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# **Effectiveness of Active Support for adults with intellectual disability in residential settings: Systematic review and meta-analysis**

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## Abstract

**Background:** The review examined the effectiveness of Active Support (RQ1) and stakeholders' experiences of the model (RQ2).

**Method:** Data were meta-analysed (RQ1; Studies=14) and synthesised narratively (RQ2; Studies=10).

**Results:** By follow-up (six-months post-training), effect sizes (RQ1) for resident total activity engagement were significant and ranged from small ( $d=0.33$ , 95% CIs: 0.10, 0.50) to large (Tau-U=0.95, 95% CIs: 0.64, 1.25) depending on study design. Follow-up changes in staff assistance were moderate ( $d=0.56$ , 95% CIs: 0.23, 0.89; Tau-U 0.63, 95% CIs: 0.32 to 0.93) and large for quality of support ( $d=1.03$ , 95% CIs: 0.61, 1.44). Other outcomes did not change.

**Conclusions:** Active Support was more effective following complete staff training, in larger settings, at lower staff-to-resident ratios, and with less experienced staff. Active Support training and outcomes were valued by staff and residents (RQ2), and staff experienced increased job satisfaction. Lower staff turnover and organisational readiness appear crucial for maintaining implementation.

## Keywords

Active Support, intellectual disability, residential living, engagement, systematic review, meta-analysis

## **Introduction**

Active Support is a model of care that aims to improve the quality of life of adults with intellectual disability (ID) by maximising their engagement in meaningful activities of daily life with appropriate support from staff (Jones et al., 1999; Mansell & Beadle-Brown, 2012; Stancliffe, Jones, Mansell, & Lowe, 2008a; Totsika, Toogood, & Hastings, 2008a). It was developed in the 1980s as part of an operational model for newly established community homes (Felce, 1989; Felce & Toogood, 1988; Mansell, Felce, Jenkins, de Kock & Toogood, 1987).

Active Support is based on a philosophy of care that promotes opportunities for people with an ID to experience a life as close as possible to the life of people without ID (an “ordinary life”; King’s Fund, 1980). Active Support is implemented in residential services following staff training on its aims, principles, and technologies. Training involves a one or two day workshop where staff are taught the aims and technologies of Active Support as a group (Jones et al., 2009). This is followed by on-site one-to-one interactive training that aims to increase staff’s behavioural repertoire in supporting activity engagement effectively (Toogood, 2010).

Four Active Support manuals have been published to date to support staff training and implementation (Jones et al., 1996; Jones et al., 2009; Mansell et al., 2005; Toogood, 2010). The 1996 manual by Jones and colleagues was reviewed in 2009 to update the presentation but also to remove some of the previously included technologies (see below) in acknowledgment of the fact that these relate primarily to skill development rather than engagement in activity. In 2010, Toogood published a manual specifically for the interactive training. In parallel to these, Mansell and colleagues published a manual on Person-Centred Active Support in 2005. This manual presented a version of Active Support that is identical in its aims, philosophy and core focus to all the other manuals, but with greater emphasis on the

moment-to-moment experience of activity rather than technology-based implementation, and monitoring of impact through narrative or observational accounts of activity levels rather than the use of structured data recording forms (Mansell et al., 2005; Beadle-Brown, Murphy, & Bradshaw, 2017). See Toogood et al. (2016) for a more comprehensive description of Active Support and the similarities and differences between the two approaches to training and implementation.

Active Support's implementation technology includes several components, most focusing on activity participation. Activity and Support Plans are daily structured timetables to enable direct care staff to plan, flexibly, what activity each house resident will do at any time of the day and which staff will support them. Staff are encouraged to use Activity Protocols to break down the steps of activities individuals cannot yet perform fully so that they learn and succeed one step at a time. Activity engagement is recorded in Participation Records which are focused at the level of the individual person (activities one person did over the course of a week), as a way to monitor implementation from the point of view of individual resident experience. Opportunity and Learning plans are two further technologies that include structured teaching protocols aiming to teach activities the person cannot yet perform either during naturally occurring opportunities in the environment (Opportunity plans) or in pre-planned teaching sessions (Teaching Plans). The technologies described here were included in the first Active Support manual (Jones et al., 1996) and subsequent revision (Jones et al., 2009) but they are not included in the Mansell et al. (2005) manual and its subsequent revision in 2017 (Beadle-Brown et al., 2017), because as mentioned above this version of Active Support does not support a technology-based implementation.

Studies have examined whether Active Support implementation is associated with better outcomes for adults with ID in community homes. To date, findings have been summarised in two non-systematic narrative reviews (Stancliffe et al., 2008a; Totsika et al.,

2008a) suggesting that Active Support improves activity engagement and staff assistance. These reviews were inconclusive about other potential effects (e.g., on challenging behaviour). Hamelin and Sturmey's (2011) systematic review and meta-analysis focused exclusively on experimental evaluations of Active Support. As there were no experimental group evaluations, the review included two single case experimental studies that were available at the time (Jones et al., 1999 and Stancliffe, Harman, Toogood & McVilly, 2007). The review concluded that Active Support was a promising but not evidence-based practice on the basis of the criteria set by Chambless and Hollon (1998). This conclusion was mostly based on the evaluation of experimental control in the included studies. However, the evaluation of experimental control was based on effect sizes (percentage of non-overlapping data and percentage of all non-overlapping data), the robustness of which was questioned for their lack of control over any baseline trend (Parker, Vannest, & Davis, 2011a).

While the Hamelin and Sturmey (2011) review adopted systematic criteria, the restrictions placed on study design excluded a large part of available evidence. Such exclusion of other evaluations may not be appropriate in a field which has urgent needs for evidence generation and evidence appraisal (Hastings, 2013). Further evaluations of Active Support have been published since 2011. The present review aims to provide an up-to-date and methodologically robust systematic review that considers as much of the available evidence as possible, and incorporates evidence beyond the question of effectiveness. The systematic review addressed two research questions:

(RQ1) What is the evidence of the effectiveness of Active Support in residential settings?

(RQ2) What are the views of adults with ID and/or of staff regarding Active Support training and implementation?

## **Method**

The review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The protocol was registered with PROSPERO (PROSPERO 2016:CRD42016051193).

### **Eligibility Criteria**

Papers were included if they met the following inclusion criteria: (1) Active Support implementation as demonstrated by: (a) the description of staff training processes and materials based on either one of the four available manuals (Jones et al., 1996; Jones et al., 2009; Mansell et al., 2005; Toogood, 2010), or a combination of these, *or* (b) the operational model of the residential setting specifically aims to promote systematic engagement in daily life activities; the operational model is reflected in written operational policy and staff are trained to maximise engagement of people with ID in age-appropriate, meaningful activities of daily living. The operational model may be termed Active Support (or synonym, e.g., person-centred Active Support), the Andover Model (a previous name for Active Support), or may not be described by a specific name but reference its origins to the developmental work that took place in the Andover demonstration project (Felce, Thomas, de Kock, Saxby, & Repp, 1985; Felce, de Kock & Repp, 1986; Felce, 1989; Felce & Repp, 1992). Within (b), the residential setting must also use technologies which aim to promote engagement in activities of daily life using, as a minimum, Activity and Support Plans, where daily activities are planned for each individual in the house and the staff responsible for supporting individuals are identified. Studies were considered for inclusion where training on Active Support included either staff workshops, one-to-one interactive training on site, or a combination of the two training approaches; (2) Studies were included if at least 75% of their participants had ID or, if they included a lower proportion of adults with ID, reporting this sub-group



separately; (3) Studies were included if available in English. No restrictions were applied for other participant or service characteristics provided that the setting was a residential service (this excluded settings where all support was provided by unpaid carers); (4) Regarding study design, for RQ1, eligible designs were: experimental (group or single case) study, non-experimental controlled group study, case series of A-B studies, and non-controlled group study with baseline data. For RQ2, eligible studies could follow any design as long as they included qualitative or quantitative data on the experience of Active Support training and/or implementation reported by adults with ID in residential settings and/or support staff.

