Original Research Article

Improving Expressive Communication in Individuals with Severe Cerebral Palsy through Leisure-Based Accompaniment within a Community-Based Rehabilitation

Yohanes Subasno[1], Maria Yulianti[1], Martinus Irwan Yulius[1]

1 Sekolah Tinggi Pastoral - Yayasan Institut Pastoral Indonesia Malang, Indonesia
* Correspondence: subasno@gmail.com

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ABSTRACT

Aim: This study examined the effectiveness of a leisure-based accompaniment intervention in improving expressive communication among individuals with severe cerebral palsy within a community-based rehabilitation context, informed by inclusive educational psychology.

Method: A single-subject experimental design employing a multiple-baseline-across-participants arrangement with a maintenance phase was used. The study involved three individuals with severe quadriplegic cerebral palsy residing in a community-based rehabilitation setting. The Pastoral Accompaniment in Leisure (PAiL) intervention was implemented through structured leisure activities supported by visual communication media and responsive interaction. Expressive communication data were collected through direct observation and analysed using visual analysis, Percentage of All Non-overlapping Data (PAND), and Tau-U.

Results: The findings demonstrated consistent improvements in both verbal and non-verbal expressive communication across all participants during the intervention phase. Visual analysis showed positive changes in level and trend following intervention onset, with PAND values ranging from 91.67% to 100% and Tau-U values ranging from 0.94 to 1.00, indicating strong intervention effects across participants.

Conclusion: The findings provide preliminary evidence that leisure-based accompaniment within a community-based rehabilitation context can support improvements in expressive communication and communicative participation among individuals with severe cerebral palsy. Continued communicative support may be important for maintaining intervent

Implications: The findings suggest that community-based and leisure-oriented approaches may provide meaningful opportunities to support expressive communication among individuals with severe cerebral palsy, particularly in settings where access to specialised communication services is limited.

Keywords: Augmentative and alternative communication; communicative participation; community participation; complex communication needs; single-case design; visual supports

INTRODUCTION

Individuals with severe cerebral palsy experience complex and multidimensional challenges that extend beyond physical impairments. In addition to motor limitations, many encounter significant barriers in expressive communication, which may restrict their participation in education, social interaction, leisure activities, and community life (Mei et al., 2020; Pennington et al., 2020; Stadskleiv, 2020). Expressive communication is central to the ability to convey needs, preferences, emotions, choices, and intentions; therefore, limited expressive communication may increase dependency and reduce opportunities for psychosocial participation (Pennington et al., 2020). Communication abilities among individuals with cerebral palsy should be understood along a functional continuum, encompassing verbal, non-verbal, aided, and unaided forms of expression that are shaped not only by individual impairments but also by communicative partners, available supports, and environmental opportunities (Avagyan et al., 2021).

This understanding is consistent with the evidence base of Augmentative and Alternative Communication (AAC), which emphasizes that communication support for individuals with complex communication needs must recognize multiple modes of expression, including gestures, facial expressions, body movements, vocalization, symbols, pictures, and other visual communication systems (Beukelman & Light, 2020). Within this framework, symbol-based approaches such as the Picture Exchange Communication System (PECS) demonstrate the importance of structured visual supports and responsive communication partners in facilitating intentional communication (Bondy & Frost, 1994). Accordingly, expressive communication in individuals with severe cerebral palsy should not be limited to spoken language alone but should include diverse communicative behaviors that enable individuals to participate more actively in social and relational contexts.

The present study is also grounded in a participation-oriented understanding of disability. The ICF-CY framework conceptualizes functioning and participation as outcomes of dynamic interactions among body functions, activities, participation, environmental factors, and personal factors (World Health Organization, 2007). From this perspective, psychosocial participation is not determined solely by impairment severity but also by the extent to which environments provide meaningful opportunities for interaction, engagement, and social inclusion. Leisure participation is particularly relevant because leisure activities may offer intrinsically motivating, socially meaningful, and low-pressure contexts for interaction and communication development among individuals with disabilities (King et al., 2003; Law et al., 2006). Therefore, within inclusive educational psychology, communication is understood not merely as a functional skill, but as a foundational capacity for learning, agency, participation, and social belonging.

Cerebral palsy is a neurodevelopmental condition resulting from non-progressive disturbances in the developing brain and is frequently associated with impairments in motor control, cognition, perception, and communication (Patel et al., 2020). Beyond motor impairments, individuals with cerebral palsy frequently present with complex cognitive and communicative profiles that require systematic and context-sensitive assessment and support across developmental stages (Pennington et al., 2020; Stadskleiv, 2020). Although often classified primarily as a physical disability, contemporary perspectives emphasise the heterogeneous and multifaceted nature of cerebral palsy, including cognitive, communicative, and psychosocial dimensions that significantly shape developmental outcomes (Salomon, 2024; Santana et al., 2024). Severe forms, particularly quadriplegic cerebral palsy, are commonly accompanied by compounded difficulties affecting expressive and receptive language development (Mei et al., 2020; Stadskleiv, 2020). These limitations are frequently exacerbated by environmental factors, including low expectations, limited interaction opportunities, and caregiving practices that prioritise physical care over

communicative engagement (Mei et al., 2020). Consequently, individuals with severe cerebral palsy are often perceived as incapable of communication, reinforcing patterns of passivity and exclusion.

