A provisional theory of change and basic logic model for Intensive Comprehensive Aphasia Programmes (ICAPs).

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Running head: Theory of change and logic model for ICAPs

Abstract

Purpose:

People with aphasia have a comprehensive range of needs due to their language impairment and its resulting impact on everyday life. Aphasia can be compounded by environments and contexts which are not aphasia friendly. This calls for a range of speech and language interventions targeting the language impairment and its consequences, as modelled by the International Classification of Functioning, Disability and Health (ICF). Intensive Comprehensive Aphasia Program/mes (ICAPs) aim to tackle this issue by providing a range of

interventions in a time-limited schedule. However, when this service delivery model was developed, the rationale and evidence base for each component of the model was not clearly defined or mapped out. Applying Theory of Change (TOC) may be helpful in detailing how the therapeutic input is hypothesized to produce desired change. A theory of change is co-constructed with key stakeholders, people with aphasia in this instance. This process can be mapped on a logic model (LM), and potential negative or adverse outcomes (dark logic) can also be considered. This article provides an overview of ICAPs, key gaps in the literature, and provides a methodological example of how TOC, logic modelling, and dark logic can be applied to an ICAP despite some limitations with the approach.

Methods:

An extensive scoping of the literature and discussion with aphasia researchers produced an initial TOC which was then refined by people with aphasia (n = 8) using focus group methodology. The focus group explored potential adverse outcomes of an ICAP using dark logic modelling. The TOC was mapped onto a logic model.

Results:

A provisional TOC and LM with dark logic for an ICAP was produced, though inclusion of other stakeholder groups is required for thorough application of a theory of change to ICAPS.

Conclusions:

There are challenges in applying TOC, LM, and dark logic modelling to a service delivery model. However, this approach was useful in mapping an ICAP in a methodological manner and in identifying how the theoretical underpinning, design, outcome measurement, and evaluation of an ICAP including a consideration of risks might be enhanced.

Keywords: Theory of change; logic model; intensive comprehensive aphasia programme.

Introduction:

The purpose of this paper is to provide readers with a comprehensive introduction to the Intensive Comprehensive Aphasia Programme (ICAP) service delivery model, and an overview of how theory of change (TOC), logic models (LMs), and dark logic modelling can be applied to ICAPs to improve research and clinical decision making in relation to this service delivery model.

Intensive Comprehensive Aphasia Program/mes (ICAPs)

Intensive Comprehensive Aphasia Program/mes (ICAPs) have been described in surveys and scoping reviews e.g., (Rose et al., 2013; Monnelly et al., 2022). An ICAP is not an intervention but a service delivery model, providing a wide range of therapies to a group of people with aphasia in an intensive bootcamp style. An ICAP combines different therapeutic philosophies and evidence bases. The evidence base for massed practice or intensive treatment which was in focus when ICAPs were developed (Bhogal et al., 2003; Cherney et al., 2008; Kleim and Jones 2008; Pulvermüller et al., 2001; Pulvermüller & Berthier., 2008) has been married with the evidence that people with aphasia (PWA) and their families desire a wide range of treatment outcomes, so the focus should be across the ICF not on language impairment alone (Wallace et al., 2017; Worrall et al., 2010). The underlying premise of an ICAP is that providing intensive practice alongside comprehensive treatment (therapeutic approaches across the ICF) should produce better results in remediating the aphasic language impairment and multiple positive therapeutic outcomes to address the range of impacts of aphasia.

The definition of an ICAP was proposed at ASHA 2011 (Cherney et al., 2011) and in a survey paper in 2013 (Rose et al., 2013). The core components of an ICAP are outlined in Figure 1 with

71 the minimum standard of ICAP intensity set at 3 hours of therapy/day, 5 days/week, x 2 weeks
72 (Rose et al., 2013). Use of technology/computers/apps was not part of the original definition but
73 was added in a 2021 survey (Rose et al., 2021).

74

75 [Insert figure 1 here]

76

77 There have been several published reports of positive outcomes from ICAPs (e.g., Babbitt et al.,
78 2015; Griffin-Musick et al., 2020; Hoover et al., 2017, Leff et al., 2023; Winans-Mitrik et al.,
79 2014), however, questions remain about how ICAPs work. Firstly, outcomes from ICAPs have
80 typically failed to match the hoped for range of improvements. A systematic review found that
81 gains are often confined to the impairment domain, such as enhanced naming (Monnelly et al.,
82 2024), with limited improvement on wider measures of communication activity or quality of life.
83 However, a recent study (Dignam et al., 2025a) found significant change on a wide variety of
84 measures, so the data here is mixed. It should be noted that certain improvements are easier to
85 measure and evidence – such as improvement in naming (Brady et al., 2025; RELEASE
86 Collaborators, 2022). On the other hand, quality of life is a complex construct influenced by
87 multiple factors, less easy to change in a constrained period, and difficult to evaluate (Cruice et
88 al., 2009). Thus, comprehensive change may be difficult to measure and evidence. Secondly,
89 variations to the ICAP model have evolved. A programme that varies one of the core
90 components of an ICAP [as listed in Figure 1] is termed a modified ICAP (mICAP) (Rose et al.,
91 2021). The most researched mICAP is the CHAT programme in Queensland Australia, which
92 provides less intensive input than a traditional ICAP. This deviation was based on a comparative
93 trial which found that less intensive ICAPs had equal or superior outcomes to an intensive ICAP
94 (Dignam et al., 2015). It is important to consider whether the original ICAP definition of intensity
95 is in keeping with newer research on intensity. Thirdly, although an ICAP must provide all

components to qualify as an ICAP (see figure 1), the content and weighting of therapy often vary across participants (Monnelly et al., 2022). And finally, no rationale has been developed for the superiority of ICAPs when compared to other potential service delivery models.

A basic overview of theory of change, logic modelling, and dark logic modelling

A theory of change (TOC) is an approach or tool detailing how an intervention is thought to affect change (De Silva et al., 2014; Anderson, 2004). It involves using the evidence base/rationale and stakeholder knowledge to map how intervention inputs are thought to produce the desired long-term outcome/impacts of an intervention. Using a TOC framework allows for the inclusion of a range of theories, depending on what is relevant to the intervention e.g., behaviour change theory (Cane et al., 2012). This approach has been used in public healthcare interventions (Breuer et al., 2015). However, it has been argued that there is lack of guidance and detail on how to integrate different forms of evidence (i.e., the literature and stakeholder views) to form a TOC (Romão et al., 2023).

Logic modelling is often used in conjunction with TOC to visually represent the links between intervention inputs, activities, outputs, outcomes, and impacts (Mills et al., 2019; W.K. Kellogg Foundation, 2004).

Dark logic modelling is a means of hypothesizing possible unwanted treatment outcomes (Bonell et al., 2015). Applying TOC alone may restrict the focus to desired positive outcomes from therapy, especially as some approaches to TOC suggest starting with the desired outcome in mind and working backwards (Anderson, 2004). With all healthcare interventions there is the risk of negative or harmful side effects. Examples include errors by omission (e.g., not exploring a person's need for psychological approaches to aphasia therapy) or errors by commission (e.g., impairment-based intervention producing increased awareness of impairment and related

psychological distress) (Rodziewicz et al., 2024). This has been acknowledged for public health interventions and health promotion (Gugglberger, 2018; Pitt et al., 2020), but research from Australia has cautioned that policy makers and practitioners underestimate the potential for intervention to cause harm (Wolfenden et al., 2024). There is also the paradoxical argument that any positive new treatment risks inflicting harm on those who cannot access it, i.e. these individuals suffer from the psychological ill effects of knowing that there is an intervention that might help them, but which is unavailable (Crocker et al., 2025).

There are different approaches to outlining intervention content and underlying theory. Readers may be familiar with the Rehabilitation Treatment Specification Scheme (RTSS) which is a system for describing treatments systematically by focusing on what clinicians do in therapy to effect change (Van Stan et al., 2019). Terms used when applying the RTSS include "mechanisms of action", (how a therapeutic input is thought to affect change) and "active ingredients" (what components of the intervention achieve change). For examples applied to aphasia see Fridriksson et al. (2022) and Cherney et al. (2022). The RTSS is useful when mapping out the micro level detail of individual treatments. However, it would be challenging to apply to a service delivery model which is why it was not our chosen methodology for this paper. Another approach to intervention development and specification is realist evaluation (Pawson and Tilley, 1997) which is concerned with what works for whom and in what context/circumstance. In this paper we focus on the initial step of building the LM and TOC behind an ICAP. We would argue that realist evaluation or hypothesising about why an ICAP may not work for all participants, is a secondary step in ICAP research.

