness of the outcomes (Foster & Mash, 1999). These domains align closely with person-centred and trauma-informed frameworks, both of which prioritise autonomy, relational safety, and respect for individual needs (Bargeman et al., 2021; Rajaraman et al., 2022). Trauma-informed care, for example, encourages practitioners to consider how past experiences may influence a child's response to intervention and to prioritise strategies that minimise harm, foster trust, and support emotional regulation (Goddard, 2021). Although explored in greater depth in later chapters, trauma-informed principles are closely aligned with the values that underpin socially valid practice.

In practice, ensuring social validity requires ongoing attention to the experiences and perspectives of those directly involved in and affected by interventions. In the context of game-based group contingencies, this may include children themselves, as well as educators, caregivers, and other adults in their social environments. In settings such as afterschool programmes, where children's experiences are shaped by a diverse range of relationships and routines, it is important to consider how interventions can be flexibly adapted to suit both individual and group needs. Interventions that are perceived as punitive, overly rigid, or disconnected from children's everyday experiences are unlikely to be sustained. By contrast, those that are experienced as supportive, respectful, and aligned with the values of the group are more likely to be embraced and maintained over time (Kennedy, 2002; Snodgrass et al., 2018). The importance of social validity is particularly pronounced when working with children at risk of ACEs or living in socioeconomically disadvantaged communities. For these populations, behavioural interventions must do more than simply manage surface-level behaviours. They must also contribute to children's sense of safety, belonging, and agency. High social validity, therefore, is not just an ethical practice but a practical necessity for achieving meaningful and lasting behavioural change.

In considering social validity within the context of this thesis, it is important to reflect not only on the acceptability of the procedures used, but also on the behaviours identified for change. Interventions should target behaviours that are both observable and socially meaningful (Kazdin,

2020; Wolf, 1978). This is particularly relevant in settings where the goal is to support the development of interpersonal and relational skills. Behaviours such as cooperation, kindness and empathy are not only important for individual wellbeing but are also central to effective group functioning and broader social inclusion (Biglan et al., 2012; Schwartz & Baer, 1991). As previously mentioned, PSBs have been associated with a wide range of both psychological and personal benefits (Wagaman, 2011) and such supportive peer interactions increase empathy and regulation, acting as a protective factor against the negative impacts of ASBs (Vinh et al., 2024). These PSBs are often viewed by educators, caregivers and practitioners as desirable outcomes, particularly when working with children in afterschool and community-based settings where shared norms and peer dynamics play a significant role (Foster & Mash, 1999; Vinh et al., 2024). Moreover, for the children themselves, engaging in PSBs and social interactions with peers can encourage greater peer relationships (Lee, 2016), less prejudice (Morselli & Passini, 2015), greater academic achievement (Lum et al., 2017) and more inclusive attitudes (Cigala et al., 2015). In this regard, the promotion of prosocial behaviour represents a socially valid goal for intervention.

1.13.1 Designing Socially Valid Interventions: Adopting a Participatory Approach

Social validity is best achieved not only by assessing acceptability after the fact but by actively involving stakeholders throughout the intervention process (Snodgrass et al., 2018). Participatory approaches engage children, caregivers, and practitioners as collaborators in designing and adapting interventions, ensuring that goals, procedures, and outcomes are relevant and meaningful within their unique contexts (Freire et al., 2022). This collaborative process complements person-centred values and supports flexible, culturally sensitive practices, particularly important in community and afterschool settings where lived experience shapes engagement and sustainability (Smith & Bradshaw, 2017).

In keeping with our participatory foundation, whereby we are obliged to design socially valid interventions, person-centred behaviour change approaches prioritise respectful, individualised strategies that respond to each child's unique needs, values, and preferences (Baer et al., 1968). Person-centred approaches advocate for the inclusion of children as active participants in decisions that affect them, fostering autonomy, self-determination and engagement. This may involve offering meaningful choice, tailoring interventions to align with a child's strengths and interests, and creating opportunities for shared planning between educators, caregivers and children themselves (Ford et al., 2018).

Importantly, participatory and person-centred interventions align with practices such as trauma-informed care (e.g., Austin et al., 2024; Rajaraman et al., 2022; Wheeler et al., 2024), community-based research (e.g., Fawcett, 2021) and co-design approaches (e.g., Rojas, 2023; Schwartz, 2025), which highlight the importance of safety, collaboration, and contextual

relevance. Trauma-informed care (Bargeman et al., 2021), and co-design approaches (Seshadri et al., 2019) each emphasise the need for dignity, participation, and responsiveness to the lived experiences of children.

Participants' preferences should be considered to design socially valid interventions. As previous research has indicated, children's preference for reinforcement-based group contingencies (e.g., Wahl et al., 2016; Wiskow et al., 2021) and that we use positive behaviour change approaches in place of punitive ones, as our first port of call (Korpershoek et al., 2016; McDaniel et al., 2022), reinforcement-based group contingencies should be prioritised. This thesis explores the application of reinforcement-based group contingencies in afterschool settings with a focus on improving participant involvement in the intervention design and evaluation.

1.14 Research Aims and Objectives

Despite a growing body of research exploring the use of reinforcement-based group contingency interventions, a number of gaps remain. Firstly, the majority of studies using group contingencies have focused on formal school settings, with limited evidence available on their use in afterschool or community-based environments, where contextual factors and adult-child dynamics may differ significantly (Smith et al., 2018; Wiskow et al., 2021). Secondly, there has been a stronger emphasis on reducing ASBs than on promoting PSBs, despite increasing recognition of the unique value of PSBs for fostering social connectedness, empathy, and resilience (Cigala et al., 2015). Thirdly, there is a lack of research examining the perspectives of children and practitioners in the development of these interventions, raising questions about their social validity and real-world applicability in diverse, high-need settings (Vinh et al., 2024).

This thesis seeks to contribute to filling these gaps by investigating the application of group contingencies for promoting PSBs outside traditional classroom settings, with a particular focus on children at risk of ACEs. Furthermore, it explores the potential of co-design methodologies in the development and refinement of such interventions, ensuring that these approaches are not only effective but also socially valid and contextually appropriate.

1.14.1 Research Aims

This thesis seeks to:

1. Synthesise existing literature on group contingency interventions for promoting PSBs and reducing ASBs in school settings.
2. Evaluate the effectiveness and acceptability of the CBGG in afterschool settings, particularly for children at risk of ACEs.
3. Explore the role of co-design in designing group contingency interventions through input from children and adult leaders.

4. Contribute to evidence on behaviour support strategies in community-based, charity-run afterschool services.

1.14.2 Research Objectives

1. Conduct a systematic review on group contingency interventions targeting PSBs and ASBs in school settings.
2. Assess the impact and social validity of the CBGG in afterschool services for children at risk of ACEs, using adult ratings and feedback.
3. Pilot co-design approaches to adapt the CBGG with input from children and staff in afterschool services.
4. Implement a full co-design study using cooperative inquiry to develop a context-responsive group contingency intervention.
5. Evaluate the outcomes of these interventions with a focus on PSBs, engagement, and social validity, and offer practical recommendations.

1.15 Thesis Outline

The current thesis consists of six chapters, each of which will be outlined briefly below.

Chapter 2 presents a systematic review exploring the use of group contingency interventions to increase PSBs and decrease ASBs in children within school settings. This review narratively synthesises existing research to evaluate the effectiveness of group contingencies as an intervention strategy. It highlights the features, methodologies, quality, short-term and long-term contingencies and reported outcomes of various studies and provides an in-depth analysis of their application in educational environments. This chapter aims to contribute to the understanding of group contingencies and their potential to improve behavioural outcomes in diverse school contexts, especially in promoting PSBs among first-level education students.

Chapter 3 presents a study exploring the use of the CBGG to increase PSBs of children attending afterschool services. The study aimed to assess how well the CBGG can be adapted for use in non-school, community-based environments for targeting group and individual level positive behavioural change.

Chapter 4, similarly to Chapter 3, presents a study exploring the use of the CBGG to increase PSBs of children attending afterschool services. In this study we also explored the utility of adult leader direct behaviour ratings for measuring the children's behaviour change.

Chapter 5 presents the findings from two empirical studies. Study 1 is a pilot study exploring the use of co-design methods to develop group rules for a version of the CBGG within afterschool settings serving children at risk of ACEs. This study investigates the feasibility of employing co-design to create rules that are meaningful and relevant to the children, aiming to enhance engagement and ensure contextual appropriateness. Building on this, Study 2 details a

full co-design study using cooperative inquiry to develop a tailored group contingency intervention with the same population. Expanding the pilot work, this study applies a more comprehensive co-design framework that positions children's perspectives at the core of intervention development, highlighting the benefits of actively involving children in designing behavioural interventions.

Chapter 6 provides a general discussion of the findings across Chapters 2-5. This chapter synthesises the results of the systematic review and the empirical studies, highlighting the strengths and limitations of the interventions and methods explored in the thesis. It discusses the implications of these findings for both practical and research purposes, considering how group contingency interventions, particularly those involving co-design methods, can be effectively implemented with children at risk of ACEs. The chapter also outlines potential directions for future research in the field of behavioural interventions in afterschool and school settings.

Chapter 2: A Systematic Review and Narrative Synthesis of Single-Case Group Contingency Interventions Targeting Prosocial and Antisocial Behaviour in School Children¹

2.1 Introduction

Prosocial behaviour (PSB), as defined in Chapter 1, is behaviour engaged in with the intention of benefiting others, even if this may at times come with a personal cost (Dunfield & Kuhlmeier, 2013). Such behaviour includes helpful, considerate, and kind behaviours (Hartas, 2011) as well as sharing, cooperating, and comforting behaviours (Jackson & Tisak, 2001). As outlined in Chapter 1, engagement in PSB, particularly at higher or sustained levels, has been associated with a range of both psychological and personal benefits (Wagaman, 2011), including more positive peer relationships (Lee, 2016), less prejudice (Dovidio et al., 2010), greater academic achievement (Caprara et al., 2000), more inclusive attitudes (Cigala et al., 2015), and lower levels of aggression (Cigala et al., 2015). PSB not only impacts an individual personally but has also provided a basis for our understanding of citizenship and responsibility across the lifespan (Hope & Jagers, 2014).

In contrast with PSB, antisocial behaviour (ASB) has been defined as recurring violations of socially accepted patterns of behaviour (Mayer, 1995) and may include behaviours such as aggression, defiance, and lack of self-regulation (Walker et al., 1998). ASB is most prominent in middle childhood and adolescence (Otto et al., 2021). It is associated with negative outcomes including current and future social and health problems (Paradis et al., 2016), increased anger, poor executive control, poorer empathetic responding, and greater display of negative emotions (Ensor et al., 2010). Students who demonstrate ASB are at a greater risk of exclusion from schools and dropping out of school, and demonstrate poorer school adjustment (Erskine et al., 2016).

Inadequate social and emotional competencies are not only associated with emotional and societal issues for youth but have also been recognised as central to public health concerns such as substance abuse, violence, and obesity (D. E. Jones et al., 2015). There are a number of ways the school environment can impact the development of PSB such as the nature of teacher child relationships (Longobardi et al., 2021), social skill development (Frostad & Pijl, 2007), teacher support (Estévez et al., 2016), the presence of an inclusive environment (Diamond & Carpenter, 2000), cooperative learning activities (Vernon et al., 2016), and the use of targeted behavioural interventions in the classroom (e.g., Dillenburger & Coyle, 2019).

¹ This chapter presents the findings from a systematic review published in the *Journal of Positive Behavior Interventions* available at <https://doi.org/10.1177/10983007241235865>. It has been adapted for inclusion in the current thesis in order to ensure continuity between chapters. The findings and their interpretation remain unchanged.

2.1.1 Group Contingency Interventions

As discussed in Chapter 1, a group contingency is a behavioural intervention in which a common consequence is contingent upon the behaviour of one or more individuals in a group of people (Little et al., 2015). They are particularly well-suited to classroom situations because they facilitate changing the behaviour of multiple individuals simultaneously. Group contingency interventions have been successfully used in educational and social settings to increase academic engagement (Bohan et al., 2022), increase academic achievement (Weis et al., 2015), decrease disruptive behaviours (Beaver et al., 2023; Bohan & Smyth, 2022), increase attendance (Costello & Smyth, 2017), and increase social interactions (Pokorski et al., 2019).

Group contingencies can take one of three forms, each form distinguished by how access to the reinforcer is achieved: independent, dependent, and interdependent group contingencies (Chafouleas et al., 2012). In independent group contingencies, each member of a group is held to the same criterion; however, an individual's access to reinforcers is based on their own behaviour (Pokorski et al., 2017). In dependent group contingencies, access to the reinforcers is reliant on the behaviour of a select few individuals in the group (Sloman et al., 2014). In interdependent group contingencies, the group's access to reinforcers is reliant on the behaviour of the whole group (Lum et al., 2019).

2.1.2 Behavioural Contingencies in Group Contingency Interventions

Group contingencies are generally seen as a positive behavioural support because they commonly use positive reinforcement to shape desirable behaviours (Maggin, Johnson, et al., 2012, Maggin et al., 2017). However, as outlined in Chapter 1, some group contingency interventions, such as the traditional Good Behaviour Game (GBG; Barrish et al., 1969; Dillenburger & Coyle, 2019; Donaldson et al., 2015), incorporate punishment procedures during the short-term contingency of the intervention (Bohan & Smyth, 2023; Wahl et al., 2016). Specifically, participants are allocated "fouls" or "marks" for engaging in undesired behaviour or breaking rules. The goal in such interventions is for a team to remain under a certain criterion of fouls. Positive reinforcement is delivered as a reward for achieving this criteria, this may be considered differential reinforcement of low rates (DRL) of disruptive behaviour (Mitchell et al., 2015). It could be argued that group contingencies impose two separate contingencies on a group of participants, a short-term contingency and a long-term contingency (e.g., Schonewille et al., 1978). The short-term contingency focuses on either punishing or reinforcing instances of target behaviours via points or fouls, and the long-term contingency typically rewards the participants for successfully meeting the game criteria (e.g., less than X fouls or more than X points; Little et al., 2015).

Unlike the traditional GBG, the Caught Being Good Game (CBGG; Bohan et al., 2021; R. A. Wright & McCurdy, 2012), or positive versions of the GBG, use only reinforcement. Again, there are both short- and long-term contingencies; however, instead of fouls for undesired behaviours, points are given for desired behaviours and a reward is then given if the points target is reached (e.g., Bohan & Smyth, 2022; Wahl et al., 2016). Today, the use of punishment in classroom management, is considered to pose ethical or moral dilemmas (Cooper et al., 2020) and to have potential negative implications for individuals (Mathur & Corley, 2014; Roache & Lewis, 2011). With a shift towards a focus on reinforcement-based strategies (Korpershoek et al., 2016), the underlying behaviour change techniques must be highlighted. Many researchers reporting on group contingency interventions do not specifically identify the two contingencies at play, nor do they label the short-term contingency in particular as reinforcement or punishment. Given the importance of positive behavioural supports to support behaviour change in children and young people, this is an important distinction. Punishment procedures, as used in the traditional GBG and other group contingency interventions, are not considered positive forms of behaviour support (Yeung et al., 2016). One aim of this review was to identify group contingency studies that could be considered positive behaviour interventions by recording which included punishment procedures within group contingency studies and which did not. In this current review, a positive behavioural intervention is defined as an intervention that utilises reinforcement-based contingencies throughout.

2.1.3 Overview of the Current Literature Exploring the Use of Group Contingencies

Whether they employ only reinforcement, or a combination of punishment and reinforcement, researchers investigating the utility of group contingencies in educational settings have frequently focused on decreasing disruptive behaviours and increasing academic engagement (Little et al., 2015; Maggin, Johnson, et al., 2012; Maggin et al., 2017). A smaller number of studies have looked specifically at behaviour toward others, for example, PSBs (e.g., Dillenburger & Coyle, 2019; Pokorski et al., 2019; Wright et al., 2021) and ASBs (e.g., Grasley-Boy & Gage, 2022; Yassine & Tipton-Fisler, 2022). Group contingencies have been used to target a number of ASBs including aggression (Kleinman & Saigh, 2011; Maggin, Fallon, et al., 2012; Saigh & Umar, 1983) and negative interactions (Wiskow et al., 2021) and PSBs such as positive interactions (Groves & Austin, 2019; Sewell, 2020; Wiskow et al., 2021), teamwork (Sewell, 2020), and supportive behaviours (Sewell, 2020).

Reviews of the literature on group contingency interventions have often focused on specific types of intervention and their utility in targeting undesired classroom behaviours (e.g., Beaver et al., 2023; Maggin, Johnson et al., 2012; Maggin et al., 2017). The dependent variables investigated in these reviews included any classroom behaviour deemed problematic including

social interactions, academic engagement, or disruptive behaviours. Although types of PSBs and ASBs may have been discussed in these reviews, they were not the primary focus and were not addressed in such a way that conclusions can be drawn on the use of group contingency interventions for targeting such behaviours.

As described in Chapter 1, there are two main design types used in the implementation of group-contingency interventions in the literature. The first, and most typical exploration, is through the use of single-case experimental designs, in which the participants act as their own control (Kazdin, 2020). The second is through the use of randomised control trials (RCTs), which involves random assignment to a control or intervention group to assess the effect of the intervention (Hariton & Locascio, 2018). Systematic reviews of group contingencies typically focus on either synthesizing research adopting single-case designs (e.g., Maggin, Johnson, et al., 2012; Maggin et al., 2017) or those adopting RCT designs (e.g., Smith et al., 2021). No known reviews have looked at both single-case and RCT designs in the same synthesis of the data. Single case designs were the specific focus of the current synthesis given that they are the most typical design for group contingency research targeting PSB and ASB. This allowed for clear communication of research aims, methods and findings, reducing the heterogeneity of results.

2.1.4 Novel Focus on Interpersonal Behaviours

Although a number of reviews have addressed the use of group contingencies for targeting academic engagement (e.g., Beaver et al., 2023), typically there is less focus on synthesising literature targeting positive behaviours in classrooms. Disruptive behaviours, as typically synthesised in the literature, include a range of school-specific behaviours that are not specifically interpersonal such as out-of-seat behaviour or talking out of turn (e.g., Bohan et al., 2022). By contrast, PSB and ASBs are interpersonal forms of behaviour that are not only important in the school environment but also impact society more generally (Hope & Jagers, 2014; Jones et al., 2015). Given the numerous positive outcomes associated with PSBs (Wagaman, 2011) and negative effects associated with ASBs (Ensor et al., 2010), as well as the potential for group contingency interventions to foster these types of behaviours, it is important to understand how these interventions can be used to encourage positive behaviours in classrooms.

2.1.5 Assessing Quality of Single-Case Designs

Assessing the quality of literature is important not only to understand the strengths of studies but also to provide an opportunity to critically evaluate reliability and validity as well as recognise common pitfalls in literature (Moeyaert & Dehghan-Chaleshtori, 2022). The What Works Clearinghouse (WWC, 2020) provides specific guidelines for conducting single-case research and systematic reviews as well as design evaluation. Previous reviews (Maggin, Johnson, et al., 2012; Maggin et al., 2017) of the group contingency literature more generally have

highlighted the lack of high-quality evidence as specified by the WWC (2020). Maggin, Johnson, et al. (2012), for example, in keeping with design standards (Kratochwill et al., 2010), excluded 70% of eligible studies from their review because they did not meet WWC standards.

While previous reviews were interested in examining intervention effect sizes, the current review planned a narrative synthesis and thus provided a good opportunity to explore and document the issue of quality in the group contingency literature on ASB and PSB. Publishing this information should provide better understanding of the difficulties posed in conducting such applied research but should also be useful for researchers aiming to design group contingency research which meets WWC standards. Researchers have highlighted concerns relating to the typical exclusion of empirically valid designs in synthesis of single-case research (Maggin et al., 2022). Including studies not meeting WWC design standards in reviews of the literature allows us to highlight patterns of strengths and weaknesses in study designs and make recommendations for future research to avoid common pitfalls.

2.1.6 The Current Review

Group contingencies have been established as effective methods at targeting desired and undesired behaviours of students in classroom settings (Maggin, Johnson, et al., 2012; Maggin, et al., 2017). However, their role in promoting PSBs and reducing ASBs in school-aged children has not yet been established through evidence synthesis. Given the numerous positive effects associated with PSBs (Wagaman, 2011), it is important that we gain insight into how they can be developed in children from a young age. Our systematic review aimed to synthesise the single-case literature using group contingency-based interventions in increasing PSBs and decreasing ASBs in school settings using single-case experimental design.

Specifically, we sought to address three key questions:

- 1) What types of PSBs and ASBs have been targeted with single-case group contingencies in different school settings?
- 2) Is it possible to identify the short-and long-term contingencies in single-case group contingency interventions targeting PSB and ASB in school settings and, in doing so, to determine what proportion of studies can be considered positive behavioural interventions?
- 3) What proportion of studies using single-case group contingencies to target ASBs and PSBs meet WWC design standards with or without reservations and what standards are typically missed?

2.2 Method

2.2.1 Study Identification Procedures

The procedures used in this systematic review are consistent with the procedures used in other systematic reviews in the area (e.g., Ballard & Bender, 2022; Maggin et al., 2017; Pokorski et

al., 2017). A protocol (Brennan et al., 2022) was developed and published to Prospero, a systematic review protocol register, prior to commencing the search. Relevant literature was identified using search terms relating to classroom settings, PSBs and ASBs, and group contingencies across five electronic databases.

The search terms used across databases are outlined in the published protocol and can be seen in the Appendix 1. The databases Education Research Complete, Education Resources Information Center (ERIC; Including ERIC and Australian Education Index), PsycInfo, Scopus and Web of Science were searched on June 14th, 2022. These databases were chosen based on those searched in similar reviews (Browne, 2013; Maggin et al., 2017; Silke et al., 2018). The search terms were searched across “All fields” and were not filtered or limited in any way.

2.2.2 Inclusion Criteria

The following criteria were used to assess whether the article was eligible for inclusion. (a) Studies must be written in English; (b) study must utilise a single-case design, studies in which the sample did not act as their own control were excluded; (c) the intervention used is a group contingency intervention (as defined in the Introduction), any other group intervention was excluded; (d) Participants must be school-aged children at either primary or secondary school age, adult participants and preschool children were excluded; (e) the study must take place in a school setting during everyday activities, general and special educational settings were included, studies investigating after-school settings or summer school settings were excluded; (f) the dependent variable must be a PSB (encouraging or cooperative) or ASB (antagonistic or uncooperative) that is measured through observation, studies that measured behaviours through any other means were excluded; (g) data relating to the PSB or ASB must be distinguishable from other data, any data that were provided collectively for a PSB or ASB as well as other nonrelevant behaviours were excluded; and (h) the article must be peer-reviewed, theses and dissertations and other gray literature were excluded.

The review team consisted of the PhD researcher (Ciara Brennan) as first reviewer, a second reviewer (a PhD student in the School of Psychology, DCU) as well as the primary supervisor Sinéad Smyth and the then secondary supervisor Clare Bohan. All reviewers had completed the WWC in single-case design standards online reviewer training and had acted as reviewers on previous reviews. Searches on all databases were run by the first reviewer on June 14, 2022. The returned search results from each database were subsequently exported and imported to Zotero, an online citation manager. At this stage, duplicates appearing across multiple databases were manually removed. The final set of citations were imported to Covidence, an online systematic review management system. The first and second reviewers independently screened titles and abstracts and assessed each article against the inclusion and

exclusion criteria. Any article deemed unsuitable was excluded at this stage. Inter-rater agreement between both reviewers at this stage was 90.78%. The same two reviewers independently assessed the full texts of all remaining articles. Interrater agreement between both reviewers at the full text stage was 93.59%. The first and second reviewers discussed any conflicts in the decision process until they reached a consensus on inclusion/exclusion. In the case that reviewers could not reach consensus, the supervisory team was consulted. The supervisory team were consulted in the case of four full texts.

Table 2.1

Definitions of Prosocial and Antisocial Behaviour as adopted by this Review

Behaviour Category	Behaviour Subcategory	Definition
Prosocial Behaviour	Encouraging Behaviour	Behaviours which involve the interpersonal communication of a positive message (Wong et al., 2019) aimed at providing support (Jose & Bellamy, 2012) or motivation (Wong, 2015) to the recipient. Examples of behaviours that were classified as encouraging behaviours include positive words of encouragement for a peer, e.g., "You got this!", complimenting behaviours and non-verbal positive communication e.g., a thumbs up or a high five.
	Cooperative Behaviour	Behaviours in which two or more individuals work together in pursuit of a common goal or work together to help an individual reach a particular goal (Goffin, 1987). Examples of co-operative behaviours include team working behaviours, peer tutoring, sharing or playing a game with peers.
Antisocial Behaviour	Antagonistic Behaviour	Behaviours that reflect a low motivation to maintain positive relationships with others. Such behaviours may be perceived as harsh, unsympathetic, hostile and cold (Scholz et al., 2022). Examples of behaviours that can be perceived as antagonistic are bullying, intimidation (Gourneau, 2012), teasing, peer pressure (Vargas, 2011) and aggression (Endedijk et al., 2015)
	Uncooperative Behaviour	Behaviours that reflect the absence of a positive cooperative attitude towards peers such as rudeness or disrespectfulness (Olson et al., 2001). Behaviours that may be perceived as being uncooperative include snatching (Santamaría-García et al., 2018), refusal to help (Grebelsky-Lichtman, 2014) and inappropriate turn taking (Simó-Pinatella et al., 2017).

2.2.3 Coding Procedures

Characteristics and variables from the studies were coded using a systematic coding procedure developed by the first reviewer based on the proposed research questions. To explore increases in PSB the literature was systematically reviewed for research reporting on increases in PSBs and decreases in ASBs. Definitions of PSBs and ASBs, as adopted in this review, are outlined in Table 2.1. Data extracted from each article included general information relating to a paper,

sample and setting characteristics, detail relating to group contingency features, detail relating to the study design, detail relating to targeted behaviours, and statistics generated in the results. We extracted data from each paper through Covidence. The first reviewer was responsible for extracting this data from each study. In the case of four uncertainties, the supervisory team were consulted until the panel reached a consensus.

2.2.4 Design Evaluation

The WWC (2022) Design Standards Version 5 were used to assess the quality of the final set of studies. For design evaluation, each case was evaluated separately (i.e., one case, one dependent variable, one independent variable). According to the WWC guidelines, each case was assessed for (a) the availability of the data in raw or graphical format, (b) the systematic manipulation of the independent variable, (c) the calculation of interobserver agreement for at least 20% of phases with an average of 80% agreement, (d) the likelihood of residual treatment effects, and (e) the investigation of the effect of the intervention across time. Based on this assessment, cases were classified as “Meeting WWC SCD Standards Without Reservations,” “Meeting WWC SCD Standards With Reservations,” or “Does Not Meet WWC SCD Standards” with those who met the standards without reservations being considered the highest quality. Any case deemed to meet WWC Standards without reservations for the first 5 criteria undergoes evaluation of a sixth criteria. Studies meeting WWC Standards without reservations are assessed for risk of bias. If a case indicates a baseline trend, lack of reversibility or overlapping data then it is reduced to a rating of “Meeting WWC SCD Standards with Reservations.” Both reviewers independently conducted the quality assessment. Doctoral students who had completed online training in WWC Design Standards in single-case research and had experience in conducting systematic reviews served as reviewers. The interrater agreement of the quality assessment was 100%. Table 2.2 outlines the outcome of this quality assessment for each paper.

2.2.5 Data Synthesis

To address the research questions in this review a narrative synthesis was deemed the most appropriate method of synthesis. This approach allowed us to examine carefully the contingencies employed, as well as the quality of the literature. We synthesised the extracted data using guidelines provided by Popay and colleagues (2006). Data from the included studies were synthesised to explore the behavioural contingencies imposed on participants, relationships in the data and assess the robustness of the literature.

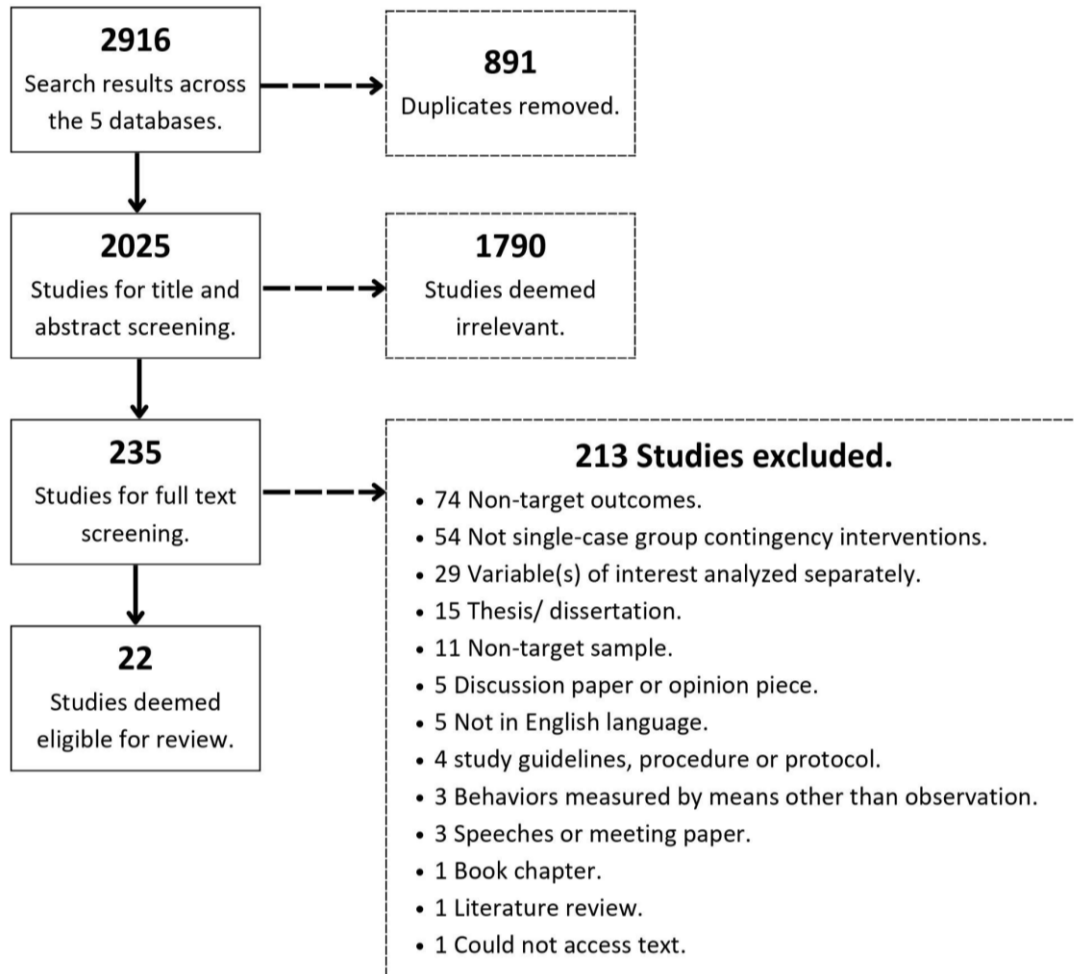
2.3 Results

Searches across the five databases generated 2,916 results. Of these, 891 duplicates were excluded from the review. Of the remaining 2,025, 1,790 did not meet the inclusion criteria at abstract and title screening. Full-text review was then carried out on the remaining 235 articles

where 22 texts fulfilled the inclusion criteria and have been included in this review. Figure 2.1 depicts a schematic overview of the search, process and reasons for the exclusion of papers at the full text stage.

Figure 2.1

PRISMA Diagram of Study Screening Process.



2.3.1 Study Characteristics

Across the 22 included studies, data were collected from more than 1,750 participants with sample sizes ranging from four to 574. Larger samples consisted of whole-school approaches to targeting ASBs at recess (N = 574; Yassine & Tipton-Fisler, 2022) or on the school playground (N = 180; Franzen & Kamps, 2008). A summary of study characteristics is provided in Table 2.3. Students ranged from 6 to 16 years of age and included both primary-level and secondary-level students. Seven studies did not report on the gender of participants (Dillenburger & Coyle, 2019; Franzen & Kamps, 2008; Gamble & Strain, 1979; Herring & Northup, 1998; Jellison et al., 1984; Kohler & Fowler, 1985; Yassine & Tipton-Fisler, 2022), but the remaining studies included 223 male students and 172 female students. A considerable majority of studies were conducted in the United States (N = 17) with others conducted in the United Kingdom (N = 3), Canada (N = 1), and Sudan (N = 1). Sixteen studies investigated the effects of a group contingency on whole class

groups, four investigated the effects of a group contingency on a combination of whole group and targets, and two explored the effects of a group contingency on target individuals only.

2.3.2 Targeting Prosocial and Antisocial Behaviours

Single-case group contingency interventions in school settings have targeted both PSBs and ASBs. Table 2.4 outlines all the behaviours targeted by the studies included in this review, as well as the behavioural mechanisms by which they were increased or decreased.

2.3.2.1 Prosocial Behaviours

A total of 15 behaviours which we categorised as PSBs (see Table 2.1) were targeted across the 22 studies included in this review (see Table 2.4). Seven behaviours can be defined as cooperative behaviours, five as encouraging behaviours and three as combinations of both encouraging and cooperative behaviours. Cooperative behaviours included behaviours such as cooperation (Aljadeff-Abergel & Ayvazo, 2020), working as a team (Sewell, 2020), play invitations (Kohler & Fowler, 1985), and helping/reciprocal interactions (Jellison et al., 1984). Encouraging behaviours included positive verbal statements (Hansen & Lignugaris/Kraft, 2005), tootling (Skinner et al., 2000), and supportive behaviours (Vidoni & Ward, 2006). Behaviours that were combinations of both cooperative and encouraging behaviours included positive peer statements (Stremel et al., 2022), positive peer interactions (Groves & Austin, 2019) and positive social behaviours (Gamble & Strain, 1979). These behaviours could not be extracted as either encouraging or cooperative but were defined in a way that was classified as PSBs. For example, Stremel and colleagues (2022) defined positive peer statements as “an audible verbalisation toward a peer that reflected collaboration or encouragement” (p. 615).

Table 2.2*WWC Design Standards Version 5 Evaluation*

Citation	No. Cases	DS1 Data	DS2 IV	DS3 IOA	DS4 RTE	DS5 EOT	DS6 ROB	Overall WWC 5 (WWC 4)
Aljadeff-Abergel and Ayvazo (2020)	4	4 MS	4 MS	4 MS	4 MS	1 MS, 2 MSR, 1 DMS	1 MSR, 3 N/A	3 MSR, 1 DMS (3 MSR, 1 DMS)
Dillenburg and Coyle (2019)	16	16 MS	16 MS	16 I/C	16 MS	16 DMS	16 N/A	16 DMS (16 DMS)
Franzen and Kamps (2008)	3	3 MS	3 MS	3 DMS	3 MS	3 MS	3 N/A	3 DMS (3 DMS)
Gamble and Strain (1979)	2	2 MS	2 MS	2 DMS	2 MS	2 MS	2 N/A	2 DMS (2 DMS)
Groves and Austin (2019)	5	5 MS	5 MS	5 MS	5 MS	5 MSR	5 N/A	5 MSR (5 MSR)
Hansen and Lignugaris/Kraft (2005)	18	18 MS	18 MS	18 MS	18 MS	10 MS, 4 MSR, 4 DMS	10 MSR, 8 N/A	14 MSR, 4 DMS (10 MS, 4 MSR, 4 DMS)
Herring and Northup (1998)	1	1 MS	1 MS	1 MS	1 MS	1 MSR	1 N/A	1 MSR (1 MSR)
Jellison et al., (1984)	1	1 MS	1 MS	1 MS	1 MS	1 MSR	1 N/A	1 MSR (1 MSR)
Jones et al., (2009)	8	8 MS	8 MS	8 MS	8 MS	8 MSR	8 N/A	8 MSR (8 MSR)
Kleinman and Saigh (2011)	1	1 MS	1 MS	1 MS	1 MS	1 MSR	1 N/A	1 MSR (1 MSR)
Kohler and Fowler (1985)	4	2 MS, 2 DMS	4 MS	4 MS	4 MS	4 DMS	4 N/A	4 DMS (4 DMS)
Lewis et al. ,(1998)	7	7 MS	7 MS	7 I/C	7 MS	7 DMS	7 N/A	7 DMS (7 DMS)
Maggin et al., (2012)	1	1 MS	1 MS	1 MS	1 MS	1 MSR	1 N/A	1 MSR (1 MSR)
Saigh and Umar (1983)	1	1 MS	1 MS	1 MS	1 MS	1 MS	1 MSR	1 MSR (1 MS)

Schonewille et al., (1978)	1	1 MS	1 MS	1 DMS	1 MS	1 DMS	1 N/A	1 DMS (1 DMS)
Sewell (2020)	3	3 MS	3 MS	3 I/C	3 MS	3 MSR	3 N/A	3 I/C (3 I/C)
Silverman and Silverman (1975)	2	2 MS	2 MS	2 DMS	2 MS	1 MS, 1 DMS	2 N/A	2 DMS (2 DMS)
Skinner et al., (2000)	1	1 MS	1 MS	1 MS	1 MS	1 MSR	1 N/A	1 MSR (1 MSR)
Stremel et al., (2022)	5	5 DMS	5 MS	5 DMS	5 MS	5 DMS	5 N/A	5 DMS (5 DMS)
Vidoni and Ward (2006)	2	2 MS	2 MS	2 I/C	2 MS	2 MS	2 N/A	2 I/C (2 I/C)
Wiskow et al., (2021)	10	10 DMS	10 MS	10 MS	10 MS	10 DMS	10 N/A	10 DMS (10 DMS)
Yassine and Tipton-Fisler (2021)	1	1 MS	1 MS	1 MS	1 MS	1 MS	1 MSR	1 MSR (1 MS)

*Please note for the purposes of the design evaluation only relevant cases were assessed. Studies may have met design standards for other cases not relevant to this review.

KEY: No. Cases = Number of cases in study relevant to research questions. DS = Design Standard. DS1 Data = Data available in graphical/ tabular format. DS2 IV = Independent variable systematically manipulated. DS3 IOA = IOA collected at least 20% of sessions and is at least 80%. DS4 RTE = Evidence of lack of residual treatment effects. DS5 EOT = Demonstrates effect over time. DS6 ROB = Risk of Bias. MS= Meets Standards. MSR= Meets Standards with Reservations. DMS= Does not Meet Standards. I/C = Insufficient information provided to decide.

Table 2.3*Summary of Study Characteristics*

Citation	Country	Educational Setting	Intervention Setting	Intervention Implementer	Intervention Targets	GC	Design
Aljadeff-Abergel and Ayvazo (2020)	U.S.	General Ed.	P.E. Class	Teacher	Target Students	Independent & Interdependent	Multiple Baseline
Dillenburger and Coyle (2019)	Northern Ireland	General & Special Ed.	Regular Classroom	Teacher	Whole group	Interdependent	Withdrawal/ Reversal
Franzen and Kamps (2008)	U.S.	General Ed.	Playground	Teacher	Whole group	Interdependent	Multiple Baseline
Gamble and Strain (1979)	U.S.	Other	Regular Classroom	Teacher	Whole group	Interdependent & Dependent	Withdrawal/ Reversal
Groves and Austin (2019)	Wales	Special Ed.	Regular Classroom	Teacher	Whole group	Interdependent	Withdrawal/ Reversal
Hansen and Lignugaris/Kraft (2005)	U.S.	Resource Unit	Regular Classroom	Teacher	Whole group & Target Students	Dependent	Withdrawal/ Reversal
Herring and Northup (1998)	U.S.	General Ed.	Regular Classroom Recess Other	Teacher	Whole group	Interdependent	Withdrawal/ Reversal
Jellison et al., (1984)	U.S.	General Ed.	Regular Classroom	Teacher	Whole group	Interdependent	Multiple Baseline
Jones et al., (2009)	U.S.	Resource Unit	Other	Teacher	Whole group & Target Students	Dependent	Withdrawal/ Reversal
Kleinman and Saigh (2011)	U.S.	General Ed.	Regular Classroom	Teacher	Whole group	Interdependent	Withdrawal/ Reversal
Kohler and Fowler (1985)	U.S.	General Ed.	Regular Classroom	Teacher	Whole group Target Students	Interdependent	Multiple Baseline

Lewis et al. ,(1998)	U.S.	General Ed.	Recess Cafeteria	Cafeteria Monitors	Whole group	Interdependent	Multiple Baseline
Maggin et al., 2012	U.S.	Resource Unit	Regular Classroom	Paraeducator	Whole group & Target Students	Interdependent	Withdrawal/ Reversal
Saigh and Umar (1983)	Sudan	General Ed.	Regular Classroom	Teacher	Whole group	Interdependent	Withdrawal/ Reversal
Schonewille et al., (1978)	Canada	General Ed.	Other	Teacher	Whole group	Independent	Withdrawal/ Reversal
Sewell (2020)	England	General Ed.	Regular Classroom	Teacher	Whole group	Interdependent	Withdrawal/ Reversal
Silverman and Silverman (1975)	U.S.	General Ed.	Regular Classroom	Teacher	Whole group	Interdependent	Changing Criterion Design
Skinner et al., (2000)	U.S.	General Ed.	Regular Classroom	Teacher	Whole group	Interdependent	Withdrawal/ Reversal
Stremel et al., (2022)	U.S.	Special Ed	Regular Classroom	Teacher	Whole group	Dependent	Withdrawal/ Reversal
Vidoni and Ward (2006)	U.S.	General Ed.	P.E. Class	Teacher	Target Students	Dependent	Multiple Baseline
Wiskow et al., (2021)	U.S.	General Ed.	Regular Classroom	Researcher	Whole group	Interdependent	Withdrawal/ Reversal
Yassine and Tipton-Fisler (2021)	U.S.	General Ed.	Recess	Paraeducator	Whole group	Independent	Multiple Baseline

Key: GC = Group Contingency Type. U.S. = United States. General Ed. = General Education. Other Educational Settings include Special Classes (unspecified if in general or special education school). Other Intervention Settings includes Open plan multi teaching space, Resource Reading Class, Small group activity centres

Table 2.4*Contingencies in Place to Target Behaviour*

Citation	Behaviours	Behavioural Category	RM	STC	LTC
Aljadeff-Abergel & Ayvazo (2020)	Cooperation	Cooperative Prosocial	PIR	PR	PR
	Impulsivity	Antagonistic Antisocial	PIR	DRA	DRA
Dillenburger & Coyle (2019)	Communicating	Cooperative Prosocial	PIR	PP & PR	PR & DRL
	Helping/Sharing	Cooperative Prosocial	PIR	PP & PR	PR & DRL
Franzen & Kamps (2008)	Physical Aggression	Antagonistic Antisocial	FR	DRA	DRA
	Inappropriate Verbal	Combined Antagonistic & Uncooperative	FR	DRA	DRA
Gamble & Strain (1979)	Positive Social Behaviours	Combined Cooperative & Encouraging	FR	PR	PR
Groves & Austin (2019)	Positive Peer Interaction	Combined Cooperative & Encouraging	FR	PR	PR
	Negative Peer Interaction	Combined Antisocial & Uncooperative	FR	DRA	DRA
	Swearing	Antagonistic Antisocial	FR	DRA	DRA
Hansen & Lignugaris/Kraft (2005)	Positive Verbal Statements	Encouraging Prosocial	PIR	PR	PR
	Negative Verbal Statements	Antagonistic Antisocial	PIR	DRA	DRA
Herring & Northup (1998)	Complaining/Whining	Uncooperative Antisocial	FR	NP	PR
Jellison et al., (1984)	Positive Interactions	Cooperative Prosocial	PIR	PR	PR
Jones et al., (2009)	Verbally Disrespectful Behaviours	Antagonistic Antisocial	FR	PP	DRL
Kleinman & Saigh (2011)	Aggression or Physical Disruption	Antagonistic Antisocial	PIR	PP	DRL & NP
Kohler & Fowler (1985)	Play Invitations	Cooperative Prosocial	PIR	PR	PR
	Negative Behaviours	Antagonistic Antisocial	PIR	DRA	DRA
Lewis et al. ,(1998)	Cafeteria Cutting in Line	Uncooperative Antisocial	FR	DRA	DRA
	Cafeteria Threats	Antagonistic Antisocial	FR	DRA	DRA
	Cafeteria Take Food	Uncooperative Antisocial	FR	DRA	DRA
	Recess Threats	Antagonistic Antisocial	FR	DRA	DRA
	Recess Argue	Uncooperative Antisocial	FR	DRA	DRA
	Recess Inappropriate Language	Antagonistic Antisocial	FR	DRA	DRA
	Recess Interfere with Games	Uncooperative Antisocial	FR	DRA	DRA

Maggin et al., (2012)	Student Aggression	Antagonistic Antisocial	PIR	PP	DRL
Saigh & Umar (1983)	Aggression or Physical Disruption	Antagonistic Antisocial	PIR	PP	DRL
Schonewille et al., (1978)	Disruptive Target Behaviour	Combined Antagonistic & Uncooperative	FR & PIR	PP	DRL
Sewell (2020)	Positive Social Interactions	Cooperative Prosocial	FR	PR	PR
	Working as a Team	Cooperative Prosocial	FR	PR	PR
	Supporting Peers	Encouraging Prosocial	FR	PR	PR
Silverman & Silverman (1975)	Verbal Aggression	Antagonistic Antisocial	FR	PP	DRL
	Physical Aggression	Antagonistic Antisocial	FR	PP	DRL
Skinner et al., (2000)	Tootling	Encouraging Prosocial	FR	PR	PR
Stremel et al., (2022)	Positive Peer Statements	Combined Cooperative & Encouraging	PIR	PR	PR
	Negative Peer Statements	Antagonistic Antisocial	PIR	DRA	DRA
Vidoni & Ward (2006)	Supportive Behaviours	Encouraging Prosocial	FR	PR	PR
	Non-Supportive Behaviours	Antagonistic Antisocial	FR	DRA	DRA
Wiskow et al., (2021)	Student Positive Interactions	Encouraging Prosocial	FR	PR	PR
	Student Negative Interactions	Uncooperative Antisocial	FR	PP	DRL
Yassine & Tipton-Fisler (2019)	Aggression	Antagonistic Antisocial	FR	DRA	DRA

Key: RM = Recording Methods, STC = short-term contingency, LTC = long-term contingency, PIR = Partial Interval Recording, FR = Frequency Recording, PR = Positive Reinforcement, PP = Positive Punishment, DRA = Differential Reinforcement of an Alternative Behaviour, DRL = Differential Reinforcement of Low Rates of a Target Behaviour, NP = Negative Punishment.