From an inclusive educational psychology perspective, communication barriers should be understood as relational and contextual rather than inherent deficits of the child (Singer et al., 2022). When individuals with cerebral palsy are provided with appropriate communicative opportunities, alternative communication systems, and responsive interaction partners, meaningful expressive behaviours—both verbal and non-verbal—can emerge (Pennington et al., 2020). Even minimally verbal or non-symbolic expressive communication contributes to participation in learning processes, social relationships, and emotional expression, and is associated with improved quality of life, autonomy, and psychosocial participation (Pennington et al., 2020; Rudebeck, 2020; Williams et al., 2021).

Previous studies have demonstrated that communication development in individuals with cerebral palsy can be effectively supported through interventions that utilise family and community resources rather than relying solely on clinical settings (Abidin et al., 2021). Such evidence underscores the relevance of Community-Based Rehabilitation (CBR) as a framework for supporting communication development in individual with severe cerebral palsy, particularly through approaches embedded in everyday interaction and community life. Contemporary CBR emphasises participation, empowerment, inclusion, and the integration of health, education, and social support within everyday community contexts (World Health Organization et al., 2010). Increasingly, understood as an approach that promotes participation, inclusion, and empowerment through engagement in everyday community life. Within such contexts, interaction, shared activities, and meaningful social participation provide important opportunities for communication development and psychosocial well-being among individuals with disabilities (King et al., 2003; Law et al., 2006; World Health Organization et al., 2010). In this context, communication interventions embedded in daily routines and leisure activities align closely with CBR principles by situating learning and rehabilitation within naturalistic, socially meaningful settings.

Leisure-based interventions represent a promising yet underexplored approach to supporting expressive communication in individuals with severe cerebral palsy. Leisure activities provide a low-pressure, intrinsically motivating context that encourages interaction, emotional expression, and shared attention (Fraser & Hannah, 2023; Steinhardt et al., 2021). Guided by inclusive educational psychology, leisure-based accompaniment functions as a relational intervention that prioritises responsiveness, scaffolding, and mutual engagement, consistent with socio-cultural learning theories in which communication emerges through supported participation rather than formal instruction alone (Vygotsky, 1978).

A growing body of research has demonstrated that expressive communication in individuals with severe cerebral palsy can be enhanced through Augmentative and Alternative Communication (AAC) interventions, including partner-assisted communication, speech-generating technologies, and symbol-based systems such as the Picture Exchange Communication System (PECS) (Beukelman & Light, 2020; Mei et al., 2020; Pennington et al., 2020). Existing studies have shown positive effects on communication performance, participation, and social interaction, particularly when interventions involve family members and other communication partners in natural environments (Pennington et al., 2020; Rudebeck, 2020). However, much of the available evidence has been generated within clinical, educational, or therapist-led contexts, with comparatively limited attention to communication interventions embedded in leisure activities and everyday community life.

This limitation is particularly evident within Community-Based Rehabilitation (CBR) settings, where communication support is often discussed conceptually as part of participation and inclusion but remains underexamined as a specific intervention target. Consequently, there is insufficient evidence regarding how leisure-based accompaniment within community-oriented environments may facilitate expressive communication among individuals with severe cerebral palsy, especially in low- and middle-income country contexts where access to specialised AAC services is frequently constrained. Addressing this gap requires research designs capable of capturing individual patterns of communicative change in real-world settings. Single-case experimental designs provide a rigorous and appropriate methodological approach for investigating intervention effects among individuals with complex disabilities, enabling detailed analysis of behavioural change and functional relations within small and heterogeneous populations (T. R. Kratochwill et al., 2012).

In response to this gap, the present study examines the effectiveness of a leisure-based accompaniment intervention in improving expressive communication among individuals with severe cerebral palsy within a community-based rehabilitation context. Grounded in inclusive educational psychology, the study employs a single-subject experimental design with multiple baselines across participants and a maintenance phase to assess changes in verbal and non-verbal expressive communication. By situating the intervention within everyday leisure activities and community life, this study seeks to contribute empirical evidence to inclusive education, community-based rehabilitation, and psychosocial support for individuals with complex disabilities.

AIM AND OBJECTIVES

Aim

The aim of this study was to examine the effectiveness of a leisure-based accompaniment intervention in improving expressive communication among individuals with severe cerebral palsy within a community-based rehabilitation context, informed by principles of inclusive educational psychology.

Objectives

Specifically, this study sought to:

- assess changes in verbal expressive communication of individuals with severe cerebral palsy following the implementation of the leisure-based accompaniment intervention;
- examine changes in non-verbal expressive communication across baseline, intervention, and maintenance phases; and
- evaluate the sustainability of expressive communication outcomes after the withdrawal of the intervention.

METHODS

Study Setting

The study was conducted in a community-oriented rehabilitation environment within a large inclusive residential complex managed by Bhakti Luhur Foundation, Malang, Indonesia. The setting functions as an integrated community-based rehabilitation ecosystem, comprising residential living facilities, inclusive and special education services, therapeutic and vocational programmes, and opportunities for social interaction within everyday community life. This environment reflects contemporary Community-Based Rehabilitation (CBR) principles that emphasise participation, inclusion, and psychosocial development within naturalistic contexts.

Study Design

This study employed a single-case experimental design using a multiple-baseline-across-participants arrangement with an additional maintenance phase. Single-case experimental methodology is particularly appropriate for populations with complex disabilities and limited sample availability, as it enables systematic examination of functional relations between intervention implementation and individual behavioural change while maintaining rigorous standards of experimental control (Epstein & Dallery, 2022).