### **Database Searches**

Nine online databases (CINAHL, ERIC, EMBASE, MEDLINE, ASSIA, PsycINFO, Cochrane Central Register of Controlled Trials (CENTRAL), SSCI and SCI) were searched during November 2016. Search strings were developed using words related to ‘intellectual disability’ and ‘Active Support’. An example search string can be found in the Appendix (Table A1). Forwards and backwards searches were undertaken, and authors of included studies were contacted. Further, requests were made via mailing lists for unpublished data and articles.

### **Review Strategy**

Electronic searches resulted in 10,896 records being identified (see Figure 1). Following de-duplication, the titles and abstracts of 9,371 papers were screened by a reviewer (SF). A second reviewer independently reviewed a random sample of 20%. Overall, 1,873 records were reviewed independently resulting in 1,860 agreements (99.31% agreement, kappa=.60). Disagreements were resolved through discussion of individual papers.

Following this, 55 papers were selected for full-text screening. All were independently reviewed by two reviewers (SF & VT) with one disagreement being discussed and resolved (98.33% agreement, kappa = .97). There were three papers where both

reviewers agreed that eligibility was not clear, and a third reviewer was consulted. Two papers were included (Mansell et al., 2008; Riches et al., 2011) and one excluded as it did not report on an Active Support intervention.

Two additional papers were identified through contact with authors, one of which was included (Qian, Tichá, Larson, & Stancliffe, 2017). The second paper was not supplied by the authors for full review. A further eligible paper was identified through mailing lists, and it was subsequently included in the final review (Baker, Appleton, & Williams, 2017). Another two papers were identified by the review team, one was included (Rhodes & Toogood, 2016) and the other excluded as the design was ineligible. Papers excluded at the full-text review stage are included in a supplementary table in the Appendix (Table A2) along with the exclusion reason.

At the end of the entire process, 20 papers were included for RQ1, and 10 for RQ2. The 20 papers included for RQ1 reported on 14 studies (Table 1). Their summary characteristics are presented in Table A3 in the Appendix. Two studies were designed and conducted as single case experimental designs (SCEDs) but were analysed and reported as single groups (Jones et al., 1999; Stancliffe et al., 2007). Table 2 presents the 10 studies included for RQ2.

[FIGURE 1 ABOUT HERE]

[TABLE 1 ABOUT HERE]

[TABLE 2 ABOUT HERE]

### **Data extraction and synthesis**

A standardised form was used for data extraction, which was conducted by one of the authors (SF) with additional checks from other team members (VT, DF). Data extracted included:

participant demographics, staff: resident ratio, number of people with ID in the group homes, Active Support training (full training [i.e., both workshop and interactive training] vs partial training), extent of Active Support implementation (Active Support technologies used; whether data monitoring was reported happening). For RQ1, extracted outcomes related to residents with ID: (a) Engagement in activities: resident engagement in activities at home, including domestic activities, social interactions, and a total measure of engagement in all home based activities: domestic, social or other activities (e.g., personal, self-care or recreational activities), (b) Other resident outcomes: challenging behaviour, mental health (namely depressive symptoms), resident choice, participation in community activities, and adaptive skill levels. Staff-related outcomes for RQ1 focused on staff assistance, i.e., the moment to moment staff behaviour (verbal or non-verbal) that supports resident activity engagement. We extracted data on staff contact, a measure of all staff interaction with residents; this included staff assistance but also other staff behaviours such as processing (doing something to the resident without the resident engaging), or having a conversation with the resident. A further staff related outcome was the quality of staff support measured by the Active Support Measure (ASM; Mansell & Elliott, 1996). Data were extracted from papers or were extracted directly from study data: some authors had included full databases in the published papers, and some of the studies were conducted by the review team who had access to the original data.

For RQ1, a meta-analysis was undertaken to summarise the evidence for each main outcome: resident engagement in domestic activities, resident engagement in social activities, resident total activity engagement, staff assistance; quality of staff support; staff contact; resident depression; resident challenging behaviour; and resident choice. For RQ2, a narrative synthesis was undertaken with a focus on the experience of Active Support training and implementation, as well as perceived facilitators and barriers to implementation.

*Statistical analysis for RQ1.* Effect sizes were calculated taking into account study design. For the two types of group evaluations (single group and controlled evaluations), a standardised mean difference was estimated ( $d$ ). For single groups, the  $d$  measured the mean difference between baseline and post (or follow-up) divided by the standard deviation of change scores, controlling for the pre-post correlation between scores (Dunlap, Cortina, Vaslow, & Burke, 1996). The  $d$  for the controlled evaluations was estimated by subtracting the mean post-pre difference for the treatment group from the mean pre-post difference for the control group, and subsequently dividing this by the pooled standard deviation of change scores, while also controlling for any pre-post score correlation within each group (Higgins & Green, 2011). Interpretation of the standardised mean differences will be as follows:  $d=0.8$  large,  $d=0.5$  moderate,  $d=0.2$  small (Cohen, 1988). Statistical significance can be inferred by a 95% Confidence Interval (CI) range not including the value of zero. These two types of  $d$  represent a different study design, therefore they were not combined. Tau-U was selected as the most appropriate non-overlap effect size for the SCEDs as it can account for any potential monotonic trend in baseline and has strong statistical power even for short phase length (Parker et al., 2011a; b). Tau-U estimates the percentage non-overlap between study phases having controlled for a positive baseline trend when one is present (Parker et al., 2011a;b). We used the online calculator developed by the effect size authors (Vannest, Parker, Gonnell, & Adiguzel, 2016) to obtain Tau-U and estimates of effect size variability across units of analysis, but we estimated by hand their 95% confidence intervals. Tau-U values typically range from 0 to 1 although values can exceed 1. Tau-U values can be interpreted as percentage improvement over baseline, with values up to 0.20 considered small, 0.20 to 0.60 moderate, 0.60 to 0.80 large, and over 0.80 very large (Vannest & Ninci, 2015). For the two studies designed as SCEDs but analysed as single groups, effect sizes were calculated both

ways. Summary effect sizes were calculated for each of the three study designs weighted by the inverse of variance.

We planned a number of a priori specified subgroup analyses to examine whether effectiveness was moderated by certain design or setting characteristics: method of staff training in Active Support (full vs partial), extent of Active Support implementation (Active Support technologies used or not); whether Active Support implementation was data monitored (Participant Record used vs not reported or not used); whether engagement was measured by researcher-led observation vs staff-reported rating scale; number of residents in a home; staff:resident ratio; and, length of staff service in role/setting. Subgroup analyses were actually conducted only when *at least* two studies had available effect sizes. Therefore, we report only subgroup analyses that were feasible.