2.3.2.2 Antisocial Behaviours

Twenty-six ASBs were targeted across the 22 full texts reviewed (See Table 2.4). Based on the operational definitions in Table 2.1, 17 behaviours could be categorised as antagonistic behaviours, six as uncooperative and three as combinations of antagonistic and uncooperative behaviours. Eight of the antagonistic behaviours across eight studies focused on more extreme physical forms of ASB such as aggression (Franzen & Kamps, 2008; Kleinman & Saigh, 2011; Lewis et al., 1998; Maggin, Fallon, et al., 2012; Saigh & Umar, 1983; Silverman & Silverman, 1975; Yassine & Tipton-Fisler, 2022). Physical aggression took many diverse forms across these studies and this heterogeneity in target behaviours adds complexity to the synthesis of results. Antagonistic behaviours also included behaviours such as impulsivity (Aljadeff-Abergel & Ayvazo, 2020), negative peer statements (Stremel et al., 2022), inappropriate language (Groves & Austin, 2019; Lewis et al., 1998), and threatening behaviours (Lewis et al., 1998).

Uncooperative behaviours included behaviours such as complaining or whining (Herring & Northup, 1998), snatching (Lewis et al., 1998), and negative student interactions (Wiskow et al., 2021). Three behaviours that could not be categorised as either antagonistic or uncooperative ASBs alone, including disruptive target behaviours (Schonewille et al., 1978), inappropriate verbal behaviour (Franzen & Kamps, 2008), and negative peer interaction (Groves & Austin, 2019). These behaviours were included in the review as their operational definitions included aspects of both definitions created for this review for uncooperative and antagonistic behaviours. For example, Groves and Austin (2019) defined negative peer interaction as behaviours that “included verbalisations or gestures that threatened, provoked, or demeaned a peer. . . or interfering with a peer’s work” (p.6).

2.3.2.3 Behaviours Targeted Based on Educational Setting

Across the 22 papers, 15 studies were conducted in general education settings, two in special educational settings, and three in a resource unit within a general education school (see Table 2.3). One study was conducted in a special class which was not specified as being in a general or special education setting (Gamble & Strain, 1979). Dillenburger and Coyle (2019) studied the effects of a group contingency across both general and special educational settings. Group contingencies applied in special education settings focused on social interaction between peers such as “positive peer interaction” (Groves & Austin, 2019), “negative peer statements” (Stremel et al., 2022), and “swearing” (Groves & Austin, 2019). Similarly, studies conducted within resource units focused mostly on communication-based behaviours such as “positive social behaviours” (Gamble & Strain, 1979), “negative verbal statements” (Hansen & Lignugaris/Kraft, 2005), “verbally disrespectful behaviours (Jones et al., 2009), and “student aggression” (Maggin, Fallon et al., 2012). It was only in general education settings that more collaborative or less

individualistic forms of PSB or ASBs were targeted such as “working as a team” (Sewell, 2020), “tootling” (Skinner et al., 2000) and “cutting in line” (Lewis et al., 1998).

2.3.2.4 Behaviours Targeted Based on Educational Level

Those between grades kindergarten and 6th (and their international equivalents) were considered primary level and those between grades 7th and 12th were considered secondary level in this review. Of the included studies, only three studies explored the use of a group contingency at the secondary level (Groves & Austin, 2019; Hansen & Lignugaris/Kraft, 2005; Silverman & Silverman, 1975). Consistent with whole group findings, at secondary school level more ASBs were targeted than PSBs with four ASBs targeted across the three papers and only two PSBs across two (Groves & Austin, 2019; Hansen & Lignugaris/Kraft, 2005) of the three articles. Although limited behaviours were targeted in second level settings, these behaviours were similar to those targeted at the primary level, for example, peer interaction and aggression were explored at both primary (Saigh & Umar, 1983; Sewell, 2020) and secondary school levels (Groves & Austin, 2019; Silverman & Silverman, 1975).

2.3.3 Short-Term and Long-Term Contingencies Used to Target Prosocial and Antisocial Behaviours

The behavioural principles underpinning the group contingencies used in the 22 studies varied. Interdependent group contingencies were the most commonly used group contingencies with fourteen studies adopting this methodology only (See Table 2.3). Four studies reported adopting dependent group contingencies only (See Table 2.3) and only two studies reported using only independent group contingencies (Schonewille et al., 1978; Yassine & Tipton-Fisler, 2022). One study explored the use of both an independent and an interdependent group contingency (AljadeffAbergel & Ayvazo, 2020). One study compared an interdependent and dependent group contingency (Gamble & Strain, 1979). Each of the included studies had two contingencies in place—both a short-term contingency and a long-term contingency. Overall, only 59.1% could be considered a purely positive behavioural intervention (i.e., using reinforcement-based contingencies throughout the intervention). Table 2.4 outlines the contingencies put in place to target specific behaviours.

2.3.3.1 Short-Term Contingency

All studies targeting PSBs (N = 12) utilised positive reinforcement procedures during the group contingency intervention to increase the behaviour (see Table 2.4). Positive reinforcement was delivered in a number of ways including earning points (e.g., Sewell, 2020), receiving a golden nugget (Wiskow et al., 2021) or receiving a sticker (Kohler & Fowler, 1985). One study compared the use of positive reinforcement to positive punishment to target a PSB (Dillenburger & Coyle, 2019); however, it must be noted that the punishment procedures used had no effect on

increasing inclusive behaviours of the students. In the short-term contingency, positive reinforcement was delivered to students for demonstrating the desired PSB (i.e., they met the behavioural expectations placed on them during the group contingency intervention). Ten of the studies using reinforcement during the short-term contingency to target PSBs explicitly label their use of points or praise or other consequences as reinforcement (Aljadeff-Abergel & Ayvazo, 2020; Dillenburger & Coyle, 2019; Gamble & Strain, 1979; Groves & Austin, 2019; Hansen & Lignugaris/Kraft, 2005; Jellison et al., 1984; Kohler & Fowler, 1985; Sewell, 2020; Stremel et al., 2022; Wiskow et al., 2021). Two studies did not explicitly label their use of reinforcement during the short-term contingency to target PSBs as reinforcement (Skinner et al., 2000; Vidoni & Ward, 2006).

The means of targeting ASBs in the short-term contingencies varied with nine studies using reinforcement, seven studies using positive punishment and one study using negative punishment (See Table 2.4). Each of the nine studies using reinforcement used differential reinforcement of alternative behaviour (DRA). Applications of DRA included, for example, reducing problem behaviours of students by rewarding points for following school-wide rules focused on reducing those behaviours (Lewis et al., 1998) or reducing the negative statements of students by reinforcing students' positive statements or providing students with a point (Hansen & Lignugaris/Kraft, 2005). The eight studies using punishment during the short-term contingency to target the children's ASB typically used positive punishment procedures (N = 7) such as giving a "foul" (e.g., Maggin, Fallon, et al., 2012) or giving a "wormy apple" (Wiskow et al., 2021) for not following class rules or for demonstrations of ASBs. The one study using negative punishment removed a happy face during the group contingency (Herring & Northup, 1998). One study compared the use of punishment and reinforcement and labeled both as such (Wiskow et al., 2021). The other eight studies using punishment in the short-term contingency to target ASBs did not explicitly label their use of "fouls" or marks as punishment.

Four studies reported using the Good Behaviour Game (GBG; Barrish et al., 1969) as their chosen group contingency intervention (Kleinman & Saigh, 2011; Maggin, Fallon, et al., 2012; Saigh & Umar, 1983; Wiskow et al., 2021) to target ASBs. The GBG is one of the most common group contingencies used to target ASBs and typically adopts a positive punishment procedure as the short-term contingency in place. In the traditional GBG, children's disruptive behaviour is positively punished with a "foul" and the children are granted access to a reward if they remain under a certain criterion of fouls for a given game period. One study (Wiskow et al., 2021) reported using the Caught Being Good Game (CBGG; R. A. Wright & McCurdy, 2012). The GBG involves a positive short-term contingency and giving children access to a prize for reaching or exceeding a certain criterion of points in the long-term contingency. Both Groves and Austin (2019) and Sewell (2020) reported using the GBG. However, both of these studies used a positive

short-term contingency rather than the positive punishment approach, which is typically used during the GBG; therefore, these studies may be better categorised as the CBGG.

2.3.3.2 Long-Term Contingency

All studies (N = 12) focusing on targeting PSBs used positive reinforcement as the behavioural mechanism in the long-term contingency. Reinforcers used included extra recess (Skinner et al., 2000), small prizes (e.g., Vidoni & Ward, 2006) and listening to rock music (Jellison et al., 1984). Studies targeting ASBs used either DRA or DRL during their long-term contingency. When DRA was used to target ASBs in the short-term contingency, DRA was used again in the long-term contingency. When positive punishment was used to target ASBs in the short-term contingency, DRL was used in the long-term contingency. Nine studies reported the use of DRA to reinforce children's behaviour following the completion of the group contingency intervention (see Table 2.4). These studies positively reinforced alternative positive behaviours such as reinforcing cooperation to decrease impulsivity (Aljadeff-Abergel & Ayvazo, 2020) or reinforcing positive social interactions to decrease negative social interactions (Groves & Austin, 2019), rather than directly targeting the ASB. Examples of ways students were reinforced using DRA include receiving a reward from a grab bag (Hansen & Lignugaris/Kraft, 2005) or the accumulation of school dollars in exchange for a prize (Yassine & Tipton-Fisler, 2022). As outlined in Table 2.4, eight studies used DRL as the long-term contingency to reinforce the children's behaviour. All eight of the studies using DRL used positive punishment procedures during the short-term contingency. During the long-term contingency children were then reinforced for demonstrating low levels of the targeted ASBs, for example, in the GBG children were positively reinforced if they received fewer than the set criterion of "fouls" (e.g., Kleinman & Saigh, 2011). In the long-term contingency, DRL was delivered in a number of ways including, for example, earning free time (Silverman & Silverman, 1975) or a mystery reward (M. Jones et al., 2009). While all 17 of the studies focusing on reducing at least one ASB utilised reinforcement procedures in the long-term contingency, one study (Kleinman & Saigh, 2011) also negatively punished the losing team (those who accumulated the most "fouls") resulting in that team losing free time as well as the winning team receiving a pizza party.

2.3.4 Quality of Literature

Each study included in this review was assessed against the WWC Design Standards for single-case research. The design evaluation was conducted for each case separately. Cases were classified as "Meeting WWC SCD Standards Without Reservations," "Meeting WWC SCD Standards with Reservations," or "Does Not Meet WWC SCD Standards" with those who met the standards without reservations considered the highest quality. Table 2.2 outlines the quality evaluation for each of the included studies.

2.3.4.1 What Works Clearinghouse Standards (Version 5)

None of the included studies met WWC Design Standards Version 5 without reservations. Overall, 37 cases across 11 studies met WWC standards with reservations (See Table 2.2). A total of 55 cases across 11 studies did not meet standards including 10 studies that did not meet standards in any of their cases (total number of cases across these 10 studies was 54. See Table 2.2). WWC Design Standards Version 5 saw the addition of the assessment of risk of bias as well as a new requirement in Design Standard 5 to have 6 initial baseline data points to meet standards without reservations. The WWC Design Standards were updated during the conduct of this review; thus, none of the included studies would have been conducted with these standards in mind. While we report here on WWC standards Version 5, for comparative purposes, Table 2.2 reports overall design evaluation using both Standards 4.1 and 5.

2.3.4.2 Design Standards Met

Each of the 22 included studies met WWC version 5 Design Standards 2 and 4. Design standard 2 outlines requirements for systematic manipulation of the independent variable. Given the nature of group contingency interventions involving measuring the dependent variable at both baseline and intervention phases, this standard was met by all cases in all 22 included studies. Design standard 4 is met if a study demonstrates evidence of a lack of residual treatment effects. All 22 of the included studies appeared free of residual treatment effects across baseline and intervention phases.

2.3.4.3 Design Standards not Met

Design Standard 1 (data should be available in graphical or tabular format) was not met in 17 cases across three studies (Kohler & Fowler, 1985; Stremel et al., 2022; Wiskow et al., 2021). Design Standard 3 (interobserver agreement should be calculated for at least 20% of sessions across all cases and outcomes and is at least 80% agreement) was not met in 13 cases across five studies (See Table 2.2) and was not reported in sufficient detail in 28 cases across 4 studies (Dillenburger & Coyle, 2019; Lewis et al., 1998; Sewell, 2020; Vidoni & Ward, 2006). More cases failed to meet Design Standard 5 than any other standard. This standard (in which a study must demonstrate effect over time) was not met by 49 cases across nine studies (See Table 2.2). As seen in Table 2.4, thirteen cases across four studies were assessed for Design Standard 6 (risk of bias). All cases were reduced to a rating of meeting standards with reservations at this point due to overlapping data.

2.3.4.4 Association of Quality With Author-Reported Effectiveness of Intervention

Although the purpose of this narrative synthesis was not to assess the effect of group contingencies for ASBs and PSBs, we did synthesise information relating to the author-reported effect. The WWC Design Standards version 5.0 suggest synthesising only cases Meeting WWC

Design Standards with and without Reservations. Therefore, we synthesised author-reported effects for cases “Meeting WWC Standards with Reservations.” In cases meeting standards with reservations, the majority of authors suggested that the group contingency was an effective means to increase PSB or decrease ASB (Aljadeff-Abergel & Ayvazo, 2020; Groves & Austin, 2019; Hansen & Lignugaris/Kraft, 2005; Herring & Northup, 1998; Jellison et al., 1984; Kleinman & Saigh, 2011; Maggin, Fallon et al., 2012; Saigh & Umar, 1983; Skinner et al., 2000; Yassine & Tipton-Fisler, 2022). M. Jones and colleagues (2009), although meeting design standards with reservations, reported mixed findings. They reported effectiveness of their group contingency interventions for two of the seven individually targeted participants. However, these two individuals demonstrated low levels of ASB in baseline and therefore may not have been accurately targeted for study inclusion. Although the author-reported effect was only explored for those meeting WWC standards with reservations, Stremel and colleagues (2022) regarded their group contingency intervention as ineffective. This study did not meet the WWC Standard in more areas than any other study, not satisfying three of the design standards.

2.4 Discussion

This review aimed to identify the types of PSBs and ASBs targeted by group contingencies as well as explore the behavioural mechanisms underpinning the contingencies put in place in the included single-case studies. A systematic search of the single-case literature found 22 studies deemed suitable for inclusion in the narrative synthesis. Across the 22 studies included in this review, group contingencies have been used to target both ASBs and PSBs, although the nature of target behaviours differed across school types. The contingencies used included positive reinforcement alone or a combination of positive or negative punishment in the short-term contingency followed by positive reinforcement in the long-term contingency.

2.4.1 Targeting Prosocial and Antisocial Behaviours in School Settings

As outlined in the narrative synthesis, researchers more frequently targeted ASBs more frequently for reduction than targeting PSBs for increase. This is an interesting finding as it demonstrates the use of group contingencies to focus on socially relevant behaviours is still aligned with, and indeed has grown out of, their traditional use in classroom management. Traditionally, behaviour management is seen as a tool for decreasing problem behaviours (Oliver et al., 2011). However, in recent years, an emphasis has been placed on utilising more positive forms of behaviour support and encouraging positive behaviours in children (LaVigna & Willis, 2012). While a number of researchers have now used group contingencies to establish PSB in the classroom, this has focused mainly on younger students (c.f. Groves & Austin, 2019; Hansen & Lignugaris/Kraft, 2005).

Previous research has suggested disruptive behaviours may occur with higher prevalence in older students, which may explain the emphasis on targeting ASBs in these groups (McDaniel et al., 2022). Given the numerous positive associations with PSBs (Wagaman, 2011), it is surprising the research exploring how group contingencies can target these behaviours is limited. Literature has suggested that teachers move toward adopting more preventive approaches (e.g., encouraging positive behaviours and the development of skills) to behaviour management rather than reactive approaches (e.g., punishment; Korpershoek et al., 2016). The findings of the review highlight a need for further exploration of the use of behaviour management as preventative approaches for disruptive behaviours by encouraging positive skill development such as the development of PSBs.

In special education settings, researchers explored the effects of group contingencies on more basic communication-based or individualistic forms of PSB and/or ASB (e.g., positive peer interaction; Groves & Austin, 2019). Only in general education settings did researchers evaluate intervention effects on more collaborative forms of ASB and PSB (e.g., working as a team; Sewell, 2020). It must be noted that group contingency interventions are used to target behaviours seen as challenging or in need of improvement specifically for the intervention context (Pokorski, 2019), which may explain differences in behaviours targeted across educational settings. Research has suggested special education students may require more support with social skills than those in general education settings (Frostad & Pijl, 2007); thus, teachers in special education settings may prioritise more communication-based behaviours over more collaborative behaviours. However, it has been suggested that collaborative and teamworking skills are important for the social skills development of individuals with additional support needs (e.g., autistic students; Vernon et al., 2016). Future research should further explore the use of group contingency interventions for increasing more collaborative behaviours of special education students as well as comparing behaviours in need of improvement across educational settings. In general, the use of group contingency interventions for targeting PSBs is under-researched and with a shift toward more positive forms of behaviour management, research too must shift toward exploring more positive behaviours.

We are also mindful that the degree to which PSBs and ASBs are distinct constructs is not always clear. While many times these behaviours might be connected (e.g., when increasing PSBs, we see a decrease in ASB), this is not always the case. Often, as seen in this review, the degree of connection between PSB and ASB relies on the contingencies in place to target those behaviours. For example, the use of positive reinforcement during the short-term contingency may aim to increase desirable behaviours and decrease undesirable behaviours (e.g., Groves & Austin, 2019). However, given that ASBs and PSBs are distinct constructs, an intervention may not be equally as effective for both (e.g., Wiskow et al., 2021).

2.4.2 Contingencies in Place for Targeting Prosocial and Antisocial Behaviours

For the purpose of this review, a group contingency intervention was considered to comprise of both a short-term and a long-term contingency, as in previous literature (Schonewille et al., 1978). Previous systematic reviews have not explored group contingencies in this way (e.g., Maggin, Johnson et al., 2012; Maggin et al., 2017). However, with a recent shift toward and focus on positive forms of behaviour support we must do so. The GBG is commonly referred to as a reinforcement-based strategy because reinforcement is delivered when meeting the game's criterion (Barrish et al., 1969). However, until the short-term and long-term conditions are dissected, we miss the subtlety of the fact that the traditional GBG is not solely reinforcement-based. Punishment (whether positive or negative) is commonly used in the short-term contingency of group contingency intervention (e.g., in nine studies within this synthesis). Yet, this is often overlooked as reinforcement is used in the long-term contingency. Traditionally, teachers have adopted more reactive strategies (e.g., punishment; Shook, 2012) for managing classroom behaviour. Although punishment methods were found effective in this review, there are a number of concerns relating to the use of punishment procedures in classrooms. Past research has emphasised the use of punishment may pose a moral dilemma, may be unethical (Cooper et al., 2020), and may lead to the development of resistance and oppositional behaviour (Mathur & Corley, 2014). Research has indicated students may prefer positive reinforcement over positive punishment (Wahl et al., 2016) further emphasising the importance of positive behaviour change techniques over punitive techniques (Osher et al., 2010).

All PSBs targeted by the studies included in this review used positive reinforcement to increase these behaviours. ASBs were targeted using DRA, positive punishment, or negative punishment. Any study using DRA to target an ASB in the short-term contingency also adopted DRA in the long-term contingency, and therefore the ASB was never directly targeted. This demonstrates group contingency interventions can reduce problematic behaviours even without direct focus.

This review highlighted that punishment procedures are commonly used in group contingency interventions. However, with a recent focus in literature to focus on more positive forms of behaviour support (LaVigna & Willis, 2012), it must be considered whether punishment procedures are necessary. Research should remain aligned with current positive focus and consider using positive reinforcement methods in their behaviour management strategies, as well as exploring the effects of more preventative approaches to behaviour management (Embry, 2002; Troncoso & Humphrey, 2021; Korpershoek et al., 2016). By raising awareness of the short-term and long-term contingencies of an intervention, we hope researchers and practitioners can make informed decisions about the interventions they use in practice. Specifically, they should aim to use interventions adopting only reinforcement-based contingencies where possible.

Researchers should provide greater clarity in publications by (a) reporting the short- and long-term contingencies and (b) using the GBG to refer only to procedures incorporating punishment in the short-term contingency. Conversely, the CBGG or positive-GBG should be used to refer to procedures incorporating reinforcement in both short- and long-term contingencies. Clear reporting is essential to further our understanding of more positive forms of behaviour support in group contingency research and practice. Future research may seek to compare other characteristics of the behavioural contingencies in place such as comparing the effect of interdependent, independent, and dependent group contingencies on PSBs. The empirical studies presented throughout this thesis all adopt reinforcement procedures in both the short- and long-term contingencies.

2.4.3 Quality of the Literature

The findings of our narrative synthesis indicated that the majority of included studies did not meet WWC Design Standards (2022) for single-case research (see Table 2.2). Given that one focus of this review was to explore whether studies using group contingencies to target PSBs and ASBs meet WWC Standards, all studies were included in the synthesis of the results.

Many past systematic reviews exclude studies not meeting WWC standards from their evidence evaluation (e.g., Maggin, Johnson et al., 2012; Maggin et al., 2017), and thus, much novel research and valuable information is frequently missed. Across previous literature, group contingency interventions are commonly deemed to not meet WWC Design Standards 3 and 5 due to calculating interobserver agreement in less than 20% of cases or failing to demonstrate effect over time (e.g., Maggin, Johnson et al., 2012). Similarly, in this review, Design Standards 3 (interobserver agreement) and 5 (effect across time) were the most common design standards not met. WWC single-case design standards are typically used to assess the strengths of studies as well as the reliability and validity of studies (Moeyaert & Dehghan-Chaleshtori, 2022). However, concerns have been posed surrounding the systematic exclusion of studies not meeting WWC Standards from synthesis (Maggin et al., 2022). Given that the focus of the current review was not to make inferences about the effect of group contingencies, this study synthesised studies meeting WWC Standards with Reservations and not meeting WWC Standards.

This review aimed to ascertain the extent to which the studies reviewed met WWC Standards, as well as to highlight areas in which standards are not met, to improve the quality of future studies. We hope researchers can learn from our synthesis of common issues in the design and reporting in this literature and this can support both the design and the implementation of future single-case group contingency investigations. Particular focus was put on ensuring that the empirical studies carried out in this thesis met WWC Standards (2022).

2.4.4 Limitations

There are several limitations to this review. Firstly, as most of the studies included in the review were conducted in the United States and other Western countries, the results may not be generalisable to Eastern cultures or different educational systems. As with all systematic reviews, there is potential that several relevant texts may not have been included in the search results of the various databases used. However, with careful strategic development of search terms in collaboration with an expert panel and librarian, we have minimised this risk as much as possible. As grey literature was excluded from this review, valuable data from other forms of literature may not be included. At the full text stage of the review, several papers explored behaviours of interest but were excluded because these behaviours were indistinguishable from other behaviours (e.g., measured collectively with other irrelevant behaviours such as out of seat behaviour). Research exploring the effect of group contingencies using RCTs were excluded from the current synthesis. Future reviews may seek to synthesise the evidence for the use of these studies in targeting PSBs and ASBs.

2.4.5 Conclusion

Developing an understanding of the use of group contingencies for targeting PSB and ASB within the single-case literature can contribute to the development and improvement of behavioural management strategies and provide insight into the malleability of these behaviours in children. Future research should evaluate the necessary components to an effective group contingency to simplify the procedures, should adopt a collaborative approach with educators and students and should explore the generalisation of results across settings. More subtle and more common forms of ASBs such as teasing, mocking, and tattling require investigation as well as further exploration of PSB in both general and special education settings. Aligned with positive behavioural support recommendations, researchers should design interventions using positive reinforcement procedures. Researchers should strive to avoid common pitfalls in single-case research and strive to conduct high quality research paying particular attention to issues surrounding interobserver agreement calculation and demonstrating effect over time.

As much of the research is conducted in school settings, there is a need for further exploration for the use of group contingency interventions outside of the classroom setting. In Chapters 3-5 of this thesis, the findings of four empirical explorations of the use of reinforcement-based group contingency interventions are presented.

Chapter 3: Using the Caught Being Good Game in the Community: Increasing Prosocial Behaviours among Children at Risk of Adverse Childhood Experiences. ²

3.1 Introduction

Socioeconomic deprivation is an increasing concern both nationally and internationally. In Ireland, for example, rates of deprivation rose from 13.8% in 2021 to 17% in 2022 (Central Statistics Office, 2022). In the UK, approximately one-third of the population experience income deprivation (Office for National Statistics, 2019), while 11% of the population in the United States live in poverty (US Census Bureau, 2021). This form of structural disadvantage is strongly associated with a range of negative outcomes for children and communities, including poorer health (Algren et al., 2015), higher crime rates (Chamberlain & Hippi, 2015), increased rates of substance misuse (Kendler et al., 2014), and lower school completion (Fenwick & Kinsella, 2020), as well as heightened experiences of stigma and marginalisation (Kearns et al., 2013; Neary et al., 2013).

These risks often manifest in children's behavioural development. Antisocial behaviours (ASBs) have been identified as both a consequence and a contributing factor to many of the outcomes associated with disadvantage (Lenzi et al., 2012; Toumbourou, 2016). Children who exhibit ASBs are more likely to experience academic difficulties (Mayer, 1995), strained relationships with peers and adults (Walker et al., 1995), and increased vulnerability to mental health issues (Paradis et al., 2016). These behaviours can also lead to reduced emotional regulation and empathy, which in turn may result in social rejection and isolation (Ensor et al., 2010), further exacerbating risk and potentially contributing to more serious challenges in adolescence and adulthood, including substance misuse and contact with the justice system (Toumbourou, 2016).

In Ireland, children growing up in socioeconomically disadvantaged contexts are more likely to be exposed to multiple, overlapping stressors such as poverty, unstable housing, family conflict, and limited access to support services (DCEDIY, 2023). These children are also disproportionately likely to experience adverse childhood experiences (ACEs), defined as potentially traumatic events such as abuse, neglect, and household dysfunction (Tzouvara et al., 2023). According to the Growing Up in Ireland study, 73% of 9-13 year olds had experienced one or more ACEs, with higher prevalence in marginalised communities (Gardner et al., 2019).

3.1.1 The Impact of Adverse Childhood Experiences on Children's Behaviour

As outlined in Chapter 1, ACEs have been associated with increased risk of mental health problems (Von Cheong et al., 2017), poor physical health (Hughes et al., 2017), and substance

² This chapter presents the findings from a study published in the Journal of Positive Behavior Interventions available at <https://doi.org/10.1177/10983007251325956>.

abuse (Bellis et al., 2016). Children from ethnic minority backgrounds, low-income households, or families facing unemployment are at heightened risk of experiencing these ACEs (Merrick et al., 2018). For these children, behavioural challenges are not merely personal issues but reflect complex interactions between personal, familial, and social factors. The importance of recognising this vulnerability has been widely emphasised in research and policy (Goddard, 2021).

There is growing evidence that ACEs can impact children's development across a wide range of domains, including emotional regulation and social wellbeing (Ray et al., 2020; Mosley-Johnson et al., 2019). Increased levels of ASBs have been found among adults who experienced multiple ACEs in childhood (Hunt et al., 2017). However, protective factors such as strong social relationships can buffer the effects of ACEs. Supportive peer, parent, and teacher relationships have been shown to reduce the likelihood of adverse outcomes such as substance misuse (McCollum et al., 2024) and emotional distress (Vinh et al., 2024). This highlights the importance of interventions that promote positive social interactions and behaviours.

3.1.2 Supporting the Development of Prosocial Behaviours in Children

As outlined in Chapter 1, a promising avenue for supporting children at risk is through the development of prosocial behaviours (PSBs). PSBs may be especially valuable for children from disadvantaged or ethnically diverse backgrounds. For example, research has shown that structured opportunities to interact with diverse peers can promote empathy and reduce exclusionary behaviours (Spivak et al., 2015; McKeown & Taylor, 2018). In Ireland, this is particularly relevant in supporting social integration between Traveller and non-Traveller children (Dupont, 2017).

3.1.3 Trauma-informed Care

As outlined in Chapter 1, social validity is particularly pronounced when working with children at risk of ACEs or living in socioeconomically disadvantaged communities. For these populations, behavioural interventions must contribute to children's sense of safety, belonging, and agency. Trauma-informed care (TIC) is a person-centred approach to care which acknowledges that individuals may have experienced traumatic experiences (Reeves, 2015). TIC involves creating safe, supportive, and predictable environments that reduce the risk of re-traumatisation (Brunzell et al., 2022). Key principles include establishing trusting relationships, using positive reinforcement over punitive measures, and incorporating emotional regulation strategies into behavioural interventions (Menschner & Maul, 2016). In the context of group contingencies, TIC may involve adjusting reinforcement criteria to accommodate children with trauma histories, providing individualised support, and integrating social-emotional learning components into interventions (Department of Education, 2024).

3.1.4 Targeting Prosocial and Antisocial Behaviour using Group Contingency Interventions

Interventions focusing on promoting social interactions and social support play an important role in reducing the effects of traumatic experiences (Wagner et al., 2016). Previous research, as outlined in Chapter 1, has identified that behaviour management interventions (e.g., Wiskow et al., 2021) are effective at decreasing the risk of ASBs and increasing PSBs of children. Specifically, interdependent group contingencies, as outlined in Chapter 1 are considered to provide an effective, evidence-based method for managing group behaviour, whether for decreasing disruptive behaviours (Maggin, Johnson et al., 2012; Maggin et al., 2017) or for increasing positive behaviours (e.g., teamworking; Sewell, 2020). Such methods have previously been used successfully with at-risk adolescents (e.g., Costello & Smyth, 2017) and has demonstrated successful uses of interdependent group contingencies for decreasing antisocial behaviours and increasing PSBs. However, the systematic review outlined in Chapter 2 highlights the scarcity of group contingency literature focusing on PSBs rather than ASBs. Aligned with findings in Chapter 2, in which reinforcement-based procedures were considered effective for targeting PSBs, research should strive to use reinforcement-based group contingencies where possible over those incorporating punishment. Trauma-informed approaches utilise strengths-based approaches rather than focusing on deficits (Comiskey et al., 2024), for example encouragement of PSBs rather than ASBs. Therefore, the Caught Being Good Game (CBGG; Wright & McCurdy, 2012), as described in Chapter 1, a reinforcement-only group contingency intervention, was the chosen intervention in this case.

3.1.5 Group Contingencies in Afterschool Settings

As outlined in Chapters 1 and 2, game-based group contingency interventions such as the GBG or CBGG are commonly used in educational settings (Maggin, Johnson et al., 2012; Maggin et al., 2017). However, research exploring the effect of these types of interventions in community-based settings are more limited. Little is known about the use of group contingency interventions in afterschool centres. Community-based afterschool centres (also known as afterschool programmes or services) are centres which provide structured and supervised programmes for children within their community after the regular school days (Philip, 2022). They may provide structured activities such as help with homework, tutoring or guided activities as well as opportunities to socialise with peers (Fredericks et al., 2017). Community-based afterschool centres have been recognised as a promising area for the care of children who might be considered at risk (McDaniel & Yarbrough, 2016; Taheri & Welsh, 2015). Afterschool care is considered to have numerous positive implications for attendees including the potential to improve school attendance (Jenson et al., 2018), reduce behaviours of concern (Kremer et al., 2015), and improve academic performance (Jenson et al., 2018). Afterschool services may be

private fee-paying services (Kremer et al., 2015), or not-for-profit charity-run organisations (Wharton et al., 2016). The focus of this thesis is on the latter.

In the only known published group contingency intervention conducted in an afterschool setting, Smith and colleagues (2018) investigated the use of the PAX GBG in an afterschool programme to improve program quality and children's PSB with a randomised control trial. The PAX GBG, a commercialised version of the GBG developed by the PAXIS Institute (Embry, 2003), focuses on the use of shared norms and praise. The typical version of the GBG was used, that is the use of positive punishment in the short-term contingency and differential reinforcement of low rates of a target behaviour (DRL) in the long-term contingency. Although successful in targeting children's behaviour, the behaviour change was measured by comparing scores on the Strengths and Difficulties Questionnaire (Goodman et al., 2003) pre- and post- intervention, rather than measuring behaviour continuously throughout the intervention through observational methods as common in single case experimental designs. Single case research designs enable us to explore the effectiveness of a group contingency using a different approach, using a different design, different outcome measures and exploring different patterns in behaviour change. It is important, therefore, to explore the effectiveness of behavioural interventions using both methods.

3.1.6 The Current Study

Afterschool services have been recognised as a promising area for tackling issues relating to ASBs and group contingencies such as the CBGG have been deemed a suitable method for increasing PSBs. To our knowledge however, no previous research has been conducted exploring the application of the CBGG in an afterschool setting. We sought to address this gap by exploring the use of the CBGG for increasing PSBs (and therefore perceived social support) among a group of ethnically diverse children in need of support attending charity afterschool services. This research therefore sought to address a number of research questions: 1) Is the CBGG effective at increasing three types of PSB of a nine-year-old girl referred to a community-based afterschool programme? 2) Is the CBGG effective at increasing three types of PSB of a whole group of nine- and ten-year-old children referred to community-based afterschool programme?

3.2 Method

3.2.1 Ethics

Prior to recruitment, all procedures were reviewed by DCU's Research Ethics Committee (REC) and full ethical approval was granted (see Appendix 1). The following section details the ethical considerations relevant to the study presented in this chapter as well as within the thesis more generally.

3.2.1.1 Designing Ethical Interventions

Key considerations were given to the design of ethical interventions throughout this thesis. The interventions designed throughout this thesis were grounded in ethical principles in keeping with behaviour analytic founding principles of social validity (Baer et al., 1968). Social validity, as described in Chapter 1, outlines that interventions should be considered acceptable and that the intervention should target behaviours that are personally meaningful to participants (Baer et al., 1968).

In ensuring ethical design, we collaborated with our participants and stakeholders in a number of ways. For example, the relevance of target behaviours was ensured by collaborating with the afterschool leaders to choose them. The behaviours targeted include a wide range of PSBs, behaviours which have been associated with numerous positive outcomes for the individual (Wagaman, 2011) and serve as protective behaviours against the range of negative outcomes associated with ASBs (Vinh et al., 2024). In Chapter 5, we build upon this participatory approach and used co-design methods with the children to develop the intervention. In these cases, children were not simply recipients of the intervention but active contributors to its design, promoting greater ownership and engagement.

The use of a single-case experimental design enabled ethical and flexible evaluation of behaviour change across time without requiring a control group, which may be considered to exclude children from potentially beneficial supports (Cooper et al., 2020). The group contingency method allows the group leader to simultaneously support group behaviour while also capturing and supporting behaviour of children who might be considered in need of additional support. In Chapters 3 and 4, the adult leader provided insight into children who may require this additional support by choosing target children for individual data monitoring.

3.2.1.2 Participant Profile and Confidentiality

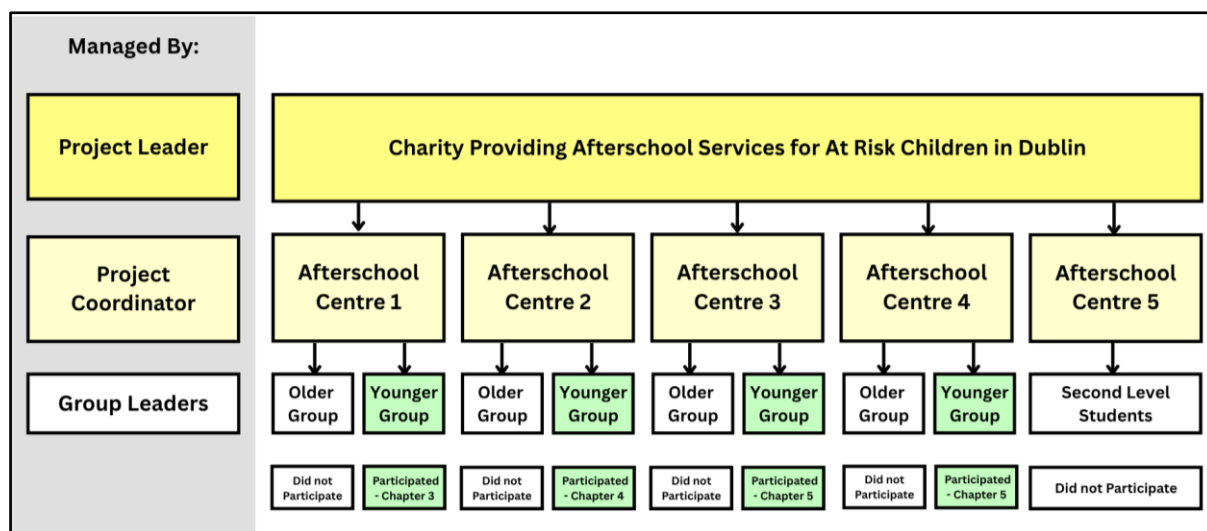
The intervention took place in a community-based afterschool programme provided by a charity in an urban area of Dublin, Ireland. The charity runs five afterschool centres across the area, with each centre accepting children from a different school or schools. Four of the centres participated in studies included in this thesis. Please see Figure 3.1 for further detail. The children attending the services were all referred into the programme (by social workers, school principals or parents) due to their experience of ACEs or their risk of experiencing ACEs. Specific data relating to the experience of ACEs were not collected due to the highly sensitive nature of the data. However, reasons for referral included, but were not limited to, experience of poverty, family experiencing addiction, and living in single-parent families as a result of bereavement, imprisonment of a primary caregiver or divorce. It is important to note that many of the adult leaders working within these centres were also living in the local area and therefore may also have been exposed to similar experiences as these children. However, these data were also not

collected to respect confidentiality. The trauma-informed approach adopted in this study prioritised children and adult leaders' safety, trust, and empowerment. This was reflected in intervention content, delivery style, and co-design activities. All participation was voluntary, and assent was confirmed throughout.

Participant confidentiality was prioritised throughout all studies. In each study, each participant was assigned anonymised ID codes to ensure confidentiality. Identifiable data (e.g., signed consent forms) were stored separately from all other forms of data. Pseudonyms were assigned to participants throughout the thesis.

Figure 3.1

Participating Afterschool Services - Organisation Structure



3.2.1.3 Risk Management

The potential risks of participating in this study were low and could be comparable to typical classroom or group-based activities. However, given the vulnerability of the participating children, several risk management procedures were put in place. There was a chance that some children might have become frustrated or disengaged with the intervention. To mitigate this, intervention activities were delivered by existing adult leaders, with the researcher present only as an observer and to support the adult leader if needed. If necessary, games were paused or adapted to maintain safety and wellbeing. Across all the empirical chapters presented in this thesis, minimal adaptations were required. Changes made included the addition of the bonus point presented in Chapter 3, the removal of a target individual in Chapter 3 and varying game lengths in various chapters. These are outlined in more detail in the relevant chapter. If a child showed signs of distress or discomfort, staff were encouraged to use existing centre protocols and communicate directly with the research team. The reinforcement-only and group nature of the CBGG meant that children worked as part of a team rather than feeling solely responsible for the outcomes of the intervention. The progress of the interventions was monitored closely

throughout the course of the PhD, with the PhD researcher meeting weekly with their primary supervisor and monthly with the broader supervisory team.

3.2.1.4 Recruitment

Recruitment procedures were facilitated by the project leader and the project coordinators (refer to Figure 3.1). The project leader initially agreed to participate in the project and facilitate participant recruitment. He arranged a meeting with all project coordinators and the PhD researcher to discuss the project aims, answer any questions they might have and provide them with contact details to reach out if interested in participating. Four of the five project coordinators expressed that they were interested in facilitating the research in their centre.

Throughout the course of the project, the PhD researcher visited each of the four centres and spoke with the staff. Each centre was organised into two groups of children, a younger and an older group, based on their academic year in school. In each of the four centres a group leader agreed to participate in the study and facilitate recruitment.

Staff distributed plain language statements and consent forms to parents and guardians (Appendices 2-3). Adult leaders also provided consent to participate in training, implementation, and feedback collection (see Appendices 4-5 for plain language statement and consent forms). The PhD researcher distributed information sheets amongst the children (see Appendix 6) and child assent sheets (see Appendix 7) both of which were written in plain, child-friendly language. Participation was voluntary for all parties. All children in the group participated in the CBGG as it was part of their activities in the centre, however, data were only collected from consenting participants. All participants were told they could withdraw their consent or assent to participate at any point. Given that behavioural data was anonymised, their data could not be distinguished from other members of the group. Therefore, if a participant withdrew their consent, they were excluded from any subsequent data collection. No participants withdrew from any phase of the study.

3.2.1.5 Data Collected

Data collection procedures were designed to prioritise participant confidentiality. Potentially identifiable data collected included signed consent and assent forms and demographic questionnaires (see Appendices 8-9). Non-identifiable data collected included behavioural observation sheets and social validity questionnaires.

3.2.1.6 Data Storage and Disposal

All data collected throughout the research were stored in accordance DCU Research Ethics Committee protocols and GDPR requirements. Particular attention was given to the secure and appropriate handling of identifiable and non-identifiable data. All data management practices adhered to the legal limitations of confidentiality, including mandated reporting obligations and

compliance with potential subpoenas, freedom of information requests, or other statutory disclosures.

Hard copy data (consent and assent forms, demographic questionnaires, behaviour observation sheets, social validity questionnaires) were stored in a locked filing cabinet in DCU's School of Psychology. Access to this cabinet was restricted to the PhD researcher only. Soft copy data (summarised questionnaires, observation data) were stored in a password-protected Google Drive folder. This folder was accessible only to the research team. Hard copy identifiable data was shredded and disposed of after the duration of the project and soft copy identifiable data was deleted from Google Drive. Non-identifiable data will be retained indefinitely in anonymised format.

3.2.2 Participants and Setting

The centre participating in the study outlined in the current chapter will be referred to as Afterschool 1. The centre ran from 3-6pm Monday to Thursday each week. The daily schedule in the centre consisted of key activities including homework time, dinner time, activity time, and free time. Following a call out from the project coordinator, the leader of the younger group of children within this centre volunteered to host the research and facilitate participant recruitment. For the purpose of this thesis, this centre will be referred to as Afterschool 1.

The leader of the group was a 35-year-old female who had been working as a youth activity worker in the centre for two years. The leader was a qualified Early Educator with five years' previous experience working with similar populations. The leader had not previously used a group behaviour management strategy like the CBGG before although other strategies would occasionally be implemented in the centre to manage behaviour including the use of reward systems. Specifically, the centre operated a "star" system in which children could receive a maximum of five stars a day - one for attendance, one for finishing their homework, one for trying their dinner, one for participating in the daily activity, and one for showing kindness to others. The children's stars were totalled monthly and used to determine which children could attend the monthly centre trip. Existing behaviour management strategies are commonly in place during the exploration of the effect of newly introduced positive behaviour interventions (i.e., school rules and consequences).

All 14 children in the participating group were invited to take part in the research. Parental consent and child assent were received for 12 children (7 boys, 5 girls) with a mean age of 9.58 years (range 9-10 years). No participants withdrew from any phase of the study. These participants were of White Irish descent (N=5) or of White Irish Traveller descent (N=7). White Irish Travellers are recognised as their own distinct ethnicity in Ireland. They are considered to be traditionally nomadic (Gilbert et al., 2017) and under researched (Condon et al., 2019). Two of the

12 participants were identified by the group leader as target participants, meaning that their behaviour was measured on an individual basis alongside measurement of the group behaviour. One target participant was moved to the “whole group” after the initial baseline line phase due to low attendance. The remaining target participant, Lauren (pseudonym) was a 9-year-old female of White Irish descent who was identified as requiring additional social and behavioural support. Lauren was chosen as a target participant by the project coordinator because she “tends to undermine leaders and rules” and “can be unkind at times to other children within the group”. The “whole group” participants consisted of the remaining ten children (11 children once the second target participant was moved to the whole group).

The intervention took place during regular activity time in the centre. Each day, the adult leader chose from a variety of activities including sports games, arts and crafts, mental health workshops, and board game sessions. The location of the intervention varied across, but not within, sessions depending on the activities undertaken on a given day. Rooms used included the homework room with small tables and chairs, a large sports hall, and a large room with long tables and chairs, a seating area and a pool table. The changing activities and locations added variety not frequently seen in the CBGG literature (cf. e.g., Barrish et al., 1969; Donaldson et al., 2017) but is perhaps more ecologically valid than data collection in a single location across a single activity. All children in the group played the CBGG as part of their activities in the centre, however, data were only collected from consenting participants. Attendance was collected by the project coordinator. Attendance of consenting participants was taken for the whole group in 73.97% of observation sessions. Attendance was below 50% in 29.63% of these sessions. These sessions are highlighted on Figure 3.1.

3.2.3 Materials

Materials needed to run the CBGG included three copies of the game rules on laminated A3 paper (297 mm x 420 mm) to be posted on the wall (see example in Appendix 10), a daily scoreboard on a laminated A3 sheet to be posted on the wall (see example in Appendix 11), a vibrating smartwatch for the group leader (in this case a Fitbit Charge 4), and reinforcers. Reinforcers or prizes were chosen based on the results of a child preference assessment (see example in Appendix 12). In keeping with previous research (Bohan et al., 2022; Stratton et al., 2018), children rated a list of prizes as recommended by the group leader from 1 (preferred option) to 7 (least preferred option). The items with the lowest combined score across all participants were considered the most highly rated and were employed as reinforcers. This assessment identified small treats, small toys, mini teddies, and squishy toys as highly rated reinforcers, all of which were used throughout the study. The group leader was given an 11-step procedural checklist each day to assist them in running the intervention (see Table 3.1). This

checklist included items such as “Remind the group how many points they need to get the prize” and “Announce the game has started”. Data collectors (The PhD researcher and undergraduate psychology students trained as second observers) collected data using pen and paper. A vibrating timer app for Android/Apple (Tabata Timer: Interval Timer Workout Timer HIIT; Sharafan, 2018) was used to signal the intervals to the data collectors through earphones attached to a smartphone (see Appendix 13 for an example of the app set up).