Experimental control was established through the staggered introduction of the intervention across participants, such that changes in expressive communication were expected to occur only after the intervention was implemented in each tier. Replication of intervention effects across different baseline lengths strengthens internal validity by reducing the likelihood that observed changes are attributable to maturation, history, or other extraneous influences. This logic of staggered introduction and replication is defining feature of multiple-baseline designs and is widely recognised as a rigorous approach for demonstrating functional relations in educational and behavioural research. (Horner et al., 2005; T. R. Kratochwill et al., 2012; Subasno et al., 2021).

Participants and Sampling

Three individuals with severe quadriplegic cerebral palsy participated in the study. Participants were selected using purposive sampling based on the following criteria:

- diagnosis of severe cerebral palsy with quadriplegic involvement;
- absence of functional verbal speech;
- reliance on caregivers for daily living activities; and
- stable medical condition during the study period.

All participants resided within the rehabilitation community and engaged in daily routines supported by caregivers. Due to the nature of single-subject experimental research, the sample size was intentionally small and analytically focused on within-subject change rather than population-level generalisation. The identities of the three participants are presented in Table 1 below:

Table 1. Participant Characteristics

Identity		Participant-1	Participant-2	Participant-3
Male/Female	:	Female	Male	Male
Age Category	:	Adult	Adolescent	Adult
Type of CP	:	Quadriplegic	Quadriplegic	Quadriplegic
Communication Profile	:	Absence of functional verbal speech	Absence of functional verbal speech	Absence of functional verbal speech
Severity	:	Severe	Severe	Severe

Intervention: Leisure-Based Accompaniment

The intervention implemented was the Pastoral Accompaniment in Leisure (PAiL) model, a structured leisure-based accompaniment approach designed to stimulate expressive communication through relational interaction. The intervention was delivered during participants' leisure time and incorporated visual communication media (picture cards), musical elements, and screen-based stimuli to encourage both verbal and non-verbal expressive responses.

The PAiL model integrates principles from alternative and augmentative communication (AAC), including the Picture Exchange Communication System (PECS), alongside inclusive educational psychology concepts such as scaffolding and mediated interaction. The intervention was administered for 60 minutes per session, twice weekly, with intervention duration varying across participants in accordance with the multiple baseline design.

The experiment setting is shown below:

Table 2. Experiment Setting

Participant-1										
Session	W-1	W-2	W-3	W-4	W-5	W-6	W-7	W-8	W-9	
Condition	A	B1	B2	B3	B4	B5	B6	M	M	
Monday	Obsv	PAiL-1	PAiL-1	PAiL-1	PAiL-1	PAiL-1	PAiL-1	Obsv	Obsv	
Thursday	Obsv	PAiL-2	PAiL-2	PAiL-2	PAiL-2	PAiL-2	PAiL-2	Obsv	Obsv	
Participant-2										
Session	W-1	W-2	W-3	W-4	W-5	W-6	W-7	W-8	W-9	W-10
Condition	A	A	B1	B2	B3	B4	B5	B6	M	M
Tuesday	Obsv	Obsv	PAiL-1	PAiL-1	PAiL-1	PAiL-1	PAiL-1	PAiL-1	Obsv	Obsv
Friday	Obsv	Obsv	PAiL-2	PAiL-2	PAiL-2	PAiL-2	PAiL-2	PAiL-2	Obsv	Obsv
Participant-3										
Session	W-1	W-2	W-3	W-4	W-5	W-6	W-7	W-8	W-9	W-10	W-11
Condition	A	A	A	B1	B2	B3	B4	B5	B6	M	M
Wednesday	Obsv	Obsv	Obsv	PAiL-1	PAiL-1	PAiL-1	PAiL-1	PAiL-1	PAiL-1	Obsv	Obsv
Saturday	Obsv	Obsv	Obsv	PAiL-2	PAiL-2	PAiL-2	PAiL-2	PAiL-2	PAiL-2	Obsv	Obsv

Note: W = Week | A = Baseline | B = Intervention | M = Maintenance | Obsv = Observation

Prior to implementation, the Pastoral Accompaniment in Leisure (PAiL) intervention underwent expert review involving five specialists in educational psychology, psychology, special education, pastoral practice, and community-based rehabilitation, including practitioners with extensive field experience. The intervention was evaluated using a 16-item validation instrument rated on a five-point scale. Content validity was assessed using Aiken's V (Aiken, 1985), yielding an average coefficient of 0.82. This result indicated an acceptable level of content validity for the intervention as a whole, while also highlighting several aspects that warranted refinement. Accordingly, the intervention was revised based on the experts' recommendations prior to its implementation in the experimental phase.

Measures

Expressive communication was operationalised as the frequency of verbal and non-verbal expressive behaviours observed during each session. Verbal expressions included vocalisations, sounds, or attempts at speech, while non-verbal expressions included facial expressions (e.g., smiling, frowning), gestures, and observable affective responses. Data were recorded using a structured tally-based observation sheet developed for the study.

Data Collection Procedures

Prior to implementation, all instructors participated in a preparatory session to review the objectives, procedures, materials, and implementation steps of the Pastoral Accompaniment in Leisure (PAiL) intervention. A common intervention guide was used to promote standardisation across participants. Regular communication among the research team and instructors was maintained throughout the intervention period to support consistent implementation of the intervention procedures across sessions.