Why a theory or change and logic modelling is important for ICAPs

Without a clearly defined theory of change or logic model, ICAPs lack the conceptual foundation needed to guide their design, delivery, and evaluation. The absence of a TOC or LM

contributes to variability across ICAPs in terms of content (Cherney et al., 2011; Monnelly et al., 2022; Rose et al., 2013; Rose et al., 2021) and outcomes (Monnelly et al., 2023b) which hinders efforts to identify which components drive change.

A TOC for ICAPs visualised on a LM is important for several reasons. Firstly, a LM defines and outlines the key components of therapy, detailing what variations are permissible and which content is essential. Secondly, a thorough understanding of what type of interventions suit an ICAP service delivery model versus interventions which do not suit an ICAP model is important. Some interventions for aphasia that may be beneficial do not necessarily fit the ICAP model. These may include interventions that evolve over time or require long-term delivery, such as those building self-management skills (Fryer et al., 2016, Wray et al., 2025) and coping mechanisms (Jewell et al., 2025), treatments that deliver long-term peer support (Hilari et al., 2021) or family/carer support (Hernandez et al., 2024), and psychological therapies aiming to reduce related mental health disorders (Baker et al., 2017), rebuild identify (Corsten et al., 2013) or explore post-traumatic growth (e.g., Menger et al., 2021). Of course, it is acknowledged that no service delivery model will provide a fully comprehensive service. Thirdly, a LM and TOC can initiate a research agenda which attempts to identify the active ingredients of an ICAP and (potentially) any redundancies. For example, studies might compare ICAPs with and without the education component. Similar approaches have been argued for in the context of other complex, multi-component interventions, for example treating panic disorder (Tolin et al., 2023). Fourthly and finally, there are risks to continuing to research the ICAP model without a TOC/LM. Non-responders are reported in the ICAP research (Worrall et al., 2024; Dignam et al., 2025a, Monnelly et al., 2023b). An a priori TOC/LM with dark logic modelling may help to determine whether non-response or limited response is linked to the outcomes used or the type of therapeutic inputs provided.

This paper therefore does not ask “do ICAPs work?” but instead focuses on proposing a provisional TOC for an ICAP both from the literature and from the perspective of people with aphasia, mapped onto a LM with dark logic included.

Method:

Methodological limitations

Before we begin, we should acknowledge some limitations to the methods used in this paper. Many theoreticians have rightly stressed the importance of context when determining the content, evaluation and implementation of an interventions (Moore et al, 2015; Moore and Evans, 2017; Shrubsole et al, 2023). Examples of influential contextual factors include staffing levels and staff knowledge and skill. Nevertheless, this paper will discuss a theoretical (or ‘Platonic’) version of an ICAP, isolated from its context. This Platonic version is outlined by the core components of an ICAP (Rose et al., 2013) as seen in figure 1. It is important to note that individual ICAPs will have different contextual factors, so our Platonic TOC is only a starting point. Additionally, although we have involved the primary stakeholder group (people with aphasia), other stakeholder groups should be involved in developing a TOC e.g., family/carers and intervention providers.

Our approach

Using the outline by De Silva et al. (2014), an initial theory of change with dark logic modelling (theorising potential adverse outcomes) was developed by first author KM. This was done by compiling the evidence base for each ICAP component (see Figure 1) which was then critiqued by the other authors JM, LD, MC. Presentations on each component of the theory of change alongside dark logic modelling were then shared with the wider aphasia research team at City St George’s, University of London, and their feedback was integrated. As noted in the introduction,

193 though stakeholders should be involved in TOC, LM and dark logic creation (Bonell et al., 2015;
194 Skivington et al., 2021) there is limited guidance on how to do so (Romão et al., 2023). Catlow et
195 al. (2022) interviewed treatment providers about harmful effects of colonoscopy audit
196 practices, which then fed into a dark LM. Our approach was to format the initial theory of
197 change and dark logic modelling into aphasia friendly presentations. These presentations
198 formed the primary discussion content of a focus group study ethically approved by the
199 Language & Communication Science Proportionate Review Committee at City St George's,
200 University of London ETH2425-1001 'The views of people with aphasia on ICAPs (Intensive
201 Comprehensive Aphasia Programmes)'. Participants provided informed consent for the study,
202 facilitated in an aphasia-friendly manner. Consent was provided to quote participant
203 statements anonymously. Full detail on the focus groups is outlined using the COREQ (Tong et
204 al., 2007) – see supplementary materials.

205 *Focus groups*

206 Eight PWA were recruited to attend six focus group sessions each. Four participants attended
207 an online group and four attended an in-person group – i.e., a total of 12 focus groups were run
208 by the researcher KM. The online group included members with significant physical disabilities
209 and from a wide geographic area for whom travel would have been impractical. Full detail on
210 participants is provided in supplementary materials using the DESCRIBE checklist and the
211 COREQ. Four participants (split between both groups) had experience of either an in-person or
212 online ICAP run by different providers. In-person focus group sessions were audio recorded, and
213 online focus groups were video recorded. Although recruits had mild-moderate aphasia and all
214 used verbal communication, aphasia-friendly materials were supplied to enable total
215 communication e.g., markers/paper/picture symbols/print outs, and understanding was
216 facilitated by regular comprehension check-ins, breaks for questioning, and recaps. Materials
217 for the online group were adapted to aid total communication during the session (e.g., using

online whiteboards and sticky notes and materials posted to participants). The group facilitator KM was careful to respond to nonverbal contributions, such as gestures and facial expressions. Interpretations of these were voiced, so that they would feature on the audio recording, for example, “your facial expression suggests you disagree, can you tell me more?”

Content was presented using aphasia-friendly PowerPoint slides. Each session involved 1) An overview of last week’s theme and summary of views presented by focus group participants for review, debate, and ratification, 2) An aphasia-friendly critical analysis of the day’s theme presented by KM e.g., the evidence base on intensive aphasia therapy, 3) presentation of the researcher-informed TOC on that theme, 4) Canvassing opinion from participants that supported or refuted the TOC, 5) Questioning on possible dark logic for each theme e.g., “can you think of any negatives of intensive aphasia therapy/is there anything you did not like about intensive aphasia therapy”? Each session focused on an ICAP component e.g., 1:1 and group therapy. Session six was a presentation and discussion of the co-created theory of change with planned debate, adaptation, and ratification of the final product. There were no formal topic guides for each session since the theme was pre-determined. Audio/video recordings were transcribed with the help of university approved artificial intelligence transcription software (on Microsoft Word or Zoom) which was double checked by KM.

Analysis

As the stakeholders provided input on pre-determined themes, comprising the core components of an ICAP (Rose et al., 2013), a thematic analysis was not used to generate themes from the data. Rather, our methodology was similar to that employed by Northcott et al (2025), who also ran iterative co-design workshops with pre-determined topics. Field notes were made during and after focus group sessions. The range or semantic edges of the data were mapped and visualised on a PowerPoint. This domain summary (e.g., views on intensive therapy) was presented for member checking, amendments and agreement. The result of this

analysis showed the range of participant views, the number of participants expressing key points, and areas of consensus. Discussion between the research team ensured the full range of views produced during focus group workshops were accurately reflected.

Results

A provisional theory of change is outlined below for each ICAP component. Stakeholder input is specifically highlighted to identify the influence it had on the TOC. Pseudonyms are used – see table 1.