**Quality appraisal.** For RQ1, the Critical Appraisal Skills Programme (CASP, 2014) checklists or the quality indicators for within single-subjects research (Horner et al., 2005), were used to appraise the quality of the studies dependent on the study design. For RQ2, the Kmet, Lee and Cook (2004) quality assessment checklist for quantitative studies and Kmet, Lee and Cook (2004) quality assessment checklist for qualitative studies were used to calculate a score for each study which indicates overall methodological quality (Table 2).

## **Results**

### **RQ1: Effectiveness of Active Support**

Table 3 presents summary weighted effect sizes by study design and time: the baseline-post test period was less than six months following training, while follow-up refers to the period six months and beyond initial Active Support training.

[TABLE 3 ABOUT HERE]

**Meta-analysis of total engagement.** There were small, significant improvements in total engagement across single group studies ( $d=0.24$ , 95% CI: 0.13 to 0.36) with available data (Jones et al., 1999; Jones et al., 2001b; Stancliffe et al., 2007; Totsika et al., 2010). The improvement maintained at follow-up ( $d=0.33$ , 95% CI: 0.10 to 0.56) (Beadle-Brown et al., 2012; Totsika et al., 2010). The equivalent effect size from the one controlled evaluation with relevant data was large ( $d=1.41$ , 95% CI: 0.58 to 2.25; Bradshaw et al., 2004) at post-test, and follow-up ( $d=0.76$ , 95% CI: 0.40 to 1.11; Mansell et al., 2002). Significant improvements in total engagement were confirmed by the SCEDs. At post-test, a weighted summary Tau-U of 0.71 (95% CI: 0.55 to 0.87), indicated a 71% improvement over baseline (Baker et al., 2017; Jones et al., 1999; Stancliffe et al., 2007). At follow-up, the Tau-U was 0.95 (95% CI: 0.64 to 1.25) (Jones et al., 1999; Stancliffe et al., 2007), indicating a 95% improvement over baseline.

**Subgroup analyses for total engagement.** Full training in Active Support had a larger effect on total engagement at post ( $d=0.42$ , 95% CI: 0.29 to 0.56) (Jones et al., 1999; Jones et al., 2001b<sup>1</sup>; Stancliffe et al., 2007) compared with partial training ( $d=-0.09$ , 95% CI: -0.21 to 0.03) (Jones et al., 2001b<sup>1</sup>; Totsika et al., 2010<sup>2</sup>). Staff years in role correlated strongly but inversely with change in total engagement pre to post ( $r= -0.99$ ,  $p=.108$ ) (Jones et al., 2001b; Stancliffe et al., 2007; Totsika et al., 2010), suggesting that fewer staff years in role were associated with larger increases in resident engagement. The mean number of residents per house (range: 1-6) correlated positively and strongly with change in total engagement ( $r=0.75$ ,  $p=.252$ ) (Jones et al., 1999; Jones et al., 2001b; Stancliffe et al., 2007; Totsika et al.,

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<sup>1</sup> Jones et al. (2001b) Phases 1 and 2 included full training; Phase 3 included workshop training only.

<sup>2</sup> Totsika et al. (2010) included interactive training only.

2010), suggesting that engagement increased more in included studies where houses had more residents.

**Meta-analysis of domestic activity engagement.** Looking specifically at engagement in domestic activities, a small but significant increase was evident across six single group studies with relevant data at post ( $d=0.41$ , 95% CI: 0.27 to 0.54) (Felce & Repp, 1992; Jones et al., 1999; Jones et al., 2001b; Riches et al., 2011; Stancliffe et al., 2007; Totsika et al., 2010), and follow-up ( $d=0.42$ , 95% CI: 0.23 to 0.61) (Beadle-Brown et al., 2012; Koritsas et al., 2008; Stancliffe et al., 2010; Totsika et al., 2010). Only one controlled study measured domestic engagement (Chou et al., 2011). It found a non-significant effect at post ( $d=-0.16$ , 95% CI: -0.58 to 0.25) and follow-up ( $d=0.24$ , 95% CI: -0.47 to 0.38).

**Subgroup analyses of domestic engagement.** A larger effect was evident when full training was delivered ( $d=0.61$ , 95% CI: 0.45 to 0.77) (Felce & Repp, 1992; Jones et al., 1999; Jones et al., 2001b<sup>1</sup>; Riches et al., 2011; Stancliffe et al., 2007) compared with partial training ( $d=0.07$ , 95% CI: -0.07 to 0.20) (Jones et al., 2001b<sup>1</sup>; Totsika et al., 2010<sup>2</sup>). Similar levels of domestic engagement were seen when the outcome was measured through staff report ( $d=0.41$ , 95% CI: 0.15 to 0.67) and researcher observation ( $d=0.48$ , 95% CI: 0.20 to 0.76). Staff: resident ratio was inversely related to change in domestic engagement pre to post ( $r=-0.94$ ,  $p=0.06$ ) (Felce & Repp, 1992; Jones et al., 1999; Jones et al., 2001; Riches et al., 2011), suggesting that engagement decreased in homes with more staff in relation to number of residents. A strong negative correlation was present for staff years in role ( $r=-0.96$ ,  $p=.036$ ) (Jones et al., 2001b; Riches et al., 2011; Stancliffe et al., 2007; Totsika et al., 2010), suggesting that fewer staff years in role were associated with larger increases in domestic engagement. A strong positive correlation was present between mean number of residents per house and change in domestic engagement pre to post ( $r=0.91$ ,  $p=.013$ ) (Felce & Repp, 1992; Jones et al., 1999; Jones et al., 2001b; Riches et al., 2011; Stancliffe et al., 2007; Totsika et

al., 2010) and also pre to follow-up ( $r=0.80$ ,  $p=.205$ ) (Beadle-Brown et al., 2012; Koritsas et al., 2008; Stancliffe et al., 2010; Totsika et al., 2010), suggesting that domestic engagement increased more in included studies where houses had more residents.

**Meta-analysis of social engagement.** For social engagement, there was a small effect at post-test ( $d=0.27$ , 95% CI: 0.12 to 0.42) (Jones et al., 1999; Jones et al., 2001b; Totsika et al., 2010), and a small effect at follow-up ( $d=0.27$ , 95% CI: 0.01 to 0.53) (Beadle-Brown et al., 2012; Totsika et al., 2010).

**Subgroup analysis for social engagement.** There were no differences between full ( $d=0.14$ , 95% CI: -0.04 to 0.31) (Jones et al., 1999; Jones et al., 2001b<sup>1</sup>) and partial training ( $d=-0.04$ , 95% CI: -0.19 to 0.11) (Jones et al., 2001b<sup>1</sup>; Totsika et al., 2010<sup>2</sup>) for social engagement.

**Meta-analysis of other resident outcomes.** Depressive symptoms did not improve significantly at post-test in single group studies ( $d=-0.31$ , 95% CI: -0.64 to 0.01) (Riches et al., 2011; Stancliffe et al., 2007). Depressive symptoms improved moderately at follow-up ( $d=-0.49$ , 95% CI: -0.79 to -0.20) (Stancliffe et al., 2010). In the only controlled evaluation to measure depression (Chou et al., 2011), scores did not change at four months ( $d=-0.05$ , 95% CI: -0.47 to 0.38) or 14 months ( $d=0.41$ , 95% CI: -0.02 to 0.85).