To facilitate systematic data collection, each participant was assigned one instructor and one observer throughout the study. Accordingly, expressive communication data for each participant were recorded by the same observer across the baseline, intervention, and maintenance phases. This arrangement was necessary because intervention sessions were conducted concurrently within the rehabilitation setting. Data collection followed a standardised protocol across all sessions to enhance comparability of observations. Observations focused on the frequency of predefined verbal and non-verbal expressive communication behaviours using the same recording procedures throughout the study.

Although a formal procedural-fidelity checklist was not employed, instructors followed the same intervention guide and implementation procedures throughout the study.

Data Analysis

Data were analysed primarily through visual inspection of graphical displays, focusing on changes in level, trend, variability, immediacy of effect, overlap, and consistency across study phases. To complement visual analysis, intervention effectiveness was quantified using two non-overlap effect-size indicators: Percentage of All Non-overlapping Data (PAND and Tau-U. PAND was retained as a supplementary descriptive index of non-overlap between baseline and intervention phases, while Tau-U was added to provide a more robust effect-size estimate consistent with contemporary recommendations for single-case intervention research. In calculating overlap, intervention data points that were equal to or lower than the highest baseline value were treated as overlapping points. The combined use of structured visual analysis, PAND, and Tau-U was intended to provide a more rigorous and transparent interpretation of intervention effects. Given the single-case experimental design, no group-based inferential statistical tests were applied; instead, intervention effects were interpreted through structured visual analysis and non-overlap effect-size indicators (Horner et al., 2005; T. Kratochwill et al., 2021; Parker et al., 2011).

Ethical Considerations

Ethical approval for this study was granted in accordance with the Research Ethics Guidelines officially enacted at Sekolah Tinggi Pastoral- Yayasan Institut Pastoral Indonesia Malang (STP- IPI Malang), as stipulated in Decree No. K/SK-156K/VIII/2022. Prior to participation, informed consent was obtained from legal guardians and authorised institutional representatives. Although two participants had reached chronological adulthood, their cognitive and communicative limitations prevented them from providing informed consent independently. Therefore, consent for participation was provided by the authorised institutional representatives responsible for their care and protection, in accordance with applicable ethical standards. All research procedures adhered to ethical principles for research involving persons with disabilities, with due regard to dignity, autonomy, confidentiality, and participant well-being. No financial or material incentives were provided.

RESULTS

This section presents the findings of the single-case experimental study examining the effects of a leisure-based accompaniment intervention on expressive communication among individuals with severe cerebral palsy. Consistent with the multiple-baseline-

across-participants design, results are presented separately for each participant and include visual analysis of changes in level, trend, and overlap across baseline (A), intervention (B), and maintenance (M) phases. Intervention effects are further supported by Percentage of All Non-overlapping Data (PAND) and Tau-U analyses (Table 3).

Table 3: Demographic Details of the samples.

Participant	Communication modality	Baseline n, mean, range	Intervention n, mean, range	Maintenance n, mean, range	Visual trend	Overlap Count	PAND	Tau-U
Participant 1	Verbal expression	2; 2.00; 2-2	12; 6.33; 3-10	4; 6.50; 6-7	Increased during intervention; partially maintained above baseline	0/12 (0.00%)	100.00 %	1.00
Participant 1	Non-verbal expression	2; 3.00; 3-3	12; 7.92; 3-13	4; 7.00; 6-8	Increased during intervention; partially maintained above baseline	1/12 (8.33%)	91.67 %	0.94
Participant 2	Verbal expression	4; 1.75; 1-2	12; 7.50; 4-10	4; 7.50; 7-8	Increased during intervention; maintained above baseline	0/12 (0.00%)	100.00 %	1.00
Participant 2	Non-verbal expression	4; 2.00; 2-2	12; 9.17; 4-14	4; 8.50; 8-9	Increased during intervention; maintained above baseline	0/12 (0.00%)	100.00 %	1.00
Participant 3	Verbal expression	6; 1.83; 1-2	12; 7.42; 2-10	4; 5.75; 5-6	Increased during intervention; partially maintained above baseline	1/12 (8.33%)	91.67 %	0.94
Participant 3	Non-verbal expression	6; 1.83; 1-2	12; 9.83; 6-12	4; 8.00; 7-9	Increased during intervention; partially maintained above baseline	0/12 (0.00%)	100.00 %	1.00

Note:
n: number of observation sessions within each phase;
Mean: average frequency of expressive communication per observation session;
Range: minimum–maximum observed values within each phase;
Overlap count: number and percentage of intervention data points that were equal to or lower than the highest baseline value;
PAND: Percentage of All Non-overlapping Data;
Tau-U: non-overlap effect size adjusted for trend.

This table presents the number of sessions, phase means, ranges, visual trend, overlap, PAND, and Tau-U values for verbal and non-verbal expressive communication across baseline, intervention, and maintenance phases. The table is provided to increase transparency in single-case data reporting and to complement the visual analysis presented in Figures 1–3.

Participant 1

During the baseline phase, Participant 1 demonstrated a consistently low frequency of expressive communication, with minimal variation across observation sessions. Both verbal and non-verbal expressions occurred infrequently, indicating limited spontaneous communicative behaviour prior to the intervention.

Following the introduction of the intervention, a clear increase in expressive communication was observed. Non-verbal expressive behaviours showed an immediate upward shift in level, while verbal expressions increased progressively across intervention sessions, although some fluctuations were noted. Visual inspection of the data revealed positive changes in level, trend, and overall performance for both verbal and non-verbal expressions following intervention onset, with minimal overlap between baseline and intervention phases.