1. High intensity and high dose therapy

ICAPs provide on average 4.5 hours of therapy a day, 5 days a week, with a dose of over 100 hours (Monnelly et al., 2022; Rose et al., 2013, 2021) – see full detail in supplementary material. The intensity and dose schedule provided by an ICAP (at least 3 hours/day, 5 days/week, for at least 2 weeks) followed evidence at the time that massed practice was preferable for language recovery post stroke to capitalise on neuroplastic recovery (see Kleim and Jones 2008, Raymer et al., 2008). It is a similar schedule to that delivered by Pulvermuller et al. (2001) who found superior outcomes when 30-35 hours of therapy was delivered over two weeks rather than four weeks. Contemporary research on dose recommends >20-50 hours (RELEASE., 2022). There is evidence for intensity of 3+ hours/week (Brady et al., 2025). A clinical real-world study of 448 PWA found 59-63% responded to (achieved change on a measure of language ability) intensive SLT of 10 hours/week at an average dose of 68 hours (Peitz et al., 2024). The literature suggests that some PWA can tolerate high intensity high dose therapy (Babbitt et al., 2022; Pierce et al., 2024) and welcome it (Kincheloe et al., 2022). SLTs engaging in ICAPs have offered positive views and experiences of intensive aphasia treatment (Babbitt et al., 2013; Scharp et al., 2024).

However, the evidence base on intensity has noted that a less intensive/dispersed ICAP schedule can offer equal or superior outcomes (Dignam et al., 2015). Other non-ICAP aphasia studies and reviews have found/noted that high intensity therapy was not superior to lower intensity regimes (Brady et al., 2016; Dignam et al., 2016; Godecke et al., 2021; Middleton et al., 2020; Monetta et al., 2021; Pierce et al., 2021; Rose et al., 2022; Stahl et al., 2018; Thomas et al., 2020). A systematic review on maintenance post intensive aphasia intervention (including ICAPs) found only 1 in 5 participants *made and maintained* gains (Menahemi-Falkov et al., 2022). Additionally, there is limited evidence for the substantially higher doses of c. 100 hours provided on some ICAPs. As a result, ICAP practices for the LIFT/CHAT ICAP in Australia (Dignam et al., 2025b; Worrall et al., 2024) have opted for a lower intensity regime (c. 8 hours/week) rather than the 15 hours set out in the original definition.

In considering dark logic, there is evidence that PWA do not universally like, tolerate or choose high intensity high dose therapy (Babbitt et al., 2022; Devane et al., 2025). Rates of refusal of ICAP intervention have been reported at 20-69% (Worrall et al., 2024; Dignam et al., 2025a). Therefore, those engaging in intensive therapy programmes may not be representative of the wider aphasia population (Peitz et al., 2024; Monnelly et al., 2024). It is noteworthy that Brady et al. (2016) found higher drop-out rates from intensive than non-intensive therapy programmes. Mixed levels of client engagement raise concerns about whether an ICAP is a model which serves a minority of PWA. Reasons for refusal of ICAP intervention have not been noted and are important to explore for a wide variety of reasons including but not limited to accessibility, equity of access, and patient choice.

Focus group feedback on intensity/dose

Focus group members had mixed feelings on intensive therapy. The four members who attended ICAPs all experienced positive changed linked to the ICAP and its intensity. The positive client feedback noted in the literature (Babbitt et al., 2022; Kincheloe et al., 2022; Off et

al., 2022) was echoed by the group including feelings of rising to a challenge, putting mind over matter, being drawn out of yourself to engage in therapy, being supported, and being able to make arrangements to attend a bootcamp. Barth said (session 1 online) “you get home and you knackered, but but it’s only for four weeks. So you know”. However, 4/8 shared that they would not be able to attend an ICAP due to childcare and financial constraints – see similar arguments in Jacobs and Ellis (2025). Some expressed a preference for a dispersed model which would better account for their life circumstances – see desired schedules mapped in table 1. Participants demonstrated broad agreement with the ICAP schedule in hours/day, about half requesting fewer days/week, and all with a preference for longer duration. In reaction to the literature on maintenance of intensive therapy gains (Menahemi-Falkov et al., 2022) participants expressed a preference for retention of gains and lasting impact rather than a focus on immediate post-therapy improvement. A study of participant fatigue on an intensive aphasia trial found participants were only minimally fatigued (Pierce et al., 2024). However, communication and cognitive fatigue were concerns for some focus group members both with and without ICAP experience. One member reported reaching saturation point in the afternoon of her ICAP and two others reported they would have preferred breaks, a nap, or days off. Portia said (session 1 remote) “By the time you reach four hours, you are very very tired… There was nothing going inside me… Someone think is bombarding into my brain. But I can tell you there was nothing coming through me, and then I feel, I feel, em you’re wasting my time and again I am angry”.

[Insert table 1 here]

In summary, the evidence base suggests that the current ICAP dosing and intensity schedule needs to be re-examined as massed practice may not be optimal for making and retaining gains.

A dispersed model (currently termed a modified ICAP) may be equally beneficial or superior for certain outcomes. Stakeholder feedback provided useful indications that the intensive scheduling may limit acceptability, feasibility and access to therapy; and could contribute to refusal to partake in ICAPs. TOC suggested a focus on outcomes first. It is important to identify what desired ICAP outcomes necessitate a bootcamp style model (likely impairment-based treatments) and what outcomes do not require intensive input (e.g., educational outcomes).

2. Individual and group therapy (and a word on technology)

ICAPs provide both individual therapy (range 0.8-5 hrs/day) and group therapy (range 0.33-3.5 hours/day) (Rose et al., 2021). This component of the ICAP definition is phrased as "uses a variety of different *treatment approaches* and *formats* including individual and group therapy" (Rose et al., 2013: 380). Individual and group therapy are more accurately described as therapy *modes/delivery formats* rather than *treatment approaches*. A TOC for individual therapy would state that individual delivery format allows for maximally personalised treatment to address each person's unique goals, impairments, context, and support network as is recommended practice (Hinckley & Jayes, 2023, NHS England, 2021). Individual therapy is the most common aphasia intervention format and not unique to ICAPS. ICAPs tend to lean towards higher levels of individual therapy with an average of 49% of time spent in individual therapy versus 31% in group therapy (Rose et al., 2021). A potential theory of change for groups is more complex. Groups have been used on ICAPs for a wide range of purposes including sharing lived experience, peer support, raising self-awareness (Monnelly et al., 2022), to promote skill generalisation (Hoover & Carney, 2014; Winans-Mitrik et al., 2014), to achieve specific therapeutic goals e.g. writing groups, or current events discussions (Hoover & Carney, 2014), and to provide counselling style support or family education groups (Off et al., 2019). There is evidence for a range of psycho-social and quality of life benefits from group work (Elman, 2006; Elman and Bernstein-Ellis, 1999; Lanyon et al., 2013; Vickers, 2010; Wilson et al., 2021) and

language therapy has been noted to be equally effective when delivered in 1:1 or group contexts (Brady et al., 2016; Efstratiadou et al., 2018; Kristensson et al., 2022). However, generalisation of language gains from individual to group contexts is not well evidenced in aphasia. The digital world 'EVA Park' aimed to facilitate this by situating language therapy in functional contexts and via 1:1 and group format, yet only one study (Marshall et al., 2016) showed significant generalisation to a functional communication measure.

In considering dark logic for group therapy, "perceptions of negative evaluation, marginalisation, and disempowerment" have been noted in aphasia group therapy (Lanyon et al., 2018, p. 139) as has unequal apportioning of therapist attention (Off et al., 2019). Reports from other domains raise other potential dark logic. For example, university students prefer individual psychological therapy due to privacy concerns, fear of criticism, and discomfort with others (Shechtman & Kiezel, 2016). Low self-esteem, poor interpersonal skills, or high sensitivity may make psychological group work unsuitable (Roback, 2000).