Table 3.1

Caught Being Good Game Procedural Checklist

Step	Checklist Instruction
1	Announce that the game will be played today
2	Remind the group of the team divisions
3	Rules are posted on the wall
4	Review the rules with kids
5	Remind the group that they earn points when their whole team is following rules when the leader decides to scan the room (i.e., how to get a point)
6	Remind the group how many points they need to get the prize
7	Announce that the game has started
8	Scan the room when the timer vibrates and record the points earned by each team
9	Announce end of game after the last ‘behaviour check’ has been completed
10	Total the team points for today’s game
11	Announce the winners and give access to the prize

3.2.4 Dependent Measures

Encouragement, Peer Cooperation, and Leader Cooperation were the PSBs chosen as dependent variables in this study. These target behaviours were identified through existing literature on the use of group contingencies and PSBs (Brennan et al., 2024), pre-baseline observations and consultation with the group leader about behaviours of concern. Please see Appendix 14 where more examples of these behaviours are provided.

Encouragement was defined as behaviours which involved the interpersonal communication of a positive message aimed at providing support or motivation to a peer.

Encouragement could occur before, during or after an action by a peer. Examples of behaviours classified as encouraging behaviours include verbal positive words of encouragement for a peer (e.g., “You can do it!”, complimenting behaviours, praise or tootling), as well as non-verbal positive communication (e.g., a thumbs up, a high five, clapping, or a pat on the back).

Peer cooperation was when a child engaged in joint work or a joint task with a peer for at least three seconds. This included behaviours such as helping with a certain task, sharing their resources, working together to clean up their workspace, sharing stationery, working together in a sports game, or working together towards a common goal.

Leader cooperation specifically included behaviours in which a child demonstrated they were cooperating with adult leaders. This included behaviours such as following the leader’s instructions within three seconds, willingly helping the leader or offering to help the leader, listening to the leader when they are explaining an activity and waiting appropriately, speaking to the leader at an appropriate volume, and using manners when talking to the leader, for example saying “please” and “thank you”.

3.2.5 Data Collection

3.2.5.1 Observation Methods

Data were collected up to four times a week by the PhD researcher using a data collection template (see Appendix 15). Data collection sessions were 30 minutes long. Data were collected using partial interval recording as an estimation of the rate of the target behaviours. Partial interval recording is commonly used to measure similar behaviours such as cooperation (e.g., Aljadeff-Abergel & Ayvazo, 2020) and positive social interactions (e.g., Stremel et al., 2022). Intervals were 10s long with a 5s break between each interval. An individual-fixed method was used meaning a different child was observed every 15s in a predetermined order (Briesch et al., 2015). An interval was marked with a plus symbol if the PSB was evident at any point during the 10s period, even if behaviours of concern occurred within the same 10s period. These behaviours, in their naturalistic presentation, tend to be briefly engaged in rather than a continuous behaviour such as academic engagement for example. Please refer to Chapter 6 section 6.1.2 and 6.6 for further discussion on measuring behaviours of concern.

Lauren was observed every four intervals (i.e., in 25% of the overall intervals; Lauren, Whole Group Participant 1, Whole Group Participant 2, Whole Group Participant 3, Lauren etc.,). Originally, when two target participants were being observed the group were only observed for a total of 50% of the overall intervals, with the second target participant also being observed in 25% of the overall intervals (i.e., Lauren, Whole Group Participant 1, Target Participant 2, Whole Group Participant 2, Lauren etc.,). Once the second target participant was moved to the whole group,

the data collection schedule was adapted and the whole group was observed in 75% of the intervals.

3.2.5.2 Interobserver Agreement (IOA)

A second observer independently collected data with the PhD researcher in 30% of the observations. For the whole group, IOA data were calculated for 35% of total observations, in at least 20% of the observations in each phase (baseline 37%, CBGG 33%). Regarding Lauren's observations, IOA data were collected in 30% of the total observations, 31% of baseline observations and 30% of CBGG observations. IOA was calculated using interval-by-interval agreement. Total number of agreements were divided by the overall number of intervals and multiplied by 100 to obtain a percentage. Second observers who collected data for the purposes of IOA calculation were undergraduate psychology students trained in observational data collection methods and the operational definitions prior to the commencement of data collection.

For the whole group, mean IOA was 97.56% for encouragement (range 93.33%-100%), 95.38% for peer cooperation (range 90%-100%) and 94.23% for leader cooperation (range 85%-100%). For Lauren, mean IOA was 99.52% for encouragement (range 96.67%-100%), 94.29% for peer cooperation (range 90-100%) and 96.67% for leader cooperation (range 90-100%).

3.2.5.3 Treatment Integrity

The group leader was asked to follow the 11-step procedural checklist during the CBGG. As a measurement of treatment integrity, the PhD researcher completed the checklist (see Appendix 16) while the CBGG was being played. Mean treatment integrity was 86.87% (SD = 9.47, range = 72.72%–100%). The most commonly missed steps were steps 5 and 7 (see Table 3.1).

3.2.5.4 Social Validity

Social validity measures were collected from both the child participants and the group leader upon completion of data collection. The child participants completed a modified version of the Children's Intervention Rating Profile (CIRP; Mitchell et al., 2015; Witt & Elliott, 1985), an 8-item social validity measure with items such as "Do you think the game was fair?". Modifications were similar to those made in other CBGG research including changing the response categories from a Likert scale to "yes" or "no" responses as well as changing mention of "teacher" to "group leader" and mentions of classrooms to "during activity time". The last two items on the measure were changed from positive wording to negative wording to assist with clarity and understanding. The highest rating on the modified CIRP was a score of 8 which represented eight positive endorsements (i.e., a "yes" answer on items 1-6 and "no" on items 7 and 8). The modified CIRP can be seen in Appendix 17.

The group leader completed the Behaviour Intervention Rating Scale (BIRS; Elliot & Treuting, 1991). The BIRS is a social validity measure consisting of 24 positively phrased items for

example “I would suggest the use of this intervention to other leaders.”. The measure comprises the 15 Intervention Rating Profile Items measuring acceptability of the intervention (IRP-15; Martens et al., 1985) as well as additional items measuring efficiency (N=2) and effectiveness (N=7). Modifications to the BIRS included modifying the wording of items to reflect the use of the intervention with a group rather than an individual, adaptations to reflect present or past tense, and changing mentions of setting to reflect the afterschool setting. The leader rated each item on a six- point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree) with higher scores indicating more favourable attitudes towards the CBGG. The highest possible rating on the BIRS was a score of 144. The BIRS has been established as reliable (Elliott & Treuting, 1991) with an overall Cronbach’s alpha of .97 as well as acceptable Cronbach’s alpha for each of the subscales, .97 for acceptability, .92 for effectiveness and .87 for efficiency. The BIRS used in this study is in Appendix 18.

3.2.6 Procedure

3.2.6.1 Design

A withdrawal design (Kazdin, 2020) with phases ABAB was used (A= baseline; B=CBGG) to explore the effect of the CBGG.

3.2.6.2 Group Leader Training

The PhD researcher conducted a 45-min training session with the group leader prior to the commencement of data collection. The training, with the guidance of a Google Slides presentation (see Figure 3.2), covered the procedures of the intervention, implementation of baseline and CBGG phases, set up of the FitBit, timeline for data collection, and IOA collection. The leader was provided with an opportunity to ask any questions at the end of the session.

3.2.6.3 Pre-Baseline Observations

Prior to the commencement of data collection, the PhD researcher visited the afterschool centre during activity time. The children were observed, and notes were taken about behaviours that could be deemed challenging as well as positive behaviours that could be targeted for increase. The pre-baseline observations were discussed with the group leader and used to choose the dependent variables to target with the intervention.

Figure 3.2

Sample Slides from Group Leader Training Session



3.2.6.4 Baseline Phase

During baseline phases, the group leader used her usual disciplinary processes while data collection was ongoing. Usual disciplinary processes included verbal warnings, issuing a “yellow card” (a positive punishment procedure used in the centre) and sending children to the project coordinator's office. On the last day of baseline data collection, the group leader practised the procedures followed for the CBGG, she wore the FitBit and awarded points privately based on the 5-minute interval schedule. These processes were unbeknownst to the children and followed by the leader to familiarise themselves with the procedures of the CBGG.

3.2.6.5 Intervention Phase: CBGG

After the initial baseline phase, the group leader and the PhD researcher set group rules that would be used during the CBGG. The group rules were aligned with the target behaviours. After baseline, the group leader described the CBGG to the children. The leader explained all the game rules to the children and provided them with the opportunity to ask any questions they might have. The group leader decided to divide the children into two teams based on their gender (males and females) due to variability in attendance.

The game ran for 30 minutes. The adult leader was required to follow the 11-step procedural checklist (as seen in Table 3.1). Steps on the checklist included, for example, “Review the rules with the kids” and “Announce the game as started”. Daily points criteria ranged between 3 and 5 (50%-83% of total possible points). The initial points criterion was set to three, half of the overall available points to be earned. This criterion was set based on baseline responding and was established in conjunction with the group leader. The criterion was increased the subsequent day

when all teams successfully met the criteria. The criterion was decreased following a day that no teams met the criteria. The teams earned a point if all members of the team were following the game rules while the leader performed a “behaviour check”. The leader was prompted to carry out this behaviour check by a silent vibrating alarm on the FitBit six times throughout the 30 minutes, once every 5 minutes. The teams could choose a small prize if they earned or exceeded the points criteria.

3.2.6.6 Bonus Point

After the initial CBGG phase, the group leader indicated concern about a sudden increase in disruptive behaviour outside of game time. It wasn’t within the scope or the objectives of the current study to explore the function of this disruptive behaviour. However, reasons for the disruptive behaviour outside of game time may include the absence of attention received from the reinforcement in short-term and long-term contingencies, the lack of tangible rewards received in the long-term contingency or escape behaviours. In an effort to increase the generalisability of the positive behaviours seen during the CBGG a bonus point was introduced at the beginning of the second CBGG phase. The group could receive a bonus point for demonstrating good behaviour outside of the game time (i.e., outside of activity time). All members of the group must have been deemed to demonstrate “good behaviour” and an absence of disruptive behaviour for the duration of the leader’s observation for the team to earn the bonus point. It is important to note, however, that this was done flexibly with the leader in order to address their concerns and that disruptive behaviour was not operationally defined and was not measured throughout the game (please refer to Chapter 6 Sections 6.1.2 and 6.6 for further discussion). If a team met the leader’s behavioural expectations outside of the game time, they were awarded a bonus point. The bonus point, if achieved, was added to a team’s points tally at the beginning of the next game session. However, there was no additional reward for the bonus point. The procedures of the CBGG remained the same but the total possible number of points and the point criteria increased.

3.2.7 Data Analysis

Data were analysed visually using the guidelines provided by the What Works Clearinghouse (WWC) for single case research designs (2022). Evaluation involved examining the number of phases and points in each phase, an assessment of trend, level, immediacy of effect, overlap, consistency of data, and variability between and across phases.

Tarlow’s (2016, 2017) method for calculating effect size was used to supplement the visual analysis. This involves assessing and, if necessary, correcting for baseline trend before calculating Tau (Kendall, 1962). Tau scores can range from 0 to 1 and may be positive or negative depending on the direction of the change in behaviours (i.e., when aiming to increase target

behaviours a large positive score is desirable). When interpreting Tau, a score of 0.2 indicates a small effect, 0.2 to 0.6 indicates a moderate effect, 0.6 to 0.8 indicates a large effect, and a score of 0.8+ indicates a very large effect (Vannest & Ninci, 2015).

Percentage of nonoverlapping data (PND; Scruggs et al., 1987) was also calculated to supplement the visual analysis and as an assessment for risk of bias, a standard required by WWC single case design standards Version 5 (2022). PND was calculated by dividing the number of non-overlapping data points over the total number of data points. PND was used to assess the overlap between baseline and intervention phase with those interventions with smaller PND considered more effective. When interpreting PND, a score of >70% suggests an effective intervention, a score of 50%-70% suggests questionable effectiveness or scores <50% suggest no observed intervention effect (Parker et al., 2011).

3.3 Results

3.3.1 Whole Group Behaviours

3.3.1.1 Encouragement

Figure 3.3 demonstrates the effect of the CBGG on whole group encouragement. During the initial baseline phase, encouragement was low and relatively stable for the whole group ($M=0.17\%$, $SD=0.53\%$, range= 0%- 1.67%). Upon introduction of the CBGG, encouragement for the group increased immediately and substantially ($M=11.6\%$, $SD=3.5\%$, range= 7.8%-18.9%). During the withdrawal to baseline, encouragement again was low, decreasing immediately and substantially and remaining relatively stable throughout the phase ($M=1.48\%$, $SD=1.4\%$, range= 0%-3.3%). Once again, when the CBGG was reintroduced, encouragement for the group increased immediately and substantially and remained relatively stable throughout ($M=9.3\%$, $SD=1.1\%$, range= 7.8%-11.1%).

3.3.1.2 Peer Cooperation

Figure 3.3 depicts the effect of the CBGG on whole-group peer cooperation. In the first baseline phase, peer cooperation was low ($M=4.2\%$, $SD=3.3\%$, range= 0%-8.33%). Once the CBGG was introduced, peer cooperation increased immediately and substantially ($M=38.9\%$, $SD=12.9\%$, range =15.6%-63.3%). Though peer cooperation was variable in this phase, no data points overlapped with the baseline phase. When withdrawing to baseline, again peer cooperation was low, decreasing immediately and substantially ($M=7.3\%$, $SD=2.3\%$, range=4.4%-10%). Upon reintroduction of the CBGG again peer cooperation increased immediately and substantially ($M=38.9\%$, $SD=3.2\%$, range= 33.3%-43.3%).

3.3.1.3 Leader Cooperation

The effect of the CBGG on leader cooperation of the whole group is shown in Figure 3.3. Leader cooperation was low in the initial baseline phase ($M=7.8\%$, $SD=3.2\%$, range=3.3%-11.7%). Upon introduction of the CBGG, leader cooperation immediately and substantially increased ($M=32.4\%$, $SD=5.8\%$, range=24.4%-44.4%). Although there was high variability across this CBGG phase there was no overlap with baseline phases ($PND=100\%$). When the CBGG was withdrawn, leader cooperation once again returned to low levels, decreasing immediately and substantially ($M=6.5\%$, $SD=2.0\%$, range=4.4%-10%). Again, once the CBGG was reintroduced, leader cooperation increased immediately and substantially ($M=34.4\%$, $SD=2.7\%$, range=30%-37.8%) and remained relatively stable.

3.3.2 Lauren's Behaviours

3.3.2.1 Encouragement

Figure 3.4 depicts the effect of the CBGG on Lauren's encouragement. In the initial baseline phase Lauren demonstrated no encouragement throughout the phase ($M=0\%$, $SD=0\%$, range=0%-0%). The introduction of the CBGG brought about immediate and substantial change to encouragement ($M=18\%$, $SD=5.6\%$, range=13.3%-26.7%). Although encouragement was variable in the first CBGG phase, it did not overlap with baseline encouragement ($PND=100\%$). In the second baseline phase, encouragement returned to baseline levels, decreasing immediately and substantially ($M=0.8\%$, $SD=1.5\%$, range=0%-3.3%). Once again, when reintroduced, the CBGG brought an immediate and substantial change to Lauren's encouragement ($M=18\%$, $SD=3.8\%$, range=13.3%-23.3%).

3.3.2.2 Peer Cooperation

The effect of the CBGG on Lauren's peer cooperation is shown in Figure 3.4. Lauren's baseline peer cooperation was low with little variability ($M=1.3\%$, $SD=3.0\%$, range=0%-6.67%). When the CBGG was initially introduced, Lauren's peer cooperation increased substantially and immediately ($M=44\%$, $SD=13.2\%$, range=26.7%-56.7%). Though peer cooperation was variable in this phase, no data point overlapped with baseline data ($PND=100\%$). When withdrawn to baseline, peer cooperation decreased immediately and substantially ($M=9.6\%$, $SD=3.8\%$, range=6.7%-16.7%). Upon reintroduction of the CBGG, once again, peer cooperation increased immediately and substantially ($M=33.3\%$, $SD=5.3\%$, range=26.7%-40%).

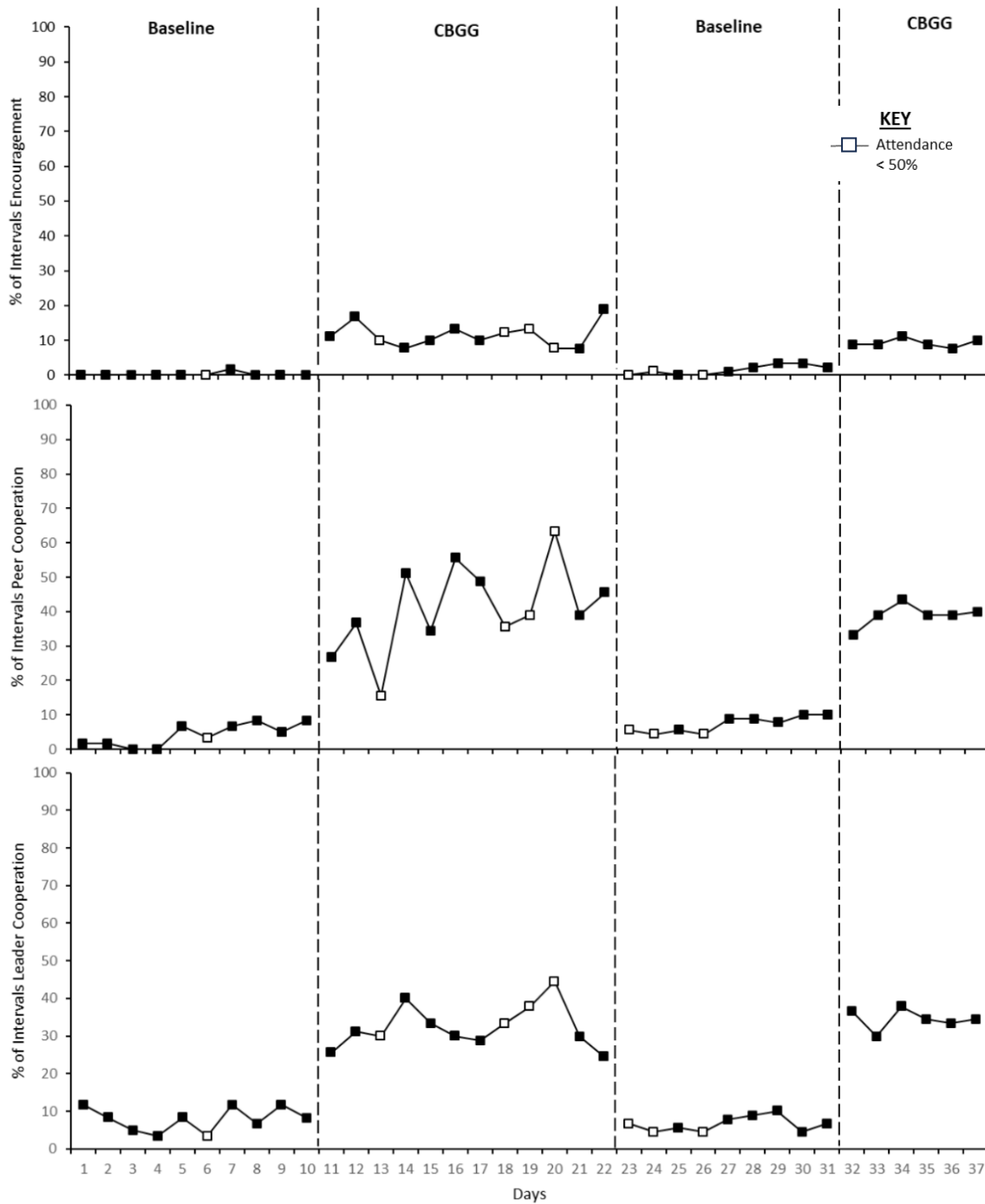
3.3.2.3 Leader Cooperation

Figure 3.4 depicts the effect of the CBGG on Lauren's leader cooperation. In the initial baseline phase, Lauren's leader cooperation was low ($M=7.3\%$, $SD=4.3\%$, range=0%-10%). Upon introduction of the CBGG, leader cooperation increased immediately and substantially ($M=30.7\%$,

SD= 8.0%, range= 20%-40%). Although this data was variable it did not overlap with baseline phases (PND-100%). When the CBGG was withdrawn, at baseline leader cooperation decreased immediately and substantially (M=9.6%, SD=4.9%, range= 3.3-16.7%). When the CBGG was reintroduced, once more leader cooperation increased immediately and substantially (M= 46.7%, SD=2.4%, range= 43.4%-50%).

Figure 3.3

Effect of the CBGG on Afterschool 1 Whole Group Prosocial Behaviours

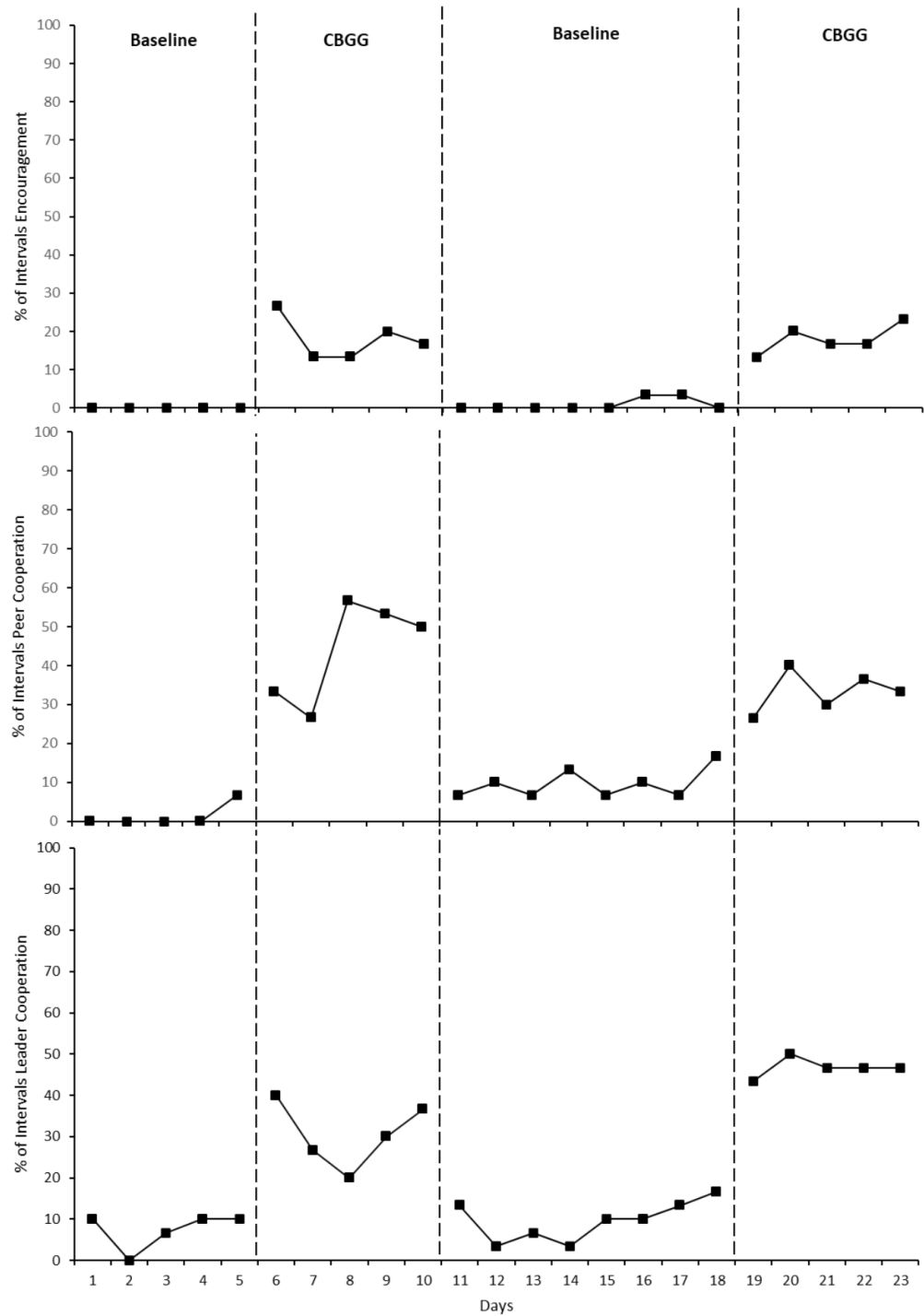


Note. The top panel presents the percentage of intervals in which encouragement of the whole group occurred during baseline and CBGG phases. The middle panel presents the percentage of intervals in which peer cooperation of the whole group occurred during baseline and CBGG phases. The bottom panel

presents the percentage of intervals in which leader cooperation of the whole group occurred during baseline and CBGG phases

Figure 3.4

Effect of CBGG on Lauren's Prosocial Behaviours



Note. The top panel presents the percentage of intervals in which Lauren's encouragement occurred during baseline and CBGG phases. The middle panel presents the percentage of intervals in which Lauren's peer cooperation occurred during baseline and CBGG phases. The bottom panel presents the percentage of intervals in which Lauren's leader cooperation occurred during baseline and CBGG phases.

3.3.3 Effect Size

Tau scores were calculated for each phase change and can be seen in Table 3.2. Effect sizes were large to very large across each phase change (>0.6).

Table 3.2

Tau Effect Sizes Afterschool 1

Phase Change	Whole Group Behaviour			Lauren Behaviour		
	Enc	Pco-op	Lco-op	Enc	Pco-op	Lco-op
Baseline 1 - CBGG 1	0.799	0.725 *	0.739	0.857	0.801	0.772
Baseline 2 - CBGG 2	0.728 *	0.724 *	0.735	0.810	0.751	0.740

Key: * = Baseline correct Tau, Enc = Encouragement, Pco-op = Peer cooperation, Lco-op = Leader cooperation.

3.3.4 Social Validity

3.3.4.1 Leader Rating

The group leader completed the BIRS (Elliot & Treuting, 1991) on the last day of data collection. The leader gave the CBGG an overall total score of 94 out of a possible 144 (M= 3.9, range 2-6). For acceptability, the leader rated the intervention a score of 60 out of 90 (M=4.5, range 3-6). For effectiveness, effectiveness a score of 20 out of 42 (M=2.9, range 2-4). For time to effect a score of 6 out of 12 (M=3, range 3-3). The leader provided additional written feedback in which she stated, “I feel as though the children's behaviours slightly changed and improved depending sometimes on the activity that was planned.”

3.3.4.2 Child Ratings

Five children in the whole group completed the CIRP (Witt & Elliott, 1985) following completion of data collection. The mean score across the children was 7.2 (range 6-8) out of a highest possible score of 8. All children marked that they liked the game, that they liked participating in the game, that they thought other children would enjoy the game, and that they liked the rewards used. One child provided written feedback stating that they “love playing Caught Being Good”.

3.4 Discussion

This study is the first known investigation of the use of CBGG within an afterschool centre supporting ethnically diverse children in need of support due to experiences of ACEs . This research aimed to explore the effect of the CBGG as a positive behavioural support for increasing encouragement, peer cooperation, and leader cooperation of the children. Individual behaviour

was monitored alongside whole group behaviour in order to assess whether Lauren, an individual considered to typically display high levels of disruptive behaviour, responded differently to the intervention than the group. Teams of children took part in the CBGG using a withdrawal design in order to assess differences in behaviour across baseline and intervention phases. All three PSBs (encouragement, peer cooperation, and leader cooperation), increased immediately and substantially for both Lauren and the whole group when the CBGG was introduced.

3.4.1 Targeting Prosocial Behaviours with the Caught Being Good Game

Although the CBGG has been established as an effective method for increasing academic engagement (Bohan et al., 2022) and decreasing classroom disruptive behaviours (Bohan & Smyth, 2022), its role for targeting social behaviours is more limited. Previous literature has targeted behaviours similar to encouragement such as positive peer/social interaction (Groves & Austin, 2019; Sewell, 2020) or supporting peers (Sewell, 2020). Encouragement, as defined in this study, has combined complimentary and supportive behaviours in both verbal and non-verbal forms. Similarly, behaviours like cooperation (Aljadeff-Abergel & Ayvazo, 2020) and working as a team (Sewell, 2020) have previously been explored. However, these behaviours have focused predominantly on engagement in academic tasks (e.g., Aljadeff-Abergel & Ayvazo, 2020) or just peer to peer cooperation (e.g., Sewell, 2020). This research is the first known to explore the effect of a group contingency intervention on both peer cooperation and leader cooperation separately and the first known to explore encouragement as we have defined it.

As in previous studies (e.g., Groves & Austin, 2019; Sewell, 2020), the CBGG was effective at increasing all three PSBs of the group and Lauren. For the whole group, Tau calculations considered the CBGG to have a large effect on the three target behaviours. For Lauren, the CBGG had a large to very large effect on all three of the target behaviours, all of which were a concern prior to the commencement of data collection. Importantly, the results of this study suggest that the CBGG is an effective method for managing PSB in an afterschool setting providing services for children at risk of experiencing ACES, something which has not previously been explored.

3.4.2 Encouraging Prosocial Behaviours in Children at risk of Experiencing ACES

The children recruited to participate in this study had been referred to the afterschool service due experience or suspected experience of ACES. Previous research has suggested that social support, whether provided by other adults or by peers, can act as a buffer against the negative outcomes of ACES (Vinh et al., 2024). Therefore, increasing PSB and social behaviour of these potentially vulnerable children should be prioritised. In addition, encouraging social interaction between children of varying ethnic groups is one way by which inclusion (McKeown & Taylor, 2018) and PSB (Lee, 2016) can be encouraged. This particular study included seven white Irish traveller children and five white Irish children. The changes in behaviour recorded when we

played the game indicate that the CBGG was successful in increasing social interaction between these groups. This study did not collect data on experiences of ACEs due to the highly sensitive nature of this data. However, future research may wish to collect ACEs data in these settings to enhance the understanding of the demographic profile of potentially vulnerable children and its potential impact on behaviour. In particular, it may be of interest to explore the influence of children's prior exposure to behaviours such as cooperation and encouragement on the CBGG's effect on these behaviours.

3.4.3 Social Validity

Child social validity measures suggested the child participants in this study enjoyed the CBGG and thought that other children would also. This finding is consistent with previous literature (e.g., Bohan et al., 2021; Bohan et al., 2022) which suggests that the CBGG is a behaviour intervention which children consider to be acceptable and enjoyable. However, we must highlight that we did not collect any social validity data from Lauren.

Social validity measures revealed that the adult leader implementing the CBGG thought that the intervention was acceptable and somewhat effective. Previous studies assessing the CBGG have gathered mixed responses from adult leaders running the game with some considering the CBGG to be socially valid (e.g., Bohan et al., 2021; Bohan & Smyth, 2023) and others considering it to be ineffective (e.g., Bohan et al., 2022). In the current study, despite study outcomes demonstrating the opposite, the leader considered the CBGG to be somewhat ineffective. Leaders' perceptions of behaviour change may not be aligned with the effect of an intervention given that adult leaders may be considering overall group behaviour rather than the specific behaviours the intervention is targeting. Measuring social validity more often or involving the group leader in the measurement of behaviour may provide ways by which adult leaders can independently explore the effect of an intervention. In Chapter 4, we explored the usability and feasibility of adult leader direct behaviour rating (DBR) as a means of incorporating the group leader in the assessment of behaviour change. Moreover, investigation into the reasons adult leaders may not consider behavioural interventions to be socially valid is needed. In Chapter 5 Study 2, we incorporate a reflective focus group to explore social validity in greater detail.

To ensure the interventions we design are socially valid, we should seek input from those involved throughout the design and delivery of interventions. Chapters 4 and 5 outlined novel applications of participatory methods such as DBR and co-design frameworks in group contingency research. Alternative methods for collecting social validity data such as collection of ongoing assent (see Chapter 5), intervention preference assessment or qualitative explorations (see Chapter 5) should be explored.

3.4.4 Strengths, Limitations and Future Directions

The current study adds greatly to the literature through the focus on positive supports for developing PSBs in a diverse population, including an ethnic minority, suspected to have experienced ACEs. Furthermore, it is only the second known study to have explored the use of game-based group contingencies in an afterschool setting (see Smith et al., 2018) and the first to have used solely positive contingencies. The findings must be considered in light of a number of limitations. Firstly, splitting the teams by gender could be considered a limitation as gender differences in behaviour have been long documented in behavioural literature. Although in the current study the adult leader used this divide as a way of quickly identifying teams during behaviour checks, future research should aim to divide teams randomly and use alternative group identifiers (e.g., teams wearing different coloured sports singlets). Secondly, the specific participant pool from which we sampled may limit the generalisability of the findings. Future research may seek to explore the use of the CBGG across other age groups in a similar setting to further validate these findings. Further exploration of the effect of the CBGG across a variety of activities may be useful. Ideally, the effects of the CBGG would be explored without any other behaviour management strategies in place (i.e., the star system). However, in practice, it is common for ongoing strategies to run in parallel with the introduction of new behaviour management interventions (e.g., Bohan & Smyth, 2022).

Every effort was made to follow the guidelines outlined by the WWC for single-case research design. Data collection commenced in October 2022, prior to the publication of the WWC Design Standards Version 5 in December (2022). The latest published guidelines (WWC, 2022) changed the recommendations for initial baseline data collection. Both the whole group and Lauren's data would have met WWC Design Standards without reservations under Version 4.1 guidelines (2020). However, the new recommendations for six initial baseline data points (WWC Version 5; 2022) meant that Lauren's PSBs met the Design Standards with reservations. Furthermore, it is important to acknowledge the lack of social validity for Lauren as a limitation of the study, particularly given that the inclusion of a target participant was designed to give greater insight into how their behaviour might differ from or align with the whole group data. It is important to note that although partial interval recording was considered the most appropriate measurement for estimating the rate of the three target behaviours, this method is not without limitation. Partial interval recording, like most observational methods, may be subject to over- or under-estimation of a behaviour. However, inter-rater reliability is used to reduce this bias. IOA in this study was considered to meet WWC Standards (2022).

Although the aim of the current research was to explore the effects of the CBGG on a sample of children suspected to have experienced ACEs, no measurement of ACEs was taken. Future research may seek to measure experience of adverse events in order to assess their impact

on behaviour. Lastly, though research has suggested that encouraging PSBs provides one way by which ASBs can be prevented, this study did not measure any ASBs. In order to assess whether the increase of PSBs can in turn decrease ASBs both PSBs and ASBs should be measured. Future research should explore the use of the CBGG for targeting both PSBs and ASBs in an afterschool program.

3.4.5 Conclusion

The current study addressed a number of important gaps in the literature surrounding the use of group contingencies to target PSBs. This study is the first known investigation of the CBGG in an afterschool program, exploring the use of the CBGG with an ethnically diverse sample who are suspected to have experienced ACES and exploring the use of the CBGG for targeting various forms of encouragement and cooperation. Results indicated that the CBGG was effective in increasing encouragement, peer cooperation, and leader cooperation of this population for both a targeted nine-year-old girl and the whole group. These findings provide additional support for the growing body of evidence supporting the use of reinforcement-based group contingency interventions such as the CBGG.

Chapter 4: Evaluating Social Validity of the Caught Being Good Game for Prosocial Behaviour in Afterschool Settings: The Utility of Direct Behaviour Rating

4.1 Introduction

As discussed in Chapter 3, afterschool programmes provide one avenue by which children's emotional and social development can be promoted (Hurd & Deutsch, 2017). Afterschool settings can be particularly beneficial for those impacted by adversity or traumatic experiences (Smith et al., 2017). Afterschool settings may be very different from the structured environment of the classroom (Schnittka et al., 2015). Without the structure needed to deliver upon a curriculum, they may offer more flexibility as well as diverse peer interactions and opportunities for informal learning (Schauble et al., 2013; Schnittka et al., 2015). For children considered at risk of ACEs, targeted afterschool programmes can act as a protective factor (Christensen et al., 2023), supporting the development of prosocial skills (as outlined in Chapter 3). However, the fluid nature of afterschool environments presents unique challenges for the implementation and evaluation of behavioural interventions, particularly those targeting nuanced or subtle forms of prosocial behaviour (Farrell et al., 2014; Mahoney, 2014; Smith et al., 2017).

4.1.1 Group Contingency Interventions beyond the Classroom

While group contingency interventions have been established as effective strategies for behaviour change in educational settings, evidence supporting their effect in afterschool settings is more limited (c.f., Smith et al., 2018). As evidenced in Chapter 3, the CBGG can increase prosocial behaviours (PSBs) such as peer cooperation and encouragement at both group and individual levels among children referred afterschool programmes due to ACEs. Despite these promising outcomes little is known about how adults responsible for delivering such interventions perceive and understand the changes in children's behaviour.

4.1.2 The Importance of Adult Leader Involvement in Measuring Effect

In behaviour analytic research, intervention effects are typically measured by researchers using systematic observation methods such as partial interval recording or momentary time sampling, while adult leaders or educators primarily implement intervention procedures (e.g., managing game-based elements) (Briesch et al., 2015; Cooper et al., 2020). Adult leaders often provide feedback retrospectively through social validity measures like questionnaires or interviews (e.g., Hochman et al., 2015; Kellems et al., 2016). However, this delayed, and less systematic involvement may fail to capture subtle changes in PSBs and limit adult leaders' active engagement in recognising and understanding these outcomes (Snodgrass et al., 2018).

Adult leaders in children's educational and care settings tend to prioritise managing disruptive or noncompliant behaviour over encouraging PSB, such as helping or cooperating (e.g., Katsapi, 2025). Observational studies have shown that reprimands are delivered more frequently

than praise in classroom settings (Caldarella et al., 2019), which may skew adult perceptions of intervention impact toward reductions in problem behaviour rather than gains in PSB (e.g., Floress et al., 2022). In game-based group contingencies like the GBG and the CBGG, these discrepancies may contribute to differences between observed effects and social validity ratings. For example, in Kleinman and Saigh's (2011) study, the GBG led to statistically significant reductions in disruptive behaviour, but teachers reported only moderate acceptability, highlighting concerns surrounding time constraints and classroom fit. Similarly, Bohan et al., (2022) found that, although the CBGG was considered effective at decreasing disruptive classroom behaviour and increasing academically engaged behaviour, the teacher rated the intervention poorly. In afterschool 1, as outlined in Chapter 3, the adult leader did not consider the intervention to be as effective as the observed data, collected through partial interval recording, demonstrated. While it was not within the scope of the current study to explore these, it should be noted that a number of factors may impact a leader's social validity ratings including, for example, perceived time, perceived skills and stress (Rademaker et al., 2021).

Unlike researchers who use structured, interval-based observation to assess individual behaviours, adult leaders monitor behaviour more holistically and informally, often attending to group dynamics or participation shifts that may elude formal measures (Snodgrass et al., 2018). In typical practice, the CBGG and other game-based group contingencies only rely on the adult leader to monitor behaviour when prompted for behaviour checks and do not engage in ongoing systematic assessment as they are intended to be played during ongoing activities e.g., during lessons. Involving adult leaders not just in post-intervention evaluation, but in evaluation throughout the intervention process, may enhance their awareness of behavioural changes and thereby increase social validity (Ferguson et al., 2019; Chafouleas et al., 2021).

4.1.3 Direct Behaviour Ratings

Direct behaviour rating (DBR) is a method that combines the strengths of direct observation with the practicality of rating scales (Al-Hendawi et al., 2025; Miller et al., 2017). This hybrid approach allows for the collection of frequent, structured feedback on target behaviours throughout the intervention period. DBR is designed to provide a flexible yet reliable means of tracking and assessing changes in behaviour (Matta et al., 2020). DBR scales typically take one of two forms: single-item scales assessing a global behaviour (e.g., academic engagement) or multi-item scales targeting multiple discrete behaviours (e.g., out-of-seat, calling out). Both DBR and systematic observation methods such as partial interval or momentary time sampling yield estimates of the percentage of time students engage in a target behaviour, although they differ in procedural execution and observer perspective.

Though one core component of social validity involves assessing the effect of the intervention according to those it is designed to support, traditionally adult leaders responsible for implementing game-based group contingencies like the GBG or CBGG are not involved in the direct observation of effect. DBR is a way by which behaviour can be measured throughout the intervention period, enabling leaders to observe behaviour change as it happens (Hagermoser Sanetti et al., 2009; Miller et al., 2016). This approach facilitates the detection of gradual behavioural changes and enhances the implementers' awareness of behaviour improvements, which in turn may improve the quality and relevance of social validity assessments (Miller et al., 2016).

A growing body of research supports DBR as a feasible tool across educational and clinical settings, with applications in monitoring academic engagement (Bruhn et al., 2018; Minkos et al., 2018), disruptive behaviour (Volpe et al., 2016), functional assessment (Kilgus et al., 2017), and social skills (Kilgus et al., 2016). DBR has also been employed by a range of raters, including students (Christ et al., 2011; Chafouleas et al., 2012) and teachers (Pasqua et al., 2021), suggesting it may serve as a practical tool for multi-informant behavioural monitoring.

The reliability and validity of DBR (Kilgus et al., 2015) have been supported by research providing evidence for moderate to high correlations with direct behavioural observations (Bruhn et al., 2018; Smith et al., 2018). However, it has also been noted that estimates of behaviour duration may vary when comparing DBR to systematic observation, highlighting potential limitation in the precision of DBR for capturing temporal aspects of behaviour (Miller et al., 2017). Research has further examined factors which can influence the accuracy of the DBR ratings. Several studies have reported that structured training protocols can enhance DBR accuracy and inter-rater reliability (Chafouleas et al., 2014; Harrison et al., 2014; Kilgus et al., 2016; Pasqua et al., 2021). The effective use of DBR therefore relies on clear, shared behavioural definitions and consistent training criteria (Chafouleas et al., 2021; Harrison et al., 2014). This is particularly important in less formalised environments such as afterschool settings where behaviour expectations may vary where implementation fidelity is important for capturing meaningful change (Chafouleas et al., 2013; Harrison et al., 2014).

While DBR is adaptable to diverse contexts and has the potential to support collaborative and reflective behavioural practice (Chafouleas et al., 2021), it is not without limitations. One concern is rater bias, as subjective interpretations of behaviour can influence the ratings provided (Chafouleas et al., 2013). Even with training, maintaining adherence to behavioural criteria remains a challenge in dynamic environments. Additionally, although DBR is designed to support real-time behavioural feedback, its impact depends on the ability of adult leaders to accurately interpret and respond to the data. There is a risk that practitioners may prioritise overt disruptive

behaviours, potentially overlooking more subtle yet meaningful improvements (Floress et al., 2022).

Application of DBR has also extended to the evaluation of behavioural interventions, including group contingency strategies. For example, DBR has been used to assess behavioural outcomes in group contingency interventions within both preschool (Pasqua et al., 2021) and elementary school settings (Chafouleas, Hagermoser et al., 2012). Pasqua et al., (2021) explored the effect of an interdependent group contingency on academic engagement and disruptive behaviours. The DBR was completed daily by teachers and systematic direct observation was collected by trained observers using partial interval recording. In Chafouleas, Hagermoser et al., (2012), the effect of an interdependent group contingency on preparedness, engagement and homework completion was explored. Both children and teachers completed daily DBRs and observers collected systematic observation data via momentary time sampling and partial interval recording. In both cases (Chafouleas, Hagermoser et al., 2012; Pasqua et al., 2021), the interventions were considered effective and DBR and direct observation were aligned. Despite DBR's demonstrated utility in school contexts for academic and disruptive behaviours, its application to group contingency interventions is limited to the two studies outlined. No previous study has investigated the applicability of DBR in afterschool programmes, where contextual dynamics and behavioural expectations may differ or for PSBs, nor have they explored the use of DBR for exploring the effect of a group contingency intervention on PSBs.

4.1.4 The Current Study

Community afterschool services have been recognised as promising environments for promoting PSBs, particularly for those children deemed at risk due to adverse childhood experiences (ACEs) (Kremer et al., 2014; McDaniel et al., 2016). Group contingency interventions, such as the CBGG, have been identified as suitable and engaging methods for increasing PSBs in educational contexts (e.g., Stremel et al., 2022). However, to date, there has been little research exploring the application of the CBGG in afterschool settings (c.f., Smith et al., 2018, Chapter 3), particularly with groups of children referred for support due to ACEs.

In addition to evaluating the effectiveness of the intervention, this research adopted an innovative approach to the measurement of behavioural change by actively involving afterschool leaders in the assessment process. Rather than relying solely on researcher-led observation or post-intervention social validity measures, DBR was used as a participatory tool throughout the intervention. This approach aimed to enhance leaders' engagement with the intervention, deepen their understanding of changes in PSB, and move beyond traditional, retrospective perceptions of what constitutes a "well-behaved" group (Chafouleas et al., 2021; Snodgrass et al., 2018).

This research specifically addressed the following objectives:

1. To evaluate the effectiveness of the CBGG in increasing two types of PSB (helping and encouragement) in a 10-year-old boy referred to a community-based afterschool programme.
2. To evaluate the effectiveness of the CBGG in increasing the same two types of PSB at the group level among nine- and ten-year-old children referred to a community-based afterschool programme.
3. To explore the feasibility and utility of DBR as a method for involving an afterschool leader in the measurement of PSB.

4.2 Method

4.2.1 Ethical Considerations

All procedures described in this chapter were approved by DCU's Research Ethics Committee (see Chapter 3 and Appendix 1). Ethical practices were upheld throughout the study, with particular attention given to the trauma-informed context of the afterschool setting and the vulnerability of the participating children. In line with the participatory and ethical principles outlined in Chapter 3, the use of DBR as a collaborative assessment tool was explored. All data collected were anonymised, and participation was voluntary, with informed consent obtained from parents/guardians and assent from children. Further detail on the recruitment processes is detailed in the following sections. The study adhered to GDPR requirements and institutional guidelines for data management and storage.

4.2.2 Participants and Setting

Participants were recruited from the community-based afterschool programme as outlined in Chapter 3. Following a recruitment call out to the management teams, the project co-ordinator in this centre agreed to participate. For the purpose of this thesis, this centre will be referred to as Afterschool 2. Please refer to Figure 3.1 in Chapter 3 for further detail.

This centre ran in the same way as described in Chapter 3. The leader of the younger group in Afterschool 2 chose to participate with her group of children "to try to enable the children to display better behaviours and learn about working together with their peers".