During the maintenance phase, both verbal and non-verbal expressive communication showed a gradual decline relative to the highest levels achieved during intervention. However, performance remained consistently above baseline levels across all maintenance sessions. This pattern suggests that, although some attenuation of intervention effects occurred following the withdrawal of active support, substantial gains in expressive communication were retained. The findings indicate partial maintenance of treatment effect and suggest that continued opportunities for communicative engagement may be important for sustaining peak levels of performance over time.

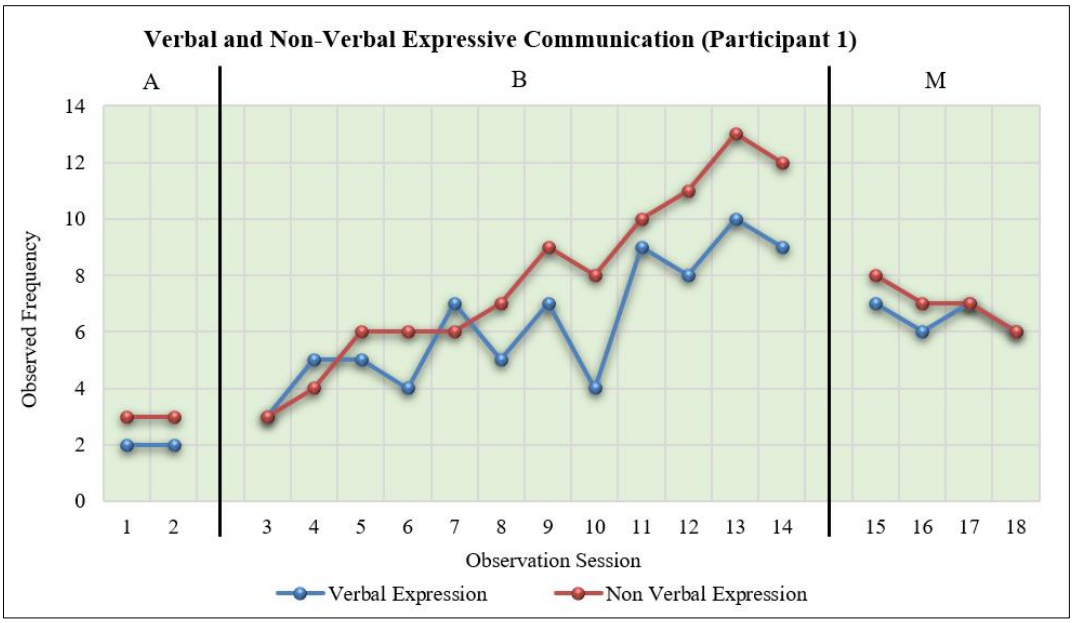

Figure 1. Verbal and non-verbal expressive communication across baseline (A), intervention (B), and maintenance (M) phases for Participant 1. The blue line represents verbal expression and the red line represents non-verbal expression. Vertical lines indicate phase changes. Values represent the observed frequency of expressive communication during each measurement session.

Analysis using the Percentage of All Non-overlapping Data (PAND) demonstrated high intervention effectiveness. The PAND value for verbal expressions was 100%, while the PAND value for non-verbal expressions was 91.67%, indicating a very high level of intervention effectiveness. These findings were further supported by Tau-U analysis. Tau-U values were 1.00 for verbal expression and 0.94 for non-verbal expression, indicating very large intervention effects and corroborating the visual-analysis findings.

Participant 2

Participant 2 exhibited very low and stable frequencies of expressive communication during the baseline phase, with minimal verbal and non-verbal expressions recorded across sessions.

Upon implementation of the intervention, both verbal and non-verbal expressive communication increased markedly. The increase was evident from the early intervention sessions and continued across subsequent sessions, despite some session-to-session variability. Visual inspection of the data indicated a clear change in level and trend between baseline and intervention phases, with no observable overlap between baseline and intervention data points.

During the maintenance phase, expressive communication frequencies decreased relative to the intervention phase. However, both verbal and non-verbal expressions remained consistently above baseline levels throughout the maintenance period.