Focus group feedback on 1:1 and group therapy

There was no disagreement that individual therapy was crucial, though two members shared reports of the frustration they experienced in 1:1 sessions, which seemed to conflate with their experience of impairment-based therapy. Members felt 1:1 therapy was better for direct language work and felt group sessions could dilute active practice as has been noted in the literature (DeDe et al., 2019). Focus group members acknowledged group-related challenges but agreed that a mix of 1:1 and group therapy should be essential on an ICAP. There was a range of experience regarding group therapy with three participants attending external groups on a long-term basis and others declining offers of group therapy. For two members, the focus groups were their first experience of meeting others with aphasia, and they both commented that they enjoyed the group interaction. Some reflected that they wouldn't have felt ready for group therapy in early recovery due to fatigue and distraction. The term "group" itself was

anxiety-inducing “I feel that that the name you called the session… that can put off group. You’re thinking of a whole class” (Portia, session 2 online). Kayla said: “I think when you are feeling lacking in confidence around communication it [a group] is daunting” (session 2 online). One participant described how he did not want to attend an ICAP group as “I can’t talk, I wasn’t saying nothing.” However, he felt that mandatory group attendance produced a boost in his “confidence” (Yves, session 2 in person). The focus group members generated suggestions for encouraging participants to join groups including: limiting group sizes (all members felt a maximum of 6 was ideal), offering pre-group information and clear objectives to reduce uncertainty, providing warm-sounding group names, and an option to trial a dyad as a stepping stone to group involvement as is used in some ICAPs (Hoover et al., 2017; Whiteside and Kong, 2013). Participants felt a dyad offered pre-group confidence-building and a potential ally within the larger group. Those who requested group therapy as a format expressed the desired outcomes to be enjoyment, bonding, positive comparison of self with others, more relaxed context than 1:1 therapy, and shared learning opportunities - especially hearing others’ experiences and gaining tips.

In summary, through focus group discussion, several gaps in the ICAP evidence base were identified. The first was the optimum balance between individual and group therapy on an ICAP as the documented range of time spent in 1:1 or group therapy suggests differing views on its value and feasibility (Monnelly et al., 2022; Rose et al., 2021). The second was the purpose of group intervention in ICAPs. This must be understood to apportion adequate time to achieving group goals (see an example of differing aims of group therapy on an ICAP mapped on a logic model in table 2). The third was how group outcomes are measured, given that ICAPs have not documented group-specific effects (Monnelly et al., 2024). Finally, the optimum group size and composition are not detailed on an ICAP. This will depend on a variety of factors including the type of group being run, participant profiles, and support required.

[Insert table 2 here]

A word on technology

ICAP participants spend an average of 11% of their time (range 0-1 hour/day) in computer therapy (49% in 1:1, 31% in group therapy, 8% in other) Rose et al. (2021). The original definition of an ICAP did not include a specific reference to technology (Rose et al., 2013). During the writing of this paper, we noted that a 2021 survey paper made a slight but specific alteration to the definition of an ICAP in the appendix "… utilising individual therapy and group therapy… *and technological advances (e.g., apps and computer therapy*)…" (Rose et al., 2021: 5874). ICAPs not including technology components were classified as mICAPs in the 2021 survey (Rose et al., 2021). However, there were ICAPs in this paper which did *not* appear to provide a computer component (Figure 3, Rose et al., 2021). To our knowledge, the published literature on ICAPs has not required that participants be in possession of their own technology as an admission criterion (see Rose et al., 2021). We did not ask the focus group about technology use on an ICAP as it was not part of the original definition, but it would have been beneficial to gain their views. Prevalence of technology use on ICAPs is widespread as noted in supplementary materials. A potential theory of change for technology use on an ICAP could be for reasons of self-management (Repetto et al., 2021), increased autonomy (Des Roches et al., 2017), as part of an alternative communication system (Hoover and Carney, 2014), to maintain gains after discharge (Kurland et al., 2018), to increase intensity and dose (Fleming et al., 2021; Plamer et al., 2019), and for generalisation (Lavoie et al., 2019; Mayer et al., 2024).

Dark logic may include client preference not to use technology in general (Hoover and Carney, 2014) or specifically as a means of alternative communication (Murray and Hopf, 2022),

clinician/researcher preference for tablets (Repetto et al., 2021) clashing with client preference for smartphone use (Cann and Bulman, 2018), lack of culturally or linguistically appropriate technologies (Wenke et al., 2014), and accessibility barriers amongst other issues. As with the other ICAP components, the desired outcome of technology use should be clearly specified. See a LM in table 3 which compares two different technology outcomes mapped to inputs. Mapping desired outcomes on a logic model helps to determine whether technology input is an essential ICAP component.

[Insert table 3 here]

3. Impairment and activities/participation

All ICAPs provide intervention at the level of language impairment and for communication activities/participation – see detail in supplementary materials. A theory of change for impairment-based aphasia treatments is supported by a variety of research into impairment-based approaches e.g., see evidence summaries on the aphasia therapy finder (Harvey et al., 2025) or systematic reviews with meta-analyses (Brady et al., 2016; Brady et al., 2025). It is unclear how ICAPs apply the evidence base when personalising therapies for PWA. For example, therapies provided on an ICAP may be limited to those with documented evidence. Therapies for similar linguistic deficits e.g., difficulties with sentence construction may be prioritised based on level of evidence. According to the aphasia therapy finder (Harvey et al, 2025) treatment of underlying forms has level II evidence (Swiderski et al., 2021) while mapping therapy has level III-3 (Silagi et al., 2020). A theory of change for impairment level therapies would employ the theory of the therapy provided. This is problematic given the amount of personalisation applied to each individual on an ICAP (Monnelly et al., 2022), and the query

about whether non-evidence-based therapies are provided (not due to poor practice but a lack of evidence for an approach felt to have clinical effectiveness). Although aiming to fix the impairment is popular (Brogan et al., 2020) it is not always achievable, with outcomes influenced by lesion characteristics (Plowman et al., 2012; Watila & Balarabe, 2015), time post stroke (Wilson et al., 2023; Marte et al., 2025), and psychosocial factors (Harvey et al., 2022). When impairment gains are minimal or incomplete (El Hachioui et al., 2013), especially after an intensive high dose therapy (Menahemi-Falkov et al., 2022), disappointment, sadness, grief, loss of hope could follow. A theory of change for activity/participation treatment would likely argue that treatment should focus beyond the level of impairment as aphasia impacts functioning (Thompson & Worrall, 2007) and activity/participation outcomes matter deeply to people with aphasia (Wallace et al., 2017; Worrall et al., 2011) and their families (Howe et al., 2012). Impairment level gains may not generalise to language function (Mayer et al., 2024; Ylvisaker et al., 2007), meaning that functional communication must be addressed directly in therapy. Finally, functional communication improvements have been evidenced in large scale reviews (Brady et al., 2016; RELEASE Collaborators, 2021).

Focus group feedback on impairment and activities/participation

Focus group members felt the division between impairment and activity/participation therapy was artificial, as their experience of therapy often integrated both. Impairment therapy was felt for some to be “the only option, what would you do instead? Wait for natural recovery?” (“Ivor”, session 2 in person). On the other hand, impairment therapy was felt to be repetitive, unpleasant as it confronts you with what you cannot do, and “necessary, but not a good experience” (“Ivor”, session 2 in person). There was a deep discussion about the decision to focus more on impairment or activities/participation. Factors influencing that decision included:

- Recovery philosophy – i.e., a personal preference of whether therapy should focus on restoration/recovery/fixing versus living well with aphasia/coping/managing. Kayla said, "for me depends where you are mentally in your loss journey and your recovery perception and whether you embrace aphasia as your, as now is you" (session 2 online)
- Timing post stroke – i.e., those in an earlier stage (and their therapists) might want to capitalise on neuroplasticity with the level of potential recovery still unknown.
- Severity of aphasia – for those with more severe aphasia, their impairment gains may be more limited (Anthony et al., 2025), so the time spent on impairment may be proportionately less.

Some members raised a desire for impairment-based therapy that focused on language associated cognitive skills e.g., multi-tasking, attention, short term memory (but doing this as part of language tasks, not working on these skills in isolation e.g., tracking patterns across a page).

With regard to dark logic, stakeholder insight contributed useful point about individual balance between impairment and functional therapy, but no strong potential adverse outcomes were identified.

Issues not clarified in the evidence base included the balance on an ICAP of individually personalised impairment therapy versus activity/participation therapy, how decisions are made on an ICAP about what impairment-based and activity/participation approaches are used and how these decisions link to theoretical hypotheses about what outcomes these therapeutic approaches will produce.