The leader was a 39-year-old female who had been working as a youth worker in the centre for over 3 years. The leader had a Level 6 qualification in social care and five years' experience working with similar populations however had no prior experience with education or research training. The leader also had no previous experience using group behaviour management strategies like the CBGG however, individual reward systems were commonly used in the centre (see Chapter 3 for a description of the star system in place across centres).

All children in the younger group in the Afterschool Centre 2 were invited to participate in the study. Parental consent and child assent was obtained from 14 children (8 boys, 6 girls) with a

mean age of 9.07 years (range 7-10 years). None of these 14 participants withdrew from any phase of the study. Please refer to Chapter 3 for further detail on the recruitment processes. The participating children were of White Irish (N=12) or Black/ Black Irish African (N=2) descent.

Of the 14 participating children, two were initially selected as target participants for individual-level behaviour tracking, in addition to group-level observation. These children, referred to by the pseudonyms Ben and Charlie, were both boys aged 10 and of White Irish descent. However, due to a change in group structure following increased centre attendance, Charlie was moved to a different room and was no longer part of the intervention group. As a result, only Ben remained a target participant for the full duration of the study. Ben was chosen by the project coordinator “as his behaviour can often be disruptive to the group”.

The intervention took place during homework time. One large room was used for homework which consisted of four large tables at which each child had a designated seat. All of the children in the group played the CBGG during homework time, however data were only collected from those who had consented.

4.2.3 Materials

Materials required to run the CBGG were as outlined in Chapter 3. In the case of Afterschool 3 the leader used a FitBit Charge 2 instead of a FitBit Charge 4, otherwise all other materials were the same. Procedures for carrying out the preference assessment (Appendix 12) were as outlined in Chapter 3. The preference assessment in this case revealed that the children rated sweet treats, small toys and keyrings highly as reinforcers, all of which were used throughout the intervention phases of the study. The group leader was given an 11-step procedural checklist each day (as used in Chapter 3 – see Appendix 16) which outlined the necessary steps to run the CBGG. Each day the group leader filled out a DBR of the target behaviours for Ben. Target behaviours were determined in consultation with the group leader and centre management and were aligned with the centre goals. The DBR template used is provided in Figure 4.1 (and in Appendix 18). Data collectors (the PhD researcher and second observers consisting of undergraduate psychology students) collected data using pen and paper (see Appendix 15). The same Tabata Timer app (Sharafan, 2018) was used in this study however the duration of the intervention varied slightly (see Appendix 13 for an example of app setup).

Figure 4.1

Direct Behaviour Rating - Smiley Face Form

After School A: DBR Smiley Face Form

Date: _____ Day of Week: M T W Th

Rating: Whole Group Activity: Baseline or Caught Being Good Game

☐ No rating today as I was unable to observe student sufficiently.

Directions: Place a mark along the line that best reflects the percentage of total time the student exhibited the target behaviors. Please note that the percentages DO NOT need to total 100% since some behaviors may co-occur.

Helping (Peer or Leader)

% of Total Time

0 1 2 3 4 5 6 7 8 9 10
0% 50% 100%

Encouragement (Verbal or Physical)

% of Total Time

0 1 2 3 4 5 6 7 8 9 10
0% 50% 100%

4.2.4 Dependent Measures

Encouragement and Helping were the dependent variables for which data were collected in this study. These behaviours were chosen through consultation with the literature on the use of group contingencies for targeting PSBs (See Chapter 2), through consultation with the group leader about behaviours of concern, through baseline observations and were aligned with centre goals. The behaviours were operationally defined as follows:

Helping behaviours included behaviours which would facilitate a peer's participation in or completion of a required task or goal. These included behaviours in which a peer gave verbal or motor assistance to another peer or group leader to assist in problem-solving or engaging in a particular skill or activity (e.g., helping a peer with their homework, collecting a worksheet for someone else, picking up a pencil for someone else when it falls or asking if a peer or leader needs help, giving a peer a suggestion for an answer to their work, sharing materials with peers). For the purpose of data collection, behaviours that could be considered encouraging were not considered to be helping behaviours.

Encouragement was defined as in Chapter 3.

4.2.5 Data Collection

4.2.5.1 Observation Methods

Data were collected up to four times a week by the PhD researcher. Data for both target behaviours were collected using partial interval recording. Intervals were 10s long with a 5s break between each interval. An individual-fixed method was used (i.e., a different child was observed every 15s) in a predetermined order (Briesch et al., 2015). In the first 3 phases, each target was observed every 2 intervals (i.e., each in 25% of the overall intervals), the whole group was observed in 50% of the intervals. Due to increased attendance at the centre, the group was split into 2 groups after the second baseline phase. Once Charlie had been moved to a different room, Ben was observed every four intervals (i.e., in 25% of the overall intervals) and the whole group was observed in 75% of intervals.

4.2.5.2 Interobserver Agreement (IOA)

Undergraduate psychology students were trained by the postgraduate researcher in observational data collection methods and the operational definitions prior to the commencement of data collection in order to calculate IOA. IOA data were calculated for 26.5% of the total whole group observations, in at least 20% of observations in each phase (Baseline 26.32%, CBGG 26.67%). IOA data were calculated for 27.59% of Ben's observations, in 31.25% of baseline observations and 22.22% of CBGG observations. IOA was calculated using interval-by-interval agreement. The total number of agreements were divided by the overall number of intervals and multiplied by 100 to obtain a percentage of agreement. For the whole group, mean IOA was 96.92% for Encouragement (range 92.5%-100%) and 91.54% for Helping (range 82.5%-100%). For Ben, mean IOA was 97.22% for Encouragement (range 85%-100%) and 96.11% for Helping (range 90%-100%).

4.2.5.3 Direct Behaviour Rating

DBRs were used to assess the adult leader's perception of Ben's target behaviours (i.e., Helping and Encouragement) during homework time. The Smiley Face DBR (Chafouleas et al., 2010) is a modified version of the DBR methods described by Chafouleas et al., (2009). For consistency, the group leader collected DBR data on the target behaviours that were also collected through direct observation. The template (as seen in Appendix 19) was edited to include two rating scales, one for Helping and one for Encouragement. Each day, the group leader was asked to rate the behaviour from 0-100% by indicating their response with a small vertical line along the horizontal line.

4.2.5.4 Treatment Integrity

The group leader was asked to follow the 11-step procedural checklist (Appendix 16) during each CBGG session. The PhD researcher also completed the procedural checklist as a measure of treatment integrity. Mean treatment integrity was 86.04% (range 72.73%-100%). The most commonly missed steps were reminding the group of the team divisions and reviewing the game rules.

4.2.5.5 Social Validity

Social validity measures were collected from the group leader and the child participants upon completion of observation data collection. The children completed the Children's Intervention Rating Profile (CIRP; Mitchell et al., 2015; Witt & Elliott, 1985), an 8-item social validity measure. Modifications to the CIRP were as outlined in Chapter 3 (see Appendix 17). The group leader completed the Behaviour Intervention Rating Scale (BIRS; Elliot & Von Brock Treuting, 1991). Modifications were made as outlined in Chapter 3 (see Appendix 18).

4.2.6 Procedure

4.2.6.1 Design

A withdrawal design (Kazdin, 2020) with phases ABABA was used (A= baseline; B=CBGG). CBGG phases were compared with baseline phases to determine the effect of the intervention.

4.2.6.2 Group Leader Training

The PhD researcher conducted a 45-min training session with the group leader prior to the commencement of data collection in which the procedures of the intervention were described to the leader with the guidance of a Google Slides presentation (as in Chapter 3). The training covered the implementation of both baseline and CBGG phases, IOA collection and how to use and set up the FitBit. Additional training which was different from the training outlined in Chapter 3 included a brief explanation of the Smiley Face DBR and its purpose.

4.2.6.3 Pre-Baseline Observations

Before baseline data collection began, the PhD researcher visited the afterschool centre during homework time. The researcher observed and wrote notes about the children's typical behaviour during this time, noting in particular desirable behaviours which could be targeted for increase. These pre-baseline observations were brought to consultation with the group leader and project coordinator in order to decide which dependent variables to target with the intervention.

4.2.6.4 Baseline Phase

During baseline phases, the group leader used her usual disciplinary processes while data collection was ongoing. Usual disciplinary processes included verbal warnings. As in Chapter 3, on the final day of baseline data collection, the group leader practiced the procedures followed for

the CBGG. Every day, at the end of the data collection period, the group leader provided a DBR for Ben.

4.2.6.5 Intervention Phase: CBGG

After the first baseline phase, the PhD researcher and the group leader set the CBGG rules. The group rules were as follows 1) I will happily help my peers with their homework or other tasks, 2) If a group leader needs help I will be happy to help them, 3) I will share with my peers, 4) I will be kind to my peers, 5) If my peers do a good job I will be happy for them and let them know that they did well, 6) I will encourage my peers to try their best with their work and 7) I will compliment my peers for good work or good behaviour. The game rules were co-designed with the group leader to ensure that they were in keeping with the centre's typical approach and the language typically used in the centre. These game rules were used only for the children's understanding of the behavioural expectations and therefore avoided any technical terminology. Please refer to the dependent variables outlined in section 4.2.4 for the objective operational definitions of the target behaviours.

Prior to commencement of the initial CBGG phase, the group leader described the CBGG and the game rules to the children. The group leader decided to divide the children into teams based on the seating arrangement in place during homework time. Children were spread across four tables in the homework room in set seats. Each table represented a different team. While in the CBGG phases, any usual disciplinary processes were not used. The only behaviour management strategy used during this phase was the CBGG.

Each day of data collection, the game ran for 30 minutes. The adult leader followed the 11-step procedural checklist (Appendix 16). Daily points criteria ranged between 3 and 6 (50%-100% of the total possible points). On day one, the points criterion was three. On any given day, if all teams successfully met the criteria, the points criterion was increased the following day. Similarly, if on any given day, all teams did not meet the criteria, the criterion the following day was decreased. The leader was prompted to carry out a "behaviour check" six times throughout the game time, once every 5 minutes. CBGG behaviour check and point allocation was as outlined in Chapter 3. During the CBGG phase, the group leader also provided a DBR for Ben after the game was played each day.

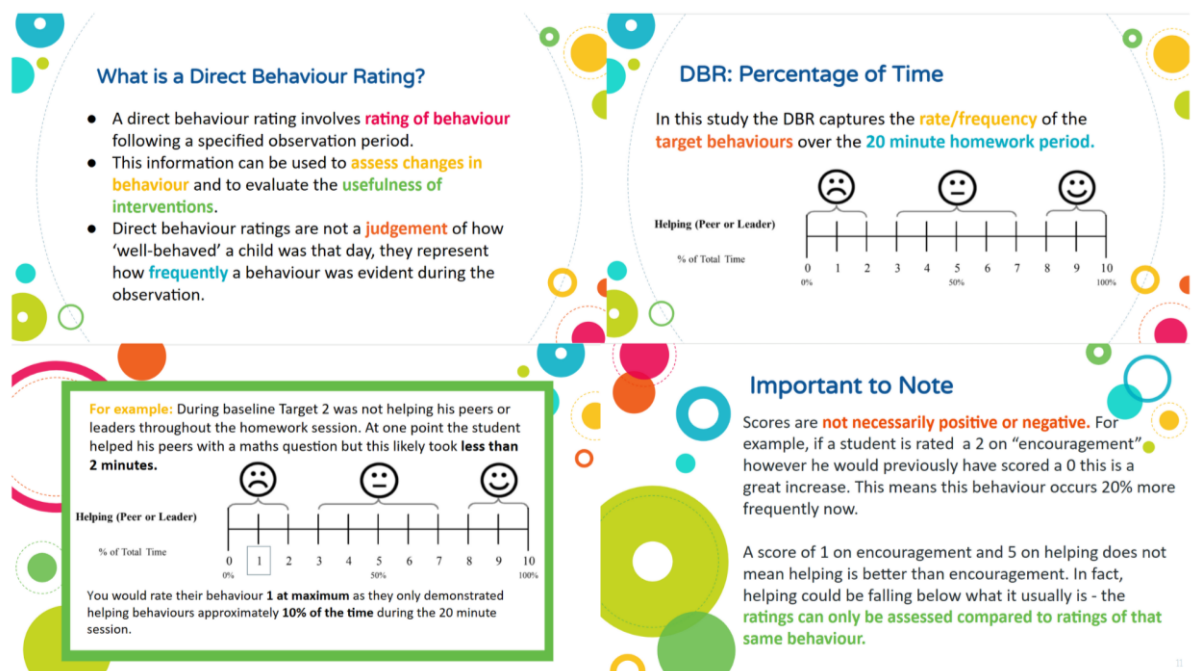
4.2.6.6 Direct Behaviour Rating Training

Ongoing data analysis across sessions in the first baseline and intervention phases signalled that the group leader's DBRs were not aligned with the rates of behaviour recorded by the PhD researcher and second data collectors in the initial baseline or initial CBGG phase. Given the group leader's lack of experience in education and behaviour analysis, the decision was made to provide her with more detailed DBR training prior to the commencement of the second CBGG

phase. The additional DBR training was provided by the PhD researcher. The training session lasted approximately 1-hour. The training, guided by a Google Slide presentation, covered an explanation of DBR, the uses of DBRs as well as opportunities to practice DBRs with guided videos. Examples of slides from the DBR training can be seen in Figure 4.2. The training was finished when the group leader stated that she felt more comfortable with the procedure. Following the DBR training, the research team decided to incorporate an additional baseline phase at the end of the ABAB withdrawal design (now ABABA) to provide the adult leader with additional opportunities to practice their new skill and also to provide further data to explore the alignment and utility of the DBR data with observational data.

Figure 4.2

Sample Slides from Group Leader Direct Behaviour Rating Training Session



4.2.7 Data Analysis

Analysis of directly observed behaviour change was as outlined in Chapter 3. WWC guidelines for visual analysis were followed (WWC; 2023). Tarlow's method (2016; 2017) for calculating effect size was used to supplement the visual analysis. Percentage of non-overlapping data (PND; Scruggs et al., 1987) was calculated as an assessment for risk of bias.

Agreement between observer and adult leader measurement of the target behaviours was explored through calculation of correlation coefficient as in previous research (e.g., Bruhn et al., 2017; Wesley et al., 2021). Pearson's correlation was calculated for observer recordings and Adult Leader DBRs of Helping and Encouragement both pre- and post- DBR training. Pearson's correlation ranges between -1 and 1 with negative scores indicating a negative correlation (i.e., as one variable increases the other decreases) and positive scores indicating a positive correlation (i.e., as one variable increases the other increases). When interpreting Pearson's correlation,

values of <0.1 indicate a negligible correlation, 0.1-0.39 indicate a weak correlation, 0.4-0.69 a moderate correlation, 0.7-0.89 a strong correlation and 0.9-1.00 a very strong correlation.

4.3 Results

4.3.1 Whole Group Researcher Observed Behaviours

4.3.1.1 Helping

The effect of the CBGG on helping, as measured by researcher observations, is depicted in Figure 4.3. In the initial baseline phase, helping was low and relatively stable ($M= 5.71\%$, $SD= 2.78$, range= 2.5%-10%). Once the CBGG was introduced, helping increased immediately and substantially ($M= 50.26\%$, $SD= 12.63$, range= 27.5%-67.5%). Although helping was variable in this phase, no data points overlapped with the baseline phases. Once the CBGG was withdrawn, helping decreased immediately and substantially and once again remained stable ($M= 10\%$, $SD= 2.5$, range= 7.5%-12.5%). Upon reintroduction of the CBGG helping again increased immediately and substantially and this time remained at a more stable rate ($M= 49.7\%$, $SD= 2.77$, range= 46.67%-53.33%). During the final withdrawal to baseline, helping once again decreased immediately and substantially and remained stable ($M= 7.67\%$, $SD= 0.91$, range= 6.67%-8.33%).

4.3.1.2 Encouragement

Figure 4.3 depicts the effect of the CBGG on whole group encouragement as per researcher observations. In the initial baseline phase encouragement was not observed and remained stable throughout the phase ($M=0\%$, $SD=0$, range=0-0%). When the CBGG was introduced, encouragement increased immediately and substantially and remained relatively stable ($M=12.63\%$, $SD= 2.94$, range=7.5%-17.5%). Upon withdrawal of the CBGG, encouragement once again decreased immediately and substantially with no instances of encouragement observed. This remained stable throughout the phase ($M=0\%$, $SD=0$, range=0-0%). Once the CBGG was reintroduced, encouragement again increased immediately and substantially and remained stable ($M= 6.36\%$, $SD= 1.45$, range= 5%-10%). Once again, when the CBGG was withdrawn, encouragement decreased immediately and substantially, this time slightly higher than previous baseline phases ($M= 1.33\%$, $SD= 0.74$, range= 0%-1.67%).

4.3.2 Ben's Researcher Observed Behaviour

4.3.2.1 Helping

The effect of the CBGG on Ben's helping according to researcher observations is demonstrated in Figure 4.4. Initially, in the first baseline phase, Ben's helping was low and remained relatively stable ($M= 4.17\%$, $SD= 3.76$, range=0%-10%). When the CBGG was introduced Ben's helping increased immediately and substantially ($M= 55.77\%$, $SD= 21.78$, range= 30%-95%). Ben's helping was highly variable in this phase but did not overlap with the previous baseline

phase. When the CBGG was initially withdrawn, Ben's helping decreased immediately and substantially and remained relatively stable ($M= 8\%$, $SD= 5.7$, range= 0%-15%). Upon reintroduction of the CBGG, helping increased once again immediately and substantially and remained relatively stable ($M= 64\%$, $SD= 7.42$, range= 55%-75%). In the final phase, when the CBGG was withdrawn, Ben's helping reduced immediately and substantially and remained relatively stable ($M= 13\%$, $SD= 2.74$, range= 10%-15%).

4.3.2.2 Encouragement

Figure 4.4 depicts the effect of the CBGG on Ben's encouragement according to researcher observations. In the initial baseline phase, Ben's encouragement was not observed and remained stable throughout the phase ($M=0\%$, $SD=0$, range=0-0%). When the CBGG was introduced encouragement increased immediately and substantially and remained relatively stable ($M= 6.92\%$, $SD= 2.53$, range= 5%-10%). When the CBGG was withdrawn, Ben's encouragement returned to original baseline levels once more with no observations of encouragement throughout this phase ($M=0\%$, $SD=0$, range=0-0%). When the CBGG was reintroduced Ben's encouragement once again increased immediately and substantially and remained relatively stable throughout ($M= 7\%$, $SD= 2.74$, range= 5%-10%). In the final phase, when the CBGG was withdrawn, encouragement once again decreased immediately and substantially, however in this instance instances of encouragement were seen during one point of data collection ($M= 1\%$, $SD= 2.24$, range= 0-5%).

4.3.3 Effect Size

Tau Scores, as seen in Table 4.1, were calculated for each phase change. Effect sizes were large to very large for Whole Group and Ben's Helping and Encouragement across each phase change (>0.6).

Table 4.1

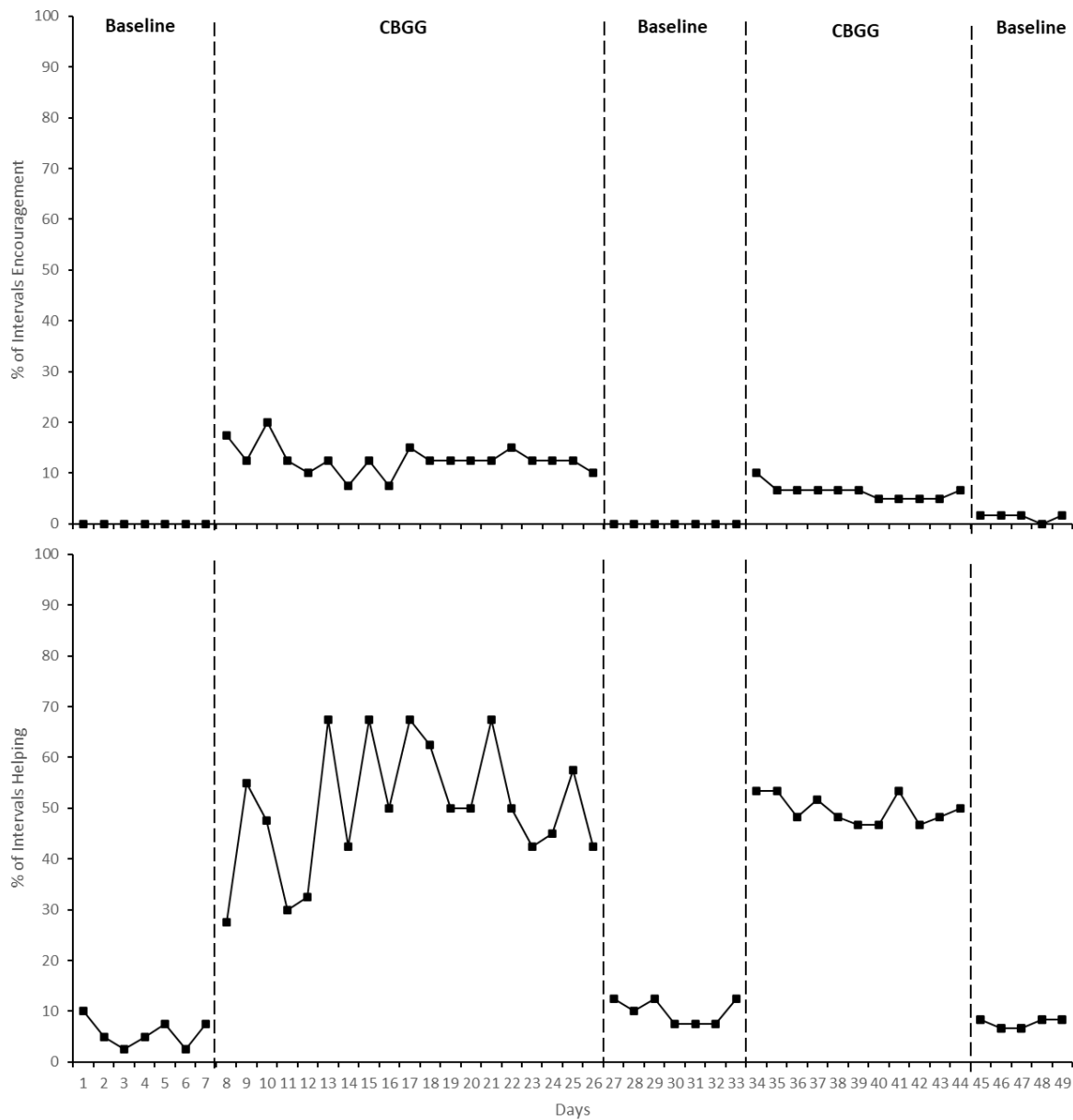
Tau Effect Sizes Afterschool 2

Phase Change	Whole Group Behaviour		Ben Behaviour	
	Help	Enc	Help	Enc
Baseline 1 - CBGG 1	0.658	0.735	0.696	0.813
Baseline 2 - CBGG 2	0.747	0.833	0.762	0.898

Key: * = Baseline correct Tau, Help = Helping, Enc = Encouragement.

Figure 4.3

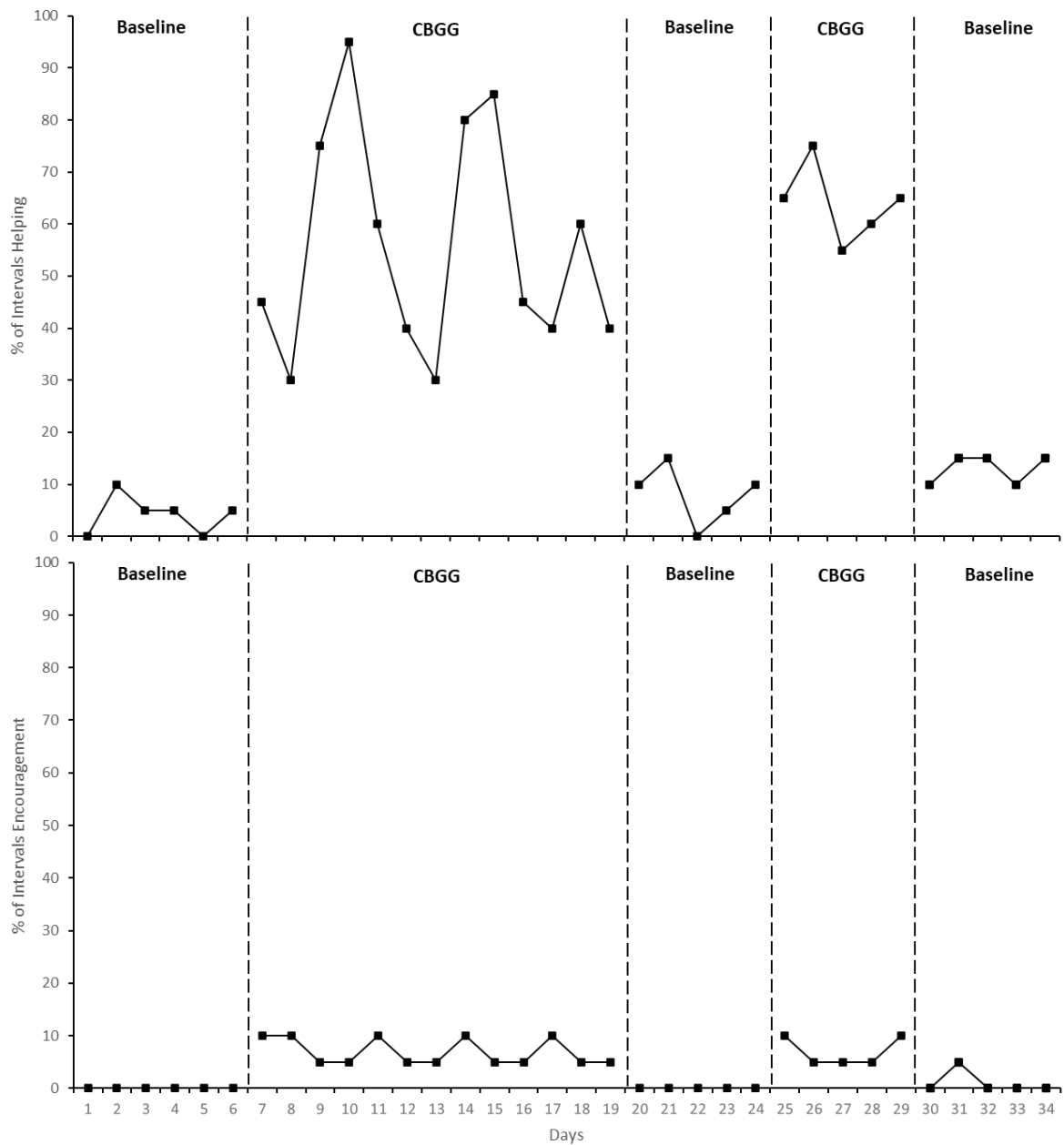
The Effect of the CBGG on Afterschool 2 Whole Group Prosocial Behaviours



Note. The top panel presents the percentage of intervals in which encouragement of the whole group occurred during baseline and CBGG phases. The bottom panel presents the percentage of intervals in which helping of the whole group occurred during baseline and CBGG phases.

Figure 4.4

The Effect of the CBGG on Ben's Prosocial Behaviours



Note. The top panel presents the percentage of intervals in which Ben's encouragement occurred during baseline and CBGG phases. The bottom panel presents the percentage of intervals in which Ben's helping occurred during baseline and CBGG phases.

4.3.4 Ben's Direct Behaviour Rating

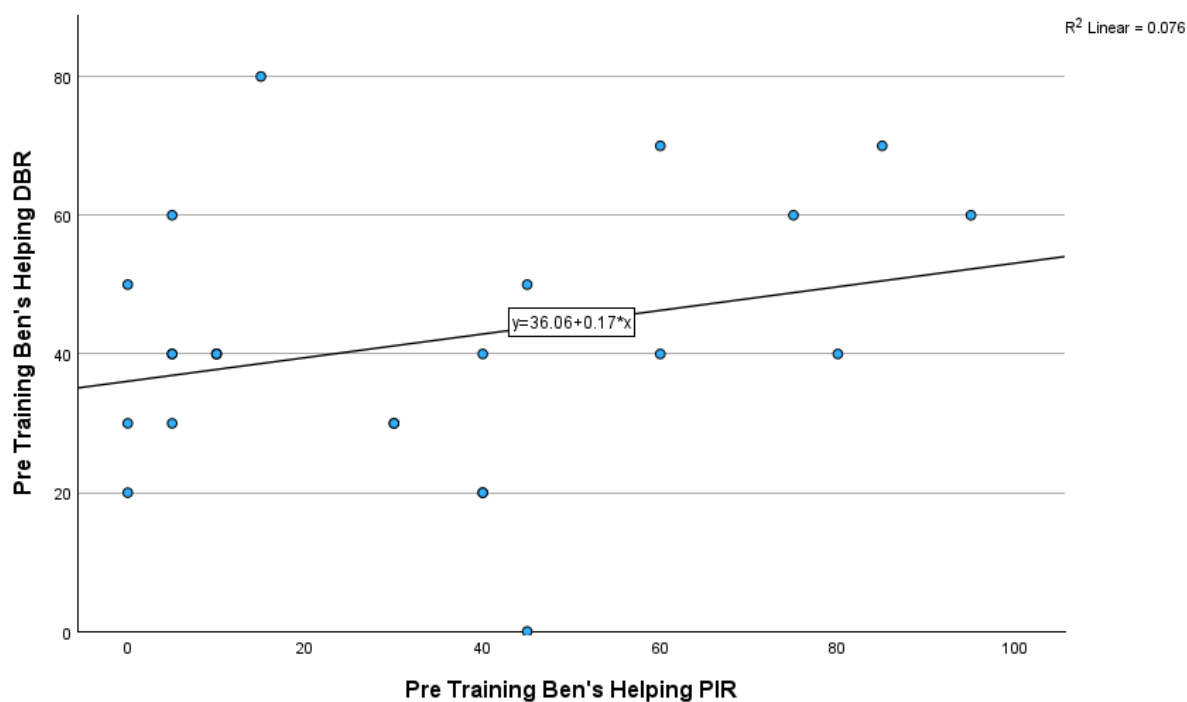
4.3.4.1 Helping

In the first baseline phase, before DBR training, DBRs for Helping were highly variable ($M=36.67\%$, $SD=1.37$, range= 20-60%). Upon introduction of the CBGG, Helping increased slightly but was once again highly variable ($M=40.77\%$, $SD=2.1$, range=0-70%). DBR data across the initial baseline and CBGG phases overlapped considerably ($PND=10.52\%$). Once the CBGG was withdrawn, DBRs for Helping increased again and were once again quite variable ($M=50\%$, $SD=1.73$, range=40-80%). Before the CBGG was reintroduced, the group leader underwent further detailed DBR training. After the training, when the CBGG was reintroduced, DBRs for helping were more aligned with researcher observations and much more stable ($M=56\%$, $SD=0.55$, range=50-60%). However, when comparing this CBGG phase to the previous baseline phase, the data still overlapped completely ($PND=0\%$). To allow further exploration of the adult leader's DBRs we returned to baseline once more. In the final baseline phase adult leader DBRs for Helping decreased immediately and substantially and remained relatively stable ($M=8\%$, $SD=0.45$, range=0-10%). The final CBGG phase and final baseline phase did not overlap ($PND=100\%$).

A Pearson correlation coefficient was computed to assess the linear relationship between Ben's researcher recorded helping behaviour and the DBR of helping prior to DBR training (Figure 4.5). There was no significant relationship between these variables. A Pearson correlation coefficient was also computed to assess the linear relationship between Ben's researcher recorded helping behaviour and the DBR of helping post- DBR training (Figure 4.6). There was now a significant strong positive correlation between the two variables, $r(9) = 0.982$, $p < 0.001$.

Figure 4.5

Pre-Training Correlation of Ben's Helping according to DBR and Partial Interval Recording

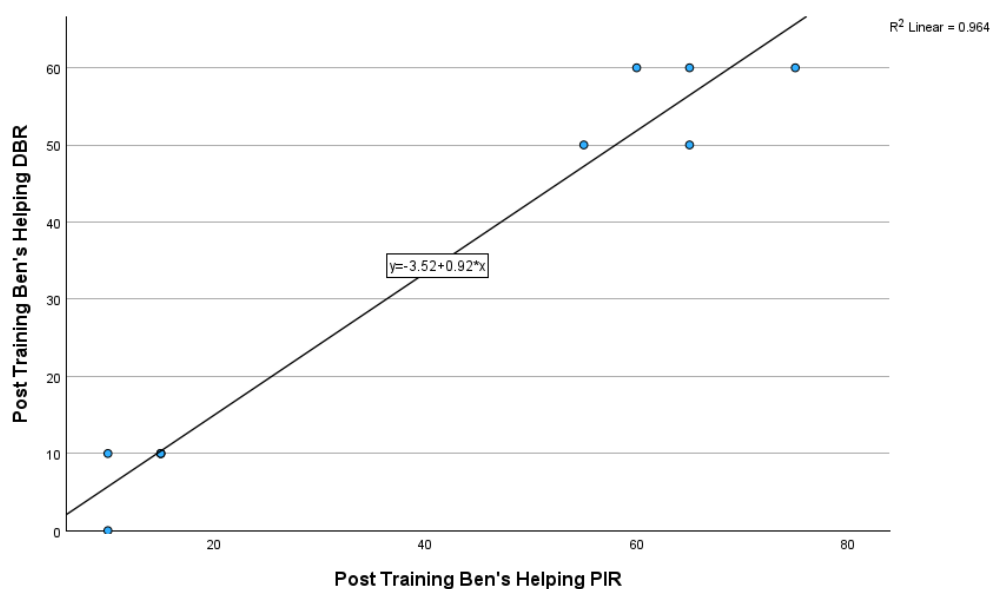


Key: DBR = Direct Behaviour Rating. PIR = Partial Interval Recording

Note. This figure presents the correlation between adult leader DBR and researcher direct observation of Ben's helping behaviour before undergoing detailed DBR training.

Figure 4.6

Post-Training Correlation of Ben's Helping according to DBR and Partial Interval Recording



Key: DBR = Direct Behaviour Rating. PIR = Partial Interval Recording

Note. This figure presents the correlation between adult leader DBR and researcher direct observation of Ben's helping behaviour after undergoing detailed DBR training.

4.3.4.2 Encouragement

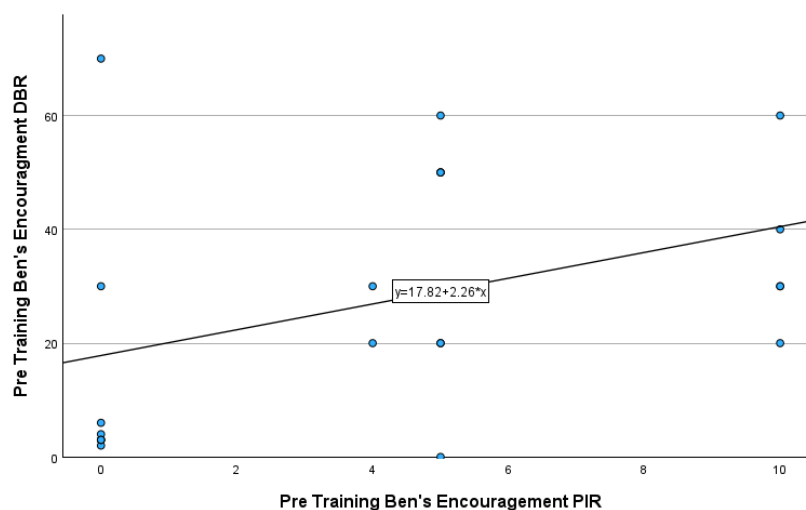
In the first baseline phase, before the DBR training, DBRs for Encouragement were highly variable ($M=35\%$, $SD=1.38$, range= 20-60%). Upon introduction of the CBGG, DBRs of Encouragement decreased slightly but was once again highly variable ($M=33.85\%$, $SD=1.76$, range=0-60%). DBR data across the initial baseline and CBGG phases overlapped completely ($PND=0\%$). Once the CBGG was withdrawn, DBRs for Encouragement increased again and were once again quite variable ($M=40\%$, $SD=2.0$, range=20-70%). After further DBR training, when the CBGG was reintroduced, DBRs for Encouragement were more aligned with researcher observations and much more stable ($M=18\%$, $SD=0.45$, range=10-20%). However, when comparing this CBGG phase to the previous baseline phase, the data still overlapped significantly ($PND=9\%$). In the final baseline phase, adult leader DBRs for Encouragement decreased immediately and substantially and remained relatively stable ($M=2\%$, $SD=0.45$, range=0-10%). The final CBGG phase and final baseline phase overlapped very slightly ($PND=80\%$).

A Pearson correlation coefficient was computed to assess the linear relationship between Ben's researcher recorded encouragement and the DBR of encouragement before DBR training (Figure 4.7). There was no significant relationship between these variables.

A Pearson correlation coefficient was then computed to assess the linear relationship between Ben's researcher recorded encouragement and the DBR of encouragement post-DBR training. There was now a significant strong positive correlation between the two variables, $r(9) = 0.896$, $p < 0.001$. The correlation between Ben's encouragement according to DBR and partial interval recording is demonstrated in Figure 4.7.

Figure 4.7

Pre-Training Correlation of Ben's Encouragement according to DBR and Partial Interval Recording

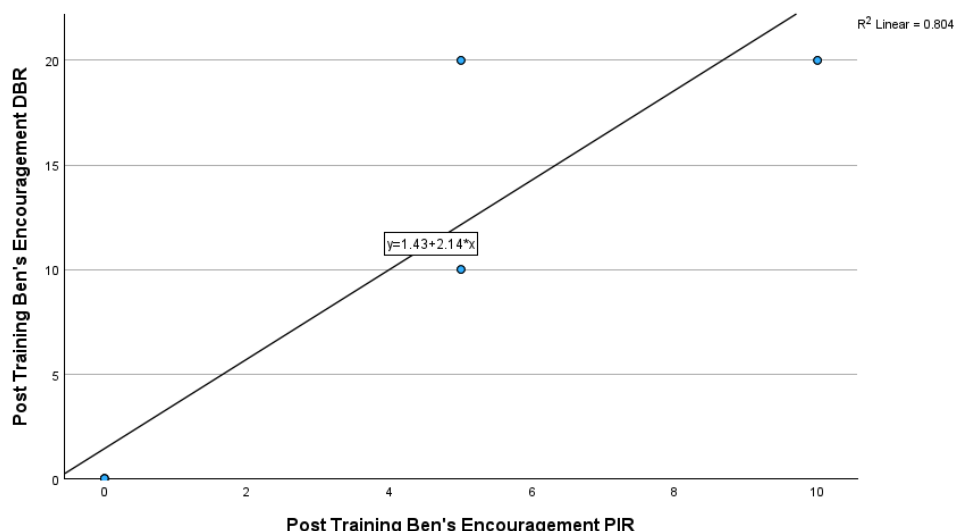


Key: DBR = Direct Behaviour Rating. PIR = Partial Interval Recording

Note. This figure presents the correlation between adult leader DBR and researcher direct observation of Ben's encouragement before undergoing detailed DBR training.

Figure 4.8

Post-Training Correlation of Ben's Encouragement according to DBR and Partial Interval Recording



Key: DBR = Direct Behaviour Rating. PIR = Partial Interval Recording

Note. This figure presents the correlation between adult leader DBR and researcher direct observation of Ben's encouragement after undergoing detailed DBR training.

4.3.5 Social Validity

4.3.5.1 Adult Leader Social Validity

The adult leader completed the BIRS (Elliot & Treuting, 1991) at two time points, once before the DBR training and once on the final day of data collection.

Prior to commencement of the DBR training, the leader rated the CBGG a total score of 118 out of a possible 144 (M= 4.9, range 4-6). For acceptability, the leader rated the CBGG a score of 79 out of 90 (M=5.3, range 5-6). For effectiveness, the leader rated the CBGG a score of 30 out of 42 (M=4.3, range 4-5). For time to effect, the leader rated the CBGG a score of 9 out of 12 (M=4.5, range 4-5).

On the final day of data collection, the group leader completed the BIRS for a second time. The leader rated the CBGG a total score of 120 out of a possible 144 (M= 5, range 4-6). For acceptability, the leader rated the CBGG a score of 79 out of 90 (M=5.3, range 4-6). For effectiveness, the leader rated the CBGG a score of 31 out of 42 (M=4.4, range 4-5). For time to effect, the leader rated the CBGG a score of 10 out of 12 (M=5).

4.3.5.2 Child Social Validity

Twelve children from the whole group completed the CIRP (Witt & Elliott, 1985) on the final day of data collection. The mean score across these 12 children was 5.5 (range 4-8) out of a highest possible score of 8. All but one of the children marked that they "Liked participating in the

game” and all but two marked that they “think the game was fair”. Ben also completed the CIRP and marked the CBGG with a total score of 5 out of a possible total of 8.

4.4 Discussion

The current study aimed to evaluate the effectiveness of the CBGG in increasing two PSBs, helping and encouragement, both at the individual level (in a 10-year-old-boy) and at the group level (among 9- and 10-year olds) attending a community-based afterschool programme. The study also sought to explore the feasibility and utility of DBR as a participatory tool for involving afterschool leaders in the ongoing measurement of behaviour change.

4.4.1 Effectiveness of the Caught Being Good Game

The results indicated that the CBGG was an effective intervention for increasing two forms of PSBs - helping and encouragement, of both the whole group and of Ben. These findings are consistent with previous research demonstrating the effectiveness of the CBGG for promoting PSBs in educational settings (Groves & Austin, 2019; Wiskow et al., 2021; Sewell, 2020). It is important to recognise that the current study extends the current literature by providing support for the use of the CBGG in afterschool environments, which are notably less structured than a traditional classroom environment (Schauble et al., 2013; Schnittka et al., 2016).

For children considered at risk due to ACEs, afterschool programmes have been identified as protective factors that support the development of PSBs (Kremer et al., 2015; McDaniel et al., 2016). The observed increases in PSBs suggest that group contingency interventions such as the CBGG can be feasibly and effectively implemented by afterschool leaders with limited formal training in behaviour management, provided that adequate support and resources are available. The group nature of the intervention allows adult leaders to simultaneously provide behaviour support for individuals who may require additional support as well as manage whole group behaviour (Little et al., 2015).

4.4.2 Exploring the Feasibility and Utility of DBR to Involve Adult Leaders in Behavioural Assessment

The third research question sought to explore whether DBR could serve as a feasible and useful method for involving adult leaders in real-time monitoring of behaviour change. This approach contrasts with traditional models in which intervention effects are measured by external observers and adult leaders provide input only retrospectively via social validity questionnaires (Wolf, 1978; Cooper et al., 2020). The use of DBR throughout the intervention period facilitated more immediate feedback on PSBs, while also enhancing the leader’s engagement with the intervention and awareness of incremental changes in behaviour. This finding supports recent research advocating for participatory and collaborative approaches to intervention assessment in educational and community settings (Chafouleas et al., 2021).

A notable finding from the present study was the impact of targeted training on the reliability of DBR ratings. Initially, there was only moderate agreement between the DBR scores provided by the afterschool leader and the observational data collected by the research team. However, following a dedicated training session focused on clarifying behavioural definitions, modelling DBR completion, and providing feedback on practice ratings, a marked improvement in the correlation between leader ratings and researcher observations was observed. This pattern is consistent with previous research highlighting the necessity of explicit and context-specific training to ensure the reliability and validity of DBR in applied settings (Chafouleas et al., 2014; Harrison et al., 2014; Kilgus et al., 2016; Pasqua et al., 2021). In afterschool environments, where routines and expectations are less formalised than in classrooms, training appears especially important for supporting leaders to accurately identify and rate PSBs. These findings emphasise that, while DBR offers a practical and participatory approach to monitoring behavioural change, its effectiveness relies on thorough initial training and ongoing support for raters. This has important implications for the wider implementation of DBR in community-based programmes, suggesting that investment in rater training is essential for maximising both the accuracy of data and the engagement of adult leaders in the intervention process (Saar et al., 2022).

While the leader in this study demonstrated high levels of engagement and procedural fidelity, future research should explore additional strategies for supporting rater accuracy and minimising potential biases, particularly when scaling up to larger or more diverse afterschool programmes (Chafouleas et al., 2021). Although an improvement in DBR-observation agreement was observed following targeted training, the current study did not include a formal evaluation of the training component itself. Future studies could consider systematically assessing the effects of DBR training using a separate evaluation phase or a pre-post design. However, incorporating a second single case experimental design to evaluate training effects within the same study may introduce complexity. An alternative approach could involve employing Behavioural Skills Training as a structured preparatory step prior to intervention. Behavioural Skills training, which includes instruction, modelling, rehearsal, and feedback (Mahon et al., 2022), has been shown to be effective in training adults in behaviour change mechanisms (Mahon et al., 2022) and could support more consistent and accurate DBR use among adult leaders in community-based settings.

4.4.3 Social Validity Findings

Another important aspect of the present study was the consistently positive social validity ratings provided by the adult leader, which were already high prior to DBR training but increased further following the training and at the conclusion of the intervention. This contrasts with the findings in Chapter 3, where the same intervention was implemented without the use of DBR, and the adult leader rated the intervention as less effective and less acceptable. This trend suggests

that the adult leader not only found the CBGG and DBR procedures acceptable and feasible from the outset, but that her appreciation for their value deepened after her training session. The improvement in social validity ratings post-training aligns with recent literature highlighting that ongoing, participatory involvement in behavioural assessment can enhance adult stakeholders' recognition of subtle, positive changes in children's behaviour (Chafouleas et al., 2021). Moreover, the highest ratings were recorded at the end of the intervention, indicating that the combination of hands-on DBR experience and the observable impact of the CBGG on group dynamics led to a greater sense of ownership and satisfaction for the leader. It is important, however, to highlight that DBR and training were not experimentally manipulated in the current study. One of the objectives of this study was to explore the feasibility of DBR for adult leaders outside of classroom settings, the objective was not to evaluate its impact on social validity. Future research should seek to explore the potential of DBRs to increase social validity ratings. We must also consider the potential impact of the timing of social validity measurement for both adult leaders and children. Future research may also seek to gather social validity data more frequently to capture a more complete picture of participant experience (e.g., daily social validity rather than once-off post-hoc measurements). The current study suggests a need for more dynamic, collaborative approaches to social validity assessment, as opposed to relying solely on retrospective measures, which may underestimate the acceptability and perceived effectiveness of interventions targeting nuanced PSBs (Snodgrass et al., 2018).