Within single group studies, initially there was no change in choice ( $d=-0.05$ , 95% CI: -0.45 to 0.33) (Riches et al., 2011; Stancliffe et al., 2007). At follow-up, a moderate significant effect was evident ( $d=0.62$ , 95% CI: 0.23 to 1.01) (Beadle-Brown et al., 2012; Koritsas et al., 2008). Choice did not change significantly at post ( $d=0.47$ , 95% CI: -0.04 to 0.99) or follow-up ( $d=0.37$ , 95% CI: -0.14 to 0.88) in the only controlled evaluation that measured it (Chou et al., 2011).

In single group studies, challenging behaviour scores presented a small reduction at post-test ( $d=-0.12$ , 95% CI: -0.24 to 0.00) (Jones et al., 2001b; Riches et al., 2011; Stancliffe



et al., 2007; Totsika et al., 2010), and at follow-up ( $d=-0.13$  95% CI: -0.24 to -0.03) (Beadle-Brown et al., 2012; Koritsas et al., 2008; Stancliffe et al., 2010; Totsika et al., 2010). In controlled evaluations, there was a small increase at post ( $d=0.24$ , 95% CI: 0.01 to 0.47; Bradshaw et al., 2004; Chou et al., 2011). Looking at these two studies individually, challenging behaviours increased in the Bradshaw et al. study but remained unchanged in Chou et al.

In single group studies, there was no change in adaptive skills at post-test ( $d=0.07$ , 95% CI: -0.06 to 0.19) (Riches et al., 2011; Stancliffe et al., 2007), or follow-up ( $d=0.10$ , 95% CI: -0.02 to 0.23) (Beadle-Brown et al., 2012; Koritsas et al., 2008; Stancliffe et al., 2010). At post, data from one controlled study indicated a large (but variable) effect ( $d=0.78$ , 95% CI: 0.37 to 1.18; Chou et al., 2011). At follow up, data from two controlled studies indicated a non-significant change in adaptive skills ( $d=0.16$ , 95% CI: -0.10 to 0.43) (Chou et al., 2011; Mansell et al., 2002).

The frequency of participation in community activities (measured by the Index of Community Involvement; Raynes & Sumpton, 1986) increased significantly at post-test ( $d=0.22$ , 95% CI: 0.07 to 0.37) (Jones et al., 2001b; Riches et al., 2011; Stancliffe et al., 2007) in single group studies. However, moderate significant reductions were reported in one controlled evaluation (Chou et al., 2011) at both post ( $d=-0.69$ , 95% CI: -1.13 to -0.25) and follow-up ( $d=-0.44$ , 95% CI: -0.87 to -0.01).

***Subgroup analyses for other resident outcomes.*** There was a moderate negative correlation between pre-post changes in challenging behaviour and the number of years staff had worked in the group home ( $r=-0.59$ ,  $p=.414$ ) (Jones et al., 2001b; Riches et al., 2011; Stancliffe et al., 2007; Totsika et al., 2010), suggesting that challenging behaviour increased at homes in houses where staff had been working for longer. There was no association between changes in challenging behaviour and mean number of residents per house at post

( $r=0.29$ ,  $p=.707$ ) (Jones et al., 2001b; Riches et al., 2011; Stancliffe et al., 2007; Totsika et al., 2010) or follow-up ( $r=-0.20$ ;  $p=.805$ ) (Beadle-Brown et al., 2012; Koritsas et al., 2008; Stancliffe et al., 2010; Totsika et al., 2010).

**Meta-analysis of staff outcomes.** Staff assistance improved post-intervention, with a small effect ( $d=0.43$ , 95% CI: 0.19 to 0.67) (Jones et al., 1999; Jones et al., 2001b; Stancliffe et al., 2007; Totsika et al., 2010) and a moderate effect at follow-up ( $d=0.56$ , 95% CI: 0.23 to 0.89) (Beadle-Brown et al., 2012; Totsika et al., 2010). SCED data confirmed that changes in staff assistance were significant at post-test (Tau-U=0.58, 95% CI: 0.42 to 0.74) (Baker et al., 2017; Jones et al., 1999; Stancliffe et al., 2007) and follow-up (Tau-U=0.63, 95% CI: 0.32 to 0.93) (Jones et al., 1999; Stancliffe et al., 2007), improving between 58% and 63% over baseline.

In single group studies with available data, quality of staff support (ASM; Mansell & Elliott, 1996) did not improve at post ( $d=0.31$ , 95% CI: -0.06 to 0.69; Totsika et al., 2010; but note this study included only partial training), but it improved significantly at follow-up ( $d=0.44$ , 95% CI: 0.15 to 0.72) (Beadle-Brown et al., 2012; Totsika et al., 2010). This is mirrored by the effect size of one controlled evaluation with ASM data at three years post-intervention ( $d=1.03$ , 95% CI: 0.61 to 1.44; Mansell et al., 2002). Similarly, the effect size from one SCED with ASM data at post-test indicated a large significant effect (Tau-U=1.00, 95% CI: 0.63 to 1.38; Rhodes & Toogood, 2016).

Overall staff contact did not change in single group studies with available data at post ( $d=-0.02$ , 95% CI: -0.20 to 0.16) (Jones et al., 1999; Jones et al., 2001b; Totsika et al., 2010) or at follow-up ( $d=.32$ , 95% CI: -.15 to .78; Totsika et al., 2010). In the single controlled evaluation that measured it, staff contact one month post-intervention did not change significantly ( $d=0.76$ , 95% CI: -0.10 to 1.61; Bradshaw et al., 2004).

**Subgroup analyses for staff outcomes.** Staff assistance showed larger effects when full training was delivered ( $d=0.68$ , 95% CI: 0.41 to 0.95) (Jones et al., 1999; Jones et al., 2001b<sup>1</sup>; Stancliffe et al., 2007) compared with only partial training ( $d=-0.14$ , 95% CI: -0.39 to 0.11) (Jones et al., 2001b<sup>1</sup>; Totsika et al., 2010<sup>2</sup>) with data at post. Conversely, the amount of training had no effect on staff contact: full training ( $d=0.02$ , 95% CI: -0.18 to 0.22) (Jones et al., 1999; Jones et al., 2001b<sup>1</sup>); partial training ( $d=-0.07$ , 95% CI: -0.25 to 0.11) (Jones et al., 2001b<sup>1</sup>; Totsika et al., 2010<sup>2</sup>).

**Quality appraisal of RQ1 studies.** Single group studies and SCEDs were mostly of adequate quality according to the CASP (2014) criteria or the SCED quality indicators (Horner et al., 2005). Three of the seven single group studies had an insufficient follow-up period. The inter-observer agreement/reliability was consistently high across studies, indicating that potential measurement bias was limited. Overall, controlled evaluations were the least sound in terms of methodological quality. None of the three controlled studies included randomisation. One of the three studies could not establish group equivalence prior to the intervention. Importantly, in two of the three controlled evaluations, the comparison group (support as usual) had actually been exposed to Active Support training (Chou et al., 2011, Mansell et al., 2002) at a time in the study where the outcome measures could have been affected. Overall, the controlled evaluations had significant limitations in their internal validity, and results from these studies need to be interpreted with this limitation in mind. Finally, the lack of implementation fidelity measurement emerged across all designs. Quality appraisal results for RQ1 studies can be found in Tables A3 and A4 in the Appendix.