4. Education for PWA and/or families

All ICAPs provide education on aphasia/stroke to PWA and less frequently to family members (Rose et al., 2021) – full detail in supplementary material. A TOC for education can be supported by research showing that education can help PWA make sense of aphasia and build insight (Manning et al., 2022). Educational programs can increase activity levels and knowledge of aphasia, have a positive impact on family relationships (Hinckley and Packard, 2001), develop coping strategies for caregivers (Bergua et al., 2022), and help build communication success (Purdy and Hindenlang, 2005). Health education may improve care-seeking and adherence to treatment (World Health Organization, 2015). Some therapies, such as LUNA (Dipper et al., 2024) require meta-cognitive skills, so call for some education about language. PWA have reported that peer and group support are desirable for individuals in the chronic phase of recovery (Hilton et al., 2014) and group education seminars after the return home (Rose et al., 2019). PWA and families frequently express a need for clear, accessible information about aphasia, recovery, and communication strategies (Rose et al., 2019; Wallace et al., 2017; Worrall et al., 2011). Family members want contact with other families with aphasia (Rose et al., 2019) and their emotional needs, distress, and need for psychological support has been extensively reported (Grawburg et al., 2013; Henihan et al., 2025; Hernandez et al., 2025; Masuku et al., 2018; Paul & Sanders, 2010). Family members are common participants in communication partner training which has high level evidence (Cruice et al., 2018; Simmons-Mackie et al., 2010; Simmons-Mackie et al.2016a) and is recommended best practice in aphasia (Shrubsole et al., 2024; Simmons-Mackie et al., 2016b; Wallace et al., 2023) but is not an essential ICAP component.

With regard to dark logic, there are risks and challenges to education provision. Some PWA prefer to be shielded from distressing information in early recovery (Manning et al., 2022) as early bleak prognostic information can harm mood and recovery (Cheng et al., 2023). Strong emotional responses (shock/anger) can interfere with information absorption (Paul & Sanders, 2010; Purdy &Hindenlang, 2005). Aphasia itself presents a challenge to absorbing education

(Paul & Sanders, 2010), and outcomes are rarely measured (Rose et al., 2018). Some families have dysfunctional interactions which lead to neglect or unreasonable expectations for their loved ones (Klonoff, 2014).

Focus group feedback on education

Focus group members had a lively debate about the educational component of ICAPs, with several key concerns. The first was that "education" was seen as an ambiguous term and required more detailed definition. Discussions revealed dissatisfaction with interpreting education narrowly as information on stroke and aphasia. Members jointly designed broad educational content they would like included on an ICAP – see supplementary material. The second was the wording of the definition, which was unclear to participants – i.e., that education could be given to PWA *"and/or"* families. Although unstated, it is likely that education is *not* given to those who cannot absorb the information (based on their language level or psychological state or other) so education is provided to family members in these situations. In situations where there is no family member/carer taking part in the ICAP, education is given to the PWA. However, this needs additional detail as the input and outcomes for education for a PWA versus family member will be different. Thirdly while ICAP-experienced participants recalled the educational sessions as professionally delivered, all of them struggled to remember the content. Charles said "I can't remember anything… with work, marvellous marvellous. But education, no" (online session 3). As a remedy, they suggested offering one key takeaway per session, accompanied by visual materials rather than extensive written handouts, which typically went unread. Finally, focus group members did not support family involvement on an ICAP being framed solely in terms of education. They produced extensive examples of additional outcomes they would desire for their families – see supplementary material. Additionally, there was broad support for a family group to run without PWA present with a focus on family members not feeling alone. One key theme when discussing family involvement was

the impact of shifting family roles, particularly when the PWA was previously the main income earner or primary parent. Members suggested that this could be addressed in 1:1 sessions, potentially with psychological support rather than under an 'educational' component. Finance was also suggested as a recommended focus as 7/8 members could no longer work due to aphasia and the burden of navigating benefit systems was significant with a direct impact on family life. Participants contrasted this with their experience of dedicated financial support services seen in conditions like cancer. Participants were surprised to learn that some ICAPs use family/carer support (e.g., for mealtimes/toileting) as a formal admission criterion (Monnelly et al., 2024), viewing this as exclusionary.

Issues not clarified in the evidence base included whether family involvement should be mandatory/optional. Optional involvement was the preference of all members citing reasons such as having a deceased spouse or family members with health conditions limiting their ability to attend, but it was recognised that ICAP attendance would be impossible for some without family support. A recent study of an online modified ICAP (TeleCHAT) found that family/friends provided technical support in almost half of online therapy sessions (Vuong et al., 2025) with only 2/12 PWA not requiring any technical support. There was also discussion about involvement of young children on ICAPs. Four members were parents to young children. While their needs were acknowledged, especially where children had received psychological support related to a parent's aphasia, ICAPs were deemed unsuitable environments for young children.

5. Cohort

All ICAPs are delivered to a cohort of PWA (typically 3-10 members, Rose et al., 2013) who start and end the programme together. It can reasonably be assumed that the already described benefits of group therapy apply to cohorts. One differentiation between cohort and group may be that participants do not change within a cohort, whereas group members may change e.g., in aphasia centre drop-in groups. However, research on aphasia group therapy includes groups

whose members do not change e.g., Hoover et al. (2025). A second differentiation may be the increased contact time between members on a cohort compared to aphasia group interaction. Aphasia groups are lesser used models of therapy and may meet once or twice a week (e.g., Elman and Bernstein-Ellis, 1999; Pound et al., 2017). The intensity of the ICAP model might play a specific role in cohort bonding whereby regular contact time between members facilitates speedier bonding. It should be noted that specific between cohort interaction time and activities are not documented for ICAPs. We attempt to differentiate between group therapy and cohort-based therapy as both are essential ICAP components. To our knowledge, there is no aphasia-specific evidence on cohorts. A theory of change must therefore draw from other areas. One supposed advantage of cohort education is increased completion and retention rates compared with the very low rates of completion (2-12%) of self-directed online courses (Jordan, 2015; Reich, 2014), though comparative studies are lacking. A second is organisational efficiency. ICAPs require extensive clinical planning which can be streamlined by cohort delivery (Levine et al., 2025). A third is increased social cohesion as found in the learning community of long-term academic cohorts (Maher, 2005; McCarthy et al., 2005). Cohort dynamics can significantly affect psychological outcomes and performance (Buch & Spalding, 2008).

Therefore, turning to dark logic, negative peer interaction may reduce course quality outcomes (Jung et al., 2025). Similarly, any unhealthy competition within the cohort could negate benefits (Seed, 2008). Having a positive cohort experience can paradoxically trigger sadness when the cohort dissolves (Lei et al., 2011). Having set cohort members rather than rotating aphasia-centre drop in members may limit the communication partners an ICAP participant interacts with and therefore not test their skills of adaptation. Cohorts may be especially taxing for introverts or neurodivergent individuals.

Focus group feedback on the cohort

The focus group members viewed cohorts as an inherent ICAP practicality, not a theoretical component. “The cohort is like an effect of it… and therefore there is a cohort… I don’t think you can do anything to force it to be a cohort” (“Ivor”, session 3 in person) and “is it for the benefit of the person leading?” (John, session 3 in person). Benefits like social cohesion were seen as non-essential and not guaranteed, depending on compatibility and therapist skill. While some welcomed increased casual peer contact, others’ ICAP experience involved social fatigue which was remedied through breaks and solitude. Only one of four ICAP experienced participants maintained occasional social media contact with their cohort post-ICAP.

Issues not clarified in the cohort evidence base included the optimal cohort size, whether there should be a minimum contact time or set activities to encourage the potential positive benefits of a cohort, whether a cohort is more of an ICAP practicality rather than an integral TOC component, and whether online ICAPs support comparable cohort benefits.