4.4.4 Implications for Practice and Future Research

The findings have several implications for practice. They highlight the potential of group contingency interventions such as the CBGG to promote PSBs in afterschool settings, particularly for children at risk due to adverse childhood experiences. They underscore the value of involving adult leaders in the ongoing assessment of PSB change, using tools such as DBR to enhance engagement, accuracy, and sustainability. They point to the need for training and support to ensure the reliable implementation of behaviour change interventions and assessment methods. Future research should seek to explore the role of training in DBR within afterschool settings with experimental control. Moreover, future research should seek to explore variables (e.g., time, confidence, familiarity etc.,) that may impact an adult leader's ability to accurately evaluate behaviour change using DBR.

Future research should seek to replicate and extend these findings in larger and more diverse settings, and to explore the long-term impact of participatory assessment approaches on both child and leader outcomes (Chafouleas et al., 2021; Brennan et al., 2024). Additionally, further investigation is warranted into the mechanisms by which adult leader involvement in assessment may influence intervention fidelity, social validity, and the maintenance of PSB change

over time (Ferguson et al., 2019; Ledford et al., 2016). Research should seek to explore adult leader preference for punishment-based or reinforcement-based group contingencies as well as exploring variables that may influence this preference for example, time-constraints, resourcing, personal traumas or ease of delivery.

4.4.5 Conclusion

In summary, this study contributes to a growing literature on the utility of group contingency interventions and participatory assessment methods in afterschool contexts. By demonstrating the effectiveness of the CBGG in increasing PSBs and the feasibility of DBR as a tool for engaging adult leaders in the measurement of behavioural change, the findings offer promising directions for both research and practice. Continued efforts to refine and scale these approaches have the potential to enhance the social and emotional development of children in afterschool programmes, particularly those facing significant adversity. Future research should seek to explore other avenues for participation in behavioural interventions. Chapter 5 presents the findings from two empirical studies in which children and adult leaders participated in co-designing group contingency interventions.

Chapter 5: Child-Centred Behaviour Support: The co-design of a group contingency intervention with children in need of support

This chapter presents two studies which explore how participatory, person-centred, and co-design methods can be integrated into applied behaviour analysis to develop socially valid and effective interventions for children in need of support.

5.1 Introduction

The field of applied behaviour analysis is grounded in the systematic application of behavioural principles to bring meaningful change to individuals' lives. Foundational work emphasised that behaviour analytic interventions should target socially significant behaviours and produce changes valued by the individual (Baer et al., 1968). Over time, the focus has evolved to adapting a person-centred approach, recognising the importance of designing interventions aligned with an individual's goals, values and preferences. Person-centred behaviour analytic approaches consider the individual's life circumstances and may adopt collaborative approaches with the individual, their families and their support networks (Gondek et al., 2017). Such approaches are particularly relevant today, as the field continues to evolve towards more inclusive (Petronelli & Ferguson, 2022) and trauma-informed (Austin et al., 2024) practices.

A key aspect of person-centred approach is the active inclusion of the individual's voice (Santana et al., 2018). While children are often the recipients of behavioural interventions, their insights are not always sought in meaningful ways (Snodgrass et al., 2018). Incorporating children's voices into intervention design can promote greater ownership, motivation, and alignment with the child's lived experience (Antonini, 2021; Kumpulainen et al., 2014). These approaches are especially important when working with participants whose behaviour is particularly impacted by their community (e.g., Fawcett, 1991; Fawcett 2021), such as those recruited in the current study. Despite increasing emphasis on these principles, it remains unclear how to systematically and transparently incorporate children's perspectives during intervention development, particularly in group contingency interventions.

The concept of social validity (as discussed in Chapter 1) is central to person-centred approaches. Though the importance of capturing social validity is well established (Baer et al., 1968; Snodgrass et al., 2018), a recent systematic review, as outlined in Chapter 1, found that only 17.6% of papers published in the *Journal of Behavior Analysis* between 2010-2020 included a measure of social validity (Leif et al., 2023). Traditionally, social validity data are collected post-intervention (Snodgrass et al., 2018), often through questionnaires or acceptability ratings (e.g., BIRS; Elliott & Treuting, 1991; CIRP, Witt & Elliott, 1985) or post-intervention interviews (e.g., Guinness et al., 2024). To date, common proactive strategies in applied settings have included preference assessments (Stratton et al., 2018), collaborative rule-setting (Embry et al., 2016;

Jones & Jones, 2016), and participatory goal setting (Sullivan et al., 2017). However, these strategies often occur at discrete points in the process. To ensure that an intervention is meaningful for those who they are designed for, we should strive to go beyond the traditional use of post hoc social validity measures and, aligned with person-centred approaches, incorporate the individual's view throughout the design and implementation of interventions.

5.1.1 Co-Design

Co-design is a participatory approach that involves collaboration between researchers, practitioners, and individuals receiving interventions to ensure relevance and effectiveness (Sanders & Stappers, 2008). In behaviour analysis, co-design methods enhance intervention acceptability, increase stakeholder engagement, and improve social validity (Schwartz, 2025). Strategies include focus groups, participatory workshops, and iterative feedback sessions to refine intervention components. By involving children, educators, and caregivers in the design process, co-design ensures that interventions align with real-world needs and preferences, leading to more sustainable behavioural outcomes (Murray et al., 2019). While preference assessments (e.g., Stratton et al., 2018) and collaborative rule-setting (e.g., Embry et al., 2016) have long featured in applied behaviour analysis, the systematic application of full co-design frameworks, where participants contribute throughout all phases of intervention design and implementation, remains unexplored.

Cooperative inquiry offers a unique model for addressing this gap. It is a participatory research framework which can be used to engage children as equal partners in the design and evaluation of interventions (Druin, 1999). Cooperative inquiry involves four iterative stages: Proposition, Action, Reaction, and Reflection. It uses a range of techniques such as low-tech prototyping, heat mapping, sticky note brainstorming, and immersive feedback cycles to ensure that participants are actively involved at every stage (Foss et al., 2013). Cooperative inquiry has previously been used to develop mental health interventions (Bearman et al., 2020), positive technologies (Yarosh & Schuleler, 2017) and science activities (Gillies et al., 2014) with children. However, to the extent of our knowledge, no previous research has used cooperative inquiry to develop a group contingency intervention.

Integrating a comprehensive co-design approach into behavioural intervention design allows for continuous participant involvement, making interventions more adaptable, relevant, and engaging (Benz et al., 2024). When individuals have a voice in shaping intervention strategies from development to implementation, they are more likely to feel invested, leading to higher motivation and adherence (Pirenen, 2016). Additionally, ongoing stakeholder feedback enables continuous refinement of reinforcement strategies and intervention procedures to optimise effectiveness (Huntington et al., 2023).

Ongoing collaboration also has the potential to strengthen the social validity of behaviour support, not just through post hoc ratings, but through active collaboration embedded within the design. In particular, cooperative inquiry provides opportunities for frequent check-ins, iterative input and prioritises shared decision making (Druin, 1999). These features of cooperative inquiry align with key social validity considerations (Baer et al., 1968) which outline that an intervention should remain acceptable and relevant to stakeholders across time and present and alternative approach for social validity measurement. Importantly, this participatory, person-centred approach aligns with principles of trauma-informed care (as described in Chapter 3), which is particularly important when working with children at risk of ACEs. Trauma-informed care emphasises creating safe, predictable environments that promote trust, collaboration, empowerment and emotional regulation while avoiding retraumatisation (SAMHSA, 2014). By involving children directly in co-design, behavioural interventions can support their sense of safety, belonging and agency, key protective factors which contribute to resilience and wellbeing (Biglan et al., 2017).

5.1.2 The Current Study

Afterschool 3 (Study 1) served as a pilot of a co-design approach in which children were engaged in structured workshops to collaboratively design the game rules for an interdependent group contingency intervention. This study explores a novel application of child involvement in rule development and evaluates the potential for co-designed rules to increase social validity and behavioural outcomes. This work addresses a gap in the literature regarding how to explicitly integrate children's voices into the co-design of behavioural interventions, particularly at the rule-creation stage of group contingencies. This participatory model aligns closely with calls for more inclusive and trauma-informed practices within applied behaviour analysis (Austin et al., 2024; Shogren et al., 2017).

5.1.3 Study 1 Research Questions

1. How can person-centred practices be used to involve children in co-designing the rules of a group contingency intervention?
2. What is the effect of a group contingency intervention with co-designed rules on children's helping, positive and encouraging social interaction, and task engagement?
3. How do children and adult leaders perceive the fairness and acceptability of co-designed game rules?

5.2 Study 1 Method

5.2.1 Ethical Considerations

This study was conducted in line with the ethical principles and procedures outlined in Chapter 3 and approved by DCU's Research Ethics Committee (see Appendix 1). In keeping with trauma-informed and participatory research practices, children in Afterschool 3 engaged in structured workshops to co-design the rules of the group contingency intervention. These workshops formed part of the centre's regular activities, and no identifiable data were collected or analysed from the rule-creation process. Materials generated during the workshops were retained by the centre and not included in the research data. As with previous studies, participation in data collection was voluntary, with informed consent obtained from parents/guardians and assent from children. All data related to behavioural outcomes and social validity were anonymised and collected in accordance with GDPR and institutional data management protocols.

5.2.2 Participants and Setting

Ethical approval was sought and granted by DCU's Research Ethics Committee (see Appendix 1). The centre manager in Afterschool 3 agreed to host the current study and to facilitate participant recruitment (see Chapter 3 for further detail). As in previous centres, all children attending the afterschool programme had been referred to the programme by social workers, their parents or school principals for a variety of reasons, including but not limited to experience of poverty, experience of familial addiction, bereavement, parental divorce or family member imprisonment. The daily structure of Afterschool 3 was the same as Afterschool 1 and 2 (i.e., Monday to Thursday). The centre manager in Centre 3 agreed to participate in the study and sought interest from the staff. The group leader of the younger group of children in centre 3 agreed to participate and facilitate recruitment.

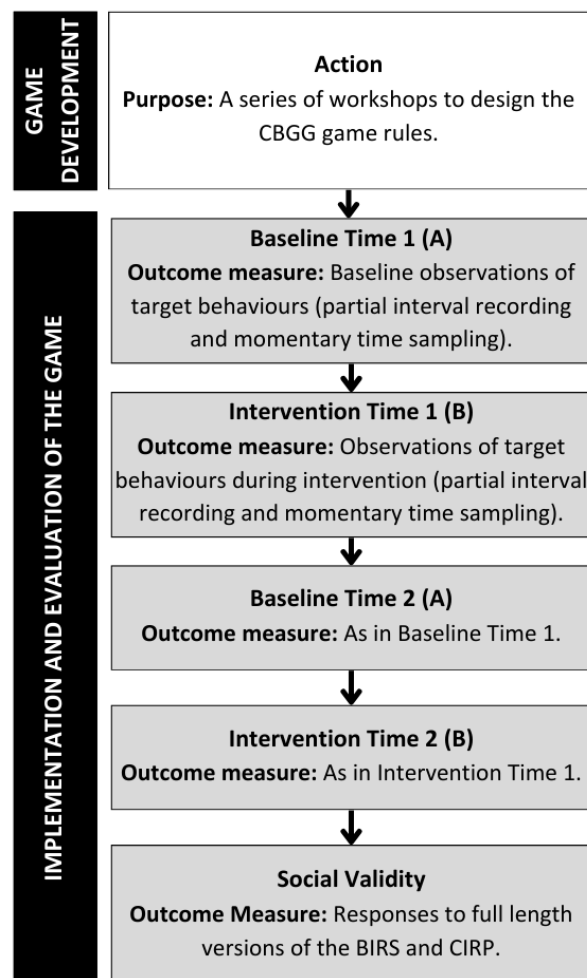
Jessica (pseudonym) was the group leader responsible for the younger group of children in Afterschool 3. Jessica had a Level 5 qualification in Childhood Care and Education and had been working in the centre for five years. Jessica reported no previous experience in using a group-based behaviour management approach like the CBGG but was operating the reward-based star system in place across all five afterschool centres (see Chapter 3 for further details).

A total of 12 children in the group were invited to participate in the research. Parental consent and child assent was received for seven children (2 boys, 5 girls) with a mean age of 8.9 years (range 8-10 years). None of the seven children withdrew from any phase of the study. These participants were all of White Irish descent (N=7). Four children required additional support in school in areas such as Reading (N=2), Spelling (N=2), Social (N=1), Behaviour (N=1) and Maths (N=1). Although seven children had parental consent to take part, all children participated in the

workshops and the game as they were part of the daily activities within the centre. However, data were only collected from consenting and assenting children. To ensure informed assent decisions, at the beginning of each day children were reminded of what data was being collected and what procedures were in place and then asked if they agreed to participate. Only those who actively assented were included in that day's data collection. Given the particularly vulnerable profile of the children attending this afterschool centre and given that the intervention was to be designed for use within the centre only, the decision was made not to invite parents or guardians to participate in the co-design sessions.

Figure 5.1

Afterschool 3 Study Phases Outline



5.2.3 Design

A series of qualitative workshops were carried out in order to determine the game rules and target behaviours of the intervention. However, as these methods were simply being piloted, no data were collected throughout the sessions. Data presented in the findings of this study consist of observed behavioural data collected using a withdrawal design (Kazdin, 2020) with phases ABAB (A= baseline; B=CBGG) and social validity measures. Please see Figure 5.1 for an outline of the study timeline.

5.2.4 Dependent Variables and Measurement

The dependent measures (helping, positive and encouraging social interaction and task engagement) were chosen and operationally defined by the researchers based on the co-designed game rules. It is important to note that as the research team and adult leader also participated in the co-design sessions, the activities were guided and controlled. Operational definitions were discussed with and approved by the group leaders prior to the commencement of direct observation data collection.

Please note, although “Helping” was targeted in Chapters 4 and 5, the operational definition varied slightly. Helping behaviours in Chapter 5 Study 1 included behaviours which would facilitate a peer’s participation in or completion of a required task or goal as well as when a child engaged in joint work or a joint task with a peer or adult leader for at least three seconds. This included behaviours such as providing physical or verbal assistance with a certain task, sharing resources or working together towards a common goal, working together to clean up their workspace, sharing stationery, helping a peer complete a task, following leaders’ instructions within 3s, collecting a worksheet for someone else, willingly helping the leader or offering to help the leader. Helping behaviours were individual or collaborative. For the purpose of data collection, behaviours that would be considered positive social interactions were not considered to be helping behaviours.

Positive and encouraging social interactions were defined as verbal and non-verbal behaviours which involved the interpersonal communication of a positive message aimed at providing support or motivation to a peer or expressing kindness. Positive social interactions could occur before, during or after an action by or interaction with a peer. Positive social interactions included verbal interactions such as positive words of encouragement for a peer, e.g., “You got this!”, complimenting behaviours, praise or tootling, as well as non-verbal positive communication e.g., smiling at a peer, a thumbs up, a high five, clapping, or a pat on the back.

Task engagement was defined as when a child was giving their attention to the ongoing task, which included homework tasks such as writing, colouring, reading aloud or to oneself, orienting eye contact toward the task or a child collecting materials needed to complete the task at the time (e.g., collecting a pencil or sharpener). A child was also considered to be engaging in the task if completing a task that the leader asked them to do (e.g., giving out worksheets to the group). Task engagement also included listening to the leader and orienting eye contact towards the leader when they were explaining a task as well as waiting appropriately when needed.

The PhD researcher collected data up to four days a week, as outlined in Chapters 3 and 4. Data collection sessions were 20 minutes long. Data were collected using partial interval recording (PIR) for helping, and positive and encouraging peer interaction and momentary time sampling for task engagement. Each interval was 10 s long followed by a 5 s interval for data

recording. An individual-fixed method (Briesch et al., 2015) was used to observe the consenting and assenting children, meaning that a different child was observed every 15s in a predetermined order.

5.2.4.1 Interobserver Agreement (IOA)

A second observer independently collected data with the PhD researcher across 24% of the observations. The second observer was an undergraduate psychology student who had been trained in observational methods. IOA data were calculated for 27% of baseline observations and 20% of intervention phases. Interval-by-interval agreement was used to calculate IOA. To obtain an IOA percentage, the total number of agreements were divided by the overall number of intervals and multiplied by 100. Mean IOA was 94.75% for helping (range 92.5%-96.25%), 91% for positive and encouraging social interaction (range 81.25%-97.5%) and 91% for task engagement (range 86.25%-96.25%).

5.2.5 Social Validity

Following the completion of data collection, social validity measures were administered to both the child participants and the group leader. Social validity procedures were identical to those in Afterschool 1 and 2 (See Chapters 3 and 4 for further detail). The child participants completed a modified version of the Children's Intervention Rating Profile (CIRP; Mitchell et al., 2015; Witt & Elliott, 1985; Appendix 17) and the group leader completed the Behaviour Intervention Rating Scale (BIRS; Elliott & Treuting, 1991; Appendix 18).

5.2.6 Treatment Integrity

Jessica was asked to follow the same 11-step procedural checklist during the CBGG as used in Chapters 3 and 4 (see Appendix 16). As a measurement of treatment integrity, the PhD researcher completed the checklist while the CBGG was being played. Mean treatment integrity was 81.81% (SD = 7.48, range = 81.81%–100%). The most commonly missed steps were steps 5 and 7 (see Appendix 16).

5.2.7 Materials

The materials needed to run the CBGG in this study were the same as those used in Chapters 3 and 4. Please refer to these chapters for further detail. In addition to those materials used in Chapters 3 and 4, additional materials were used throughout the design workshops for the game rules development. Table 5.1 outlines the materials used to design the game rules.

5.2.8 Procedure

5.2.8.1 Game Rules Development

In this study we ran a series of four 30-minute design workshops to design the CBGG game rules. The design works took place across one week (Monday-Thursday). Participants were informed that the aim of these workshops was to create the rules for a new behaviour game that would be used in their afterschool centre during homework time. The game rules design process was iterative. The children, adult leader and researcher all engaged in the co-design materials and worked together to determine the game rules. The sessions, therefore, were guided and controlled to ensure suitability of the game rules for the centre and the activity, children did not have complete freedom to choose anything they desired. Please refer to Table 5.1 for an outline of the activities of each design session. The materials used during these sessions can be found in Appendices 20-22.

The rewards were determined by a preference assessment carried out during the final design workshop. The procedures for conducting the preference assessment were as in Chapters 3 and 4. The preference assessment identified small toys, sweet treats, hair accessories and fidget toys as highly rated rewards, all of which were used throughout the intervention phases of the study. Upon completion of the design workshops the CBGG game rules and rewards to be used in the game were determined. As mentioned previously, a withdrawal design was used to assess the effectiveness of the CBGG with co-designed game rules.

5.2.8.2 Adult Leader Training

Adult leader training procedures were as in Chapter 3. As the leader had been involved in the game rules design, the training was slightly shorter than in other centres lasting approximately 25-30min.

5.2.8.3 Baseline

Baseline procedures were as in Afterschool 1 (Chapter 3). The leader continued with usual disciplinary processes adopting a “business-as-usual” approach. As in previous chapters, Jessica has the opportunity to practice the CBGG procedures on the final day of the initial baseline phase. She wore the FitBit and awarded points privately based on the 5-minute interval schedule. These processes were unbeknownst to the children.

Table 5.1*Game Rules Design Workshops Activities in Afterschool 3*

Workshop	Activities	Materials
1.	Children and the adult leader filled out 2 worksheets. One exploring what they would like to “do”, “see”, “hear” and “feel” more in the afterschool centre and the other exploring what they would like to “do”, “see”, “hear” and “feel” less in the afterschool centre.	“Do”, “See”, “Hear”, “Feel” More Worksheet (Appendix 20) “Do”, “See”, “Hear”, “Feel” Less Worksheet (Appendix 21)
2.	Children and the adult leader brainstormed ideas for rules for homework time.	“Ideas for Game Rules” Worksheet (Appendix 22)
3.	Heat-mapping was used to decide what rules were suitable for the group. Children, the researcher and the adult leaders (the design team) were given 6 green stickers. They were asked to place 3 stickers on their favourite rule, 2 stickers on their second favourite rule and 1 sticker on their third favourite rule. Any rules with no stickers were then removed. The design team were then given one star sticker to place on their overall favourite rule. Any rule without a star was then removed.	Ideas for Game Rules all written on one A4 sheet each and spread throughout the room. Circular Stickers Star Stickers
4.	The design team worked together to create the final rules for the intervention. Rules needed to be positively framed and the goal was to create between 3 and 6 game rules.	Flipchart and markers to guide discussion.

5.2.8.4 Intervention: Caught Being Good Game

Unlike in previous chapters, in Afterschool 3, the children were aware of the development of the CBGG and were involved in the development of the game rules. Therefore, upon introduction of the CBGG Jessica simply reminded the children of the rules and split them into their teams rather than giving the children a full explanation of the game. In the case of Afterschool 3, the children were divided into teams based on the table they sat at during homework time. These seats were not set according to a seating plan.

The game ran for 20-mins. As in previous chapters, Jessica followed the 11-step checklist (as seen in Appendix 16). The children had the opportunity to earn a maximum of 5 points throughout the CBGG. Jessica was prompted by the FitBit silently every 4 minutes to carry out a behaviour check. Behaviour check and point allocation procedures were as in Chapters 3 and 4. Daily points criteria ranged between 2 and 5 (40-100% of total possible points). If a team satisfied the game criteria (i.e., reached or exceeded the criteria) then they could choose a reward. The initial point criteria were set to 2. As in previous studies, the criterion was increased the

subsequent day when all teams successfully met the criteria and decreased following a day that no teams met the criteria.

5.2.9 Data Analysis

As previously mentioned, no data were collected from participants during the game rules design workshops. Observational data were collected in order to assess the effectiveness of the CBGG. The data from the withdrawal design were analysed as in Chapters 3 and 4, as per the guidelines provided by the WWC (2022). Tarlow's Tau (2016, 2017) was used to calculate an effect size and the percentage of nonoverlapping data was calculated to supplement the visual analysis.

5.3 Study 1 Results and Discussion

Figure 5.2 outlines the effect of the CBGG with co-designed game rules on helping, positive and encouraging social interaction and task engagement of the children in this study (Afterschool 3).

5.3.1 The Effect of the Caught Being Good Game with Co-Designed Rules of Group Behaviour

5.3.1.1 Helping

During the initial baseline phase, helping was low and relatively stable ($M = 8.33\%$, $SD = 0.65\%$, range = 7.5%-8.75%). Upon introduction of the co-designed behaviour game, helping increased immediately and substantially ($M = 24.25\%$, $SD = 1.43\%$, range = 23.75%-26.25%). When the co-designed behaviour game was withdrawn, helping returned to low levels, decreasing immediately and substantially ($M = 5.75\%$, $SD = 0.68\%$, range = 5%-6.25%). When the co-designed behaviour game was reintroduced, helping increased immediately and substantially once again and remained relatively stable throughout ($M = 22\%$, $SD = 1.68\%$, range = 21.25%-25%). Helping data throughout the four phases did not overlap (PND = 100%).

5.3.1.2 Positive and Encouraging Social Interaction

In the first baseline phase, positive and encouraging social interaction was low and relatively stable ($M = 9.79\%$, $SD = 2.0\%$, range = 6.25%-11.25%). Once the CBGG was introduced, positive and encouraging social interaction increased immediately and substantially ($M = 39\%$, $SD = 3.24\%$, range = 36.25%-42.5%). When withdrawing to baseline, again positive and encouraging social interaction was low, decreasing immediately and substantially ($M = 14\%$, $SD = 2.4\%$, range = 11.25%-13.75%). Upon reintroduction, the CBGG increased positive and encouraging social interaction again ($M = 48.25\%$, $SD = 1.68\%$, range = 46.25-47.5%). Positive and encouraging social interaction data did not overlap across baseline and intervention phases (PND = 100%).

5.3.1.3 Task Engagement

Task engagement was relatively low in the initial baseline phase ($M = 15.83\%$, $SD = 2.81\%$, range = 13.75-21.25%). Once CBGG was introduced, task engagement increased immediately and

substantially ($M = 61.25\%$, $SD = 6.43\%$, range = 52.5-70%). Though task engagement was variable in the initial intervention phase, no data points overlapped with the initial baseline phase. Once the co-designed behaviour game was withdrawn, task engagement decreased immediately and substantially ($M = 25.5\%$, $SD = 3.38\%$, range = 21.25-28.75%). In the final phase, when the CBGG was reintroduced, task engagement again increased immediately and substantially ($M = 63.75\%$, $SD = 2.65\%$, range = 60%-66.25%). Although variable, task engagement data across baseline and intervention phases did not overlap ($PND = 100\%$).

5.3.2 Effect Size

Tau scores were calculated for each phase change and can be seen in Table 5.2. Analysis indicated a baseline trend for Baseline 2 to Intervention 2 phase change for positive and encouraging social interaction and therefore the baseline corrected Tau was calculated. Effect sizes for all target behaviours were large to very large across each phase change (>0.6).

5.3.3 Social Validity

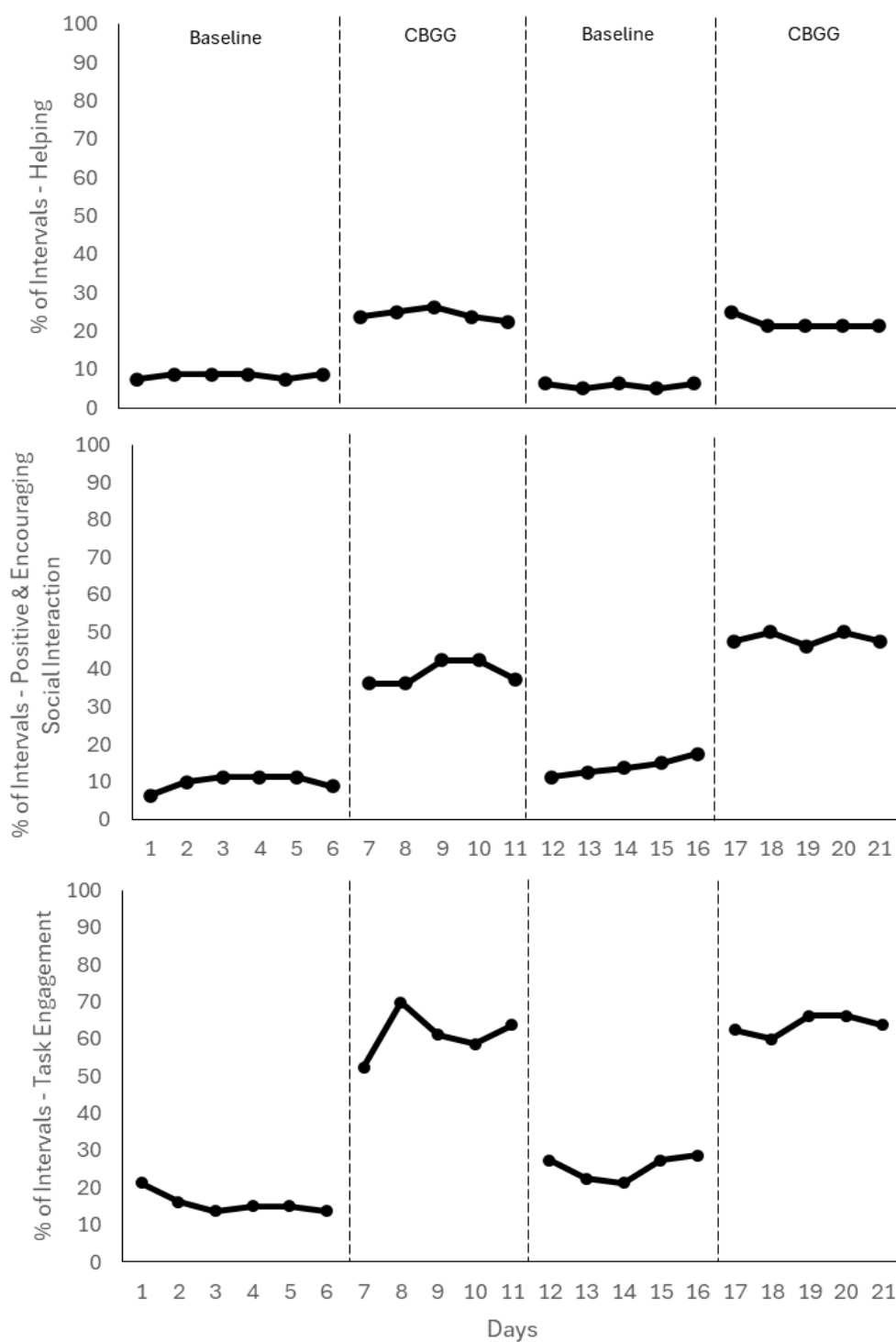
5.3.3.1 Leader Rating

As in Chapters 3 and 4, Jessica completed the BIRS (Elliot & Treuting, 1991) on the last day of data collection. Jessica gave the CBGG an overall total score of 127 out of a possible 144 ($M = 5.29$, range 4-6). For acceptability, Jessica rated the intervention a score of 80 out of 90 ($M = 5.33$, range 4-6). For effectiveness, a score of 36 out of 42 ($M = 5.14$, range 4-6). For time to effect, a score of 11 out of 12 ($M = 5.5$, range 5-6). The leader provided additional written feedback in which she stated, "It definitely benefited us by playing the game."

The leader was asked some additional questions about the co-design process in order to assist us in making modifications ahead of the full co-design study in Afterschool 4 if needed. These additional questions as well as the leader's responses are outlined in Table 5.3.

Figure 5.2

The Effect of the CBGG on Afterschool 3 Children's Behaviour



Note. The top panel presents the percentage of intervals in which helping occurred during baseline and CBGG phases. The middle panel presents the percentage of intervals in which positive and encouraging social interactions occurred during baseline and CBGG phases. The bottom panel presents the percentage of intervals in which task engagement occurred during baseline and CBGG phases.

Table 5.2*Tau Effect Sizes Afterschool 3*

Phase Change	Tau Effect Sizes		
	Helping	P & E Social Interaction	Task Engagement
Baseline 1 – Intervention 1	0.799	0.775	0.752
Baseline 2 – Intervention 2	0.845	0.801*	0.762

Key: P & E Social Interaction = Positive and Encouraging Social Interaction

*= Baseline Corrected Tau

Table 5.3*Additional Co-Design Questions for Afterschool 3 Social Validity Questionnaire*

Number	Question	Answer *
1	Adult leaders should be included in the design of the rules of the intervention.	6
2	The researcher should be included in the design of the rules of the intervention	6
3	The children should be included in the design of the rules of the intervention.	6
4	The co-design process used to create the game rules was fair.	5
5	The rules generated through the co-design process were fair.	5
6	The design team (children, adult leaders and researcher) worked well together.	6
7	The design team (children, adult leaders and researcher) provided equal input into the creation of intervention rules.	6

KEY: * = Answers were made on a Likert Scale with a score of 0 representing that the leader Strongly Disagreed with the statement and a score of 6 representing that the leader Strongly Agreed with the statement.

5.3.3.2 Child Ratings

Six children in the whole group completed the CIRP (Witt & Elliott, 1985) following completion of data collection. The mean score across the children was 6.33 (range 4-8) out of a highest possible score of 8. All children marked that they liked the game, that they liked participating in the game, that they thought the game was fair, and that they liked the rewards used. Children provided additional written feedback including “I like the prizes and I find it fun”, “It was very fun” and “I want to win”. The children were also asked two additional questions

relating to the co-design process. All children responded “Yes” to the question “Do you think the way we created the game rules together was fair?” and also to “Did you enjoy creating the game rules together?”.

The findings from this study, Afterschool 3, demonstrated that involving children in the co-design of the CBGG game rules through structured workshops can effectively increase helping behaviour, positive and encouraging social interactions, and task engagement. These results support the use of person-centred practices that incorporate children’s voices during intervention design, with both child and adult leader ratings indicating strong social validity and perceived fairness. However, while the pilot successfully engaged children in game rule development, their participation was limited to a single stage of the intervention process. This raises important questions about the potential impact of involvement throughout design and implementation of a group contingency intervention. To address this, Study 2 expanded on these findings by adopting a full cooperative inquiry framework, involving children and adult leaders throughout all stages of intervention development and evaluation.

5.4 Study 2 Introduction

Building upon Study 1, this study, conducted in Afterschool 4, expanded the scope of child participation by implementing the full cooperative inquiry framework. While Afterschool 3 piloted the “action” phase through co-design workshops focused on game rule development, Afterschool 4 engaged children and adult leaders throughout all four stages of cooperative inquiry - proposition, action, reaction, and reflection.

Afterschool 4 represents the first known study to adopt a full cooperative inquiry framework to co-design a behavioural intervention from start to finish. In this study, children and adult leaders participated in all four phases of cooperative inquiry to design, implement, and evaluate an interdependent group contingency intervention. This comprehensive model allowed for participant voices to shape not only the rules of the game, but also the target behaviours, reward structures, contingency types, and evaluation criteria. This study aimed to expand the field’s understanding of how cooperative inquiry methods can be embedded within behaviour analytic frameworks to promote both effectiveness and social validity.

5.4.1 Research Questions

1. How can a full cooperative inquiry framework be used to co-design a group contingency intervention with children and adult leaders?
2. What is the effect of a fully co-designed group contingency intervention on children’s helping, positive peer interaction, and task engagement?
3. How do children and adult leaders experience and evaluate their participation in the cooperative inquiry process and the co-designed intervention?

5.5 Study 2 Method

5.5.1 Ethical Considerations

This study was conducted in accordance with the ethical procedures outlined in Chapter 3. A separate application was made to DCU's Research Ethics Committee in this case given that the design of the study and the data collected differed slightly to the previous studies. The study received full ethical approval from Dublin City University's Research Ethics Committee (see Appendix 23). Several additional ethical considerations apply to this study which were not outlined in Chapter 3. Prior to data collection, participants received plain language statements (Appendices 24 and 26) or information sheets (Appendix 28) explaining the research purpose, procedures, data handling, and the right to withdraw at any time without consequence. Informed consent was obtained from parents (Appendix 25), adult leaders (Appendix 27), and informed assent from children (Appendix 29). Given the ongoing nature of the study, children's assent was actively monitored each day using a double-sided card system with the green side of the card indicating assent to participate that day, and red indicating a refusal.

Audio recordings were taken during the proposition and reflective focus groups to capture participant perspectives and were transcribed and pseudonymised before permanent deletion of the recordings. During the action phase workshops, children's worksheets were collected and analysed to inform intervention design. No video recordings were made. All personal information was anonymised to protect privacy. Data storage and retention was as outlined in Chapter 3.

5.5.2 Participants and Setting

The recruitment procedures for Afterschool 4 were identical to the procedures adopted in Afterschool 1-3. Please refer to Chapter 3 for further information relating to the afterschool services participating in these studies as well as the management structure and daily activities of the centres. Following a call out from the centre manager in centre 4, the two leaders in the younger group of children agreed to participate in and facilitate this study.

Kate and Tom (pseudonyms) were the adult leaders responsible for the younger group of children in the centre. Kate and Tom had been working as youth activity workers in the centre for 23 years and under a year, respectively. Although Kate and Tom had not used a group contingency intervention in the centre before, centre 3 also operated the star system in place across the other centres (see Chapter 3 for further detail).

All 12 children in the group were invited to participate in the research. Parental consent and child assent was received for 10 children (3 boys, 7 girls) with a mean age of 9.7 years (range 8-10 years). Throughout the course of the study, no participants withdrew. These participants were of White Irish descent (N=9) or mixed race (N=1). Although 10 children had parental consent

to take part, the number of children who actually participated in each stage and/or session of the study varied depending on attendance and whether attending children assented to participation on a given day. To ensure informed assent decisions, at the beginning of each day children were reminded of what data were being collected and what procedures were in place and then asked if they assented to participate. Only those who actively assented were included in that day's activities.

5.5.3 Design

For Afterschool 4, a complex multi-method design was adopted, combining a cooperative inquiry co-design framework with a single case experimental design (see Figure 5.3).

The four-stage process of the cooperative inquiry framework was followed (see procedure for further detail). Game development (encompassing Stages 1 and 2 of the cooperative inquiry framework) adopted a qualitative research design, using focus group and co-design methodologies. The implementation and evaluation of the game (Stages 3 and 4 of the cooperative inquiry framework) adopted a mixed-method approach, using both qualitative and quantitative methods. Reflexive focus groups and structured questionnaires were used to evaluate participant perceptions. A single case withdrawal design (Kazdin, 2020) was used to evaluate the effects of the game on children's behaviour.

5.5.4 Dependent Variables and Measurement

As in Study 1 (Afterschool 3), the dependent measures (helping, positive and encouraging peer interaction and task engagement) were chosen and operationally defined by the researchers based on the co-designed game rules. Operational definitions were discussed with and approved by the group leaders prior to the commencement of direct observation data collection.

Helping behaviours were defined as in Chapter 5 Study 1 (Afterschool 3). Again, for the purpose of data collection, behaviours that would be considered positive social interactions were not considered to be helping behaviours.

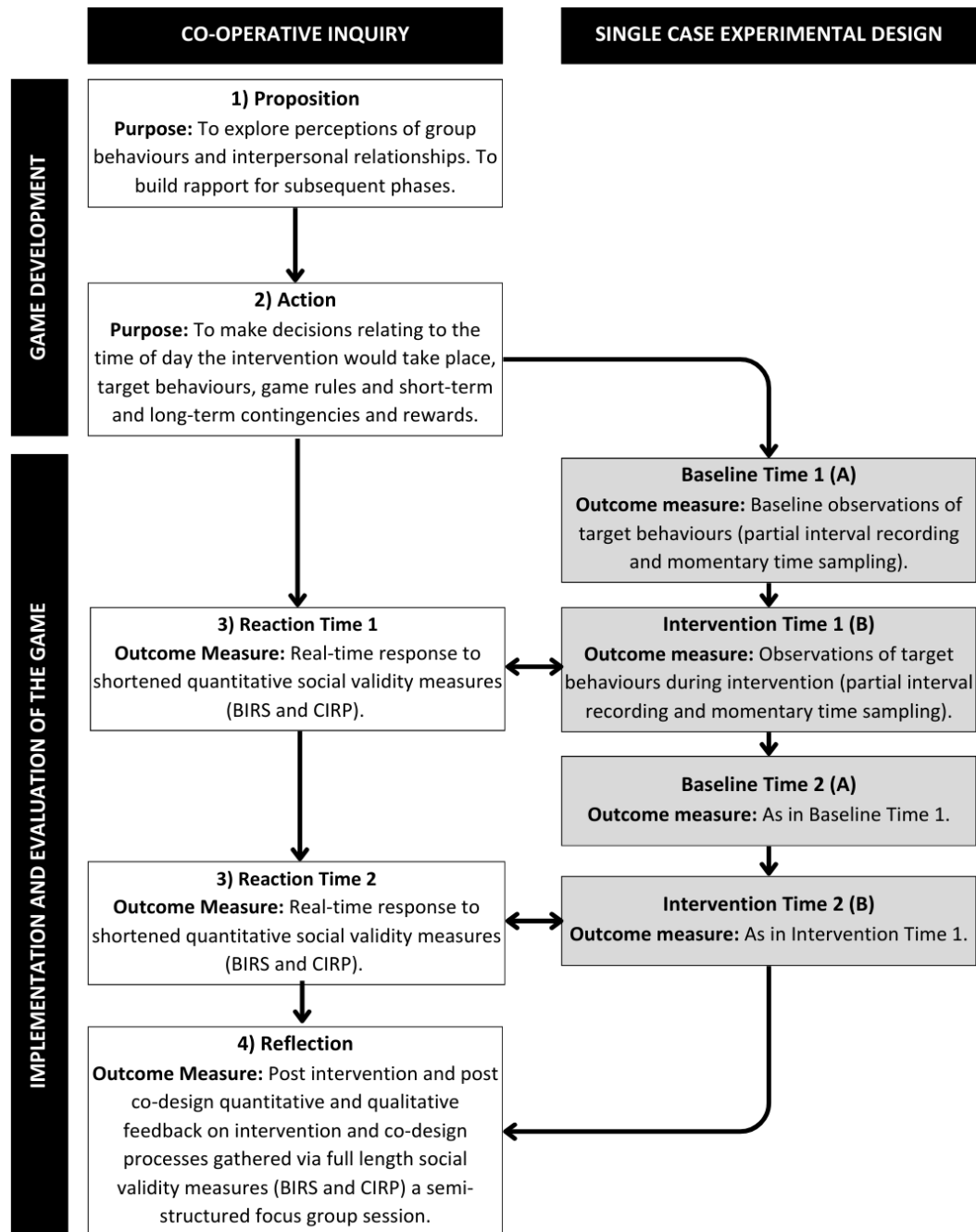
In this study, positive and encouraging peer interactions were selected as a dependent variable rather than positive and encouraging social interactions. Positive and encouraging peer interactions were defined as verbal and non-verbal behaviours which involved the interpersonal communication of a positive message aimed at providing support or motivation to a peer or expressing kindness. Positive social interactions could occur before, during or after an action by or interaction with a peer. Positive social interactions included verbal interactions such as positive words of encouragement for a peer, e.g., "You got this!", complimenting behaviours, praise or tootling, as well as non-verbal positive communication e.g., smiling at a peer, a thumbs up, a high five, clapping, or a pat on the back.

Task engagement was as defined in Chapter 5 Study 1.

Data collection procedures were determined by the research team and were the same as Afterschool 3 except that data collection sessions were only 10 minutes long in Afterschool 4 rather than 20 minutes long. The recording methods remained the same.

Figure 5.3

Afterschool 4 Study Phases Outline



5.5.4.1 Interobserver Agreement (IOA)

The second observer independently collected data with the PhD researcher across 45% of the observations. The second observer was an undergraduate psychology student who had been trained in observational methods. IOA data were calculated for 57% of baseline observations and 27% of intervention phases. Interval-by-interval agreement was used to calculate IOA. To obtain

an IOA percentage, the total number of agreements were divided by the overall number of intervals and multiplied by 100. Mean IOA was 95.5% for helping (range 85%-100%), 92.25% for positive and encouraging peer interaction (range 82.5%-97.5%) and 85.25% for task engagement (range 82.5%-90%).

5.5.5 Social Validity

Social validity measures were taken in both the reaction and reflection stages (see Figure 5.3). Children's social validity was assessed using the Children's Intervention Rating Profile (CIRP; Mitchell et al., 2015; Witt & Elliott, 1985). Kate and Tom's social validity was assessed using the Behaviour Intervention Rating Scale (BIRS; Elliot & Von Brock Treuting, 1991). The full length CIRP and BIRS were administered following the intervention (Appendices 17-18). Shortened versions of these measures were administered during the reaction phase and full versions administered during the reflection phase. The researchers included the following questions from the CIRP:

1. Did you like the game used during homework time?
2. Do you think the game has helped you do better?
3. Is there anything you like about the homework game?
4. Is there anything you would change about the homework game?

The researchers included the following questions from the BIRS:

1. This is an acceptable intervention for the children's target behaviours
2. The intervention proved effective in changing the children's target behaviours
3. The intervention did not result in negative side effects for children
4. The intervention would be appropriate intervention for a variety of children
5. Is there anything you like about the homework game?
6. Is there anything you would change about the homework game?

5.5.5.1 Reflective Focus Group

The reflective focus group was conducted to evaluate participants' experiences and perceptions of the co-designed group contingency intervention. All 10 participating children and both adult leaders attended the 20-minute session, which followed a semi-structured focus group schedule (see Appendix 30).

5.5.6 Procedure

5.5.6.1 Game Development

5.5.6.1.1 Stage 1: Proposition

The development of the co-designed group contingency was a two-stage process encompassing the proposition and action stages of the cooperative inquiry framework (see Figure 5.3). The primary aim of the proposition phase was to explore children and adult leaders'

perceptions of behaviour and interpersonal relationships within the group as well as aiming to build rapport. Six children and both adult leaders participated in a 35-minute semi-structured focus group. The interview schedule used to guide the focus group session can be found in the Appendix 31. The focus group data were recorded on the voice recorder app on an iPhone. Data were transcribed verbatim and analysed using content analysis method. Given that the primary aim of the study was to explore the effect of the co-designed behaviour game on children's behaviours, the current thesis does not focus on analysing the proposition focus group data in detail. These data were used to inform in subsequent co-design workshops. Key findings that informed the workshops included a) behaviours of concern were evident in the group; b) reward systems worked well for the children; and c) the children's behaviours were heavily influenced by their peers.

5.5.6.1.2 Stage 2: Action

The findings of the focus group informed the action phase of the cooperative inquiry framework (Stage 2). Aligned with a cooperative inquiry approach, in which children act as equal partners in a design process (Druin, 1999), in this study, the research team (the PhD researcher and a research intern in the School of Psychology, DCU) also participated in the game development processes, providing input throughout the design sessions and engaging with the daily materials. Similar to Study 1 in the current chapter, the action phase comprised a series of four one-hour design workshops which took place across one week (Monday-Thursday). Participants were informed that the aim of these workshops was to create a new behaviour game that would be used in the centre. The action stage involved the use of a variety of cooperative inquiry techniques including low-tech prototyping, mock-ups, stickies and technology immersion (see Table 5.4 for further detail). All children in attendance participated in the workshops as they were part of the daily activity in the centre, but, data were only collected from consented and assenting participants (i.e., 10 children and 2 adult leaders). The design process was iterative, with key boundaried decisions made in each session, gradually moving towards the final group contingency design. While it was predetermined that a group contingency intervention in the form of a game would be used, no specific group contingency type (dependent, interdependent, independent), short-term or long-term contingency, or target behaviours had been specified. The group were presented with features of empirically validated strategies for promoting positive behaviour however the decisions about the final design were made by the group. Key decisions made during the workshops therefore included 1) the time of day the intervention should take place, 2) potential target behaviours, 3) game rules, 4) type of group contingency, 5) short-term and long-term contingencies, and 6) rewards. Please see Table 5.4 for further details. Please see Appendices 22 and 32-36 for workshop materials.

The rewards were determined by a preference assessment carried out during the final design workshop. Preference assessment procedures were as outlined in the preceding chapters. The preference assessment identified small toys, mini footballs, key chains and sweet treats as highly rated rewards, all of which were used throughout the intervention phases of the study.