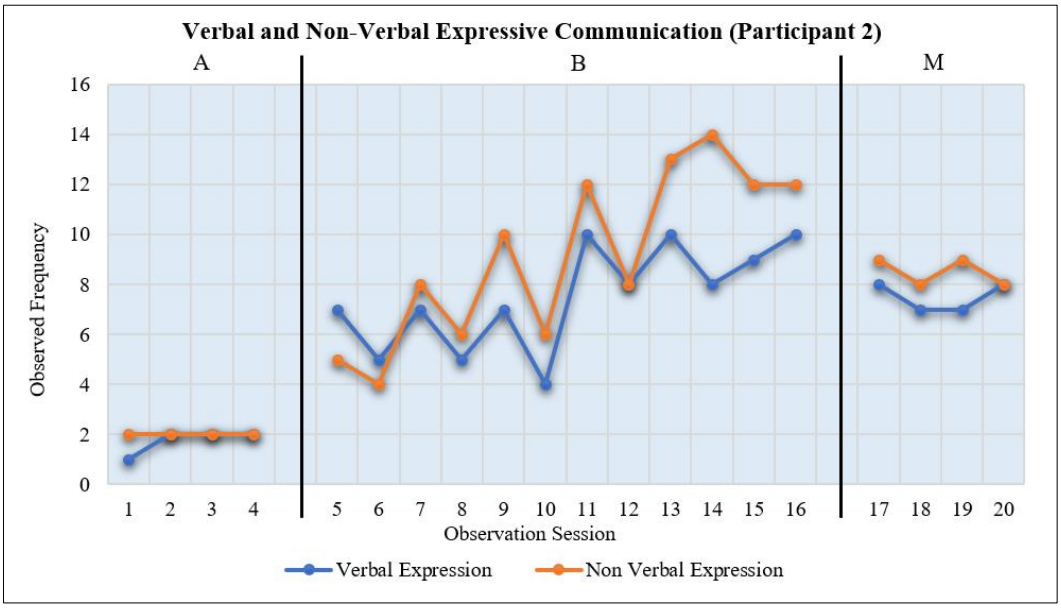

Figure 2. Verbal and non-verbal expressive communication across baseline (A), intervention (B), and maintenance (M) phases for Participant 2. The blue line represents verbal expression and the orange line represents non-verbal expression. Vertical lines indicate phase changes. Values represent the observed frequency of expressive communication during each measurement session.

PAND analysis revealed no overlapping data points between baseline and intervention phases for either verbal or non-verbal expressions, yielding 100% PAND values across both behaviours and indicating very high level of intervention effectiveness. These findings were further supported by Tau-U analysis. Tau-U values of 1.00 were obtained for both verbal and non-verbal expressions, indicating very large intervention effects and corroborating the visual-analysis findings.

Participant 3

For Participant 3, the baseline phase consisted of a longer observation period, during which verbal and non-verbal expressive communication remained consistently low, with limited variability across sessions.

Introduction of the intervention was associated with an increase in both verbal and non-verbal expressive communication. Although a brief decrease was observed during the early intervention sessions, subsequent sessions demonstrated an overall upward trend in expressive behaviours. Visual inspection of the data confirmed a positive change in level and trend across intervention sessions compared to baseline, with minimal overlap between baseline and intervention phases.

During the maintenance phase, expressive communication frequencies decreased relative to the intervention phase. However, both verbal and non-verbal expressions remained consistently above baseline levels throughout the maintenance period.

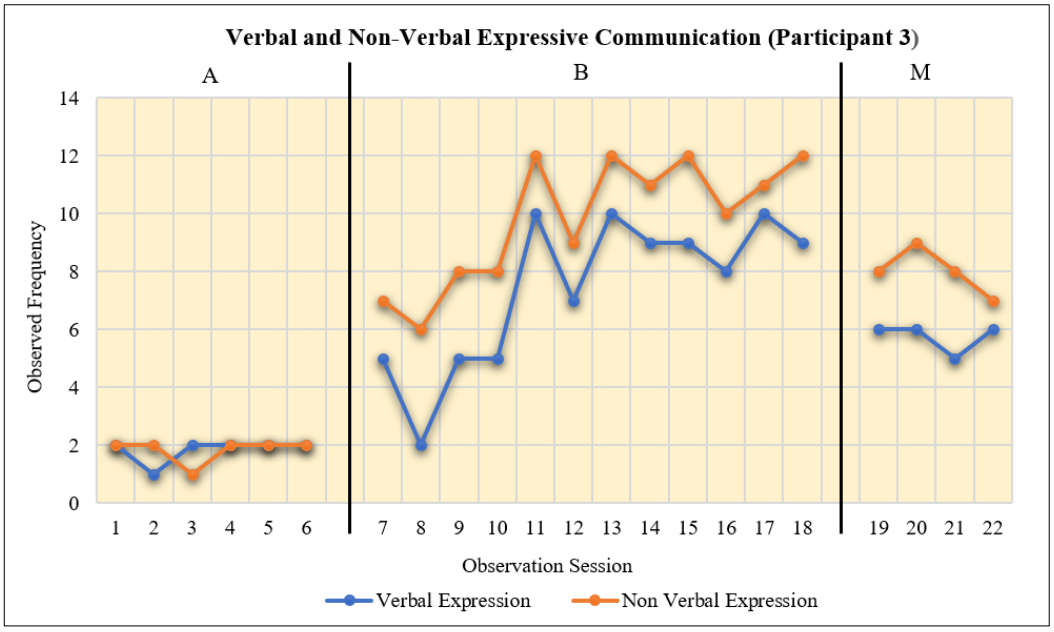

Figure 3. Verbal and non-verbal expressive communication across baseline (A), intervention (B), and maintenance (M) phases for Participant 3. The blue line represents verbal expression and the orange line represents non-verbal expression. Vertical lines indicate phase changes. Values represent the observed frequency of expressive communication during each measurement session.

PAND analysis showed a high level of intervention effectiveness. The PAND value for non-verbal expressions was 100%, while the PAND value for verbal expressions was 91.67%, indicating very high intervention effectiveness. These findings were further supported by Tau-U analysis. Tau-U values were 0.95 for verbal expression and 1.00 for non-verbal expression, indicating very large intervention effects and corroborating the visual-analysis findings.

Summary of Results

Across all three participants, the leisure-based accompaniment intervention was associated with consistent increases in both verbal and non-verbal expressive communication during the intervention phase. High PAND values (ranging from 91.67% to 100%) and Tau-U values (0.94 - 1.00) indicated strong intervention effects across participants. Visual analysis further demonstrated positive changes in level and trend following intervention onset, with minimal overlap between baseline and intervention phases.

A consistent pattern was observed during the maintenance phase. Although expressive communication frequencies remained above baseline levels for all participants, decreases were evident following the withdrawal of active intervention support. This pattern suggests that the intervention effects were largely maintained but attenuated over time, indicating that continued support may be important for sustaining peak levels of expressive communication.