6. The TOC of all ICAP components combined

A theory of change has been provided for each component individually, but the ICAP service delivery model requires these components be delivered in a time bound bootcamp style model, rather than sequentially over a longer period. Therefore, a theory of change is required as to why a bootcamp style model is superior to other delivery models. Some components have natural links: high-dose therapy aligns with impairment-based and functional language work (Brady et al., 2025); generalisation is best addressed via activity/participation therapies and potentially through group formats rather than 1:1 alone (Mayer et al., 2024); education underpins understanding of strategies for long-term therapeutic gains and adaptation (Dipper et al., 2024); and while the cohort component is not required to achieve these gains, it may provide added value as well as having practical benefits. The evidence base does not currently allow clear interactional links to be drawn between ICAP components, but we have attempted to map out

interactions on figure 2. In figure 2, impairment therapy or education can be delivered via individual, group, or computer format. Group therapy can focus on computer work, impairment therapy to increase intensity/dose, activity/participation work, or educational content, etc. If an element was to be removed (e.g., computers), figure 2 shows that the ICAP components could still be delivered via other formats. This figure alone does not explain the rationale for each ICAP component e.g., computers may be included to ensure carryover and maintenance of gains post ICAP, in which case they are an essential component. Figure 2 illustrates that written theoretical underpinning of ICAP ingredients is important as a model alone does not explain the rationale for ICAP ingredients.

[Insert figure 2 here]

In considering a theory of change for all ICAP components combined, it can be argued that an ICAP is a rare opportunity to receive many elements of best practice aphasia intervention. These elements of best practice were outlined by Simmons-Mackie et al. (2016b) and quality indicators of best practice (as rated by PWA and speech-language pathologists) have recently been published (Shrubsole et al., 2024). The best practice points and quality indicators have been combined and mapped on figure 3 and compared with ICAP provision. Examining figure 3, it is evident that an ICAP does not address all best practice recommendations or quality indicators. No single service delivery model will address all consequences of aphasia. However, this brings back into question the definition of comprehensive therapy as operationalised on an ICAP.

Comprehensive aphasia therapy – exploring the definition

When the definition of an ICAP was proposed, comprehensive therapy was conceptualised as a mixture of therapy formats alongside elements of an ICF approach. In the almost 15 years since the definition of an ICAP was proposed, research on psychological and self-management approaches to aphasia has grown (Baker et al., 2017; Baker et al., 2025; El-Helou et al., 2024; Wray et al., 2025). A re-conception of comprehensive therapy might include psychological and self-management approaches and a wider perspective on the ICF including environmental and personal factors which are not cited in the ICAP definition. Stakeholders are also likely to have different definitions of comprehensive aphasia therapy (Monnelly et al., 2023a; Shrubsole et al., 2024).

Dark logic considered that some therapeutic interventions are not typically delivered in a bootcamp style model and indeed the ICAP model may be contra-indicated for some interventions. For example, solution focused brief therapy is delivered in low doses and requires participants to practice in the community and report back on experiences (Northcott et al., 2021).

An ICAP is one model of aphasia service delivery which provides benefit for a subset of PWA (Monnelly et al., 2023b). There may be other models which are slightly different (e.g., modified ICAPs) but equally beneficial (Dignam et al., 2015), or models which contain interventions not delivered on an ICAP which are still of benefit to PWA. These might include aphasia camps (Heggie et al., 2025), project-based intervention (Sather & Strong, 2024), or peer-support models (Hilari et al., 2021). It is unclear if it is necessary, preferable, or advisable to receive all components of an ICAP simultaneously as opposed to distributed delivery of ICAP components. Some could be delivered post ICAP as part of maintenance of gains and/or for their unique merit e.g., longer term aphasia groups, self-management, developing coping skills. Additionally, the bootcamp style model may be limiting the implementation of the model in clinical services (Shrubsole et al., 2018; Shrubsole et al., 2023). Questions of equal access and fairness are

relevant when considering if the ICAP model needs a re-definition to broaden accessibility. The question of drop off and maintenance of gains raised in the discussion about intensity is also relevant when considering a bootcamp model.

[Insert figure 3 here]

There are some outstanding knowledge gaps with the ICAP model. We do not have detail on the dose that should be allocated to each ICAP component – i.e., how much time to spend on therapy with activity/participation focus. Each ICAP component is of a different nature. For example, the ICF and intensive/high dose therapy are *theoretical perspective*s; group, individual, computer, and cohort therapy are *therapy formats/service delivery modes; and* impairment or activity/participation are *therapy approaches*. The difference in classification of each component makes discussion of their relative merit a challenge. A final factor to consider is the influence of personal preference of PWA partaking in an ICAP. As outlined by focus group feedback, some may wish to focus less on their impairment, and more on living with aphasia, or more on individual therapy sessions, and less group involvement.

Logic model

As discussed, a LM maps out the enactment of an intervention in a simplified version of the TOC. This is challenging for an ICAP as the intervention is multi componential. A simple LM is shown in table 4 with a longer version in supplemental material. Mills et al. (2019) suggest that simple LMs are sufficient if the aim is for a representation of the intervention without the possible contextual dynamics. The list of possible activities and inputs is lengthy and not included here as it is essentially a list of all possible aphasia therapies - these have been listed

686 in a scoping review by Monnelly et al. (2022). To save space, common or repeated elements of
687 the LM have not been included. These are:

688 • Inputs – Speech and language therapists/ assistants/ students, physical facilities,
689 means to monitor progress, therapy protocols, training materials, computer
690 equipment[1]*, transportation*, accommodation*, family involvement for caregiving*
691 • Activities - Goal setting and assessment, tailored and personalised therapy, breaks as
692 required, therapy schedules, therapy activities.
693 • Outputs - Completion rates, total therapy delivered per participant, attendance rates,
694 Goal achievement.
695 • Outcomes - Improved results on assessments of impairment and functional
696 communication, self-reported gains, possible gains in other areas e.g., quality of life,
697 maintenance of gains, self-management.
698 • Impacts – Increased life participation, reduced caregiver burden, reduced mental health
699 needs, Increased independence for PWA and family.

700

701 [Insert table 4 here]

702

703 It is evident from the LM of ICAP components that the level of "component" is too abstract to
704 map specific inputs e.g., as in table 2, group therapy outcomes vary widely so inputs will vary.
705 Each ICAP programme can use a LM with their specific input/desired outcomes more clearly
706 linked and mapped.

707

708 Discussion

[1]* If required

This paper set out to involve people with aphasia in applying the frameworks of theory of change (TOC), logic models (LMs), and dark LMs to Intensive Comprehensive Aphasia Programmes (ICAPs) - an intervention approach growing in popularity yet lacking in conceptual clarity. By developing a provisional LM for a Platonic ICAP, we aimed to provide rationales for component inclusion and illuminate potential harms that might otherwise go unrecognized.

High intensity/dose ICAP therapy

Several questions remain unanswered by the definition and require clarification. Firstly, the evidence base on intensity does not support a massed practice model over a more dispersed model (Digam et al., 2015). A modification of the intensive component of an ICAP may be preferable for retention of gains (though this is based on theories of language learning rather than significant evidence in the field of aphasia – see Dignam et al., 2016). Modification of intensity may also allow for opportunities to implement the model in a wider range of settings which in turn may increase stakeholder access and uptake of the model. Secondly, it is unclear what content requires intensive delivery. Discussions on dose/intensity apply mostly to impairment-based approaches (Brady et al., 2025). Other components of the ICAP model may not require intensive delivery e.g., educational sessions or group therapy. Perhaps a delineation between intensity and impairment/functional approaches and the other components of the ICAP is required. Finally, around half of ICAPs include MDT input (Monnelly et al., 2022). It is unclear whether non-SLT hours count toward ICAP intensity, though it is likely they do. Again, there needs to be clarification of the purpose of the high intensive/dose model, and what outcomes it intends to target as the outcomes of other MDT members may not require highly intensive input.

Individual and group therapy (and technology)

The outstanding questions for this component included the desired outcomes of group therapy on an ICAP and how these could be more effectively measured. Simmons-Mackie et al. write

that success/positive outcomes from social model groups should be measured by "the complex interaction among group members" (2007, p. 7) – a lovely ambition but high bar without substantial resource invested in measurement of group interaction data. Research on group therapy is complex. An RCT of thematically oriented conversation group treatment found the large group (consisting of eight PWA) was superior to control and dyads on a self-rated measure of communication (Hoover et al., 2025). The authors note the complex relationship between group size and outcome measures as dyads were superior for repetition and verb naming. A larger study of n = 273 children found that smaller groups of 2-4 yielded better language outcomes than larger groups of 5-10 (Hutchins & Schmitt, 2024). The inclusion of technology as core to an ICAP should be debated and rationalised as this change in definition since 2013 is subtle but again potentially limits the implementation of ICAPs in clinical settings where there are barriers to technology use (Kearns & Kelly, 2022, Nichol et al., 2022).