As previously described, a withdrawal design was used to explore the effect of the co-designed behaviour game on the observed behaviour of the children. Observed behaviour data collection took place during homework time from Monday-Thursday in the afterschool centre. Detailed baseline and intervention procedures are provided below.

5.5.6.2 Adult Leader Training

The PhD researcher carried out a 30-minute training session with both adult leaders after the co-design process. As the co-designed game was a reinforcement-based game, the training procedures were the same as in Chapter 3. The leaders were provided with the opportunity to ask any questions they had at the end of the session.

5.5.6.3 Baseline

Baseline procedures were as outlined in Chapters 3 and Study 1, Chapter 5. During baseline phases, the adult leaders used their usual disciplinary processes (e.g., verbal warnings or sending children to the project coordinator's office). On the final day of the initial baseline phase, the adult leaders wore their Fitbits and privately awarded points, unbeknownst to the children, in order to practice the intervention procedures.

Table 5.4*Key Aims and Outcomes of the Design Workshops in Afterschool 4*

Workshop	To Determine	Activities / Co-Design Techniques	Outcome
1	What time of the day should the group contingency take place?	Conceptual Inquiry: Group completed a worksheet outlining the daily schedule in the centre and the behaviours that occur throughout the day. Stickies: The group mapped the daily behaviours on a large group sheet on sticky notes. (Appendices 32-33)	The co-designed behaviour game would take place at Homework Time.
2	What behaviours could we increase/ decrease during this time of day?	Stickies: The group mapped the behaviours that occur at homework time on a group sheet. Green sticky notes represented behaviours that could be increased. Pink sticky notes represented behaviours that could be decreased. (Appendix 34)	A list of potential target behaviours, including, for example, shouting, being quiet, saying mean things, lying, distracting, reading, working, playing, being nice.
3	What rules should our group contingency have?	Low-tech Prototyping: The group all wrote ideas for game rules. All rules must be positively framed. Heatmapping: The group were each allocated three stickers to place on their preferred rules. Any rule without a sticker was removed. The group then placed a star sticker on their overall preferred rule. (Appendix 21)	Game Rules: 1. Listen to your Leaders 2. Speak nicely to and about others 3. Focus on your homework 4. Help each other 5. Start your Homework Immediately.
4	How can you 'win' our group contingency? What prizes should our group contingency have?	Technology Immersion: The researchers presented the possibility for the group contingency to the group. Including the various types of group contingency intervention, possibilities for short-term contingency (points vs fouls, open scoreboard vs secret points etc.,) and possibilities for long-term contingency (frequency of access to long-term rewards, criteria for accessing the reward etc.,). The group discussed these possibilities and then wrote their own ideas on individual worksheets. Prototyping: The group came together to make the final decisions on the game design. (Appendices 35-36)	The co-designed behaviour game was an interdependent group contingency where points would be allocated throughout the intervention, and a token would be provided to winning teams at the end of each intervention session. The tokens could be exchanged for a list of rewards. Please see the Co-Designed Behaviour Game section for further detail.

5.5.6.4 Co-Designed Behaviour Game

The intervention used was designed by the group during Stage 2) Action. Key decisions made by the group included 1) the time of day the intervention should take place, 2) potential target behaviours, 3) game rules, 4) type of group contingency, 5) short-term and long-term contingencies, and 6) rewards. Please refer to Table 5.4 for further detail on the game design process. The co-designed behaviour game was an interdependent group contingency similar to the Caught Being Good Game (CBGG; Barrish et al., 1969). The game took place during homework time in 'the homework room', a small room with 3 long tables. Children were divided into teams based on their assigned table. Teams could earn points throughout the game period if all members followed the game rules. At the end of the game period, children could earn a token if they met or exceeded the game's criteria. The tokens earned throughout the game could be exchanged for these rewards. Children had the option to exchange their tokens for rewards any time the game was played. Rewards varied in token value (i.e., sweet treat = 1 token, keyring = 3 tokens, small football = 10 tokens).

On the first day of the intervention phase, the adult leaders reminded the children that they would be playing the homework game that they had co-designed. They reminded the children that they would be divided into teams based on their table and reminded the children of the group rules. The game was played for 10-15 min. The game period varied as the leader sometimes was slightly delayed in carrying out the behaviour checks due to supporting children with homework or leaving the room etc.. However, the observation period remained consistent at 10 min a day. Daily point criteria for winning the game ranged between 3 and 6 (50-100% of total possible points). On the first day of the intervention phase the points criterion was set to 3. The criterion increased by one point in the subsequent day when all teams successfully met the criteria. The criterion was reduced by one point following a day that no teams met the criteria. The teams earned a point if all members of the team were following the game rules when the leaders performed a "behaviour check".

The leaders were responsible for carrying out the behaviour check for specific tables that they were responsible for. The leaders were prompted to carry out this behaviour check by a silent alarm on their Fitbit which went off once every 2 mins. It is important to note however, that sometimes the leader was delayed in allocating the points, as outlined above. If at the end of the 10-minute period, a team had met or exceeded the daily points criteria, they were each given one token. The tokens earned throughout the game could be exchanged for these rewards. Children had the option to exchange their tokens for rewards any time the game was played. Rewards varied in token value (i.e., sweet treat = 1 token, keyring = 3 tokens, small football = 10 tokens).

5.5.6.5 Treatment Integrity

The PhD researcher used the 11-step checklist (as in Chapter 3) to score procedural integrity during all intervention observations as a measurement of treatment integrity. Mean treatment integrity was 83.47% (range = 72.72%-100%). Steps 7 and 9 were the most commonly missed steps.

5.5.6.6 Social Validity

Social validity was assessed through both quantitative and qualitative methods during the Reaction and Reflection stages of the cooperative inquiry framework (see Figure 5.3). During the Reaction stage, a shortened version of the Children's Intervention Rating Profile (CIRP; Witt & Elliott, 1985; Mitchell et al., 2015) was administered to children, and a condensed Behaviour Intervention Rating Scale (BIRS; Elliott & Treuting, 1991) was completed by adult leaders. In the Reflection stage, full versions of the CIRP and BIRS (Appendices 17-18) were used to gather more comprehensive social validity data. A reflective semi-structured focus group (Appendix 24) was also used to evaluate the group's experience with the intervention and perception of behaviour change.

5.5.7 Data Analysis

5.5.7.1 Single Case Experimental Design

The single case experimental design data was analysed as in preceding chapters. Data analysis included following the WWC guidelines (2023), calculating a percentage of non-overlapping data and calculated Kendall's Tau (1962) using Tarlow's method (2016; 2017).

5.5.7.2 Reflective Focus Group

Prior to participation, individuals were reminded of their voluntary involvement and provided consent or assent. The recording app on an iPhone was used to record the discussion before being transferred and stored in Google Drive and transcribed. Once transferred to Google Drive, the recording was deleted from the iPhone and once transcribed, the recording was deleted from Google Drive. The research intern attended the focus group session and took notes throughout the session. Data were transcribed verbatim with all potentially identifiable participant data (e.g., name, location etc.,) anonymised.

Content analysis was used to examine the transcript, identifying commonalities and differences in participant responses. Specifically, the analysis focused on three key areas: the group's experience of the co-design process, their perception of the intervention's effectiveness, and any perceived changes in interpersonal relationships within the group.

5.6 Study 2 Results

5.6.1 The Effect of the Co-Designed Behaviour Game

Figure 5.4 depicts the effect of the co-designed behaviour game on helping, positive and encouraging peer interaction and task engagement.

5.6.1.1 Helping

During the initial baseline phase, helping was low and relatively stable ($M = 2.14\%$, $SD = 1.73\%$, range = 0%-5%). Upon introduction of the co-designed behaviour game, helping increased immediately and substantially ($M = 25\%$, $SD = 8.83\%$, range = 10%-32.5%). When the co-designed behaviour game was withdrawn, helping returned to low levels, decreasing immediately and substantially ($M = 2\%$, $SD = 2.09\%$, range = 0%-5%). When the co-designed behaviour game was reintroduced, helping increased immediately and substantially once again and remained relatively stable throughout ($M = 30.42\%$, $SD = 2.46\%$, range = 27.5%-35%). Helping data throughout the four phases did not overlap (PND = 100%).

5.6.1.2 Positive and Encouraging Peer Interaction

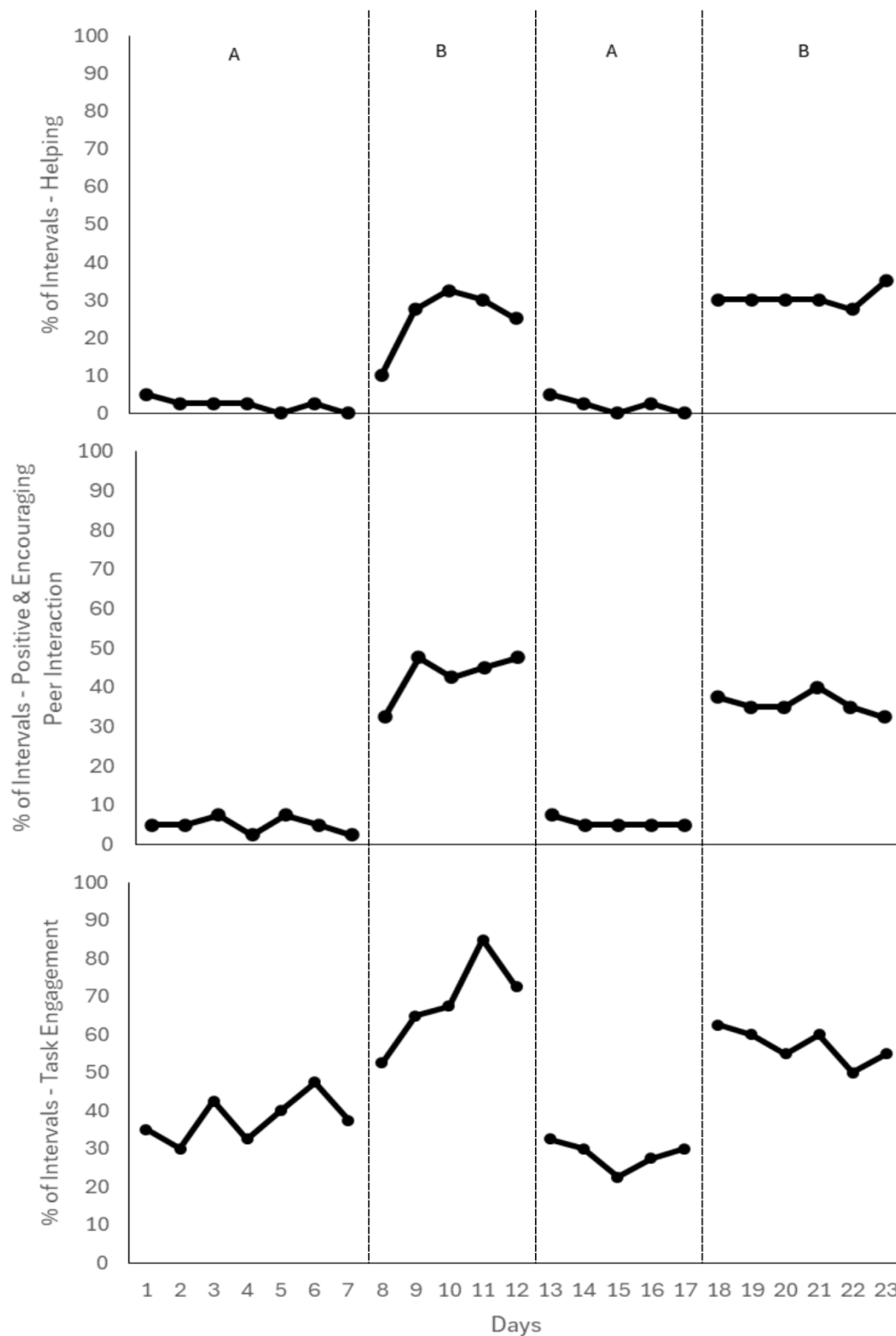
In the first baseline phase, positive and encouraging peer interaction was low and relatively stable ($M = 5\%$, $SD = 2.04\%$, range = 2.5%-7.5%). Once the co-designed behaviour game was introduced, positive and encouraging peer interaction increased immediately and substantially ($M = 43\%$, $SD = 6.22\%$, range = 32.5%-47.5%). When withdrawing to baseline, again positive and encouraging peer interaction was low, decreasing immediately and substantially ($M = 5.5\%$, $SD = 1.12\%$, range = 5%-7.5%). Upon reintroduction, the co-designed behaviour game increased positive and encouraging peer cooperation again ($M = 35.93\%$, $SD = 2.58\%$, range = 32.5%-40%). Although variable, positive and encouraging peer interaction data did not overlap across baseline and intervention phases (PND = 100%).

5.6.1.3 Task Engagement

Task engagement was relatively low in the initial baseline phase ($M = 37.86\%$, $SD = 6.02\%$, range = 30%-47.5%). Once the co-designed behaviour game was introduced, task engagement increased immediately and substantially ($M = 68.5\%$, $SD = 11.81\%$, range = 52.5%-72.5%). Though task engagement was variable in the initial baseline phase, no data points overlapped with the initial intervention phase. Once the co-designed behaviour game was withdrawn, task engagement decreased immediately and substantially ($M = 28.5\%$, $SD = 3.79\%$, range = 22.5%-32.5%). In the final phase, when the co-designed behaviour game was reintroduced, task engagement again increased immediately and substantially ($M = 57.03\%$, $SD = 4.59\%$, range = 50%-62.5%). Task engagement data across baseline and intervention phases did not overlap (PND = 100%).

Figure 5.4

The Effect of the Co-designed Group Contingency on Afterschool 4 Children's Behaviour



Note. The top panel presents the percentage of intervals in which helping occurred during baseline and CBGG phases. The middle panel presents the percentage of intervals in which positive and encouraging peer interactions occurred during baseline and CBGG phases. The bottom panel presents the percentage of intervals in which task engagement occurred during baseline and CBGG phases.

5.6.2 Effect Size

Tau scores were calculated for each phase change and can be seen in Table 5.5. Analyses indicated no baseline trend and therefore no Tau calculation required baseline correction. Effect sizes for all target behaviours were large to very large across each phase change (>0.6).

Table 5.5

Tau Effect Sizes Afterschool 4

Phase Change	Tau Effect Sizes		
	Helping	P & E Peer Interaction	Task Engagement
Baseline 1 - Intervention 1	0.770	0.764	0.728
Baseline 2 - Intervention 2	0.799	0.808	0.760

Key: P & E Peer Interaction = Positive and Encouraging Peer Interaction

5.6.3 Social Validity

5.6.3.1 Reaction Measures

5.6.3.1.1 Leader Ratings

Both adult leaders responded to the BIRS at time 1. At time 2, only one leader responded to the measure. Leader feedback was generally positive during the reaction phases. At time 1, the leaders gave the co-designed behaviour game a mean overall total score of 21 out of a total possible score of 24 ($M = 5.25$, range = 5-6). The leaders provided additional open-ended feedback including that they believed it was a “very clear reward system”. At time 2, one leader responded to the shortened BIRS. The leader gave the co-designed behaviour game a total score of 24 out of 24. The leader stated that the “small reward means a lot to [the children]”. They suggested that they might like to trial an independent group contingency rather than an interdependent group contingency (“children to be graded individually”).

5.6.3.1.2 Child Ratings

Shortened versions of the CIRP (Mitchell et al., 2015; Witt & Elliott, 1985) were administered to the children at the end of each intervention (B) phase. Reaction data were gathered from 10 children at time 1 and 8 children at time 2. At time 1, the mean score across the 10 children was 1.8 out of a highest possible score of 2. All children marked that they liked the game used during homework time. Most children said they felt the game helped them do better during homework time (80%) and that they would not change anything about the game (90%). At time 2, the mean score across the 8 children was 1.4 out of a total possible score of 2. All children marked that they liked the game used during homework time. Most children said that they felt the game helped them do better during homework time (75%) and that they would not change

anything about the game (75%). When asked what they like about the game, children said that they like “everything”, “the prizes” and the “tokens”.

5.6.3.2 Post-Intervention Reflective Measures

5.6.3.2.1 Leader Rating

Kate and Tom completed the full-length version of the BIRS once data collection was complete. Kate gave the intervention a total score of 93 out of a total possible score of 144 (M=3.87, range 2-6). For acceptability, they rated the intervention a score of 69 out of 90 (M=4.6, range 3-6). For effectiveness, a score of 16 out of 42 (M=2.3, range 2-4). For time to effect, a score of 8 out of 12 (M=4, range 4-4). This leader provided additional written feedback in which they stated, “Because it's a group effort and one group always loses, it can become unmotivating for the good behaved ones in the group.”

Tom gave the intervention a total score of 106 out of a total possible score of 144 (M=4.1, range 2-6). For acceptability, they rated the intervention a score of 77 out of 90 (M=5.1, range 3-6). For effectiveness, a score of 24 out of 42 (M=3.4, range 2-5). For time to effect, a score of 5 out of 12 (M=2.5, range 2-3). This leader provided additional written feedback in which they stated, “some children didn't have interest to care” and they “Didn't think it was fair for the children who worked hard to miss out on rewards”.

5.6.3.2.2 Child Ratings

Seven children completed the full-length version of the CIRP upon completion of the SCED. The mean score across the seven children was 7.14 out of a total possible score of 8. All children marked that they liked the game, that they liked participating in the game, that they felt other children would enjoy the game, that they enjoyed the rewards and that they felt the game was fair. Most children felt that the game did not cause any problems for them (85.7%) or others (85.7%) and that the game helped them do better during homework time (71.4%). To explore their perceptions of the co-design process the children were also asked “Did you like working together to make the homework game?”, to which five of the seven children (71.4%) responded “Yes”.

5.6.3.3 Reflective Focus Group Findings

5.6.3.3.1 Engagement with the Intervention

Participants expressed mixed reactions to the Homework Game, with some showing enthusiasm while others appeared less engaged. A key motivator for engagement was the reinforcement, with several children highlighting the appeal of receiving rewards. One child stated, “Cause you get sweets,” while another simply said, “Sweeties.” Other rewards, such as toys, were also mentioned, with one child noting, “Bouncy balls,” and another adding, “A Pop-It.”

However, not all participants found the rewards appealing, with one stating, “I’d rather money. I’d put it in my pocket, let’s go to the shops.”

5.6.3.3.2 Behavioural Impact

Children and leaders reported noticeable behavioural changes associated with participation in the Homework Game. Some children described improved behaviour, with one stating, “No messing and no sitting on the table,” while another noted a reduction in inappropriate language, “[less] bad language.” Leaders also observed shifts in engagement and conduct. One leader commented, “Some people who would have never been interested... tried to work,” while another agreed, saying, “Yep, and worked better with the big group.”

The children’s responses to questions about teamwork and peer interaction were mixed. When asked whether they worked better together than usual, one child responded, “Probably yeah.” However, when asked if they got along better as a result of the game, the group collectively responded, “The same.” Discussions around shouting also reflected differing perceptions, with one child noting, “Less shouting,” while another remarked, “Shouting’s annoying.”

5.6.3.3.3 Co-Design Process

Children expressed appreciation for their involvement in designing the game. When asked whether it was important for them to have a say in the process, the group unanimously responded, “Yeah.” They also enjoyed collaborating on the design, with one child affirming, “Yeah,” when asked if they liked working together to create the game. Specific aspects of the design process were highlighted as enjoyable, with one child recalling, “Yeah, the sticky notes,” and another stating, “I liked making the rules.”

5.6.3.3.4 Suggestions for Improvement

Participants offered several suggestions for improving the Homework Game. In discussing the points system, one child suggested, “Change them to two a day,” while another noted, “Three is too many?” Some children proposed structural changes to the game’s format, with one suggesting, “Put all the boys in one room and all the girls in the other room.” This idea received support from others, with one group agreeing, “Yeah, they’d like it,” and another adding, “Yeah, my class would.”

Leaders also reflected on possible adjustments to the game’s format. One leader suggested that it “might have worked better” if children played individually rather than in groups and indicated that they planned to continue experimenting with this approach. This suggestion highlights an interest in refining the game’s structure to better suit different group dynamics and individual learning styles.

5.7 General Discussion

The studies presented in this chapter explored how participatory, co-design methods can be used to develop and evaluate a group contingency intervention that is both effective and socially valid for at-risk children attending community afterschool services. Study 1 Afterschool 3 involved the piloting of co-design methods for intervention design with the children attending the centre by collaboratively designing the game rules, moving towards including children as equal design partners in behaviour intervention design. Building on these findings, Study 2 (Afterschool 4) followed a comprehensive cooperative inquiry framework to co-develop a group contingency intervention. The importance of community-based, participatory research has long been established (Fawcett, 1991), yet this is the first-known study to adopt a co-design framework in designing a group contingency intervention. The findings provide evidence supporting the use of co-design for developing interventions which are effective in bringing about behaviour change but also enhance the engagement, perceived fairness and overall social validity of the interventions.

Importantly, this work aligns with and extends current calls for more person-centred practices in behaviour analysis (Petronelli & Ferguson, 2022; Rajaraman et al., 2022), specifically emphasising the compatibility and complementarity of co-design with trauma-informed care principles. Given the vulnerability of the participating children, many of whom experience or are at risk of adverse childhood experiences, these participatory approaches represent not only novel models for using co-design in behaviour analysis but also ethical imperatives to create interventions that promote safety, empowerment, and trust.

5.7.1 Piloting Co-Design Methods in Afterschool 3

In Study 1 (Afterschool 3) children participated in structured workshops to co-create game rules. Although their involvement was limited to this aspect of the intervention, they demonstrated high levels of engagement and responsiveness to the programme. The CBGG was effective in increasing all three target behaviours in Study 1 of this chapter - helping, positive and encouraging social interaction and task engagement. These findings were aligned with previous research which also found the CBGG to be effective at increasing similar target behaviours (e.g., Helping/sharing, Dillenburger & Coyle, 2019; Positive Social Interactions, Sewell, 2020; Task Engagement, Bohan & Smyth, 2022). Previous research has suggested that when children are involved in setting rules, they are more likely to follow them (e.g., Alter & Haydon, 2017). Similarly, research has suggested that when individuals are involved in creating intervention strategies from development to implementation, they are more likely to feel invested, leading to higher motivation and adherence (Pirenen, 2016).

In Study 1 presented in this chapter, children and adult leaders rated the intervention highly, in particular, reporting that they enjoyed the co-design process and felt the rules were fair.

This is supported by previous research that highlighted the role of collaboration in improving implementation fidelity and satisfaction (Sivola, 2023).

5.7.2 Designing a Group Contingency using a Cooperative Inquiry Framework in Afterschool 4

Building on the success of Afterschool 3 (Study 1), Study 2 involved the application of a cooperative inquiry framework to co-develop a group contingency intervention with the children and adult leaders in the centre. By doing so, the group's participation was extended across all stages of intervention development. Children and adult leaders were invited to contribute to the identification of target behaviours via the design of game rules, game format, contingency type and rewards. Cooperative inquiry has previously been used to develop mental health interventions (Bearman et al., 2020), positive technologies (Yarosh & Schuleler, 2017) and science activities (Gillies et al., 2014) with children. However, to the extent of our knowledge, no previous research has used cooperative inquiry to develop a group contingency intervention. Cooperative inquiry, in the case of Afterschool 4, was successfully adopted to design a interdependent group contingency intervention which was effective at increasing all three target behaviours - helping, positive and social peer interaction and task-engagement. These findings provide further evidence for the use of group contingency interventions for targeting PSBs (Brennan et al., 2024) and academic behaviours (e.g., Bohan & Smyth, 2022). However, it could be argued that the co-design process, in which the participants are required to work together to meet a common goal, may itself impact the children's behaviour. Although the target behaviours are decided as part of the co-design process, future research should seek to explore the impact of co-design processes on behaviour change, perhaps through more qualitative accounts of behaviour change or through scale or questionnaire measurements of behaviour.

As a method specifically designed for working with children (Druin, 1999), the cooperative inquiry framework was considered the most appropriate co-design method in this case. However, future research should explore the use of other co-design methods for the development of behaviour interventions with other cohorts, for example Design Thinking (Micheli et al., 2019), experience-based co-design (Hawke et al., 2024) or value sensitive design (Davis & Nathan, 2015).

5.7.3 Exploring the Social Validity of Co-Designed Group Contingency Interventions

Social validity findings across both studies presented in this chapter highlighted that co-design methods can produce socially valid interventions. In Afterschool 3 (Study 1), high child and adult ratings across measures such as the Children's Intervention Rating Profile (CIRP; Witt & Elliott, 1985) and Behaviour Intervention Rating Scale (BIRS; Elliott & Treuting, 1991) reflected strong acceptability, perceived effectiveness, and procedural clarity. These findings are aligned with the view that co-design methods may enhance buy-in from users (Ramos et al., 2020) and

ensure that the interventions align with individuals' needs and preferences (Snodgrass et al., 2018).

In Afterschool 4 (Study 2), although children's ratings of the co-designed behaviour game remained positive, adult feedback was more complex. In the case of Afterschool 4, social validity measures were gathered throughout the intervention to ensure we were maintaining an intervention that was considered socially valid. However, although the feedback gathered throughout the intervention was positive, the feedback at the end of the intervention was more mixed. During the reaction phases, when shortened versions of the BIRS (Elliott & Treuting, 1991) were administered, leaders responded positively to the intervention. However, during the reflective phase, when leaders completed the full-length BIRS (Elliott & Treuting, 1991), their responses were less positive. Leaders raised some concerns about the motivational effects of team-based rewards and highlighted that some children remained disengaged.

Future studies may seek to gather even more frequent measures of social validity throughout an intervention, in particular when co-designing. Perhaps daily check-ins could provide a simple, time-effective measure of ensuring that all users are satisfied with the final product of the co-design and if not, amending the approach.

5.7.3.1 Insights from the Reflective Focus Group

The post-intervention, reflective focus group in Study 2 (Afterschool 4) added a valuable layer of understanding of social validity, extending beyond what was captured by the structured rating scales. Children described their enjoyment of the game and their pride in contributing to its design. They also suggested modifications to the structure, such as changing how points were earned or how teams were formed. These insights support previous findings that children are capable of critically evaluating their experiences and offering constructive suggestions (Salmon et al., 2021).

Some children reported increased cooperation during the game, although others felt that interpersonal relationships remained unchanged. This mixed response suggests that while co-designed interventions may improve specific behaviours, broader social dynamics may require additional support (Farmer et al., 2018). Adult leaders shared similar feelings, observing that while many children were motivated, a few remained indifferent. These reflections align with calls for behaviour support models that are adaptive to individual needs and reinforcement preferences (Baer et al., 1968).

Focus group findings strengthened the observational and social validity questionnaire data, confirming positive behaviour change trends while also highlighting areas for improvement. They reinforced the value of mixed-method evaluation designs, which integrate behavioural outcomes with qualitative data to provide a more holistic picture of impact. It is important however, to note that the feedback received from adult leaders and children in this study were

limited to the specific questions that they were asked, whether in quantitative social validity measures or qualitative focus group sessions. Feedback received from this cohort, while relevant to this cohort for this co-designed behaviour game, may not be relevant to other cohorts. Future research should strive to include social validity measures throughout intervention design and delivery, including participants where possible to ensure relevance for the particular cohort they are working with. Researchers might develop co-evaluation tools that empower children to assess and modify interventions in real-time, further extending the participatory design into the evaluation phase. With a growing recognition of the importance of accounts of qualitative impacts of behavioural research, future research should seek to, as aligned in this study, collect mixed-methods social validity evaluations.

5.7.4 Implications of a Person-Centred Approach to Designing Behaviour Analytic Interventions

The findings of the studies presented in this chapter offer support for person-centred approaches in behaviour analysis, in particular when working with children at risk of ACEs. All participating children in the two studies had been referred to the community-based afterschool programmes due to social, emotional, or familial challenges. For these populations, feeling heard and valued is not simply an ethical concern but is essential for meaningful engagement (Franchino-Olsen et al., 2025).

Behaviour analysts are tasked with designing interventions that are meaningful, relevant and responsive to the unique needs of the individuals they work with (Baer et al., 1968). Co-design frameworks provide opportunities for voice, agency and collaboration, fostering partnerships that empower participants and involve them in all aspects of the intervention rather than positioning them only as recipients of the intervention. Research has suggested these approaches can lead to better, more successful innovations, higher satisfaction of users, improved decision making and faster development (Antonini, 2021; Steen et al., 2011).

Embedding participatory methods like co-design into behaviour analytic practice aligns with trauma-informed (Austin et al., 2024; Rajaraman et al., 2022) principles. Trauma-informed care advocates for recognising the widespread impact of trauma and actively seeks to create environments that promote safety, trust and empowerment (SAMHSA, 2014). These approaches emphasise an understanding of individual differences and a rejection of a one-size-fits-all approach (Staszowski, 2018). Integrating trauma-informed principles into behaviour analytic interventions means that strategies are designed “with” and not just “for” the key stakeholders. Currently, applied behaviour analysis would benefit from clearer guidelines for the implementation of co-design approaches systematically as well as a suite of resources to support these practices. Future research may seek to compare co-design across environments (community, clinical and educational environments) as well as exploring the effects of co-design

approaches on collaboration and critical thinking skills. Moreover, given that the co-design processes were not experimentally controlled in either study presented in this chapter, future research may seek to do so. Arguably, the co-design process itself provides adult leaders with a vessel for teaching and promoting PSBs, regardless of the aim of the output behaviour intervention. Future research should seek to explore behaviour change due to co-design processes alone.

5.7.5 Conclusion

The studies conducted in Afterschool 3 and 4 demonstrate that participatory, co-design methods can effectively enhance both the efficacy and social validity of group contingency interventions for at-risk children in community afterschool settings. The cooperative inquiry framework, in particular, proved to be a valuable method for extending participation across all stages of intervention development, resulting in interventions that were not only effective at increasing target behaviours but also responsive to the unique needs and preferences of participants.

Beyond effectiveness, these findings demonstrate a model that could be used for more person-centred and trauma-informed practices within applied behaviour analysis. By empowering children to co-create interventions, practitioners can uphold core trauma-informed care principles of safety, trust, collaboration and empowerment (SAMHSA, 2014). Embedding participatory methods like co-design empowers individuals, particularly those facing social and emotional challenges, to have a meaningful voice in interventions that affect them. Ultimately, participatory co-design not only enhances intervention outcomes but also aligns with ethical responsibilities to respect and value the lived experiences of those served.

Chapter 6: Discussion

The development of prosocial behaviour (PSB) during childhood is an important determinant of long-term emotional wellbeing (Flynn et al., 2015), academic success (Lum et al., 2017) and greater peer relationships (Lee, 2016). Although considerable research highlights the importance of nurturing these behaviours early (Wagaman, 2011), intervention efforts have traditionally focused on reducing antisocial behaviours (ASBs), such as disruption and aggression (Maggin et al., 2012). This prioritisation often results in punitive or punishment-based responses, even for children who may be considered vulnerable (Pokorski et al., 2021). As noted in Chapters 1 and 2, researchers have demonstrated the potential for group contingencies to support positive and long-term behaviour change (e.g., Embry, 2002; Troncoso & Humphrey, 2021). However, existing studies predominantly target disruptive or ASBs and rarely embed trauma-informed or person-centred principles (Austin et al., 2024; Rajaraman et al., 2022). Behavioural interventions in afterschool or out-of-school contexts also remain under-researched, despite their potential to support marginalised children during high-risk hours of the day (Kremer et al., 2014).

A systematic synthesis of the group contingency literature, exploring the use of group contingencies for targeting PSB and ASB in school settings, revealed several critical limitations. Firstly, there is a significant imbalance in the types of behaviours targeted, with most of the included studies targeting ASB rather than prosocial interaction (Yeung et al., 2016). Secondly, the majority of interventions adopted punishment procedures in the short-term contingency of the group contingency intervention (e.g., Maggin et al., 2012). Thirdly, none of the reviewed studies met the WWC (2020) standards for single-case experimental design without reservations.

The present thesis addressed the limitations of the literature outlined in Chapter 2 by applying a trauma-informed, person-centred, and participatory lens to the design and delivery of group contingency interventions for children at risk of ACEs. Across four community-based afterschool programmes, single-case experimental designs were used to evaluate the effectiveness and acceptability of both standard and co-designed versions of the Caught Being Good Game (CBGG; Wright & McCurdy, 2012). These interventions focused on reinforcing PSB (e.g., helping, encouragement, and cooperation) and some (Chapter 5) were developed in collaboration with children and staff to reflect shared values and contextual realities. This work represents the first known application of trauma-informed, co-designed group contingencies in afterschool programmes serving children exposed to adversity. It contributes to a continuously evolving body of literature within ABA that prioritises ethical and context-sensitive practices (Rajaraman et al., 2022) and demonstrates that collaborative intervention design can produce effective and socially valid behaviour change interventions. The key aims of the empirical chapters of this thesis are summarised below.

The systematic review presented in Chapter 2 synthesised and evaluated the findings of 22 eligible studies. The review was the first known review to synthesise the literature exploring the use of group contingencies for target PSBs and ASBs of children in school settings. In typical behaviour analytic synthesis, studies not meeting WWC Design standards (2022) are excluded from the review (e.g., Maggin, Johnson, et al., 2012; Maggin et al., 2017). However, by including studies not meeting design standards, as we did in Chapter 2, we can identify common quality shortcomings of such research providing guidance for researchers and practitioners in the area.

The findings of the Chapter 2 review highlighted several gaps in the literature which provided a basis for further empirical research outlined throughout this thesis. Firstly, there was a clear overrepresentation of studies focusing on reducing ASBs with far fewer targeting the promotion of PSBs, despite calls in the literature for such a shift (Yeung et al., 2016). Additionally, although ethical and moral concerns surrounding the use of punishment techniques in behaviour management have been posed (Cooper et al., 2020), many group contingency interventions still adopt punishment (whether positive or negative) in the short-term contingency. Dissecting a group contingency by the short-term and long-term contingencies allows us to explore the behaviour change mechanisms at play within group contingency interventions more accurately, enhancing the clarity and understanding of the mechanisms throughout the intervention. Finally, the review highlights the lack of high-quality literature in the area with none of the cases in any of the included studies meeting WWC (2020) design standards without reservations. Chapter 2 identified several gaps which were then addressed in subsequent empirical chapters including conducting high-quality research, meeting WWC design standards (2020), adopting purely reinforcement-based contingencies and contributing to the literature exploring the use of group contingencies targeting PSBs.

Chapter 3 reported the findings of the first empirical study (Afterschool 1), in which the CBGG was implemented in a community-based afterschool programme supporting at-risk children. The study employed a withdrawal design and demonstrated clear increases in three PSBs (Encouragement, Peer Cooperation, and Leader Cooperation) of both the group of children and an individual target child. Though participating children rated the CBGG highly, adult leader social validity ratings were mixed, highlighting the need to focus on designing socially valid interventions.

Chapter 4 outlined the findings of the second empirical study (Afterschool 2), which in addition to exploring the use of the CBGG for targeting PSBs also explored the usability and feasibility of DBR as a tool for adult leaders to assess behaviour change. Similarly to findings from Afterschool 1, the CBGG was also found to be effective with this cohort of children. The CBGG was effective in increasing helping and encouragement of the whole group and of one target child. After a brief training session, adult leader DBR were aligned with the researcher's direct

observations of behaviour collected using partial interval recording. Both the children and adult leader rated the CBGG highly on social validity measures. The study marked a shift toward involving practitioners more actively in the intervention process and in increasing their awareness and understanding of behavioural change.

Chapter 5 presented the findings from two studies which examined the development and implementation of a group contingency intervention in two community-based afterschool programmes. In Afterschool 3 (Study 1), the "action" phase of a cooperative inquiry model was piloted to explore how children might be engaged in the collaborative development of intervention rules. In Afterschool 4 (Study 2), a full cooperative inquiry framework was implemented, involving children throughout all stages of the intervention design and evaluation process. In Study 1, the CBGG with co-designed game rules, led to increases in children's helping, positive and encouraging social interaction and task engagement. Children and adult leaders rated the intervention highly. In Study 2, the fully co-designed group contingency produced increases in helping, positive and encouraging peer interactions and task engagement. While children in Study 2 rated the co-designed group contingency highly, adult leaders' feedback was mixed. Adult leaders in Study 2 may have perceived lower social validity due to differing interpretations of meaningful behaviour change. Perhaps including a leader measurement such as DBR as used in Afterschool 2 (Chapter 4) would enhance the leaders' social validity.

Please refer to Table 6.1 for an overview of how each of the thesis aims was addressed.

6.1 Synthesis of Key Findings

6.1.1 Exploring the use of Group Contingencies Beyond the School Context

A significant contribution of this thesis lies in its extension of the use of group contingencies to afterschool settings, particularly with populations who may be at increased risk of ACEs. Typically, behaviour analytic interventions have been conducted in structured school environments focused on curriculum delivery and classroom management (Maggin et al., 2012). However, afterschool programmes offer a unique and underexplored context for supporting children's social, emotional, and behavioural development (Frazier et al., 2020). These settings often serve children who have experienced ACEs (McDaniel & Yarbrough, 2016; Taheri & Welsh, 2015) and therefore require interventions that are not only effective but also trauma-informed.

Table 6.1*Overview of Thesis Aims and Corresponding Chapters in which Aims were Addressed*

Thesis Aim	Chapter(s) Addressed	Summary of How Aim was Addressed
Synthesise existing literature on group contingency interventions for promoting PSBs and reducing ASBs in school settings.	Chapter 2	Conducted a systematic review of 22 studies using group contingencies with children. Identified a predominance of interventions targeting ASBs, with limited high-quality evidence on PSBs. Critically appraised intervention designs and highlighted a need for reinforcement-based, ethically aligned approaches.
Evaluate the effectiveness and acceptability of the CBGG in afterschool settings, particularly for children at risk of ACEs.	Chapters 3-5	Across four empirical studies, the CBGG and its co-designed variants consistently increased PSBs such as helping, encouragement, and task engagement. Effect sizes were large to very large. Acceptability was assessed using CIRP and BIRS, with children rating the intervention highly and adult leader responses varying by level of engagement.
Explore the role of co-design in designing group contingency interventions through input from children and adult leaders.	Chapter 5	Co-design and cooperative inquiry methods were piloted and implemented in Afterschool 3 and 4 respectively. These participatory processes enhanced social validity and procedural fit.
Contribute to evidence on behaviour support strategies in community-based, charity-run afterschool services.	Chapters 3-5	Conducted research in four urban, community-based, charity-run afterschool centres. Demonstrated feasibility and adaptability of the CBGG within settings that lacked formal curricula or behaviour support infrastructure.

This thesis contributes new insights by demonstrating how group contingency interventions can be designed and implemented in these flexible, afterschool environments in ways that are sensitive to the lived experiences of vulnerable children. Through the integration of trauma-informed principles such as promoting safety, trust, predictability and collaboration, the interventions presented throughout this thesis not only prioritise behavioural outcomes but also children's voice. In doing so, the thesis aligns with calls for trauma-informed approaches to behaviour analytic interventions (Austin et al., 2024; Rajaraman et al., 2022).

Afterschool settings differ from schools in terms of structure, staffing, and purpose (Fukkink & Boogaard, 2020). They prioritise social and emotional learning over academic performance and often rely on staff without formal behaviour management training (Frazier et al., 2019). These features present both challenges and opportunities for behaviour intervention.

The lack of structure can complicate the consistency of behaviour management (Frazier et al., 2019), yet it also provides a more naturalistic environment in which to observe and support the development of PSBs (Smith et al., 2017). This provides an informal environment which provides an opportunity to build trusting relationships, foster psychological safety and model emotion regulation strategies, key principles of trauma-informed care (SAMHSA, 2014). Interventions like the CBGG must therefore be adaptable, easy to implement, and sensitive to the evolving needs of children and staff in these dynamic contexts (Farrell et al., 2013). The studies presented throughout this thesis prioritised the safety and trust of participants by focusing on strengths-based interventions (i.e., targeting PSBs rather than ASBs) with a high degree of input sought from participants and designed activities mindful of the potential for past traumatic experiences in their lives.

Furthermore, the role and profile of adult leaders in afterschool settings differs substantially from that of teachers (Hwang et al., 2020). Afterschool leaders often have less formal training in pedagogy or behaviour management and may be volunteers or youth workers from the local community (Hwang et al., 2020). While this can present a barrier to implementing more complex interventions, it also provides a valuable opportunity to design accessible, socially valid, and person-centred strategies. The current thesis demonstrates that with appropriate support, such as DBR training and co-design processes, afterschool leaders can play a vital role in facilitating effective behaviour change and evaluating intervention success.

By demonstrating the feasibility and effectiveness of group contingency interventions in non-school environments, this research provides a model for extending behaviour change interventions to community-based settings where resources may be limited but the need for positive behavioural support is substantial. Moreover, the use of trauma-informed, participatory methods in these contexts holds promise for exploring new models of trauma-informed behaviour analysis which allows us to design interventions that the most vulnerable children have access to while ensuring they are both effective and affirming.

6.1.2 Effectiveness of the Caught Being Good Game in Increasing Prosocial Behaviour

Across the empirical studies presented in Chapters 3-5, the CBGG and co-designed equivalents, demonstrated a capacity to increase PSBs of children attending four community-based afterschool centres in an urban area of Dublin. Across all studies, data were collected from a total of 43 children and five adult leaders. The CBGG (Wright & McCurdy, 2012) is a group contingency intervention using positive reinforcement in both the short-term and long-term contingencies. Throughout this thesis it was effective at increasing the following behaviours - Encouragement, Peer Cooperation, Leader Cooperation, Helping, Positive and Encouraging Peer Interaction, Positive and Encouraging Social Interaction and Task Engagement. Across all studies,

visual analysis of the ABAB withdrawal design revealed consistent improvements in PSBs during intervention phases, with immediate reductions in behaviour observed upon withdrawal of the intervention. These patterns support a functional relation between the intervention and behaviour change. Effect sizes (Tarlow, 2016, 2017) ranged from 0.658 to 0.898 across phase changes, indicating large to very large effects for all targeted behaviours in all empirical studies.

Notably, effects were observed at both group and individual levels. In Chapter 3, Lauren's behaviour was observed alongside the whole group and in Chapter 4 Ben's behaviour was observed alongside the whole group. The CBGG was considered effective at increasing Lauren and Ben's PSB again producing effect sizes (Tarlow 2016, 2017) that would be considered large to very large. These findings contribute to an expanding body of literature supporting the utility reinforcement-based group contingencies (Bohan & Smyth, 2022; Groves & Austin, 2019). Notably, this thesis demonstrated the first known applications of the CBGG to afterschool settings serving ethnically diverse children at risk of ACEs.

Given the inherent cooperative nature of the CBGG, the intervention provides a natural way to encourage cooperative and PSBs between children. The studies presented throughout this thesis did not measure communication between and within teams of children throughout the intervention phases. Future research may seek to explore teammate reprimands and praise and compare their frequency in the reinforcement-only CBGG and the GBG which incorporates punishments.

Critically, this thesis advances the field beyond existing studies by directly addressing several gaps identified in the systematic review of the literature (see Chapter 2). First, whereas the review found that the vast majority of group contingency interventions targeted reductions in antisocial behaviour and frequently incorporated punishment-based elements (Yeung et al., 2016), the present studies focused exclusively on the promotion of PSBs through reinforcement-only strategies. This aligns with ethical imperatives in behaviour analysis to minimise punishment and promote strengths-based practice (Cooper et al., 2020). It is important, however, that we note the limitation in the lack of data presented on these disruptive or ASBs. Though the studies presented in this thesis provide evidence for the CBGG and co-designed equivalents for promoting PSBs, no inferences can be made about their effects on disruptive or ASBs. Future research should seek to explore the effect of these methods for targeting both PSBs and ASBs simultaneously, particularly by using DRA.

Importantly, many of the studies reviewed in Chapter 2 were limited by insufficient design quality, with none meeting WWC (2020) standards for single-case designs without reservations. In contrast, the current thesis employed rigorous ABAB withdrawal designs, clearly operationalised target behaviours, independent data collection, and regular assessment of interobserver agreement. This methodological robustness strengthens the internal validity of findings and

directly responds to concerns about the standards of prior group contingency research (Maggin et al., 2012). Chapter 3 presented the findings of six experiments, three of which meet WWC Design Standards (2022) without reservations (Whole Group Behaviours) and Lauren's experiments which meet design standards with reservations (though they met design standards 4.1 (2020), the current standards at the time of conducting the study, without reservations). Chapter 4 presented the findings of four experiments, all of which meet design standards without reservations. Finally, Chapter 5 presented the findings of six experiments across two studies, all of which meet design standards without reservations.

Finally, this thesis represents the first known application of the CBGG in afterschool programmes serving children with elevated risk due to ACEs. By situating the intervention in real-world, non-classroom environments, it extends the ecological validity and relevance of group contingency research, providing a foundation for future work in out-of-school care and other community-based settings.

6.2 Social Validity Findings

Social validity was a central focus in the design, implementation, and evaluation of all studies in this thesis. Consistent with the foundational dimensions of applied behaviour analysis outlined by Baer, Wolf, and Risley (1968), the studies in this thesis not only measured behavioural change but prioritised the acceptability, relevance, and contextual fit of the interventions for both children and adult leaders. This reflects broader shifts in the field which emphasise the need for interventions to align with stakeholder values, protect individual dignity, and promote collaborative engagement (Volmer & Pendergrass, 2025).

In total, 30 children across four centres completed the Children's Intervention Rating Profile (CIRP; Witt & Elliott, 1985). Ratings were consistently high (mean range: 5.5–7.2), indicating that the Caught Being Good Game (CBGG) and its co-designed variants were perceived as fun, fair, and helpful by the children themselves. This is particularly noteworthy given that child feedback is not always included in studies adopting single case research designs (Snodgrass et al., 2018). By emphasising the perspectives of children, those most affected by the interventions, this research contributes to a growing commitment within behaviour analysis to adopt person-centred approaches (Fernández-Mateos et al., 2022).