DISCUSSION

This study examined the effectiveness of a leisure-based accompaniment intervention in improving expressive communication among individuals with severe cerebral palsy within a community-based rehabilitation context. The findings showed consistent increases in both verbal and non-verbal expressive communication across all participants

during the intervention phase. These improvements were supported by visual analysis, high PAND values ranging from 91.67% to 100%, and Tau-U values ranging from 0.94 to 1.00. Taken together, these findings indicate a strong intervention effect and suggest that leisure-based, relational accompaniment can facilitate expressive communication among individuals with severe cerebral palsy (Horner et al., 2005; T. Kratochwill et al., 2021).

From the perspective of inclusive educational psychology, the observed improvements can be understood not merely as gains in isolated communication skills but as outcomes of expanded interactional opportunities. Communication among individuals with cerebral palsy exists along a functional continuum and is shaped by verbal, non-verbal, relational, and environmental factors. In this study, the intervention created structured yet natural opportunities for participants to express needs, emotions, preferences, and intentions within meaningful activities. This supports the view that communication is foundational for participation, agency, and inclusion, rather than simply a functional ability (Andersen, 2022; Edström et al., 2024; Speroni et al., 2026).

The findings also align with the augmentative and alternative communication (AAC) literature, which emphasises multimodal forms of expression, including gestures, facial expressions, body movements, symbols, and other aided or unaided communication supports. Although this study was not designed as a formal AAC trial in a clinical setting, the intervention incorporated AAC-compatible principles by recognising both verbal and non-verbal expressions as meaningful communicative acts. This is particularly important for individuals with severe cerebral palsy, whose communicative capacity may be underestimated when expression is judged only by spoken language (Avagyan et al., 2021; Pennington et al., 2020).

A distinctive contribution of this study lies in situating communication support within leisure-based accompaniment rather than in a purely clinical or instructional format. Leisure activities provided a low-pressure and motivating context for interaction, emotional expression, shared attention, and social engagement. The findings suggest that leisure can function as a communicative space in which participants are not merely recipients of care but active partners in interaction (Fraser & Hannah, 2023; King et al., 2003; Law et al., 2006; Steinhardt et al., 2021).

The results further support the relevance of Community-Based Rehabilitation (CBR) as a framework for communication development. The intervention was implemented within a community-oriented living environment where daily routines, relationships, and leisure activities formed part of participants' lived experience. This ecological embedding is consistent with CBR principles of participation, empowerment, inclusion, and contextual support. In developing-country contexts, where access to specialised communication services may be limited, community-based and relational approaches may offer a feasible pathway for strengthening communicative participation (Abidin et al., 2021; World Health Organization et al., 2010).

Methodologically, the use of a single-case experimental design with multiple baselines across participants was appropriate for the small and heterogeneous sample. The staggered introduction of the intervention strengthened the logic of experimental control by showing that increases in expressive communication occurred after the intervention was introduced in each tier. The addition of Tau-U strengthened the analysis by complementing PAND with a more current non-overlap effect-size index. Thus, the findings are supported by convergent evidence from visual analysis, PAND, and Tau-U (Epstein & Dallery, 2022; Horner et al., 2005; T. Kratochwill et al., 2021).

At the same time, the findings should be interpreted with methodological caution. The baseline phase for Participant 1 was limited to two observations, and Participant 2 had four baseline observations. This constrained the evaluation of baseline stability and trend and therefore reduces the strength of causal inference. Although the staggered

multiple-baseline pattern supports the functional relation between the intervention and behavioural change, future studies should employ longer and more stable baseline phases to strengthen internal validity (Horner et al., 2005; T. R. Kratochwill et al., 2012).

The maintenance findings require careful interpretation. Across all participants, expressive communication declined after the withdrawal of active intervention support. Although performance remained above baseline levels, the consistent downward trend during maintenance suggests that the highest levels of expressive communication may have depended partly on continued interactional scaffolding, responsive communication partners, and access to structured communicative opportunities. Therefore, the results indicate meaningful improvement during intervention, but only partial maintenance after active support was reduced (Mei et al., 2020; Pennington et al., 2020; Smith & Hustad, 2016).

This maintenance pattern is theoretically important. Expressive communication among individuals with severe cerebral palsy is not simply an individual competence that, once acquired, remains stable independently of context. Rather, it is relational and environmentally mediated. The decline during maintenance suggests that communication gains may require ongoing opportunities for practice, partner responsiveness, and continuity of support within daily routines. From a CBR perspective, the finding that communication gains declined during the maintenance phase when structured support was reduced highlights the need for caregiver and staff capacity-building to sustain communicative engagement beyond the formal intervention period (Singer et al., 2022; Vygotsky, 1978; World Health Organization et al., 2010).

Overall, this study contributes to literature by demonstrating that leisure-based accompaniment embedded within community-based rehabilitation enhances verbal and nonverbal communication among individuals with severe cerebral palsy. The findings extend existing AAC, inclusive education, and CBR literature by showing that communication support can be meaningfully implemented through relational, everyday, and leisure-based interaction. However, the maintenance results also indicate that sustained communicative improvement may require continued environmental support rather than short-term intervention alone (Avagyan et al., 2021; Edström et al., 2024; Fraser & Hannah, 2023; World Health Organization et al., 2010).