Impairment and activity/participation-based therapy

These approaches in an ICAP seems to have good theoretical underpinning and dark logic did not feature strongly. However, as the focus group members raised, individual variation in therapy balance should be expected and respected, possibly tied to readiness to accept aphasia as a long-term condition. Clinicians should approach both therapy types with equal philosophical value, and participants should be supported early on to understand that while the impairment may improve, complete resolution is unlikely. Redefining success to include living well with aphasia is key (Cheng et al., 2023).

Education (and the role of the family)

There are many possible reasons education should be provided on an ICAP. However, the impact of this component remains underexplored in ICAP literature, and caution is needed around timing, delivery, and potential unintended consequences. Notably, education is the only ICAP component that mentions family members, raising questions about the broader role of

families in ICAP design and delivery. Communication partner training is not an essential ICAP component which differs from some best practice recommendations (Shrubsole et al., 2024; Simmons-Mackie et al., 2016b; Wallace et al., 2023). Practical suggestions when providing educational content included screening readiness for educational sessions, to ensure content not generic but based on participant's specific needs, to offer separate individual educational sessions where required, and to co-design content with PWA and families. These suggestions reflect a broader call to position education not simply as information delivery, but as a collaborative, responsive, and values-driven component of recovery.

Cohort

Differentiating the benefits of group and cohort therapy is challenging and based on theory rather than evidence from the field of aphasia. Although the cohort may have substantial additional qualitative benefit for attendees where attempts are made to leverage the potential therapeutic benefits of cohort peers, it is also a logistical feature of an ICAP and may be less therapeutically considered on some programmes. Additionally, some participants may find cohort membership challenging due to social fatigue or emotional demands. If positive cohort-related outcomes are desired (e.g., group cohesion) then time/planning/training needs to be dedicated to achieving this by scheduling in informal bonding time, time to share goals, and promote ongoing contact where appropriate.

TOC of all components

As with the cohort, the bootcamp model may be more logistical than evidence-based in design especially given updates in the aphasia literature on intensive intervention. The evidence base for ICAPs supports simultaneous delivery of various aphasia therapies, but ICAPs have not been compared to different models of therapy delivery. For example, in one alternative model an educational programme could be delivered at low dose over several weeks, followed by a block of individual therapy, then a block of group therapy.

Theory of change and logic modelling in aphasia

Our findings suggest that logic modelling offers a valuable approach to unpacking the complexity of ICAPs. Each ICAP component was grounded in mixed evidence bases and at times was lacking a clear rationale. Focus group data from people with aphasia (PWA) underscored the importance of aligning programme design with client perspectives. Participants highlighted both the benefits and burdens of intensive schedules, group formats, and educational content, revealing preferences and challenges that may not be visible from a purely professional or research-oriented standpoint.

Incorporating dark logic modelling into our process added a further dimension. Many interventions, including ICAPs, may inadvertently cause harm e.g., via negative self-comparison with peers or a lack of focus on desired longer-term impact. In line with arguments put forward by Bonell et al. (2015) our model includes dark logic, so that potential negative outcomes do not go undetected.

This first iteration of an ICAP LM has multiple potential uses. It can support the design of ICAPs in both clinical and research settings by mapping required inputs (e.g., staffing, space, content), identifying desirable outputs, and specifying suitable outcome measures. The model can guide educational input planning via the detailed educational content recommendations provided by PWA. Workforce training can be explored by mapping out required clinical competencies, and prompt services to consider administrative demands and data collection strategies. It also highlights the gap between immediate outcomes typically measured and the longer-term impacts that matter to clients. Furthermore, dark logic elements and stakeholder feedback encourage ICAP developers to revisit fundamental assumptions, such as the necessity of a fixed cohort model or the universal benefit of intensive therapy. We suggest several directions for future development.

Research recommendations

1) To re-examine the definition of ICAP intensity and scheduling of dose. This will require comparative trials exploring high dose therapy at different intensities. Additionally, evidence for optimal intensity for each ICAP component is required (how much time to spend on education versus group therapy etc).
2) To assess whether technology should be added to the ICAP definition (as was done via survey methodology in 2021) or remain optional (as with family involvement at this current time).
3) To clarify the role of family on ICAPs and explore with stakeholders better ways to involve them beyond "education".
4) To define education on an ICAP and consider the focus group designed educational content.
5) To further explore how ICAPs as a service delivery model align with and deviate from best practice recommendations (e.g., inclusion/exclusion of communication partner training or specific reference to psychological support for PWA).
6) To explore the concept and definition of comprehensive aphasia therapy as applied to an ICAP and more widely in the field of aphasia rehabilitation.
7) To outline alternative aphasia service delivery models that may be complimentary to ICAPs or suited for the post-ICAP discharge phase, long-term management of aphasia, or suited for those not deemed eligible for ICAP attendance or who refuse attendance.
8) To explore the role of a cohort on an ICAP and in aphasia more generally and identify the added therapeutic benefit of a cohort and how this might be measured and harnessed therapeutically. With the development of online ICAPs (Vuong et al., 2025), comparative studies should examine the therapeutic relevance of the cohort element and whether online ICAPs can deliver similar psychosocial outcomes.
9) To apply a logic model to specific ICAPs starting with desired outcomes, linking back to inputs required.

10) To explore dark logic on an ICAP and potential adverse outcomes which if not hypothesised and assessed for are unlikely to be found.
11) To explore the role of the multi-disciplinary team (MDT) on an ICAP (potentially via the use of a LM measuring joint MDT outcome targets versus uni-disciplinary aims).
12) To consider ICAP outcomes, particularly in areas of participation, quality of life, and emotional well-being. This is in line with broader areas of research in aphasia rehabilitation including outcome measurement e.g., work on meaningful outcomes from the perspective of PWA (Shrubsole et al., 2024; Zingelman et al., 2024).
13) To consider the implementation and dissemination issues involved in roll-out of the model. This is being considered via a new research project exploring a hub and spoke model for a modified ICAP in Australia (Copland et al., 2024) and an exploration of what outcome measures are feasible to implement clinically (Harvey et al., 2024). Issues of equality of access to treatment are also relevant to consider in relation to ICAPs.

Clinical recommendations

1) To apply a logic model to your specific ICAP to ensure that outcomes align with therapeutic input provided, especially where multi-disciplinary input is involved
2) ICAPs would benefit from service user input to develop and refine their provision, and a LM could be used to structure this discussion i.e., what outputs and outcomes are desired, what inputs and activities link to this.
3) Educational content for ICAPs was designed by the focus group members and an overview is available in the supplementary material.
4) Involvement of families on an ICAP is not mandatory and will vary based on the individual and programme requirements. Desired family outcomes (from the perspective of PWA) are available in supplementary material.

5) To consider generally how dose can be increased in your clinical setting and not to be constrained by the current ICAP schedule of 3 hours/day, 5 days/week as variations in that schedule may be equally beneficial.
6) Pre-ICAP preparation activities should be considered to tailor engagement and align expectations. This might include the grief cycle or readiness for therapy (Prochaska & Velicer) or a person's concept of getting better/living well with aphasia (Cheng et al., 2023). Detail on the range of outcomes from ICAPs could be provided from limited to no improvement for some participants (Monnelly et al., 2023b) to significant measurable improvement for others (Dignam et al., 2025a).
7) ICAPs should explicitly define and evaluate their intended long-term impacts, ensuring alignment with functional and meaningful life changes for clients.
8) Non-standardised but high-value components such as financial support, family groups, or psychological therapy should be considered based on local needs.