Adult leaders' ratings, captured through the BIRS, were more mixed. The mean total score on the final administered BIRS across the 5 adult leaders was 108 out of a total possible score of 144 (range 93 - 127). Notably, the highest scores were recorded in Chapter 4 (120/144) and Chapter 5 Study 1 (127/144), both of which involved leaders in participatory processes, behaviour measurement through DBR in the former, and co-design workshops in the latter. This pattern supports the notion that involvement in intervention development or evaluation enhances perceived relevance and effectiveness, a claim also supported in the wider literature on person-

centred practice and collaborative intervention design (Fernández-Mateos et al., 2022; Rajaraman et al., 2022).

In two chapters, social validity was collected at multiple timepoints allowing for a more dynamic interpretation of acceptability. In Chapter 4, social validity was measured before and after the DBR training session. In Chapter 5 Study 2, shortened social validity measures were administered during the reaction phase at two time points. For Chapter 4, before DBR training the leader gave the intervention a score of 118 out of a total possible score of 144. Her score then increased to a score of 120 out of a total possible score of 144 suggesting that an increased understanding and awareness of behaviour change may positively impact social validity.

However, in the case of Afterschool 4, at reaction timepoint 1 the leaders gave the intervention a mean total score of 21 out of a possible total of 24. At reaction timepoint 2, one leader responded and gave the intervention a score of 24 out of a total possible score of 24. These scores in the reflective phase then reduced to 93 and 106 out of a total possible score of 144. Discrepancies between initial impressions and reflective assessments suggested that social validity should be treated as an evolving construct, sensitive to time, context, and perspective (Vollmer & Pendergrass, 2025). These findings align with Friman's (2021) Circumstances View, which posits that behaviour is a product of environmental contexts rather than inherent traits. Recognising that stakeholders' perceptions are influenced by their circumstances underscores the importance of creating supportive environments that facilitate positive experiences with interventions. This perspective reinforces the need for ongoing engagement and adaptation to maintain high social validity.

In conclusion, these findings underscore the importance of conceptualising social validity not as a one-off post hoc measurement but as a core evaluative dimension of behaviour analysis research. The variability in adult leader responses illustrates that social validity is sensitive to a number of factors which may include role clarity, training, implementation fidelity, and contextual stressors. Meanwhile, the consistently high ratings from children reaffirm the potential of co-designed, strengths-based group contingencies to resonate with those they are designed to serve.

6.2.1 Adult Leader Participation in Intervention Design

The empirical studies outlined in this thesis demonstrated an evolving and expanding role for adult leaders in the behavioural intervention process, a concept also noted by previous researchers (Donaldson & Austin, 2017; Donaldson et al., 2018). In Afterschool 1 and 2, adult leaders played an important role in the identification of target participants, offering insights based on their ongoing interactions with children and their understanding of their individual behavioural profiles. This was particularly valuable in identifying children like Lauren and Ben, whose participation provided data on individual responses to these interventions. Additionally, in these

studies, adult leaders contributed to the selection of target behaviours, helping ensure that the behaviours addressed were contextually relevant and aligned with the social goals of the afterschool programmes.

This involvement is consistent with participatory approaches, which typically find that educators and practitioners are more likely to adopt and sustain evidence-based practices when they perceive the intervention as relevant to their context and when they see their own experiences and expertise reflected in the output (Ehrhert et al., 2022). Practitioners' "buy-in" is not just about compliance with the intervention but about meaningful engagement, which enhances fidelity and outcomes (Walton et al., 2017). The empirical chapters presented in this thesis support this by demonstrating how adult leaders' active roles in participant selection and behavioural targeting lead to higher social validity ratings. Without experimental manipulation however, we cannot provide evidence of this relationship. Future research may wish to do so.

The role of adult leaders expanded further in Afterschool 2 through the integration of DBR. By training leaders to systematically observe, record, and reflect on PSBs, they became active evaluators of the intervention's impact. This active involvement promoted greater awareness of behavioural trends and subtle improvements that may otherwise have gone unnoticed. This approach aligns with growing calls in the behavioural literature to empower community practitioners as collaborators in research and data collection (Chafouleas et al., 2021; Gondek et al., 2017).

In Chapter 5, the role of adult leaders evolved from contributors (as in Chapters 3 and 4) to co-designers. In Study 1 Chapter 5, leaders supported children in generating and refining the rules of the CBGG, ensuring that relevance and appropriateness to the setting were maintained. This shared decision-making process enhanced procedural fidelity and buy-in. In Study 2 Chapter 5, the cooperative inquiry framework formalised adult participation in all phases of intervention design, including the identification of behaviours, design of game rules, design of game structure and reinforcement type.

Together, these practices reflect a broader philosophical alignment with the original principles articulated by Baer, Wolf, and Risley (1968), who argued that behaviour analytic interventions must be socially important, contextually appropriate, and meaningful to the individuals involved. However, this approach advances the field by operationalising these principles through participatory and co-design methodologies, areas only recently beginning to gain traction in behaviour analysis (e.g., Rojas, 2023; Schwartz, 2025). The integration of adult leaders throughout the research process ensured that the interventions were not only functional but also experienced as relevant by all stakeholders. Moreover, the trauma-informed lens adopted throughout the studies in this thesis ensured the studies were designed to be aware of and reduce the risk of distress of not only the child participants, but also the adult leaders working

in these centres, many of whom are impacted by similar experiences to the children they work with.

6.2.2 Children's Participation in Intervention Design

The importance of community research, which recognises how an individual's community and context provide a basis for learning and development (Fawcett, 2021), has long been established (Fawcett, 1991). Though participatory, person-centred approaches such as co-design have been recognised as promising avenues for increasing buy-in and relevance for participants (Ehrhert et al., 2022), no previous research has explored children's ability to co-design behaviour interventions. Children's active participation in intervention design emerged as a defining strength of the thesis and represents a progressive step beyond traditional behaviour analytic approaches, where children's involvement in an intervention is often simply as a recipient (Snodgrass et al., 2018). In Chapter 5 Study 1, children participated in a series of structured workshops to collaboratively develop the game rules for the CBGG. This process provided the first opportunity for direct involvement of children in designing behavioural contingencies, serving as a pilot for the more comprehensive participatory work undertaken in Chapter 5 Study 2. The feedback and success of Chapter 5 Study 1 informed the development of a full cooperative inquiry framework in Chapter 5 Study 2. Cooperative inquiry is a participatory design methodology that positions children as partners in research and design, engaging them across all stages from conceptualisation to evaluation (Druin, 1999; Gillies et al., 2014). This methodology aligns with calls within behaviour analysis to recognise children's "expertise by experience" and to move towards ethically sound, inclusive intervention development (e.g., Donaldson et al., 2018). By working alongside adult leaders, children co-identified target behaviours, selected contingency structures, and chose reinforcement systems, resulting in interventions that were contextually relevant and personally meaningful.

The active involvement of children in both interventions was linked to high levels of behavioural responsiveness and consistently strong social validity ratings. Children not only reported enjoying the game but also expressed pride in contributing to its design and offered constructive suggestions for improvement. This supports findings from broader participatory research, which suggest that involvement in design enhances engagement, motivation, and self-efficacy, particularly in vulnerable or marginalised populations (Franchino-Olsen et al., 2025). By validating children's perspectives, the studies outlined in Chapter 5 avoided a "one-size-fits-all" approach and instead reflected the lived realities of the participants. It is important to note, however, that without experimental manipulation, we can only hypothesise that active participation improves social validity. Future research should seek to further explore this potential relationship.

The field of behaviour analysis increasingly acknowledges the importance of child participation to improve outcomes and intervention acceptability (Antonini, 2021; Kumpulainen et al., 2014). However, this thesis extends beyond the methods described in much of the existing behavioural literature by operationalising a formal cooperative inquiry framework, demonstrating its feasibility and benefit in afterschool settings for at-risk children.

Future research should continue to explore and refine participatory frameworks such as cooperative inquiry, design thinking, and experience-based co-design. These methods hold promise for establishing relational safety and trust, which are essential when working with vulnerable populations, and they align strongly with ethical imperatives for empowerment and inclusion (Franchino-Olsen et al., 2025). Specific avenues for future inquiry might include comparative studies of participatory methods in behaviour analysis, investigations into the mechanisms by which participation enhances intervention outcomes, and research examining how these approaches can be adapted for children with additional needs. Embedding child participation at the core of behavioural intervention design represents both an ethical advance and a practical strategy for improving intervention effectiveness and sustainability.

6.3 Trauma-Informed Behaviour Change

The findings outlined in this thesis align with the growing call for trauma-informed approaches in behaviour analysis (Austin et al., 2024; Rajaraman et al., 2022) by focusing on a population of children who were referred to these community-based afterschool programmes due to experiences of or suspected experiences of ACEs. SAMHSA (2014) outline six key principles of trauma-informed care – 1) Safety, 2) Trustworthiness and Transparency, 3) Peer Support, 4) Collaboration and Mutuality, 5) Empowerment, Voice and Choice and 6) Cultural, Historical, and Gender Issues. Table 6.2 provides examples of how the current thesis aligns with these six principles.

Recent literature underscores the critical importance of tailoring behaviour analytic interventions to acknowledge and accommodate the impact of trauma on learning and behaviour (Downey et al., 2022). Biglan et al. (2017) articulate the importance of creating nurturing environments, settings that not only reduce exposure to toxic conditions such as threat, neglect, and inconsistent reinforcement but also actively promote PSB and psychological wellbeing. Consistent with this, the interventions outlined throughout this thesis prioritised psychological safety and agency by embedding participatory design processes, offering choice and voice to children and adult leaders alike (see Table 6.2 for further detail).

Importantly, this thesis presents novel applications of trauma-informed practice in behaviour analysis by embedding trauma-informed values in all phases of intervention design, implementation, and evaluation. The use of co-design and cooperative inquiry provided children with meaningful opportunities to shape the behavioural expectations and contingencies applied

to them, ensuring that interventions were developmentally appropriate, socially valid, and contextually responsive. Such practices also align closely with inclusive education (Rajaraman et al., 2022), which focuses on more collaborative, person-centred approaches.

Although data on ACEs history were not collected due to ethical considerations, the study settings and referral criteria provide a strong contextual basis for assuming that participants were part of a vulnerable cohort. The consistently positive outcomes, both in terms of behavioural change and social validity, suggest that trauma-informed, participatory behaviour analysis holds significant promise for supporting children who may be considered at-risk.

Table 6.2*The Thesis Alignment with Principles of Trauma-Informed Care*

Principle of Trauma-Informed Care	Application in the Current Thesis
Safety	• Careful consideration of ethical concerns relating to the vulnerability of the group and ensuring participant anonymity. • Used predictable routines through structured group contingencies. • Used reinforcement-based contingencies over punitive contingencies. • Consistent positive behaviour expectations reduced ambiguity and supported emotional security.
Trustworthiness and Transparency	• Children and staff aware of the intervention's purpose and mechanism. • Behavioural expectations were clear. • Utility of adult leader DBR allowed for transparency in monitoring of behaviour change. • Co-design ensured open communication and transparency around behavioural goals and consequences.
Peer Support	• Interdependent group contingency encouraged teamwork and cooperation. Delivery of long-term reinforcement was dependent on group effort. • Behaviours targeted included PSBs such as helping, encouragement, cooperation and positive social interactions.

**Collaboration and
Mutuality**

- Adult leaders' insights sought in choosing target participants, target behaviours and game rules.
- Children worked together to satisfy game requirements for reinforcement.
- Cooperative inquiry methodology involved both children and adult leaders as co-designers

**Empowerment, Voice
and Choice**

- Rewards chosen via preference assessments.
- Ongoing assent collected with no negative implications for not participating.
- Social validity measures collected from children and adult leaders in each study.
- Children chose target behaviours, reinforcement types, and game rules.
- Children and adult leader's feedback in co-design informed iterative changes to intervention design.

**Cultural, Historical,
and Gender Issues**

- Interventions were contextually tailored to reflect the participating community and their environment.
- Awareness and respect for cultural diversity of children in Afterschool 1 outlined in Chapter 3.
- Adult leaders from local backgrounds supported culturally relevant delivery

6.4 Contributions to Theory and Practice

The research presented throughout this thesis makes several theoretical and practical contributions to the literature. At the theoretical level, it extends current understandings of group contingency interventions by distinguishing between short-term and long-term behavioural contingencies (see Chapter 2). This dissection draws attention to how some interventions incorporate punitive short-term elements (e.g., fouls) while still being classified as reinforcement-based due to the positive reinforcement generally used in the long-term contingency. By clarifying this distinction, the thesis contributes to a more precise conceptualisation of group contingencies and challenges the assumption that such interventions are universally "positive." It offers a novel framework for assessing the ethical and functional dimensions of behaviour change strategies, supporting a shift toward purely reinforcement-based approaches (Cooper et al., 2020; Bohan & Smyth, 2023; Wright & McCurdy, 2012). This contributes to the growing literature supporting the use of positive reinforcement-based behaviour strategies, adopting preventive and strengths-based approaches, especially when working with vulnerable populations (Fontenot et al., 2019; Rajaraman et al., 2022).

The research also offers theoretical insights into the integration of trauma-informed principles within ABA. By operationalising core trauma-informed values such as safety, choice, and empowerment in intervention procedures, this work contributes to the growing body of literature advocating for ethically grounded, person-centred practices in behaviour analysis (Rajaraman et al., 2022). The CBGG focuses on a strengths-based, protective approach rather than a deficit-based approach (such as a procedure adopting punishment) which could put vulnerable populations at increased risk of distress or re-traumatisation (Fontenot et al., 2019). These findings highlight the importance of adapting behavioural interventions to meet the unique needs of vulnerable populations and underscore the potential for trauma-informed approaches to enhance both the effectiveness and acceptability of ABA practices.

The importance of a participatory approach is heightened when working with vulnerable populations, such as children with experience of ACEs (Hales et al., 2023). These individuals may have experienced environments in which control, autonomy, and safety were compromised (Wang et al., 2018). As such, behaviour analytic interventions must not only be effective but affirming, respectful, and empowering (Baer et al., 1968). Embedding social validity checks and participatory mechanisms throughout intervention development is one way to ensure that interventions are not imposed but co-created.

In terms of research practice, this thesis explores novel applications of participatory approaches to the design of socially valid behaviour interventions. The use of co-design as both a methodological and philosophical stance contributes to theoretical discourse surrounding social validity and participatory behaviour analysis. This thesis advances the argument that social validity

should not be reduced to post hoc assessment (Snodgrass et al., 2018) but embedded throughout the intervention process via meaningful involvement of service users. Children's active involvement in shaping intervention goals, procedures, and evaluation not only affirms their agency and voice but also enhances the contextual fit of such interventions. Moreover, the use of DBR in conjunction with co-design offers a novel perspective on behavioural assessment tools. This approach reframes data collection not as an external, researcher-driven activity but as a collaborative, reflective practice that engages relevant stakeholders in the evaluation process. From a practical perspective, the thesis provides robust evidence for the feasibility of DBR as a method for capturing behaviour change in naturalistic, low-resource environments. Training and supporting adult leaders to collect and interpret behavioural data enabled ongoing reflection, improved social validity, and enhanced intervention sustainability. In addition, the thesis offers detailed examples of how to implement co-design processes in ABA, particularly when working with children. It outlines structured workshops, cooperative inquiry methods, and iterative feedback cycles that can be adapted to other community or educational contexts. These practical strategies demonstrate that co-design is not only possible but beneficial, even in under-resourced environments.

The thesis also highlights the ecological and temporal dimensions of social validity. Findings indicate that participants' in-the-moment reactions can differ from their retrospective reflections (Chapter 5), underlining the need for real-time, continuous social validity measurement. This insight calls for new tools and methodologies that better capture evolving participant perspectives.

Practically, the research provides concrete, transferable frameworks for implementing reinforcement-based interventions in low-resource, informal educational settings. It offers guidance for the structuring of co-design workshops, supporting adult leaders to collect behavioural data, and maintaining intervention fidelity in real-world environments. These practical contributions are especially valuable for professionals working in afterschool and community programmes where formal training and behaviour support infrastructure may be variable.

6.5 Person-Centred Approaches and the Role of Social Validity

Central to this thesis is the adoption of a person-centred approach, which positioned participants as active contributors to the design, implementation, and evaluation of behaviour supports. A person-centred approach recognises that behaviour change strategies must be aligned with the values, experiences, and goals of the people they are intended to support (Santana et al., 2017). In applied behaviour analysis, this ethos is embedded within the concept of social validity (Wolf, 1978).

To maintain a person-centred approach to designing socially valid interventions, an iterative model is proposed for integrating social validity across the development, implementation, and evaluation phases of behavioural intervention. During the development phase, it is essential to engage stakeholders, particularly those with lived experience, in the co-design of behavioural goals and procedures. This can be achieved through structured activities such as participatory workshops or cooperative inquiry. Throughout the implementation phase, ongoing feedback mechanisms, including direct behaviour ratings and regular informal check-ins, can help ensure that the intervention remains acceptable and procedurally clear. Finally, in the evaluation phase, reflective and summative measures should be incorporated to provide a deeper understanding of the intervention's perceived effects and to identify areas for improvement. This iterative model affirms the ethical obligation to ensure that interventions are not only technically sound but socially meaningful (Baer, Wolf & Risley, 1968), ensuring that their practices are responsive to the complex needs of diverse populations.

6.6 Opportunities for Further Research

While the findings of this thesis provide important insights into the design and delivery of socially valid, trauma-informed interventions in afterschool settings, several limitations also point to key opportunities for future research. These limitations do not detract from the value of the studies, but instead highlight areas for refinement and deeper exploration. The limitations and recommendations outlined in this section relate to the thesis more broadly. Limitations and opportunities arising from individual studies are presented in the discussion section of each chapter.

The interventions reported here focused exclusively on PSBs. While this emphasis aligns with a strengths-based approach (Mottron, 2017), the exclusion of ASB data limited the capacity to examine whether increases in PSBs were associated with corresponding reductions in disruptive or harmful behaviours. Future research should consider the integration of PSB and ASB measures to evaluate the broader impact of group contingencies.

Due to ethical constraints, no direct data were collected on participants' experiences of ACEs. While the referral pathways and afterschool settings strongly suggest that the participants were a vulnerable population, it is important to acknowledge that measuring ACE exposure in childhood carries different methodological and ethical considerations than retrospective adult self-report, which is more common in ACEs research. Retrospective measures rely on adult reflection and memory, whereas assessing trauma exposure during childhood involves sensitive, potentially distressing disclosures that require robust safeguarding protocols. Future research may benefit from the careful and ethically sensitive inclusion of trauma exposure indicators, such as teacher or caregiver observations or anonymous screening tools, where appropriate. This would allow for more nuanced analyses of how trauma history interacts with intervention

responsiveness and social validity. Importantly, trauma-informed care also recognises that staff too may have experienced trauma, and practices that offer them voice, support, and collaboration can, for them, foster a safe and responsive intervention environment.

The short duration of the interventions also presents a limitation. Without longitudinal follow-up, it is not possible to determine whether the observed behaviour changes were maintained over time or generalised to other settings. While ~~R~~research has provided some evidence for the longitudinal effects of the GBG for disruptive behaviours (e.g., Troncoso et al., 2024; Wilcox et al., 2022), ~~several gaps remain in the literature in regard to longitudinal explorations of group contingency interventions.~~ Future research should seek to explore the longitudinal effects of the CBGG or GBG on PSBs and should also seek to collect behavioural data, as presented throughout this thesis, through direct behaviour observation and not using scale measures. Additionally, longitudinal studies are needed to assess the sustainability of interventions developed through co-design and implemented with DBR. Such research could explore whether continued stakeholder involvement supports intervention fidelity, social validity, and behavioural maintenance. While the incorporation of DBR as a participatory assessment method was a strength, there remains the possibility of rater bias, even with structured training. Future work should explore strategies to further enhance the reliability of DBR in applied settings, such as peer-assisted rating, video-based calibration, or the use of mixed-method approaches to triangulate findings.

The social validity data collected in these studies also revealed an interesting divergence between immediate, in-the-moment reactions and more reflective evaluations. For example, the adult leaders in Afterschool 4 often rated the co-designed intervention positively during the intervention but retrospective measures revealed more nuanced or mixed perspectives. This suggests that social validity is not only dynamic but context-dependent and can shift as participants gain distance from an intervention or reflect more critically on its outcomes. This divergence aligns with research in psychology and education suggesting that retrospective evaluations are often shaped by cognitive biases (e.g., memory-experience gap; Gloster et al., 2017) and may not fully capture participants' lived, moment-to-moment experiences (Leertouwer et al., 2022). Momentary assessments, on the other hand, offer greater ecological validity by capturing reactions as they naturally occur in context (Stone et al., 2023). Yet, social validity within behaviour analysis is predominantly measured through retrospective self-report tools (e.g., post-intervention questionnaires or interviews), which may not account for fluctuations in perceived acceptability, feasibility, or effectiveness across time and settings (e.g., Hochman et al., 2015; Kellems et al., 2016). The studies outlined in the current thesis aimed to address the gap in high-quality group contingency literature targeting PSBs. The criteria set by the WWC (2022) provides useful markers for ensuring the validity and reliability of our intervention design,

however, may not reflect the flexibility that is often required in practice. Practitioners may also use methods such as daily intervention preference assessments with the children they work with to ensure social validity, though an everchanging intervention type would not meet WWC Design Standards (2022). Alternatively, as an additional measure of social validity, researchers may seek to collect and analyse data on the ongoing consent procedures adopted in Chapter 5 of this thesis by analysing the proportion of children providing assent on a given day from the day's attendance.

Future research should therefore explore the development of real-time or near-time co-evaluation tools (e.g., digital prompts, ecological momentary assessment) that allow participants, both children and staff, to continuously reflect on and shape interventions as they unfold. These methods may enhance the sensitivity and accuracy of social validity data while aligning with participatory and trauma-informed values of voice, agency, and responsiveness. Future research should explore the potential role of adult leader involvement in enhancing procedural fidelity, maintenance and generalisation of intervention effects.

Additionally, future research should seek to explore the variables that may influence adult leader implementation of the CBGG and the relationship between these variables and social validity. Factors such as time, emotional wellbeing, staffing and personal traumas of the adults running these interventions should be explored. Future researchers should aim to explore the relationship between perceived ease of intervention delivery and social validity ratings.

More generally, studies should aim to broaden the demographic and contextual scope of research in this area. The interventions were conducted in four community-based afterschool programmes serving children from particular socio-economic and cultural contexts. Expanding this work to include diverse geographic regions, age groups, and community settings will support greater generalisability and inform culturally responsive practices.

6.7 Conclusion

This thesis has outlined a comprehensive exploration of how group contingency interventions can be designed and implemented in a manner that is collaborative, socially valid, and contextually appropriate for children attending community-based afterschool settings. By shifting from traditional researcher-driven models of behaviour intervention, this research illustrates the value of engaging both children and adult leaders in the co-creation of behaviour support strategies. The journey undertaken through this research has highlighted the importance of designing with, not for, those who are most affected by behavioural interventions. In doing so, it has placed a particular emphasis on the voices and experiences of children, especially those at risk due to adverse childhood experiences, as well as on the pivotal role that adult leaders play in supporting, modelling, and evaluating behaviour change.

One of the most significant learnings from this work is the power of participatory methods such as co-design, cooperative inquiry, and DBR to enhance both the efficacy and the ethical grounding of applied behaviour analysis. These methods not only produced measurable improvements in PSB but also fostered a sense of ownership, fairness, and engagement among participants. They offered a practical framework for implementing person-centred (Petronelli & Ferguson, 2022) and trauma-informed (Austin et al., 2024) practices in under-resourced, real-world environments.

The research underscores the importance and relevance of aligning practice with the original foundations of ABA, as articulated by Baer, Wolf, and Risley (1968), who called for interventions to be effective, generalisable, and, above all, socially important. Social validity has been positioned as a key component of the current thesis, guiding the selection of goals, shaping procedures, and informing the evaluation of outcomes. This approach reflects an evolving understanding of the field's ethical responsibilities and methodological possibilities.

Ultimately, this thesis contributes to the growing body of literature which advocates for collaborative, inclusive and person-centred approaches to behaviour support (Austin et al., 2024; Rajaraman et al, 2022; Rojas, 2023; Schwartz, 2025). The thesis outlines practical examples of how stakeholder voice, particularly children and community afterschool service staff, can be meaningfully incorporated into multiple elements of behaviour change planning and evaluation. By embedding participatory methods throughout intervention design, implementation, and evaluation, the studies demonstrate how such approaches can enhance both the effectiveness and social relevance of behavioural interventions. In doing so, the thesis highlights the potential for participatory practices to support interventions that are closely aligned with the values and needs of those they are designed for.

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Appendix 1: Search Strategy for Systematic Review

Below outlined are the search terms that were used for each of the 5 databases used in the Systematic review "Exploring the use of Group Contingencies in Targeting Prosocial Behaviours of School Aged Children".

PsycInfo and Education Research Complete

(TX "Class group*" OR "School group*" OR "Whole class" OR student* OR pupil* OR "primary school*" OR "junior school*" OR "elementary school*" OR "resource unit*" OR "resource class*" OR "special school*" OR "classroom*" OR "high school*" OR "secondary school*" OR "middle school*" OR "school*" OR "education") AND (TX "Pro social" OR prosocial* OR teamwork* OR encourag* OR friend* OR inclus* OR peer OR cooperat* OR help* OR comfort* OR altruism OR "turn taking" OR waiting OR share OR sharing OR tootling OR praise OR "peer interaction*" OR "social behaviour*" OR "social behavior*" OR "social skills" OR accountability OR teasing OR aggress* OR "peer pressure" OR "negative interaction*" OR bully* OR mock* OR tattling OR "anti social" OR antisocial OR "disruptive behaviour*" OR "disruptive behavior*") AND (TX "Group contingenc*" OR "group-oriented contingenc*" OR "group oriented contingenc*")

ERIC (Automatically searches "All fields + Text")

("Class group*" OR "School group*" OR "Whole class" OR student* OR pupil* OR "primary school*" OR "junior school*" OR "elementary school*" OR "resource unit*" OR "resource class*" OR "special school*" OR "classroom*" OR "high school*" OR "secondary school*" OR "middle school*" OR "school*" OR "education") AND ("Pro social" OR prosocial* OR teamwork* OR encourag* OR friend* OR inclus* OR peer OR cooperat* OR help* OR comfort* OR altruism OR "turn taking" OR waiting OR share OR sharing OR tootling OR praise OR "peer interaction*" OR "social behaviour*" OR "social behavior*" OR "social skills" OR accountability OR teasing OR aggress* OR "peer pressure" OR "negative interaction*" OR bully* OR mock* OR tattling OR "anti social" OR antisocial OR "disruptive behaviour*" OR "disruptive behavior*") AND ("Group contingenc*" OR "group-oriented contingenc*" OR "group oriented contingenc*")

Scopus

((ALL ("Pro social" OR prosocial* OR teamwork* OR encourag* OR friend* OR inclus* OR peer OR cooperat* OR help* OR comfort* OR altruism OR "turn taking" OR waiting OR share OR sharing OR tootling OR praise OR "peer interaction*" OR "social behaviour*" OR "social behavior*" OR "social skills" OR accountability OR teasing OR aggress* OR "peer pressure" OR "negative interaction*" OR bully* OR mock* OR tattling OR "anti social" OR antisocial OR "disruptive behaviour*" OR "disruptive behavior*")) AND (ALL ("Class group*" OR "School group*" OR "Whole class" OR student* OR pupil* OR "primary school*" OR "junior school*" OR "elementary school*" OR "resource unit*" OR "resource class*" OR "special school*" OR "classroom*" OR "high school*" OR "secondary school*" OR "middle school*" OR "school*" OR "education")) AND (ALL ("Group contingenc*" OR "group-oriented contingenc*" OR "group oriented contingenc*")))

Web of Science

("Class group*" OR "School group*" OR "Whole class" OR student* OR pupil* OR "primary school*" OR "junior school*" OR "elementary school*" OR "resource unit*" OR "resource class*" OR "special school*" OR "classroom*" OR "high school*" OR "secondary school*")

OR "middle school*" OR "school*" OR "education" (All Fields)) AND ("Pro social" OR prosocial* OR teamwork* OR encourag* OR friend* OR inclus* OR peer OR cooperat* OR help* OR comfort* OR altruism OR "turn taking" OR waiting OR share OR sharing OR tootling OR praise OR "peer interaction*" OR "social behaviour*" OR "social behavior*" OR "social skills" OR accountability OR teasing OR aggress* OR "peer pressure" OR "negative interaction*" OR bully* OR mock* OR tattling OR "anti social" OR antisocial OR "disruptive behaviour*" OR "disruptive behavior*" (All Fields)) AND ("Group contingenc*" OR "group-oriented contingenc*" OR "group oriented contingenc*" (All Fields))

Appendix 2: Evidence of Ethical Approval Obtained from DCU's Ethics Committee 1 of 2

Ollscoil Chathair Bhaile Átha Cliath
Dublin City University



Ms. Ciara Brennan
School of Psychology

Dr. Sinéad Smyth
School of Psychology

30th May 2022

REC Reference: DCUREC/2022/089

Proposal Title: Exploring the use of positive behavioural interventions to facilitate inclusive education.

Applicant(s): Ms. Ciara Brennan, Dr. Sinéad Smyth, and Dr. Clare Bohan

Dear Colleagues,

Thank you for your application to DCU Research Ethics Committee (REC). Further to expedited review, DCU REC is pleased to issue approval for this research proposal.

DCU REC's consideration of all ethics applications is dependent upon the information supplied by the researcher. This information is expected to be truthful and accurate. Researchers are responsible for ensuring that their research is carried out in accordance with the information provided in their ethics application.

Materials used to recruit participants should note that ethical approval for this project has been obtained from the Dublin City University Research Ethics Committee. Should substantial modifications to the research protocol be required at a later stage, a further amendment submission should be made to the REC.

Yours sincerely,



Dr. Melrona Kirrane
Chairperson
DCU Research Ethics Committee



Taighde & Nuálaíocht Tacalocht
Ollscoil Chathair Bhaile Átha Cliath,
Baile Átha Cliath, Éire

Research & Innovation Support
Dublin City University,
Dublin 9, Ireland

T +353 1 700 8000
F +353 1 700 8002
E research@dcu.ie
www.dcu.ie

Appendix 3: Parent Plain Language Statement 1 of 2

Exploring the use of positive behavioural interventions to facilitate positive peer interactions.

Student Researcher: Ms. Ciara Brennan - Dublin City University, School of Psychology.

Supervisors: Dr. Sinéad Smyth, Dr. Clare Bohan - Dublin City University, School of Psychology.

This study has received ethical approval from DCU's Research Ethics Committee, approval code DCUREC/2022/089.

Why is this research being conducted and what is this research about?

This research is being conducted as part of Ciara's PhD in the School of Psychology. This research is focused on exploring the use of games focused on improving behaviours for increasing social and/or inclusive behaviours of Irish school-aged children. This research is completely self-funded.

What will happen if my child takes part in this research?

If you and your child both agree to your child taking part, we will ask you to answer some short questions about your child (e.g. their age). Everything else will happen while your child is at the [centre name] in the background of their usual activities. The group will play a game for about 30 minutes a day for about 10 weeks. Your child's group leader will give the group an outline of the game and the rules of the game. The children will be asked to work together in teams to follow these rules and may win a small prize by earning 'points' while playing. We will observe the children playing the game and will take notes on what they do. Ciara will do most of the observation but some days a second observer will come in to help her. The notes that we take will not make any mention of any child's name in order to make sure everything is kept confidential.

How will my child's behaviour be recorded?

When we say that we will record behaviour, we will simply take notes on whether children do or do not follow the rules of the game. These might include things like working nicely with their peers or listening to the group leader. Ciara will be in the room taking note of what happens and counting the number of times that rules are or are not followed. We need to measure these behaviours before the children play the game and during game playing in order to see if the game means that the children's behaviour changes.

What will happen if I do not consent for my child to take part in the research?

Your child's participation in this research is completely voluntary. Yourself or your child can decide to stop taking part in the research at any stage. The group leader will be playing the game with the whole group but we will stop collecting any information on your child's behaviour. If you do withdraw part way through the 10 week period, it will not be possible to distinguish your child's data from their peers after data collection as data is observed at a group level. However, if you withdraw your consent for your child to participate in any further data collection you may do so without giving any reason and without any consequence for doing so. If you do not consent for your child to take part in the research and/or we do not receive assent from your child data will not be gathered on their behaviour. As the game will be played during everyday activities at the [centre name] your child will still be taking part in the game to prevent singling out of individuals, however, no data will be collected from them.

How will my child's privacy be protected?

Your child's centre and group leader names will be provided with unique identification codes which will be used to connect the behavioural data with the questionnaires and will be replaced with pseudonyms (e.g., given a different name) when reporting on the results of the study. These identifiers will be visible on the demographic questionnaire provided but no name will be written on this sheet. Any personal data will be stored separately to all behavioural data.

How will the data be used and subsequently disposed of?

If both yourself and your child agree for them to take part in this study every effort will be made to ensure that your data remains unidentifiable. Data will remain confidential except for in circumstances where confidentiality is subject to legal limitations. Hardcopies of consent and assent forms, questionnaires and data collection sheets will be stored in a securely locked cabinet in DCU's School of Psychology. Questionnaires and data collection sheets will be scanned and backed-up to a password protected Google Drive folder. Only the primary research team will have access to the data. Data with identifiable information will be shredded and disposed of once data collection is finished. Soft copies of questionnaires will be compiled into a summary table and then deleted from the Drive. Data with no identifiable information will be stored permanently as it will not be identifiable. Your data will be handled in compliance with GDPR guidelines.

What are the legal limitations to data confidentiality?

Confidentiality of information can only be protected within the limitations of the law - i.e., it is possible for data to be subject to subpoena, freedom of information claim or mandated reporting by some professions.

What are the benefits for your child to participate in this research?

Games like this one have been associated with a wide range of benefits for children including increased attention, increased academic achievement and decreased disruptive behaviours. Inclusive behaviours can improve peer attitudes, help encourage student friendships and increase children's participation in social activities. Overall, we expect that by playing this game the children and group leader will experience a more pleasant environment.

What are the risks of participating in this research?

The level of risk is considered to be no greater than the risks associated with everyday life. As such, it is not anticipated that there is any risk in participating in the current study. However, there is a small chance that your child may become frustrated or embarrassed as there always is when a child is learning something new. Your child's group leader will always be present in the room and available to help the students. If you have any particular concerns about the conduct of the research or your child please contact the primary investigator Dr. Sinéad Smyth at 01 7007422 or by email at sinead.smyth@dcu.ie. Should you wish to discuss this further with a representative from the [centre name] you may talk to Leighann at the project. If your child has any concerns about the project and is in need of extra support, Childline provides useful support to those under the age of 18 anytime day or night. Your child can contact Childline by freephoning 800 666 666 or texting the word "Talk" to 50101 or live messaging them at [childline.ie](https://www.childline.ie).

How do I find out about the results of the study?

Should you wish to find out about the results of this study you may email ciara.brennan239@mail.dcu.ie in order to receive a summary of the results.

Privacy Notice

Data will be under the control of DCU. Should you have any concerns or questions about the handling of the data contact DCU's Data Protection Officer Mr. Martin Ward - data.protection@dcu.ie Ph.: 01 7005118 / 7008257. If you are unhappy with how the data of this project is being handled you have the right to lodge a complaint to the Irish Data Protection Commissioner.

Who can I contact for more information on this project?

Should you wish to learn more about the study you may contact Ciara at ciara.brennan239@mail.dcu.ie. Should you wish to express any concerns you have about the project or how it is planned to be conducted you can contact the principal investigator, Dr. Sinéad Smyth at sinead.smyth@dcu.ie.

If participants have concerns about this study and wish to contact an independent person, please contact:

The Secretary, Dublin City University Research Ethics Committee, c/o Research and Innovation Support, Dublin City University, Dublin 9. Tel 01-7008000, e-mail: rec@dcu.ie

Appendix 4: Parent Consent Form 1 of 2

Exploring the use of positive behavioural interventions to facilitate positive peer relationships.

Research Team: Ms. Ciara Brennan, Dr. Sinéad Smyth - DCU School of Psychology

This research is focused on exploring the use of behaviour games for increasing inclusive behaviours of Irish school-aged children.

Please indicate your answer to the statements below by circling either YES or NO.

I confirm that I am 18 years of age or older. YES NO

I confirm that I have read the Plain Language Statement (or have had it read to me). YES NO

I confirm that I have understood the Plain Language Statement. YES NO

I have had the opportunity to ask questions and have satisfactory answers to any questions I had. (Please note that researchers' contact details have been provided to give you an opportunity to ask questions). YES NO

I am a parent/guardian of a child in [centre name]. YES NO

I consent for my child to participate. YES NO

Parent / Guardian Signature: _____

Parent / Guardian Name in Block Capitals: _____

Child's Name: _____

Date: _____

Appendix 5: Adult Leader Plain Language Statement 1 of 2

Study title: Exploring the use of positive behavioural interventions to facilitate positive peer interactions.

Student Researcher: Ms. Ciara Brennan - Dublin City University, School of Psychology.

Supervisors: Dr. Sinéad Smyth - Dublin City University, School of Psychology.

This study has received ethical approval from DCU's Research Ethics Committee, approval code DCUREC/2022/089.

Why is this research being conducted and what is this research about?

This research is being conducted as part of Ciara's PhD in the School of Psychology. This research is focused on exploring the use of behavioural games for increasing social and/or inclusive behaviours of Irish school-aged children. This research is completely self-funded.

What will happen if I decide to take part in this research?

By agreeing to participate in this research you will be agreeing to implement a game during your after-school activities. This game is a behavioural intervention designed, based on the science of behaviour changes. While the research team will design the intervention, you will have the opportunity to identify behaviours that are relevant to the group that you work with which can be targeted. Ciara will arrange to run a training session with you to make sure you are comfortable with and understand the intervention procedure and how the intervention should be implemented. You will be asked to distribute and collect relevant forms (e.g., consent forms, assent forms) from the children in your group and their parents. The group will play a game for about 30 minutes a day for about 8-10 weeks during regular activities. If you consent to participate yourself, you will determine a set of group rules based on inclusive behaviours with Ciara's help. You will give the group an outline of the game and the rules of the game. The children will be asked to work together in teams to follow these rules and may win a small prize by earning 'points' while playing. We will observe the children playing the game and will take notes on what they do. Ciara will do most of the observation but some days a second observer will come in to help her. When we are finished collecting data in the centre, we may ask you to fill out a short survey with questions about your views on and experience with the intervention.

How will the childrens' behaviour be recorded?

When we say that we will record behaviour, we will simply take notes on whether children do or do not follow the rules of the game. Ciara will be in the room taking note of what happens and counting the number of times that rules are or are not followed. We need to measure these behaviours before the children play the game and during game playing in order to see if the game means that the children's behaviour changes.

How will my privacy be protected?

Your name and the centre's name will be given unique identification codes which will be used on the demographic questionnaires as well as the data collection sheets. These codes will be replaced with pseudonyms (e.g., given a different name) when reporting on the results of the study. Any personal data will be stored separately to all behavioural data.

How will the data be used and subsequently disposed of?

Hardcopies of consent forms will be stored in a securely locked cabinet within DCU's School of Psychology. Hardcopies of consent and assent forms, questionnaires and data collection sheets will be stored in a securely locked cabinet in DCU's School of Psychology. Questionnaires and data collection sheets will be scanned and backed-up to a password protected Google Drive folder. Only the primary research team will have access to the data. Data with identifiable information will be shredded and disposed of upon the completion of data collection. Soft copies of questionnaires will be compiled into a summary table and then deleted from the Drive. Data with no identifiable information will be stored permanently as it will not be identifiable. Your data will be handled in compliance with GDPR guidelines.

What are the legal limitations to data confidentiality?

Confidentiality of information can only be protected within the limitations of the law - i.e., it is possible for data to be subject to subpoena, freedom of information claim or mandated reporting by some professions.

What are the benefits associated with participating in this research?

Games like this one have been associated with a wide range of benefits for school-aged children including increased attention, increased academic achievement and decreased disruptive behaviours. Inclusive behaviours can improve peer attitudes, help encourage friendships and increase children's participation in social activities. Overall, we expect that by playing this game both you and the children will experience a more pleasant environment.

What are the risks of participating in this research?

The level of risk is considered to be no greater than the risks associated with everyday life. As such, it is not anticipated that there is any risk in participating in the current study. However there is a small chance that your child may become frustrated or embarrassed as there always is when a child is learning something new. If you have any particular concerns about the conduct of the research please contact the primary investigator Dr. Sinéad Smyth at 017007422 or by email at sinead.smyth@dcu.ie.

How do I find out about the results of the study?

Should you wish to find out about the results of this study you may email ciara.brennan239@mail.dcu.ie in order to receive a summary of the results.

Privacy Notice

Data will be under the control of DCU. Should you have any concerns or questions about the handling of the data contact DCU's Data Protection Officer Mr. Martin Ward - data.protection@dcu.ie Ph.: 7005118 / 7008257. If you are unhappy with how the data of this project is being handled you have the right to lodge a complaint to the Irish Data Protection Commissioner.

Who can I contact for more information on this project?

Should you wish to learn more about the study you may contact Ciara at ciara.brennan239@mail.dcu.ie. Should you wish to express any concerns you have about the project or how it is planned to be conducted you can contact the principal investigator, Dr. Sinéad Smyth at sinead.smyth@dcu.ie.

If participants have concerns about this study and wish to contact an independent person, please contact:

The Secretary, Dublin City University Research Ethics Committee, c/o Research and Innovation Support, Dublin City University, Dublin 9. Tel 01-7008000, e-mail: rec@dcu.ie

Appendix 6: Adult Leader Consent Form 1 of 2

Exploring the use of positive behavioural interventions to facilitate positive peer relationships.

Research Team: Ms. Ciara Brennan, Dr. Sinéad Smyth - DCU School of Psychology

This research is focused on exploring the use of positive behaviour games for increasing inclusive and prosocial behaviours in Irish children.

Please indicate your answer to the statements below by circling either YES or NO.

- | | | |
|---|-----|----|
| I confirm that I am 18 years of age or older. | YES | NO |
| I confirm that I have read the Plain Language Statement (or have had it read to me). | YES | NO |
| I confirm that I have understood the Plain Language Statement. | YES | NO |
| I have had an opportunity to consider this information. | YES | NO |
| I have had the opportunity to ask questions and have satisfactory answers to any questions I had. (Please note that researchers' contact details have been provided to give you an opportunity to ask questions). | YES | NO |
| I understand that I will be responsible for implementing the chosen intervention with my group. | YES | NO |
| I consent to participate in this research. | YES | NO |

Signature: _____

Name in Block Capitals: _____

Date: _____

Appendix 7: Child Information Sheet 1 of 2

Information Sheet

Exploring the use of positive behavioural interventions to facilitate positive peer relationships.

Research Team: Ms. Ciara Brennan, Dr. Sinéad Smyth - DCU School of Psychology

We recommend that you read through this information sheet with the help of an adult.

1.  Over the next few weeks your team leader will run a new game with your group.	2.  This game will look at how your group can get better at including all of your friends and work together as a team.
3.  Your team leader will set some new class rules.	4.  You will work in teams to follow the group rules which will earn your team points.
5.  If your team gets a certain number of points or more than you will win a small prize.	6.  You will have a visitor called Ciara in the room who will watch your class during the game.

7.



Ciara will be collecting information about the points all of the children in your group get while you all play the game.

8.



It is okay if you decide you do not want Ciara to collect information about you while you play the game. Just let us know!

9.



If you decide not to let Ciara collect information, you will still play the game because your team leader will ask all children to play but Ciara will not collect any information about how you play the game.

10.



The information Ciara collected about you during the game will not have your name written anywhere. The sheet you sign with your name will be stored in a safe locked cabinet.

11.



If you have any questions about the research you can ask a parent or your teacher.

If they need some help answering your question they can email ciara.brennan239@mail.dcu.ie.

Appendix 8: Child Assent Form 1 of 2

Assent Form

Exploring the use of positive behavioural interventions to facilitate positive peer relationships.

Research Team: Ms. Ciara Brennan, Dr. Sinéad Smyth - DCU School of Psychology

Draw an X or tick ✓ in the right box.

1.  I have read the information sheet or an adult has read the information sheet for me. YES • ☐ NO • ☐	2.  I have asked an adult any questions that I have about this project. YES • ☐ NO • ☐
3.  I understand how the game will work. YES • ☐ NO • ☐	4.  I am happy to let Ciara collect information about me while I play the game. YES • ☐ NO • ☐

Write your name neatly here: _____

Date: _____

Appendix 9: Demographic Questionnaire Adult

Demographic Summary Group Leader

1. Gender

Male	
Female	
Other (Specify)	

Other: _____

2. Age: _____

3. Job Title/Role: _____

4. Qualification: _____

5. Number of Years working in the [Centre Name]: _____

6. Number of Years experience working in this field overall: _____

7. Have you Previously used a Group Behaviour Management Method Like the Caught Being Good Game (team-based)?

Yes	
No	

If Yes, Please Describe:

8. Please describe other methods you have used to manage the groups' behaviour:

Appendix 10: Demographic Questionnaire Child

Demographic Questionnaire

ID: _____

Please note that the information provided will only be used to describe all the children as a group. Individual information will not be shared.

Please answer the following questions based on your child.

1. What age is your child? _____

Mark an X in the following statements to indicate your answer.

2. What is your child's gender?

Male	☐
Female	☐
Other	☐

3. What is your child's ethnic group/ background?

Choose **one** from the following:

White Irish	☐
White Irish Traveller	☐
White Roma	☐
Any other White Background	☐
Black (or Black Irish) African	☐
Any other Black Background	☐
Asian (or Asian Irish) Chinese	☐
Asian (or Asian Irish) Indian/ Pakistani/ Bangladeshi	☐
Any other Asian Background	☐
Arabic	☐
Mixed (please describe below)	☐
Other (please describe below)	☐

If 'mixed' or 'other' please describe: _____

4. Does your child experience/ have a diagnosis of any of the following?

No	
Physical Disability	
Deaf/ Hearing Impairment	
Blind/ Visual Impairment	
Mild general learning disability	
Moderate general learning disability	
Severe/ Profound general learning disability	
Dyslexia	
Dyspraxia	
Autism Spectrum Disorder (ASD)	
Asperger's syndrome	
ADHD	
ODD	
Clinical Depression	
Down Syndrome	
Tourette Syndrome	
William's Syndrome	
Speech and Language Disorder	
Medical Conditions	
Other (please describe below)	

If answered '**Other**' please describe: _____

5. a) Does your child require additional learning support in school?