## **RQ2: Experience of Active Support**

**Experience of Active Support training.** Two studies evaluated staff experiences of interactive training (Toogood, 2008; Totsika et al., 2008b), and another reported on staff

experiences of both workshop and interactive training (Riches et al., 2011). All studies used the same training feedback questionnaire, where items are scored on a 1-5 scale, with higher values indicating higher agreement. Overall, participants enjoyed the training (83-100%), felt it was well organised (94-100%), relevant and helpful (90-100%), felt that they had learned new approaches and techniques (80-91%), that they would be more able to assist people with ID to participate (92-100%), and that there would be lasting benefits for clients (89-100%). Participants did not mind being observed (61-80%), and preferred being trained by an external person, rather than their manager (76-80%).

Facilitators and barriers to interactive training were highlighted in one study (Totsika et al., 2008b) that interviewed staff and analysed the data using content analysis: the most common helpful characteristics were that the training was one-to-one, and happened in the setting. Barriers were the difficulty to engage some residents, and difficulties in scheduling the training around other activities (Totsika et al., 2008b). Qian et al. (2017), in a thematic analysis of staff interview and focus group data, noted that the low wages of support staff often led to them having a second job which presented problems for scheduling group training sessions as not all staff could attend training at the same time.

**Experience of Active Support implementation.** Data on implementation experiences were synthesised using a social validity framework (Wolf, 1978) to establish whether: (a) programme goals are wanted, (b) the procedure is acceptable, and (c) the results are satisfactory for the stakeholders. We also synthesised reported barriers and facilitators of Active Support implementation.

*Are the goals of Active Support wanted by stakeholders?* Jones et al. (2001b) conducted a focus group with people with ID who had experience of Active Support, and 80% of participants said that Active Support helped them. They enjoyed the independence, learning new skills and doing things for themselves. However, a quarter of residents said they

found housework tiring and they now had too much to do. Staff perspectives were gathered by two studies which found that trained staff had attitudes which were better aligned to those of community care than staff who had not been trained (Mansell et al., 2008); and that promoting risk taking and the chance to fail were new approaches but staff ultimately saw the importance of these outcomes (Graham et al., 2013). Mansell et al. (2008) suggested that Active Support trained staff were more likely to consider most care related tasks as being less difficult.

*Is the procedure of Active Support acceptable to stakeholders?* Active Support led to a change of mind set for staff who switched from perceiving their role as a caregiver to someone who supported people to lead their own lives (Qian et al., 2017). Staff also reported that Active Support had led them to change their practice (Graham et al., 2013; Totsika et al., 2008b). This change was difficult for staff, and that some felt that they were no longer caring for the people they support as they were taking more of a back seat role (Graham et al., 2013). Residents felt that Active Support increased staff awareness about the skills required to support them better, but this was reported by a training facilitator, not residents themselves (Jones et al., 2001b). In addition to knowing which new skills staff need, most staff (27/37) in Totsika et al. (2008b) reported using at least one new skill (e.g. better task preparation/presentation, communication changes, creating more opportunities for engagement) when supporting residents. However, none of the studies examined the experience of using the Active Support technologies. In Jones et al (2001b) a small number of residents (one fifth) – who were supported by staff to complete the questionnaires – said that there was too much paperwork, and that this gave staff less time to spend with them.

*Are the results of Active Support satisfactory for stakeholders?* Staff in two studies indicated that the people they support were more actively participating in activities and decisions (Graham et al., 2013; Qian et al., 2017), but this information was not presented by

residents themselves. Staff also reported a reduction in challenging behaviour (Qian et al., 2017), and that residents were happier (Graham et al., 2013). Conversely, staff in the Totsika et al. (2008b) study seldom mentioned improvements in engagement (16%), skill development, or improved quality of life (all 14%); this lack of staff perceived changes was reflected in the quantitative evaluation that found little change after Active Support interactive training delivered alone (Totsika et al., 2010). Improved relationships with staff were noted by staff and residents in Jones et al.'s (2001b) study, including more attention being paid to residents' needs and wishes. Qian et al. reported that staff were offering more encouragement to residents. Totsika et al. (2008b) reported that there was increased continuity in residents' routines and consistency in the staff approach to supporting residents (both 27%). Staff in the Graham et al. study were satisfied with the new approach, and agreed with giving residents more opportunities to engage in activities that presented risks (e.g., preparing food).

Two studies found significant increases in staff job satisfaction shortly after (12 weeks) or 12 months after Active Support implementation (Beadle-Brown et al., 2012; Rhodes & Toogood, 2016). Interestingly, staff propensity to leave their job in the next 12 months also decreased (Beadle-Brown et al., 2012). Staff perceived better quality support from their managers, including more modelling of good practice and feedback (Beadle-Brown et al., 2012).

**Perceived barriers and facilitators to Active Support implementation.** Staff in Qian et al. (2017) reported several barriers to Active Support implementation, many of which were related to sector pay conditions: support staff receive low wages which poses a problem for staff retention, often leading to untrained staff replacing Active Support trained staff, thus hindering consistent implementation of Active Support. Other identified implementation barriers were an absence of leadership and support within the services, and a lack of

organisational readiness for Active Support (Qian et al., 2017; Totsika et al., 2008b). In Totsika et al. (2008b) staff also reported implementation barriers related to residents: low levels of ability, challenging behaviour, or low motivation. Facilitators for successful Active Support implementation were highlighted by staff in Fyffe et al. (2008) as being positive responses about Active Support training, teamwork, having regular house staff meetings, and staff having a good understanding of what resident engagement should look like.

**Quality appraisal of RQ2 studies.** Studies included for RQ2 were generally of high quality (Table 2). Kmet and colleagues (2014) recommend that a conservative cut-off for inclusion is 75%, and that if any studies fall below the cut-off to consider excluding them from a systematic review. Here, all identified studies were above this cut-off. Common limitations were the description of analysis and reflexivity methods (qualitative studies only), participant selection and characteristics, and not having a clearly defined research question or objective.

## Discussion

The present review aimed to synthesise available evidence on the effectiveness of Active Support (RQ1), and stakeholders' experience of the model (RQ2). Findings on effectiveness suggested that Active Support led to significant increases in the amount of time residents spent engaged in all types of activities at home (total engagement). This is the only resident-related outcome where effect sizes from different study designs converged on their message. Effect sizes ranged from small in single group studies ( $d$ s between 0.24 and 0.33) to large in controlled evaluations and SCEDs ( $d=0.76$  and  $\text{Tau-U}=0.71$ ) and very large in controlled studies and SCEDS ( $d=1.41$ , and  $\text{Tau-U}=0.95$ ). When activities were broken down to more specific types, data were either only available from one study design (single group studies) or

effect sizes from different designs disagreed: significant increases in domestic and social engagement were only seen in single group studies.

A convergence on the message of effect sizes from different designs was evident for all staff outcomes. Staff assistance (i.e., staff verbal and non-verbal behaviour directly supporting resident engagement) and the quality of staff support significantly improved by follow-up (i.e., in the period 6 to 12 months following training). Staff assistance increased moderately with effect sizes in single group studies ranging between ( $d$ ) 0.43 and 0.56, and (Tau-U) .58 to .63 in SCEDs. The change in the quality of staff support ranged from small in single group studies ( $d=.44$ ) to very large in controlled evaluations and SCEDS ( $d=1.63$  and Tau=1.00). In contrast, staff contact (i.e., staff interactions that include assistance but also all other exchanges) did not significantly change at any point. The pattern of changes is consistent with Active Support's training input that directly aims to change staff moment-to-moment behaviour to facilitate engagement, but does not place any other demands on the way staff interact with residents on other occasions (Jones et al., 2009; Toogood, 2010).