Limitations

TOC should be generated with multiple stakeholders and in relation to a specific context which was not the case here. The logic model generated was simple and unable to map out links between components. This was due in part to the nature of the evidence base in aphasia where these links are missing. However, it is also a logic model for a theoretical ICAP which does not consider contextual factors. The focus groups involved a limited number of PWA (n = 8) who had mild-moderate aphasia and for these and other reasons, they weren't representative of the broad spectrum of PWA. There were benefits to having ICAP-experienced participants in both focus groups, though their comments may have been hooked to the ICAP they attended. Having participants without ICAP experience may have limited their conceptualisation of the service model, but the components of an ICAP are standalone features of aphasia therapy which do not

require ICAP experience. The content of the focus group data was not subjected to more comprehensive qualitative analysis e.g., thematic analysis. This decision was made as themes were pre-determined, the researchers took steps to reduce risk of bias and to ensure the qualitative analysis was reflective of the discussion held (as indicated by regular participant checking of conclusions). The feedback provided by the focus groups could have been compared to the published literature on the views/experience of PWA who participated in named ICAPs. However, we did not feel this to be a natural comparator as these studies sought opinions from participants who participated in ICAPs, whereas our study focused on theoretical development of a model, logic model creation, and dark logic hypothesis generation. There is a lack of information about how to integrate TOC, LMs, and stakeholder input and our method may not be the optimal model to use. Stakeholders could have been involved in earlier steps of knowledge creation and generation rather than responding to a research-based model produced by the team. Finally, TOC and logic modelling is not the only methodology that can be used to plug gaps in our ICAP knowledge base. Other approaches such as relativist review or application of the RTSS may also suit the ICAP context and augment the work presented here. We also acknowledge that while mapping desired ICAP outcomes on a logic model may provide a range of benefits, there is no guarantee these desired outcomes will be achieved. On this note, Lorenzo-Luaces (2023) argues that identifying mechanisms of action in multi component psychological treatments is costly of research time and may not render clear findings. We feel research on the theoretical basis of a service delivery model is beneficial to reduce treatment redundancies, and we agree with Lorenzo-Luaces that a focus on implementation and dissemination of existing best practice is a complimentary approach.

Conclusion

This paper does not argue against ICAPs. Rather, it argues for the value of greater conceptual rigour and transparency in how we develop, deliver, and evaluate these complex service delivery models. Ultimately, this approach - combining logic modelling, stakeholder involvement, and dark logic reflection - offers a robust, person-centred framework for the development and evaluation of complex aphasia interventions. By articulating how and why an intervention works, we can better design, deliver, and refine therapy in ways that are both empirically grounded and responsive to the lived experiences of those we serve.

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Data Availability Statement

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

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1467 Figures

1468 Figure 1: The five components required to qualify as an Intensive Comprehensive Aphasia
1469 Programme

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1471 Figure 2: ICAP interactions

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1473 Figure 3: Top ten best practice recommendations versus ICAP components

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1476 Tables

Table 1: Stakeholder views on preferred intensity and dose for an ICAP				
Pseudonym	Hours/day	Days/week	Duration in weeks	Dose calculation in hours
John	2-3 (2.5)	1	26	65
Zsófia	3	2-3 (2.5)	5	37.5
Yves	3	5	10	150
Charles	3-4 (3.5)	4-5 (4.5)	52	819
Kayla	4	5	6	120
Portia	4	3	6-8 (7)	84
Barth	4	5	8	160
Ivor	4	5	I don't know	Unable to calculate
	Average 3.5 hours/day	Average 3.875 days/week	Average 16 weeks (with missing value)	Average 205 hours (with missing value)

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Table 2: Simple logic model of two different desired group outcomes on an ICAP				
Inputs	Activities	Outputs	Outcomes	Impacts
SLT/students, communication ramps for group, equipment for group activities, tea/coffee.	3 x weekly peer group for PWA, goals set for group therapy, informal conversation with themed weekly topics, smaller group/dyad activities.	Attendance at all group sessions, increased initiation rate in group, use of humour with peers.	Regular attendance at an aphasia group post-ICAP, at least one additional friend in social network map, increased confidence in aphasia group setting.	Increased participation in a wider range of activities post ICAP, reduced anxiety towards new activities.
As above with additional target word lists for participants,	Group therapy focusing on language stimulation, barrier games, language games, and use of target words in small group interaction.	Use of target words and sentences during group sessions, measurably decreased scaffolding from therapist, production of a range of sentence formats during group sessions.	Generalisation of targets from 1:1 therapy to group, increased participation in conversations with peers, improved language ability on testing.	Able to produce scripted language in personally identified relevant contextual situations, increased communication interaction with relatives.

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Table 3: Simple logic model of two different desired technology outcomes on an ICAP				
Inputs	Activities	Outputs	Outcomes	Impacts
Aphasia friendly technology manuals, SLT input for technology enhanced therapy	Technology training, maximising accessibility on devices, strategies to circumvent reading/writing difficulties, and development of self-help resources to foster long-term use – see approaches used by Caute et al. 2019 and Marshall et al. 2018	Ability to access news websites on own device and send emails and what's app messages to family/friends	Improved online access and participation, increased confidence and problem solving with technology.	Increased independence and decreased caregiver burden.
Therapist-selected apps and devices, home-practice with apps	Delivery of evidence-based language interventions at high dose and intensity	Improved language ability [e.g. Client able to produce SVO sentences or complex sentences via script training]	Increased participation in conversations, improved language ability on testing.	Increased confidence with communication, decreased anxiety with communication, uptake of a new activity.

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Table 4: Basic logic model for an ICAP – short version					
	Inputs	Activities	Outputs	Outcomes	Impacts
High dose/ intensity aphasia therapy [Dark logic in red]	[Listed above]	Impairment based therapies. Monitoring fatigue/ engagement	Ability to use app/ computer device to supplement impairment-based therapy.	Increased endurance of therapy. No/limited improvement in impairment. Fatigue/ Burnout/ drop out.	Job retention. Increased endurance for other activities. Disengagement with therapy/ refusal. Disengagement with wider life activities.
Group and individual therapy	Pre-therapy information for participants. Unskilled therapy input may lead to harmful group experiences.	Wide range of therapy types provided including: Psycho-social groups/ special interest groups e.g., music.	Personalisation of narratives/ word lists/ scripts. Completion of group content e.g., grief cycle discussion	Increased resilience/ confidence. Improved participation in group. More negative self-perception. Unaddressed emotional needs in group.	Attendance at other groups post ICAP. Improved non-family support systems. Decreased participation in other life activities post ICAP due to negative experiences. Increased reliance on family rather than external sources.
Impairment and activity/ participation	Assessments covering ICF domains. Unskilled therapy input may not adequately address these areas equally.	Wide range of therapy types such as sentence level impairment or strategy development to aid participation.	Completion of set functional tasks e.g., making a phone call. Progress across ICF domains linked with goals.	Increased use of strategies. Reduced frustration. Improved mental health.	Sustained engagement in activities. Ability to partake in a wider range of communication challenges e.g., debate. Unmet family expectations from therapy could result in relationship strain. Withdrawal from communication activities.
Education for PWA/families	Educational materials in a variety of formats e.g., written,	Tailored education sessions. Key takeaway visuals. Family-only groups.	Takeaway tools. Range of materials used. Feedback forms	Increased knowledge on set topics. Deeper insight/ awareness of aphasia for PWA and families.	Reduced isolation/ stress for families and increased coping capacity. Families better able to support PWA.

	visual, digital. Content generated by focus group. Generic group input may not be relevant to all	Sessions focused on peer education.	completed.	Education felt to be ineffective. Education causes harm/ upset. PWA/families unable to absorb education.	Increased discord between PWA/ family. Increased mental health issues for all parties.
Cohort	Training in group dynamics. Time allocated for cohort interactions. Resources to monitor and support group cohesion. Quiet spaces for breaks from interaction.	Cohort-enhancing activities e.g., shared meals, social outings. Check-ins to monitor group dynamics. Management of negative group processes e.g., cliques.	Staff reports on group cohesion/ dynamics. Participant feedback on cohort experience. Post ICAP follow-up data on ongoing peer interaction.	Increased contact with other PWA. Improved therapy completion and retention rates compared with non-cohort models. Personality clashes and group conflict. Additional fatigue from cohort interactions. Group exclusion. Unhealthy competition.	Ongoing social connections for PWA with their ICAP peers. Greater client satisfaction ratings compared to non-cohort model. Enhanced mental health outcomes compared with group alone. Increased emotional challenges at the end of the ICAP due to loss of supportive cohort.

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Supplemental file 1 – Containing extended detail on ICAP content sourced from survey and review papers.