CONCLUSION

This study provides empirical evidence that a leisure-based accompaniment intervention can support improvements in both verbal and non-verbal expressive communication among individuals with severe cerebral palsy within a community-based rehabilitation context. Across all participants, expressive communication increased following the introduction of the intervention, as demonstrated through visual analysis and supported by high PAND and Tau-U values, indicating strong intervention effects. The findings suggest that communication development may be meaningfully facilitated when communicative opportunities are embedded within leisure activities, everyday interactions, and supportive social relationships. Rather than positioning communication as an isolated clinical skill, the results highlight the potential value of relational and context-responsive approaches that promote participation and communicative engagement in naturalistic environments.

At the same time, the decline observed during the maintenance phase indicates that the highest levels of performance were not fully sustained following the withdrawal of active intervention support. Although expressive communication remained above baseline levels, the findings suggest that continued opportunities for interaction and communicative support may be important for maintaining intervention gains over time.

Overall, this study contributes to the growing literature on communication support, inclusive education, and community-based rehabilitation by demonstrating the potential

of leisure-based accompaniment as a community-embedded intervention approach. While the findings should be interpreted within the limitations of a single-case experimental design and a small sample, they provide preliminary evidence supporting the relevance of relational, participation-oriented interventions for individuals with complex communication needs.

IMPLICATIONS

Implications for Practice

The findings of this study suggest that caregivers, educators, and rehabilitation practitioners can support expressive communication in individuals with severe cerebral palsy by embedding communication opportunities within leisure activity and everyday interaction. Leisure-based accompaniment, combined with visual supports and responsive communication partners, may provide a practical and context-sensitive approach that can be implemented within community-based rehabilitation settings.

The maintenance findings further indicate that communication gains may require ongoing support beyond the formal intervention period. Therefore, caregivers and support staff should be encouraged to recognise, respond to, and reinforce both verbal and non-verbal forms of expression in daily routines. Strengthening the communication capacity of those who interact regularly with individuals with severe cerebral palsy may contribute to sustaining communicative participation and reducing the risk of declining performance after active intervention has ended.

These findings highlight the importance of creating supportive communicative environments in which individuals with severe cerebral palsy are recognised as active participants in social interaction rather than passive recipients of care.

Implications for Inclusive Education and Rehabilitation

From an inclusive educational psychology perspective, the findings suggest that communication development should be understood as a relational and context-dependent process rather than solely as an individual competence. The observed improvements in expressive communication occurred within environments that provided structured opportunities for interaction, participation, and meaningful engagement. This supports the view that communication is closely linked to participation, agency, and social inclusion.

For rehabilitation practice, the findings reinforce the value of community-oriented approaches that integrate communication support into everyday activities and social relationships. In contexts where access to specialised communication services may be limited, community-based rehabilitation settings can provide important opportunities for fostering communicative participation. The decline observed during the maintenance phase further highlights the importance of creating sustainable support systems that extend beyond time-limited interventions. Consequently, communication-focused strategies should be embedded within broader inclusive education and rehabilitation programmes that actively involve caregivers, educators, and community members in supporting ongoing communicative engagement.

Implications for Research

This study demonstrates the value of single-case experimental designs for investigating interventions involving populations with low prevalence, heterogeneous characteristics, and complex support needs. The combination of visual analysis, PAND, and Tau-U provided complementary evidence regarding intervention effects and contributed to a more comprehensive interpretation of behavioural change.

At the same time, several directions for future research emerge from the present findings. Future studies should consider employing longer baseline phases and extended maintenance observations to strengthen the assessment of intervention durability.

Research may also explore variations of leisure-based accompaniment, caregiver-mediated implementation models, and the integration of augmentative and alternative communication supports within community-based settings. In addition, combining single-case experimental designs with qualitative approaches may provide a deeper understanding of participants' lived experiences, communicative participation, and the contextual factors that influence the sustainability of communication outcomes over time.

Limitations

Several limitations should be considered when interpreting the findings of this study. *First,* the study employed a single-case experimental design with only three participants. Although this design is appropriate for examining individual behavioural change in populations with complex disabilities, the small sample size limits the generalisability of the findings to broader populations. In addition, the baseline phase was relatively short for some participants, particularly Participant 1, which may limit the strength of causal inference despite the use of staggered intervention introduction across participants.

Second, limitations relate to measurement reliability and procedural fidelity. Expressive communication was measured through frequency counts of predefined verbal and non-verbal behaviours, which may not fully capture the qualitative richness, intentionality, or communicative meaning of participants' responses. Formal interobserver agreement (IOA) was not calculated because each participant was observed by one designated observer across baseline, intervention, and maintenance phases. Similarly, procedural fidelity was not formally quantified using a structured fidelity checklist, although instructors received preparatory orientation and followed a common intervention guide. Future studies should include periodic dual-observer sessions and formal fidelity monitoring to strengthen reliability and methodological transparency.

Third, the maintenance phase was short, and expressive communication decreased after the withdrawal of active intervention support, although scores remained above baseline levels. This suggests that the intervention effects were partially maintained but may require continued communicative opportunities and partner support over time. Moreover, the study was conducted in a specific community-based rehabilitation setting, which may differ from other educational, clinical, or community contexts. Future research should involve longer follow-up periods, more diverse settings, and larger participant samples to examine the durability and transferability of leisure-based communication support.

DECLARATION

Data Availability Statement: The Pastoral Accompaniment in Leisure (PAiL) intervention model, raw research data, observation instruments, and validation results are available from the corresponding author upon reasonable request. To protect participant confidentiality and comply with ethical requirements, access to these materials will be considered only for legitimate academic or research purposes and, where necessary, subject to institutional approval.

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