Findings support earlier narrative reviews (Stancliffe et al., 2008a; Totsika et al., 2008a), and extend the previous synthesis (Hamelin & Sturmey, 2011). Our use of a SCED effect size that can effectively account for any baseline trend (Tau-U; Parker et al., 2001a; b), and the larger number of experimental studies (four SCEDs) available here indicated that, after accounting for baseline trend, improvements in total resident engagement were large: 71% to 95% better than baseline at post and follow-up, respectively; improvement in staff assistance was moderate: 58% to 63% by follow-up; and very large for quality of staff support with increase 100% over baseline. However, the overall number of SCEDs is still small, and studies had relatively short phase lengths, and high variability in measurement. These design characteristics combined with large changes resulted in confidence intervals exceeding 1 (Table 3), which is considered the rational limit of Tau-U (Parker et al., 2011b).



We selected not to cap the Tau-U confidence intervals at 1 as we wanted to demonstrate this effect which in our view was due to a ceiling effect and SCED design characteristics. While more robust than simple non-overlap effect sizes, Tau-U may be prone to ceiling effects in Active Support evaluations that measure activity engagement as percentage of time and include short or very short (e.g., less than three points) phase lengths.

We were able to meta-analyse for the first time data on other resident outcomes. These mostly came from single group studies or controlled evaluations. Overall, effect sizes from the two study designs did not converge on the direction or significance of change in depressive symptoms, adaptive skills, resident choice, or community participation. While increases in engagement in community activities would be expected following a period of Active Support implementation, outcomes such as depressive symptoms or adaptive skills are not primary targets of the intervention, but might be expected to be affected following a period of sustained activity engagement in and out of the house (Bartlo & Klein, 2011; Qian et al., 2015).

Previous reviews were inconclusive regarding Active Support effects on challenging behaviour (Stancliffe et al., 2008a; Totsika et al., 2008a). Present findings suggest that challenging behaviours mostly do not change much. Effect sizes across all study designs were very small ( $<.25$ ) in any direction. Researchers have proposed that the measurement method may relate to the direction of score change (Emerson & Hatton, 1996). Direct observations have been criticised for not being able to capture small changes in high-impact behaviours (e.g., aggression). Unfortunately, there were not enough studies with available data to allow us to compare challenging behaviour scores between staff-reported questionnaires vs direct observations, as we had planned. Because of this measurement confound, a clearer understanding of effects on challenging behaviour may emerge if we gather evidence to test the hypothesis that Active Support has function-related effects on challenging behaviour. In

other words, future evaluations should examine not just the impact on the frequency of topographically-defined challenging behaviours, but any impact on the frequency of challenging behaviours defined by function, as it has been hypothesised that environmental changes brought about by Active Support implementation could alter the motivation (i.e., establishing operations) for presenting certain behaviours (Jones et al., 2013; Totsika et al., 2008a), for example a reduction in behaviours motivated by lack of access to activities and tangibles because of the increase in activities and support to participate throughout the day.

We had planned a number of subgroup analyses to explore potential moderators of effectiveness in our protocol. We conducted only those subgroup analyses where at least two effect sizes were available. The number of studies where this was possible was small, so results are tentative, but indicate that: (a) receipt of the full Active Support training (i.e., both group workshop and interactive training) is associated with larger positive changes in resident engagement; (b) a higher number of years in the current role had a significant negative effect on both engagement and challenging behaviours. There are two possible explanations for this. Working in the current role for more years could mean that change in staff behavior and subsequently resident behavior is harder to achieve. A parallel possibility is that more years in the role means more exposure to informal – negative – staff culture (Hastings & Remington, 1994). Staff culture in homes where residents have low activity levels is characterised by staff resistance to change and staff perceiving their role as doing for rather than doing with (Bigby et al., 2012); (c) effectiveness appears enhanced in homes with fewer staff and more residents (maximum reported within included studies = 8). There was a strong, negative relationship between staff: resident ratios and changes in domestic engagement, suggesting that the presence of more staff hinders resident engagement in domestic activities. There were also strong positive correlations between number of house residents and engagement.

Taken together, these findings support suggestions that the promotion of active participation in Active Support does not place additional demand on services (Mansell et al., 2008), and further indicate that a good level of engagement can be achieved in larger homes (average setting size in our review was 4, SD:1), without any adverse effects on challenging behaviours.

We synthesised quantitative and qualitative evidence on the experience of Active Support training and implementation (RQ2). Findings indicated that training and, in particular, interactive training was positively received by staff. In terms of the acceptability of the model's aims and outcomes, staff and residents valued the aims of Active Support, even if each group thought it was easier or preferable if staff did the jobs at home. Staff and residents recognised it was important for residents to be leading their own lives and activities. Staff were satisfied with the outcomes of the implementation and were reporting they thought residents were also happy; this dimension lacked evidence from residents themselves. An important outcome of Active Support was increased job satisfaction and lower propensity to leave which have been strongly associated with actual job searching behaviours in support staff (Hatton et al., 2001).

The final dimension of social validity refers to the acceptability of the implementation process. Initially, staff appeared to experience conflict in the way they viewed their role (as carers) vs the way they were expected to work during Active Support (as enablers), but once they changed their perspective they were able to change their practice and use the new skills they learned through training. It was also clear that leadership or managerial support for the model along with appropriate organisational processes (such as regular staff meetings) were crucial facilitators of implementation.

Interestingly, a number of factors staff viewed as barriers to implementation (high staff turnover, not enough staff, challenging behaviours) appear to be factors that Active

Support addresses directly or indirectly: our data indicated increased job satisfaction that may reduce turnover; that effective implementation actually requires fewer staff; and a lack of association with increases in challenging behaviours. These messages could be incorporated in Active Support training to address staff perception of barriers.

The inclusion of three study designs in the review represented both an improvement over previous syntheses and a challenge. While the present review is more inclusive of Active Support evaluations, the variation in design and the methodological limitations make drawing firm conclusions more challenging, in terms of the number of dimensions that need to be considered. It was clear that most evaluation efforts have adopted single group designs. These cannot effectively determine effectiveness as there is no control or comparison condition. The three controlled evaluations did not necessarily provide stronger evidence than single group studies just by virtue of their design. None of the controlled studies included randomisation. Two of the three studies had internal validity limitations: their “support as usual” comparison groups had actually been exposed to Active Support training at a time when their outcomes could have been affected (Mansell et al., 2008; Chou et al., 2011). Additionally, the equivalence of groups prior to intervention could not be fully demonstrated in Chou et al. (2011) and was not examined in Bradshaw et al. (2004). For these reasons, and for the small number of controlled evaluation studies that fed into effect sizes, effect sizes from this design should not be over-interpreted. The methodological quality of SCEDs was, on average, better, and by extension effect sizes from these designs are more reliable, although, as discussed above, for some outcomes ceiling effects were present. It should be mentioned that an available randomised controlled evaluation was identified through the search but it could not be considered for inclusion as the authors were still in the process of finalising their report. Since our searches were undertaken, new evidence will soon be published, or has recently been published (for example, Bigby, Bould & Beadle-Brown,

2017); an updated systematic review and meta-analysis should therefore be undertaken when the literature has developed even further.