Yes	
No	

b) If answered '**Yes**' to 5 a) please mark the area(s) that best describe(s) the support your child requires below.

Behavioural	
Reading	
Spelling	
Organisational Skills	
Academics	
Social	
Other (describe below)	

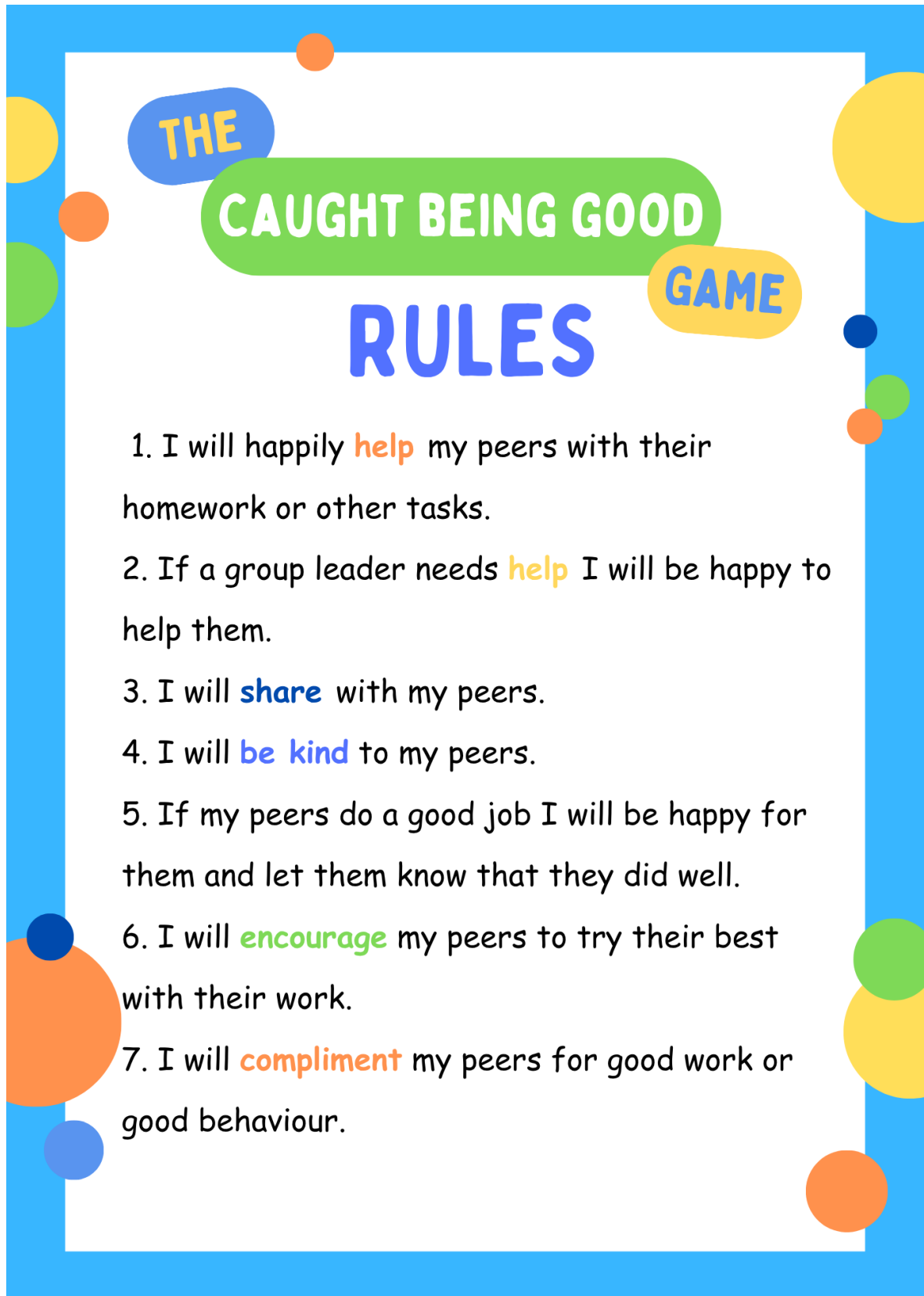
If answered '**Other**' please describe: _____

6. Does your child receive the support of an SNA in the classroom?

Yes	
No	

Appendix 11: Example of Game Rules Poster

Note: The image provides an example of the game rules poster used in each afterschool centre. The rules written on the poster were different in each centre.



Appendix 12: Example of Game Scoreboard

Note: The image provides an example of the game scoreboard poster used in each afterschool centre. The number of teams and the number of behaviour checks varied from centre to centre.

THE CAUGHT BEING GOOD GAME SCOREBOARD

TODAY'S POINT GOAL

TEAM NAME:							

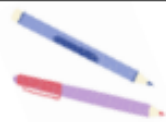
Appendix 13: Example of Preference Assessment

Note: The preference assessment for each centre was edited based on rewards suggested by the group's leader.

The Caught Being Good Game

The following is a list of prizes you may get for behaving well and treating your peers nicely during Activity Time.

Please put a number beside each prize with number '1' being your favourite (the prize you'd most like to win for behaviour in class) to number '7' being your least favourite.

Stationery - scented gel pen, glitter gel pen, decorative pencil or rubber.		
Sweet Treat - jelly, chocolate, hot chocolate		
Small Toy - bouncy ball, slime, fidget spinner, pop-it		
Nail jewels, body gems, hair clip or scrunchie		
Bubbles		
Mini teddy or squishy toy		
Temporary Tattoo or 3D Sticker		

Do you have any other ideas for prizes for behaving well and treating your peers nicely during activity time?

Appendix 14: Examples of Observed Behaviour in Operational Definitions

The examples listed below are intended to supplement the operational definitions outlined in Chapter 3 and are not intended to replace them. These examples and non-examples were used to support the training of second observers in the dependent variables as outlined in Chapter 3.

Encouragement

Encouragement refers to verbal or non-verbal acts that communicate support, praise, or motivation directed toward a peer.

Examples include:

- Positive communication such as saying “good job,” “you got this,” or “that looks great!” to a peer during or after an activity.
- Offering reassurance when a peer appears frustrated or hesitant (e.g., “Don’t worry, I’ll help you”).
- Celebrating a peer’s success (e.g., clapping, cheering, giving a thumbs up, or high-fiving).
- Nonverbal supportive gestures such as smiling, nodding, or giving an encouraging pat on the back.
- Writing or drawing a positive message for a peer during group art or craft activities.

Non-examples or boundary behaviours (not coded as encouragement):

- General positive mood or laughter not directed toward a peer.
- Statements about oneself (“I did it!”) even if positive in tone.
- Teasing or sarcasm disguised as praise.

Peer Cooperation

Peer cooperation captures joint engagement or assistance between two or more children working toward a shared goal.

Examples include:

- Helping a peer find materials, pack up, or complete a task.
- Sharing resources such as stationery, game equipment, or space during an activity.
- Working collaboratively to clean up after an activity (e.g., one holds the bin while the other gathers papers).
- Taking turns smoothly within a shared game or conversation.
- Coordinating actions with a peer in a sports or building activity (e.g., passing a ball, constructing a tower together).
- Offering to swap materials so that both peers can participate equally.

Non-examples or boundary behaviours:

- Passive participation near a peer without active engagement.
- Helping behaviour that is teacher-prompted rather than peer-initiated.
- Competitive interactions (e.g., racing against a peer) unless cooperation is evident within the competition.

Leader Cooperation

Leader cooperation refers to positive and responsive interactions with adult leaders or facilitators that reflect respect, compliance, and engagement.

Examples include:

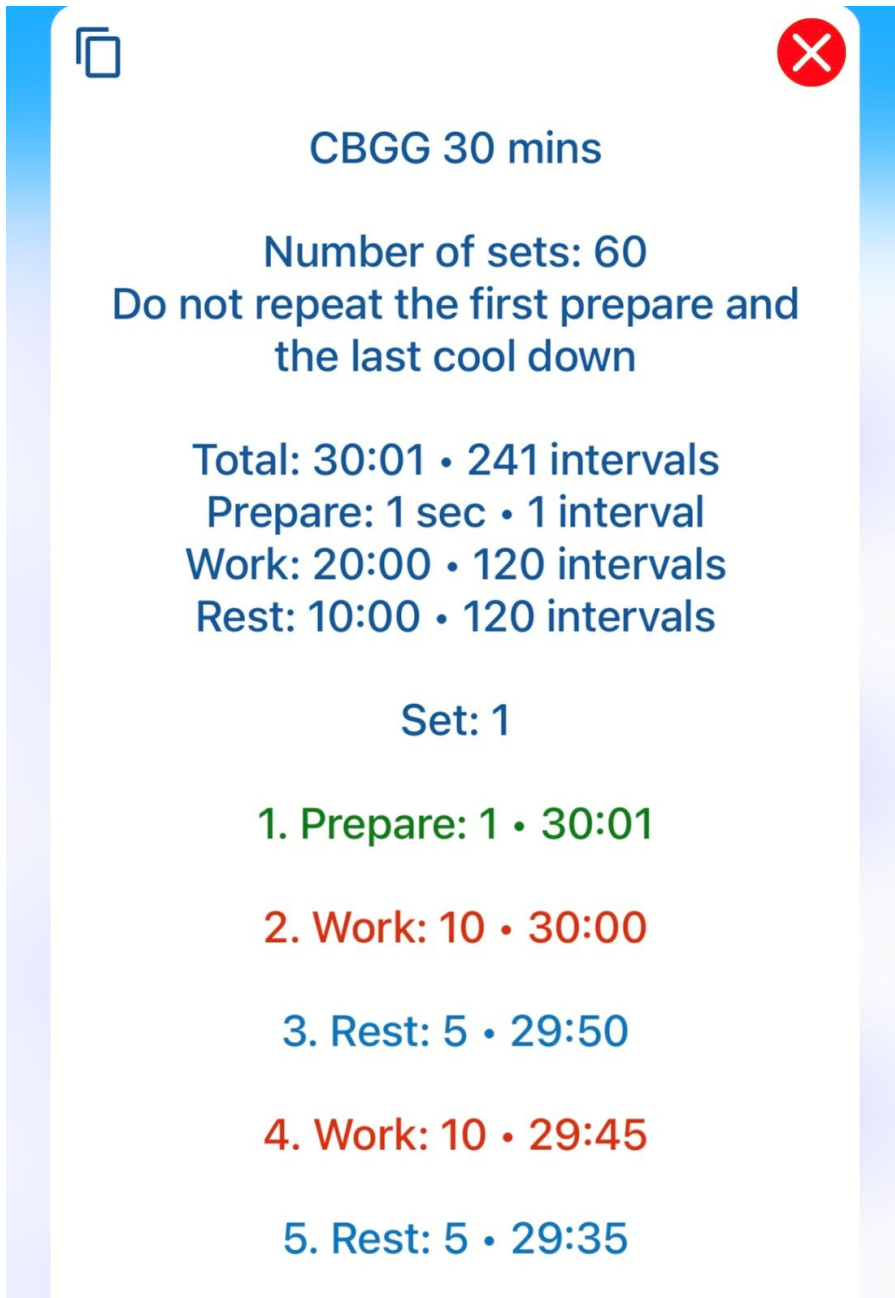
- Following a leader's instruction within three seconds.
- Waiting calmly and appropriately (e.g., without complaint or without bothering peers) while a leader organises materials or gives directions.
- Volunteering to assist the leader (e.g., carrying materials, setting up activities).
- Actively listening to instructions, asking clarifying questions, and responding at an appropriate, audible volume (e.g., not whispering or shouting).
- Using polite forms of communication ("please," "thank you," "excuse me").
- Helping maintain group routines (e.g., encouraging peers to tidy up when asked by a leader).

Non-examples or boundary behaviours:

- Compliance following repeated prompts or after a delay longer than three seconds.
- Polite conversation unrelated to the activity (e.g., chatting about the weekend).

Appendix 15: Example of Tabata Timer Setup

Note: The setup on the Tabata Timer app varied across centres depending on the length of time the intervention was played for.



The screenshot shows the Tabata Timer app interface. At the top left is a copy icon, and at the top right is a red close button. The main content is centered and reads:

CBGG 30 mins

Number of sets: 60

Do not repeat the first prepare and the last cool down

Total: 30:01 • 241 intervals
Prepare: 1 sec • 1 interval
Work: 20:00 • 120 intervals
Rest: 10:00 • 120 intervals

Set: 1

- 1. Prepare: 1 • 30:01**
- 2. Work: 10 • 30:00**
- 3. Rest: 5 • 29:50**
- 4. Work: 10 • 29:45**
- 5. Rest: 5 • 29:35**

Appendix 16: Example of Data Collection Template

Observation Sheet

20 minute observation 15 second intervals

After School C Date: _____ Observation Start time: _____ Finish Time: _____ Observer Initials: _____

HELP: Helping - partial interval recording (any occurrence during the 15s interval marked +, non occurrence marked -)

PESI: Positive & Encouraging Social Interaction - partial interval recording (any occurrence during the 15s interval marked +, non occurrence marked -)

T-EN: Task Engagement - momentary time sampling (engaged in the behaviour at the end of the 15s interval marked +, not engaged at the end of the interval marked -)

Interval	HELP	PESI	T-EN	Interval	HELP	PESI	T-EN
1.1				11.1			
1.2				11.2			
1.3				11.3			
1.4				11.4			
2.1				12.1			
2.2				12.2			
2.3				12.3			
2.4				12.4			
3.1				13.1			
3.2				13.2			
3.3				13.3			
3.4				13.4			
4.1				14.1			
4.2				14.2			
4.3				14.3			
4.4				14.4			
5.1				15.1			
5.2				15.2			
5.3				15.3			
5.4				15.4			
6.1				16.1			
6.2				16.2			
6.3				16.3			
6.4				16.4			
7.1				17.1			
7.2				17.2			
7.3				17.3			
7.4				17.4			
8.1				18.1			
8.2				18.2			
8.3				18.3			
8.4				18.4			
9.1				19.1			
9.2				19.2			
9.3				19.3			
9.4				19.4			
10.1				20.1			
10.2				20.2			
10.3				20.3			
10.4				20.4			

Appendix 17: Caught Being Good Game Procedural Checklist

Procedural Checklist

Tick each step once you have completed it.

Date: _____

	Step	Tick When Complete
1	Announce that the game will be played today	
2	Remind the group of the team divisions	
3	Rules are posted on the wall	
4	Review the rules with kids	
5	Remind the group that they earn points when their whole team is following rules when the leader decides to scan the class (i.e., how to get a point)	
6	Remind the group how many points they need to get the prize	
7	Announce that the game has started	
8	Scan the room when the timer vibrates and record the points earned by each team	
9	Announce end of game after the last 'behaviour check' has been completed	
10	Total the team points for today's game	
11	Announce the winners and give access to the prize (Any team passing the goal or criterion number of points is a 'winning team'. If no team passes the goal, the team with the most points can win. The team with the most points gets to choose the prize for the day)	

Appendix 18: Children's Social Validity Questionnaire

Caught Being Good Game Rating Scale for Child Participants

Adapted from Witt & Elliott (1985)

Read the questions about the Caught Being Good Game and circle 'YES' or 'NO' as your answer

1	Did you like the game used during activity time?	YES	NO
2	Did you like participating in the game?	YES	NO
3	Do you think other children would like to use the game?	YES	NO
4	Did you like the rewards earned during the game?	YES	NO
5	Do you think the game has helped you do better during activity time?	YES	NO
6	Do you think the game was fair?	YES	NO
7	Do you think the game caused any problems for you?	YES	NO
8	Do you think the game caused any problems for your peers?	YES	NO

Do you have anything else to write about the Caught Being Good Game?

Appendix 19: Adult's Social Validity Questionnaire

Caught Being Good Game Rating Scale for Group Leaders

Based on the Behaviour Intervention Rating Scale (BIRS; Elliot & Von Brock Treuting, 1991).

1 = Strongly Disagree	2 = Disagree	3 = Slightly Disagree
4 = Slightly Agree	5 = Agree	6 = Strongly Agree

- 1 This is an acceptable intervention for the children's target behaviour(s). 1 2 3 4 5 6
- 2 Most people would find this intervention appropriate for behaviour problems in addition to the one(s) described (i.e. other behaviour issues in the group not targeted by the CBGG during this project). 1 2 3 4 5 6
- 3 The intervention proved effective in changing the children's target behavior(s). 1 2 3 4 5 6
- 4 I would suggest the use of this intervention to other leaders. 1 2 3 4 5 6
- 5 The children's behaviour problem(s) were severe enough to warrant use of this intervention. 1 2 3 4 5 6
- 6 Most people would find this intervention suitable for the behaviour(s) targeted. 1 2 3 4 5 6
- 7 I would be willing to use this in the after school setting again. 1 2 3 4 5 6
- 8 The intervention would not result in negative side-effects for children. 1 2 3 4 5 6
- 9 The intervention would be appropriate intervention for a variety of children. 1 2 3 4 5 6
- 10 The intervention is consistent with those I have used in the after school setting. 1 2 3 4 5 6
- 11 The intervention was a fair way to handle the children's problem behaviour(s). 1 2 3 4 5 6
- 12 The intervention is reasonable for the targeted behaviour(s). 1 2 3 4 5 6

13	I like the procedures used in the intervention.	1 2 3 4 5 6
14	The intervention was a good way to handle these children's behaviour problem(s).	1 2 3 4 5 6
15	Overall, the intervention was beneficial for the children.	1 2 3 4 5 6
16	The intervention quickly improved the children's behaviour.	1 2 3 4 5 6
17	The intervention will produce a lasting improvement in the children's behaviour.	1 2 3 4 5 6
18	The intervention improved the children's behaviour to the point that it is not noticeably deviate from other children's behaviour (e.g. other 'well-behaved' groups).	1 2 3 4 5 6
19	Soon after using the intervention, the leader noticed a positive change in the children's behaviour.	1 2 3 4 5 6
20	The children's behaviour will remain at an improved level even after the intervention is discontinued.	1 2 3 4 5 6
21	Using the intervention should not only improve the children's behaviour in the after school setting, but also in other settings (e.g., classrooms, home).	1 2 3 4 5 6
22	When comparing these children with well-behaved peers before and after the use of the intervention, the children's and the peer's behaviours are more alike after using the intervention.	1 2 3 4 5 6
23	The intervention produced enough improvement in the target behaviours so they are no longer a problem in the after school.	1 2 3 4 5 6
24	Other behaviours related to the target behaviour(s) were also improved by the intervention.	1 2 3 4 5 6

Do you have any further comments/feedback on the CBGG? If so, please record them below.

Appendix 20: Direct Behaviour Rating Template

Date: _____ Day of Week: M T W Th

Rating: Whole Group

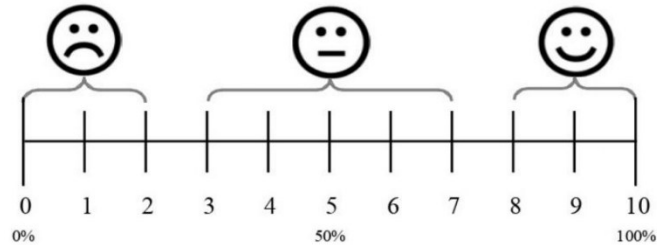
Activity: Baseline or Caught Being Good Game

☐ No rating today as I was unable to observe student sufficiently.

Directions: Place a mark along the line that best reflects the percentage of total time the student exhibited the target behaviors. Please note that the percentages DO NOT need to total 100% since some behaviors may co-occur.

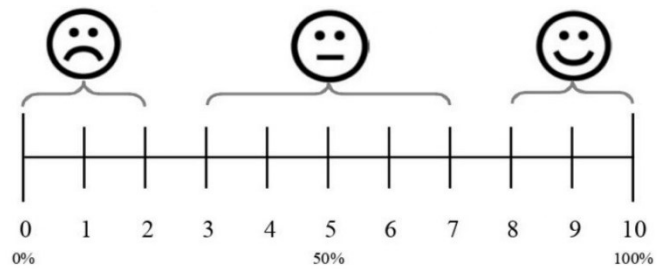
Helping (Peer or Leader)

% of Total Time



Encouragement (Verbal or Physical)

% of Total Time





MORE...



Write what you think you should "do", "see", "feel" and "hear" more of during homework time.



Do



See



Hear



Feel



LESS...



Write what you think you should "do", "see", "feel" and "hear" less of during homework time.



Do



See



Feel

IDEAS FOR GROUP RULES

Work together to write some ideas for different group rules you could follow during home work time.



Appendix 24: Evidence of Ethical Approval Obtained from DCU's Ethics Committee 2 of 2

Ollscoil Chathair Bhaile Átha Cliath
Dublin City University



Ms Ciara Brennan
School of Psychology

26th July 2023

REC Reference: DCUREC/2023/124

Proposal Title: An exploration of the use of positive behavioural interventions developed through cooperative inquiry with children

Applicants: Ms Ciara Brennan, Dr Sinead Smyth

Dear Colleagues,

Thank you for your application to DCU Research Ethics Committee (REC). Further to expedited review, DCU REC is pleased to issue approval for this research proposal.

DCU REC's consideration of all ethics applications is dependent upon the information supplied by the researcher. This information is expected to be truthful and accurate. Researchers are responsible for ensuring that their research is carried out in accordance with the information provided in their ethics application.

Materials used to recruit participants should note that ethical approval for this project has been obtained from the Dublin City University Research Ethics Committee. Should substantial modifications to the research protocol be required at a later stage, a further amendment submission should be made to the REC.

Yours sincerely,



Dr. Melrona Korrane
Chairperson
DCU Research Ethics Committee



Taighde & Nuálaíocht Tacalocht
Ollscoil Chathair Bhaile Átha Cliath,
Baile Átha Cliath, Éire
Research & Innovation Support
Dublin City University,
Dublin 9, Ireland
T +353 1 700 8000
F +353 1 700 8002
E research@dcu.ie
www.dcu.ie

Note: Please retain this approval letter for future publication purposes (for research students, this includes incorporating the letter within their thesis appendices).

Appendix 25: Parent Plain Language Statement 2 of 2

Study title: An exploration of the use of positive behavioural interventions developed through cooperative inquiry with children.

Why is this research being conducted and what is this research about?

We are Ms. Ciara Brennan and Dr. Sinéad Smyth from DCU's School of Psychology. We are inviting you to participate in our study focused on exploring the use and effect of a behaviour change game designed through a collaborative process between the children, adult leaders and Ciara. This research is being conducted as part of Ciara's PhD. This research is partially funded by a stipend only scholarship awarded to Ciara through DCU's School of Psychology. This study has received ethical approval from DCU's Research Ethics Committee, approval code DCUREC/2023/124.

Why is this research being conducted and what is this research about?

This research is being conducted as part of Ciara's PhD in the School of Psychology. This research is focused on exploring the use and effect of a behaviour change game designed through a collaborative process between the children, adult leaders and Ciara. This research is partially funded by a stipend only scholarship awarded to Ciara through DCU's School of Psychology.

What will happen if my child takes part in this research?

If you and your child both agree to your child taking part, we will ask you to answer some short questions about your child (e.g. their age) and any learning disabilities or additional needs that they might have (e.g., learning or emotional support in school). Your child will play a part in designing the behaviour change game that will be used with the group. This will involve interviews about the behaviour in the setting (playing the role of both the interviewer and interviewee), sketching ideas and engaging in discussions about the specifics about the game. The audio of the interviews will be recorded but deleted once they have been transcribed, within one month of data collection. Any identifiable information (e.g., names, centre name etc.) will be removed. Everything else will happen while your child is in the [centre name] during usual activity. The group will play a game for about 30 minutes a day for about 10-20 weeks. Your child's leader will give the group an outline of the game and the rules of the game. The children will be asked to work together in teams to follow these rules and may win a small prize by earning 'points' while playing. We will observe the children playing the game and will take notes on what they do. Ciara will do most of the observation but some days a second observer will come in to help her. The notes that we take will not make any mention of any child's name in order to make sure everything is kept confidential.

How will my child's behaviour be recorded?

When we say that we will record behaviour, we will simply take notes on whether children do or do not follow the rules of the game. These might include things like working nicely with their peers or listening to the adult leader. Ciara will be in the room taking note of what happens and counting the number of times that rules are or are not followed. We need to measure these behaviours before the children play the game and during game playing in order to see if the game means that the children's behaviour changes.

What will happen if I do not consent for my child to take part in the research?

Your child's participation in this research is completely voluntary. You or your child can decide to stop taking part in the research at any stage. The adult leader will be playing the game with the whole class but we will stop collecting any information on your child's behaviour. The leader will be playing the game with the whole class but we will stop collecting any information on your child's behaviour. If you do withdraw part way through the 10-20 week period we can remove what your child has said from the focus group transcripts. However, it will not be possible to distinguish your child's behavioural data from their peers after data collection as data is observed at a group level. However, if you withdraw your consent for your child to participate in any further behavioural data collection you may do so without giving any reason and without any consequence for doing so. Your child will still be taking part in the game itself to prevent singling out of individuals, however, no data will be collected about them or their behaviour.

How will my child's privacy be protected?

Your child's group and leader will be provided with unique identification codes which will be used to connect the behavioural data with the questionnaires and will be replaced with pseudonyms (e.g., given a different name) when reporting on the results of the study. This process is called pseudo-anonymisation. These identifiers will be visible on the demographic questionnaire provided but no name will be written on this sheet. Audio recordings from the interviews will be transcribed once the interviews have been completed within a month of interview completion. Again any personal information (e.g., names) will be replaced here with pseudonyms. The audio will then be deleted. Any personal data will be stored separately to all behavioural data.

How will the data be used and subsequently disposed of?

If both yourself and your child agree for them to take part in this study every effort will be made to ensure that your data remains unidentifiable. Data will remain confidential except for in circumstances where confidentiality is subject to legal limitations. Hardcopies of consent and assent forms, questionnaires, data collection sheets and sketches etc., will be stored in a securely locked cabinet in DCU's School of Psychology. Questionnaires and data collection sheets will be scanned and backed-up to a password protected Google Drive folder. Only the primary research team will have access to the data. Data with identifiable information will be shredded and disposed of by the end of the school year or within a month of the completion of data collection, whichever is sooner. Soft copies of questionnaires will be compiled into a summary table and then deleted from the Drive. Once the audio of interviews has been transcribed they will be deleted permanently from all devices. The pseudoanonymised data will be stored permanently as it will not be identifiable. This data may be shared on open science platforms which means it will be uploaded to a database that other researchers might use. This can help other research answer new research questions to further expand on our understanding of this area. Your data will be handled in compliance with GDPR guidelines. The pseudoanonymised data will be reported for the purpose of submission to academic journals or conferences, lay reports and Ciara's PhD thesis.

What are the legal limitations to data confidentiality?

Confidentiality of information can only be protected within the limitations of the law - i.e., it is possible for data to be subject to subpoena, freedom of information claim or mandated reporting by some professions.

What are the benefits for your child to participate in this research?

Collaborative methods like this have a wide range of benefits including increased enjoyment, better decision making and feelings of responsibility. Games like this one have been associated with a wide range of benefits for school-aged children including increased attention, increased academic achievement and decreased disruptive behaviours in the group. Teamworking can improve peer attitudes, help encourage student friendships and increase children's participation in social activities. Overall, we expect that by playing this game the children and the leader will experience a more pleasant environment.

What are the risks of participating in this research?

The level of risk is considered to be no greater than the risks associated with everyday life. As such, it is not anticipated that there is any risk in participating in the current study. However there is a small chance that your child may become frustrated or embarrassed as there always is when a child is learning something new. Your child's leader will always be present in the room and available to help the students. If you have any particular concerns about the conduct of the research or your child please contact the primary investigator Dr. Sinéad Smyth at 01 7007422 or by email at sinead.smyth@dcu.ie. If your child has any concerns about the project and is in need of extra support external to the centre, Childline provides useful support to those under the age of 18 anytime day or night. Your child can contact Childline by freephoning 800 666 666 or texting the word "Talk" to 50101 or live messaging them at childline.ie.

How do I find out about the results of the study?

Should you wish to find out about the results of this study you may email ciara.brennan239@mail.dcu.ie. A report will be available at the end of the school year.

Privacy Notice

DCU is the data controller for this project. That means that all the data from the project will be under the control of DCU. This study will be conducted in compliance with the General Data Protection Regulation (GDPR), and if you have any concerns regarding how your data in this study has been handled, you can contact: DCU Data Protection Officer, Mr. Martin Ward – (data.protection@dcu.ie Tel: 01-7005118/01- 7008257) who will handle any data protection concerns arising from this research. An individual also has the right to report a complaint concerning the use of personal data to the Irish Data Protection Commission: Data Protection Commissioner.

Who can I contact for more information on this project?

Should you wish to learn more about the study you may contact Ms. Brennan at ciara.brennan239@mail.dcu.ie. Should you wish to express any concerns you have about the project or how it is planned to be conducted you can contact the principal investigator, Dr. Sinéad Smyth at sinead.smyth@dcu.ie.

If participants have concerns about this study and wish to contact an independent person, please contact: The Secretary, Dublin City University Research Ethics Committee, c/o Research and Innovation Support, Dublin City University, Dublin 9. Tel 01-7008000, e-mail: rec@dcu.ie

Appendix 26: Parent Consent Form 2 of 2

An exploration of the use of positive behavioural interventions developed through cooperative inquiry with children.

Research Team: Ms. Ciara Brennan, Dr. Sinéad Smyth - DCU School of Psychology

This research is focused on exploring the use and effect of a behaviour change game designed through a collaborative process between the children, leaders and Ciara.

Please indicate your answer to the statements below by circling either YES or NO.

I confirm that I am 18 years of age or older.	YES	NO
I confirm that I have read the Plain Language Statement (or have had it read to me).	YES	NO
I confirm that I have understood the Plain Language Statement.	YES	NO
I have had the opportunity to ask questions and have satisfactory answers to any questions I had. (Please note that researchers' contact details have been provided to give you an opportunity to ask questions).	YES	NO
I am a parent/guardian of a child [centre name].	YES	NO
I consent for my child to participate.	YES	NO

Parent / Guardian Signature: _____

Parent / Guardian Name in Block Capitals: _____

Child's Name: _____

Date: _____

Appendix 27: Adult Leader Plain Language Statement 2 of 2

Study title: An exploration of the use of positive behavioural interventions developed through cooperative inquiry with children.

Why is this research being conducted and what is this research about?

We are Ms. Ciara Brennan and Dr. Sinéad Smyth from DCU's School of Psychology. We are inviting you to participate in our study focused on exploring the use and effect of a behaviour change game designed through a collaborative process between the children, adult leaders and Ciara. This research is being conducted as part of Ciara's PhD. This research is partially funded by a stipend only scholarship awarded to Ciara through DCU's School of Psychology.

This study has received ethical approval from DCU's Research Ethics Committee, approval code DCUREC/2023/124.

Why is this research being conducted and what is this research about?

This research is being conducted as part of Ciara's PhD in the School of Psychology. This research is focused on exploring the use and effect of a behaviour change game designed through a collaborative process between the children, adult leaders and Ciara. This research is partially funded by a stipend only scholarship awarded to Ciara through DCU's School of Psychology.

What will happen if I decide to take part in this research?

By agreeing to participate in this research you will be agreeing to design and implement a game in your room. This game is a behavioural intervention designed, based on the science of behaviour changes. The intervention will be designed through a collaborative process between yourself, the children in your group and Ciara (the design team). Ciara will arrange to run a training session with you to make sure you are comfortable with and understand the intervention procedure and how the intervention should be implemented. You will be asked to distribute and collect relevant forms (e.g., consent forms, assent forms) from your students and their parents. The design process will involve a number of steps including child and adult interviews to explore behaviours of concern, sketching and noting ideas and a discussion surrounding the specific aspects of the game. The design team will decide on the nature of the game, the game rules and the behaviours to be targeted by the game. Once set, the class will play a game for about 30 minutes a day for about 8-10 weeks during everyday class activities. If you consent to participate yourself, you will take part in the designing of the game as well as implementing the game. You will take part in a focus group about the behaviour in the group, you will sketch and discuss ideas and you will work with the design team to finalise the game. The children will be asked to work together in teams to follow these rules and may win a small prize by earning 'points' while playing. We will observe the children playing the game and will take notes on what they do. Ciara will do most of the observation but some days a second observer will come in to help her. When we are finished collecting data in the room we may ask you to fill out a short survey with questions about your views on and take part in a group discussion with the children to explore your experience with the intervention. You can withdraw your consent to participate at any stage. Data collection will stop in your room and all of your data will be deleted. Please note that once the list of names and ID numbers has been deleted at the end of the school year it may no longer be possible to distinguish your data from the other data and therefore may not be possible to delete it.

How will the students' behaviour be recorded?

When we say that we will record behaviour, we will simply take notes on whether children do or do not follow the rules of the game. Ciara will be in the classroom taking note of what happens and counting the number of times that rules are or are not followed. We need to measure these behaviours before the children play the game and during game playing in order to see if the game means that the children's behaviour changes.

How will my privacy be protected?

Your name and the centre's name will be given unique identification codes which will be used on the demographic questionnaires as well as the data collection sheets. Audio recordings from the interviews will be transcribed once the interviews have been completed. Any personal information (e.g., names) will be replaced here with pseudonyms (e.g., given a different name) for reporting of the results. This process is called pseudoanonymisation. The audio will then be deleted.

How will the data be used and subsequently disposed of?

Hardcopies of consent forms will be stored in a securely locked cabinet within DCU's School of Psychology. Hardcopies of consent and assent forms, questionnaires, data collection sheets and sketches etc., will be stored in a securely locked cabinet in DCU's School of Psychology. Questionnaires, data collection sheets and sketches will be scanned and backed-up to a password protected Google Drive folder. Only the primary research team will have access to the data. Data with identifiable information will be shredded and disposed of upon the completion of data collection by the end of the school year or within a month of the completion of data collection, whichever is sooner.. Soft copies of questionnaires will be compiled into a summary table and then deleted from the Drive. Once the audio of interviews has been transcribed (within one month of data collection) they will be deleted permanently. Data with no identifiable information (e.g., pseudoanonymised transcribed interviews, data collection sheets, sketches etc.,) will be stored permanently as it will not be identifiable. This data may be shared on open science platforms which means it will be uploaded to a database that other researchers might use. This can help other research answer new research questions to further expand on our understanding of this area. Your data will be handled in compliance with GDPR guidelines. The pseudoanonymised data will be reported for the purpose of submission to academic journals or conferences, lay reports and Ciara's PhD thesis.

What are the legal limitations to data confidentiality?

Confidentiality of information can only be protected within the limitations of the law - i.e., it is possible for data to be subject to subpoena, freedom of information claim or mandated reporting by some professions.

What are the benefits associated with participating in this research?

Games like this one have been associated with a wide range of benefits for school-aged children including increased attention, increased academic achievement and decreased disruptive behaviours in the room. Teamwork can improve peer attitudes, help encourage student friendships and increase children's participation in social activities. Overall, we expect that by playing this game both you and the children will experience a more pleasant learning environment. Allowing children to have a say in the design of such a game may increase their buy-

in, improve decision making capacity, increase their responsibility and mean that they enjoy the game more so than if it were designed by adults only.

What are the risks of participating in this research?

The level of risk is considered to be no greater than the risks associated with everyday life. As such, it is not anticipated that there is any risk in participating in the current study. However there is a small chance that a child may become frustrated or embarrassed as there always is when a child is learning something new or you may become frustrated yourself during the process. If you have any particular concerns about the conduct of the research please contact the primary investigator Dr. Sinéad Smyth at 017007422 or by email at sinead.smyth@dcu.ie.

How do I find out about the results of the study?

Should you wish to find out about the results of this study you may email ciara.brennan239@mail.dcu.ie. A report will be available by August 2024.

Privacy Notice

DCU is the data controller for this project. That means that all the data from the project will be under the control of DCU. This study will be conducted in compliance with the General Data Protection Regulation (GDPR), and if you have any concerns regarding how your data in this study has been handled, you can contact: DCU Data Protection Officer, Mr. Martin Ward – (data.protection@dcu.ie Tel: 01-7005118/01- 7008257) who will handle any data protection concerns arising from this research. An individual also has the right to report a complaint concerning the use of personal data to the Irish Data Protection Commission: Data Protection Commissioner.

Who can I contact for more information on this project?

Should you wish to learn more about the study you may contact Ciara at ciara.brennan239@mail.dcu.ie. Should you wish to express any concerns you have about the project or how it is planned to be conducted you can contact the principal investigator, Dr. Sinéad Smyth at sinead.smyth@dcu.ie.

If participants have concerns about this study and wish to contact an independent person, please contact:

The Secretary, Dublin City University Research Ethics Committee, c/o Research and Innovation Support, Dublin City University, Dublin 9. Tel 01-7008000, e-mail: rec@dcu.ie

Appendix 28: Adult Leader Consent Form 2 of 2

Consent Form

An exploration of the use of positive behavioural interventions developed through cooperative inquiry with children.

Research Team: Ms. Ciara Brennan, Dr. Sinéad Smyth - DCU School of Psychology

This research is focused on exploring the use and effect of a behaviour change game designed through a collaborative process between the children, adult leaders and Ciara.

Please indicate your answer to the statements below by circling either YES or NO.

I confirm that I am 18 years of age or older.	YES	NO
I confirm that I have read the Plain Language Statement (or have had it read to me).	YES	NO
I confirm that I have understood the Plain Language Statement.	YES	NO
I have had an opportunity to consider this information.	YES	NO
I have had the opportunity to ask questions and have satisfactory answers to any questions I had. (Please note that researchers' contact details have been provided to give you an opportunity to ask questions).	YES	NO
I understand that I will be responsible for implementing the chosen intervention in my classroom.	YES	NO
I consent to audio recording of the focus groups I will be part of.	YES	NO
I consent to allow any drawings or writings completed individually or as a group to be analysed.	YES	NO
I consent to participate in this research.	YES	NO

Signature: _____

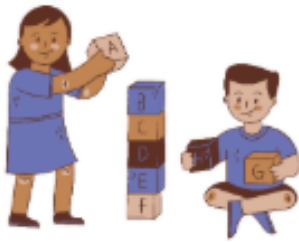
Name in Block Capitals: _____

Date: _____

Appendix 29: Child Information Sheet 2 of 2

Information Sheet

We recommend that you read through this information sheet with the help of an adult.

1.  Over the next few weeks you will design and run a new behaviour game in your group.	2.  You will have a visitor called Ciara in your room who will help you design the game.
3.  Your group, your leaders and Ciara will work together to design the game by taking part in group discussions. Ciara will record these discussions so she can listen back to them.	4.  You will draw and write ideas in a workbook. You will decide on a set of rules for the game and the behaviours you want to change. Ciara will collect what you have drawn and written to see if it is similar or different from others in your group.
5.  During the game, you will work together to follow the rules you set as a group.	6.  If you follow the group rules you could win a small prize.

7.  Ciara will be collecting information about the points all of the people in your group get while you all play the game.	8.  It is okay if you decide you do not want Ciara to record you or to collect information about you while you play the game. Just let us know! You can change your mind at any time and we will delete the information we have about you if we can.
9.  If you decide not to let Ciara collect information, you will not take part in designing the game or in any group discussions, you will still play the game because your leaders will ask all people to play but Ciara will not gather any information about how you play the game.	10.  The information Ciara collected about you during the game will not have your name written anywhere. Ciara will delete the recordings of your chat after she has written it up. The sheet you sign with my name will be stored in a safe locked cabinet.
11.  Ciara will use the information she collected to write reports as part of her college work. Ciara might present the information to other researchers interested in the work. When Ciara writes reports and presents the information she will not use your name or our centre name or anything else that might mean someone can identify you.	12.  If you have any questions about the research you can ask a parent or your leader. If they need some help answering your question they can email ciara.brennan239@mail.dcu.ie. You can also ask an adult to email Ciara if you want to learn more about the results of the study.

Appendix 30: Child Assent Form 2 of 2

An exploration of the use of positive behavioural interventions developed through cooperative inquiry with children.

Research Team: Ms. Ciara Brennan, Dr. Sinéad Smyth - DCU School of Psychology

Draw an X or tick ✓ in the right box.

1.



I have read the information sheet or an adult has read the information sheet for me.

YES  ☐

NO  ☐

2.



I have asked an adult any questions that I have about this project.

YES  ☐

NO  ☐

3.



I understand how the game will work.

YES  ☐

NO  ☐

4.



I am happy to let Ciara collect my drawings and notes to see if they are similar or different to the others in my group.

YES  ☐

NO  ☐

5.



I am happy to let Ciara record my voice during our group chats.

YES

☐

NO

☐

6.



I am happy to let Ciara collect information about me while I play the game.

YES

☐

NO

☐

Write your name neatly here:

Date:

Appendix 31: Reflective Focus Group Interview Schedule

- Do you think the game we played worked?
- What does it mean “the game worked” or “the game didn’t work”?
- Do you think the behaviour in your group is changed when you play the game we designed compared to when you are not playing the game?
- What would you say improves about the behaviour in your group when you play the game?
- What would you say hasn't improved (or even gotten worse) about the behaviour in your group when you play the game?
- How would you describe changes in how you all get on together when you played the game?
- Describe how you feel in [the centre name] now after playing the game. Is it different than you felt before?
- Would you say there are any differences in the environment in [the centre name] after playing the game?
- If you could make any changes to the game we designed, what would you change?
 - Why or why not?
- What did you enjoy about working together to design the game?
 - What was the best part of working together to design this game?
- What didn’t you enjoy about designing the game?
- Do you think it would be a good idea for other groups to design a game like this?
 - Do you think they would enjoy it?
 - Why or Why not?
- Would you like to work together like this to design something again?
 - Why or Why not?

Appendix 32: Proposition Focus Group Interview Schedule

- What is behaviour?
 - Behaviour is a word that describes how we act throughout the day. Behaviour is the words and actions that we use. Our words and actions can be good or bad. Behaviours can be how we treat other people, how we work together with other people or how we act on our own. Behaviours are things like being kind to others, working together as a team, listening carefully and paying attention.
- What words do you think are the best way to explain to somebody what the behaviour of this group is like when everyone comes together?
- What do you think are the good things about the behaviour of this group?
- How does the behaviour in this group make you feel?
 - Is that different from how you feel when with different groups?
 - Or when you're on your own?
- What would you say is the best thing about this group's behaviour?
- What would you say is the worst thing about this group's behaviour?
- Can you describe how everybody in the group gets on together?
 - What words would you use to describe how everybody gets on?
 - Do you think everybody gets on well together?
- Can you tell me about a time when the group worked well together?
 - Or encouraged somebody?
- Can you tell me about a time when the group did not work well together?
- In what ways does the behaviour of this group affect you?
 - How might you act differently because of behaviour in this group?
 - Sometimes is this a good difference? - like helping people, doing homework quickly
 - Or sometimes is this a bad difference? - feeling shy, not wanting to speak
- How can you show someone that you care about them through your words and actions?
- In what ways might you show someone that you don't care about them through your words and actions?
- Are there things you would like to change about the behaviour in this group?
- Could the group work better together?
 - In what ways?
 - Get on better?

OUR DAILY SCHEDULE	
Today we are going to decide what time of day we will play our behaviour game.	
ACTIVITY	BEHAVIOUR DURING ACTIVITY - How we act and feel

OUR DAILY SCHEDULE

The worksheet displays a daily schedule organized into columns representing different parts of the day. The activities and times noted are as follows:

- Top Section (Left to Right):**
 - Homework (pink note)
 - 2:30 (blue note)
 - 3:15 (blue note)
 - Screening (pink note)
 - Happy people (green note)
 - Reading not to do homework (pink note)
 - Be good (green note)
 - Do Homework (green note)
 - Be nice (green note)
 - Not concentrate on Homework (pink note)
 - Be nice (green note)
- Middle Section (Left to Right):**
 - Looking out the window (pink note)
 - Screening (pink note)
 - Some people can be quiet (green note)
 - Watching (pink note)
 - Be nice (green note)
 - Be kind (green note)
 - Standing out badly (pink note)
 - 3:30 (blue note)
 - 4:00 (blue note)
 - Dinner (blue note)
- Bottom Section (Left to Right):**
 - Listening to music (green note)
 - Screening (pink note)
 - Be mean (pink note)
 - Training things (pink note)
 - Activity 2 (blue note)
 - 4:00 (blue note)
 - 4:30 (blue note)
 - Activity 1 (blue note)
 - 5:00 (blue note)
 - 6:30 (blue note)
 - 5:45 (blue note)
 - 5:00 (blue note)
 - 6:30 (blue note)
 - Activity 1 (blue note)
 - Activity 2 (blue note)
 - Activity 3 (blue note)
 - Activity 4 (blue note)
 - Activity 5 (blue note)
 - Activity 6 (blue note)
 - Activity 7 (blue note)
 - Activity 8 (blue note)
 - Activity 9 (blue note)
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 - Activity 97 (blue note)
 - Activity 98 (blue note)
 - Activity 99 (blue note)
 - Activity 100 (blue note)

THE MOST IMPORTANT BEHAVIOURS

Which behaviours should we focus on?
Organise the behaviours from most to least important

MOST IMPORTANT **LEAST IMPORTANT**

The worksheet displays the following behaviors arranged from most to least important:

- Singing (smiley face)
- Good work (smiley face)
- Building
- Quiet
- Open boxes
- Feeling disgraced
- Fight
- Lying (smiley face)
- Crying (smiley face)
- Screaming
- Softing
- Mean things (smiley face)
- Hiding (smiley face)
- Playing
- Silence

HOW CAN YOU WIN THE GAME?

Write or draw any ideas you have about how you can win the game

Maybe we could earn "points" on a scoreboard...

Maybe we could get a "star" at the end of the game...



HOW WE WIN OUR GAME

How will we decide on teams for the game? Boys vs Girls Half and Half All 1 team! Table by Table * UHU	How will we keep track of who is doing well during the game? Team Captain is 1 player! Leader Scoreboard * Start with 0 points * Start with 100 Points
Can more than one group win the game? Rock paper scissors One group * Different groups Only "good" people Everyone on team has to work together	How often will there be winners of the game? Everyday
How will you win the game? Half of total points * More than half Everybody on team needs to follow rules	What types of prizes could we win? Football Tokens and exchange for big prize Sweets * Option Teddy Colouring book Voucher Bouncy balls prize