The present study is the most comprehensive systematic review and meta-analysis of Active Support to date. In the field of ID where several approaches lack any evidence base and there is a high need for rapid evidence generation (Hastings, 2013), the present systematic review suggests that, as an approach, Active Support has a growing evidence base with regard its effectiveness on resident total activity engagement, staff assistance and quality of staff support. Findings provide for the first time evidence of minimal change in resident challenging behaviours, but could not elucidate the direction of change for other resident data, such as adaptive skills, depressive symptoms, resident choice and community participation. Importantly, our risk of bias evaluation strongly highlights the need for better quality evaluations, especially controlled evaluations. In the absence of any rigorous randomised trials, the challenge of integrating three study designs in the meta-analysis was deemed necessary to make full use of the information available.

Present findings have immediate relevance to residential services who consider implementing Active Support. In terms of implications for practice, present findings suggest that services that aim to improve resident quality of life can achieve increases in activity engagement, staff assistance, and quality of staff support, if they adopt Active Support. Importantly, these improvements can be successfully achieved without an increase in resident challenging behaviours. In terms of training and implementation requirements, current evidence is suggesting that full training is more effective (on average 2 days group workshop and one 2-hour session interactive training for each staff). In addition, Active Support seems to work well in environments with a lower staff: resident ratio (i.e., fewer staff, more residents), with the mean ratio in the present study at 1.7 (and 4 the mean number of residents). For services who are considering Active Support adoption but are concerned about

staff turnover and its effects on implementation, it is important to emphasise current evidence of increased staff job satisfaction and reduced propensity to leave as a likely beneficial side-effect of implementation against the backdrop of high staff turnover in the sector. The synthesis of staff and residents' experience suggested that all stakeholders recognised and valued the benefits and outcomes of Active Support implementation. As research moves to refine the evidence on effectiveness, researchers and practitioners need to work together to develop more knowledge about best implementation practice.

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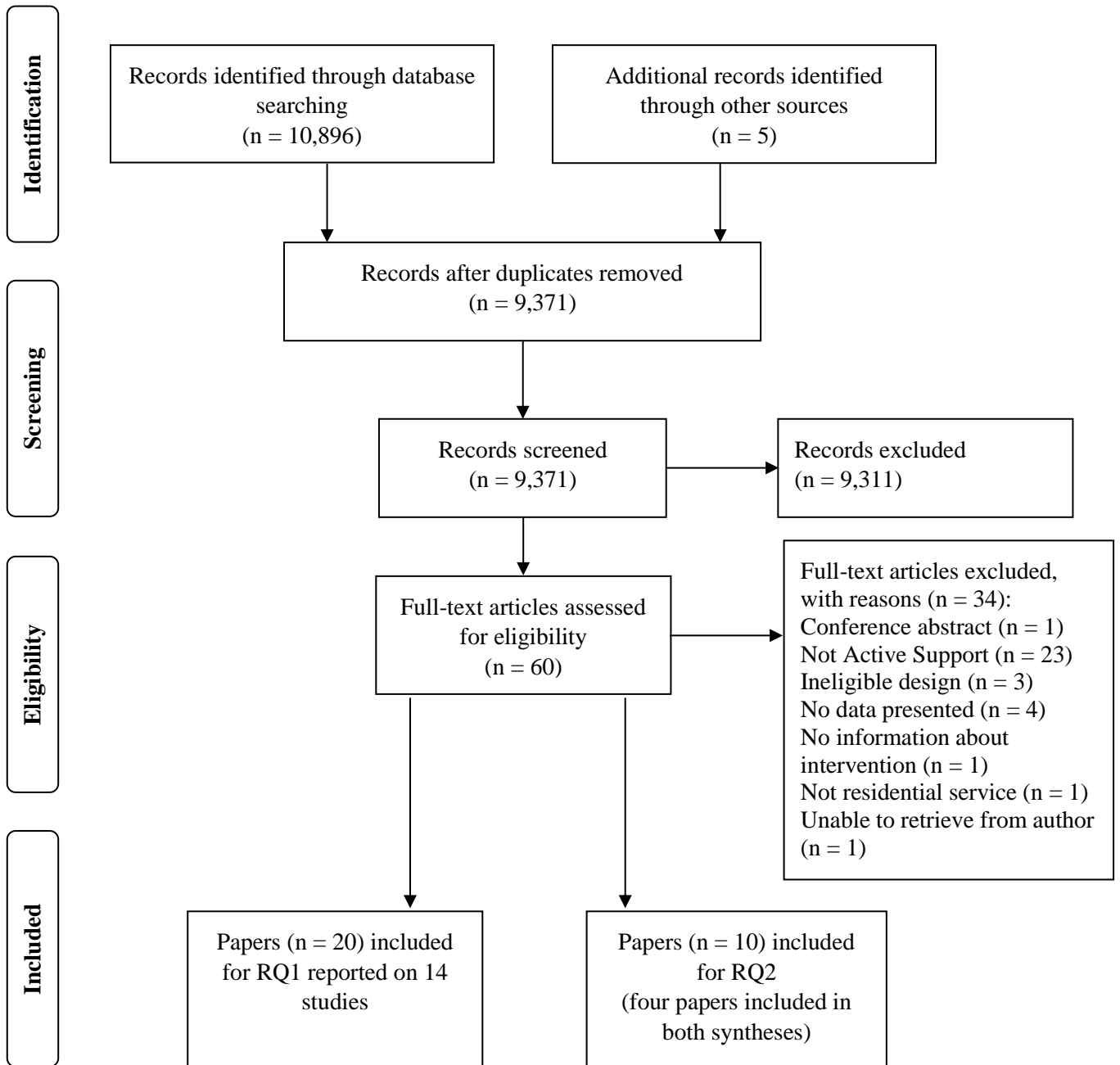


Figure 1. PRISMA flow diagram illustrating study selection

Table 1. Papers and studies included for Research Question 1 (Effectiveness of Active Support)

<b>Study</b>	<b>Paper first author (date)</b>	<b>Study design</b>	<b>Country</b>	<b>Participant N</b>	<b>Age in years (range)</b>	<b>Gender (% male)</b>	<b>Group homes (N)</b>	<b>Mean number of residents per house (range)</b>
1	Beadle-Brown (2008)	Single group	UK	29 staff	44 (20-61)	Not reported	6	Not reported
	Beadle-Brown (2012)	Single group	UK	33 staff  31 staff follow-up) 29 staff (at both time-points)	44 (20-61)	Not reported	6	5.5 (2-8)
2	Bradshaw (2004)	Controlled	UK	10 residents [Control: 11] 38 staff [Control: 29]	Residents: Not reported Staff: 37 [Control: 38]	Residents: 91.00 [all residents] Staff: 32.00 [Control: 34.50]	3 [Control: 3]	3.7 (3-4)
3	Baker (in press)	SCED <sup>1</sup>	UK	25 residents	45 (22-69)	48.00	4	4 (5-8)

4	Chou (2011)	Controlled	Taiwan	49 residents [Control: 19]	32 (19-54) [Control: 32 (24-53)]	63.30 [Control: 57.90]	12 [Control: 5]	4 (2-6)
5	Felce (2000)	SCED	UK	19 residents	48 (30-67)	63.16	5	3.8 (Not reported)
	Jones (1999)	SCED <sup>2</sup>	UK	19 residents	48 (30-67)	63.16	5	3.8 (3-4)
6	Felce (1992)*	Single group	UK	6 residents	42	Not reported	1	6 (N/A)
7	Koritsas (2008)	Single group	Australia	12 residents 11 staff	Residents: 37 (27-57)	Residents: 75.00	3	4 (Not reported)
8	Mansell (2002)	Controlled	UK	23 residents [Control: 26]	39 (32-47) [Control: 39 (20-69)]	63.00 [Control: 42]	13	6 (Not reported)
9	Riches (2011)	Single group	Australia	13 residents	52 (30-72)	69.00	6	3.67 (Not reported)
10	Jones (2001a)	Single group	UK	106 residents 303 staff	Residents: 43 (22-76)	Residents: 54.00 Staff: 32.80	38	2.8 (1-4)

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					Staff: 40 (20-63)			
	Jones (2001b)	Single group	UK	188 residents	45 (21-79)	55.90	74	2.5 (1-5)
	Smith (2002)	Controlled	UK	106 [Control: 82]	43 (22-76) [Control: 48 (21-79)]	54.00 [Control: 58.00]	74	2.5 (1-5)
11	Rhodes (2016)	SCED	UK	10 residents 38 staff (baseline) 19 staff (follow- up)	Not reported	Residents: 70.00 Staff: 33.33	2	5 (5)
12	Stancliffe (2007)	SCED <sup>2</sup>	Australia	22 residents 36 staff	Residents: 41 (27-62)	Residents: 36.36	5	4.4 (4-5)
	Stancliffe (2008b)	Single group	Australia	20 residents 36 staff	Residents: 42 (27-62)	Residents: 35.00	5	4.4 (Not reported)
	Stancliffe (2011)	SCED	Australia	4 residents 8 staff	Residents: 44 (32-56)	Residents: 25.00	1	4 (N/A)

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13	Stancliffe (2010)	Single group	Australia	41 residents	44 (25-63)	65.85	9	4.71 (3-6)
14	Totsika (2010)	Single group	UK	21 residents	47 (28-75)	57.14	10	2.1 (Not reported)

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<sup>1</sup>SCED= Single Case Experimental Design

<sup>2</sup>These two studies were designed as SCEDs but analysed and reported as single groups

\*We included data from one group in this study; the group with data available before and after Active Support implementation

Table 2. Studies (n=10) included in Research Question 2 (experience of Active Support)

<b>Paper first author</b>	<b>Country</b>	<b>Qualitative/ Quantitative data</b>	<b>Group homes (N)</b>	<b>Study participants Role: N</b>	<b>Active Support training</b>	<b>Focal outcome</b>	<b>Measurement method</b>	<b>Quality appraisal % (Kmet et al., 2004)</b>
Beadle-Brown (2012)	UK	Quantitative	6	Staff: 36	Workshop and interactive training	Staff job satisfaction and propensity to leave in the next 12 months	Staff Experiences and Satisfaction Questionnaire (parts A and parts of Part B) (Beadle-Brown et al., 2005)	89%
Fyffe (2008)	Australia	Quantitative	11	Staff: 80	Not reported	Experience of Active Support implementation	Novel questionnaire based on responses from focus groups with staff and Active Support professionals	94%

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Graham (2013)	New Zealand	Qualitative	1	Staff: 12	Onsite coaching from a self-trained Active Support trainer	Experience of Active Support implementation	Focus groups	90%
Jones (2001b)	UK	Qualitative	22	Residents with ID: 32	Workshop and interactive training	Experience of Active Support implementation	Focus groups	80%
Mansell (2008)	UK	Quantitative	59	Staff: 230	Workshop and interactive training	Experience of Active Support implementation	Staff Experience and Satisfaction Questionnaire (SESQ; Beadle-Brown et al., 2003)	95%
Qian <i>(in press)</i>	US	Qualitative	4	Staff: 13	Not reported	Experience of Active Support implementation	Interviews and a focus group	100%
Riches (2011)	Australia	Quantitative	12	Staff: 63	Workshop and interactive training	Staff experience of training	Training feedback scale	94%

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Rhodes (2016)	UK	Quantitative	2	Staff: 38 baseline 19 follow-up	Workshop and interactive training	Staff job satisfaction	Staff satisfaction measure (Ford & Horner, 2000)	90%
Toogood (2008)	UK	Quantitative	1	Staff: 5	Interactive training	Staff experience of training	Training rating scale	81%
Totsika (2008b)	UK	Qualitative & Quantitative	10	Staff: 37	Interactive training only	Experiences of Active Support training and implementation	Training rating scale Semi-structured interviews	Qual:90% Quant: 88%

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Table 3. Inverse of variance weighted effect sizes (*d* and Tau-U) and confidence intervals (CI) for changes after Active Support training (RQ1)

Outcome	Single group						Controlled						SCEDs					
	<6 months			>6 months			<6 months			>6 months			<6 months		>6 months			
	Studies (n)	Weighted <i>d</i>	CI (95%)	Studies (n)	Weighted <i>d</i>	CI (95%)	Studies (n)	Weighted <i>d</i>	CI (95%)	Studies (n)	Weighted <i>d</i>	CI (95%)	Studies (n)	Weighted Tau-U	CI (95%)	Studies (n)	Weighted Tau-U	CI (95%)
Total engagement	4	0.24	0.13<>0.36	2	0.33	0.10<>0.56	1	1.41	0.58<>2.25	1	0.76	0.40<>1.11	3	0.71	0.55<>0.87	2	0.95	0.64<>1.25
Domestic engagement	6	0.41	0.27<>0.54	4	0.42	0.23<>0.61	1	-0.16	-0.58<>0.25	1	0.24	-0.47<>0.38	-	-	-	-	-	-
Social engagement	3	0.27	0.12<>0.42	2	0.27	0.01<>0.53	-	-	-	-	-	-	-	-	-	-	-	-
Depression	2	-0.31	-0.64<>0.01	1	-0.49	-0.79<>-0.20	1	-0.05	-0.47<>0.38	1	0.41	-0.02<>0.85	-	-	-	-	-	-
Challenging Behaviour	4	-0.12	-0.24<>0.00	4	-0.13	-0.24<>-0.02	2	0.24	0.01<>0.47	-	-	-	-	-	-	-	-	-
Adaptive Skills	2	0.07	-0.06<>0.19	3	0.10	-0.02<>0.23	1	0.78	0.37<>1.18	2	0.16	-0.10<>0.43	-	-	-	-	-	-
Choice	2	-0.05	-0.45<>0.33	2	0.62	0.23<>1.01	1	0.47	-0.04<>0.99	1	0.37	-0.14<>0.88	-	-	-	-	-	-
Community Activities	3	0.22	0.07<>0.37	-	-	-	1	-0.69	-1.13<>-0.25	1	-0.44	-0.87<>-0.01	-	-	-	-	-	-
Staff assistance	4	0.43	0.19<>0.67	2	0.56	0.23<>0.89	-	-	-	-	-	-	3	0.58	0.42<>0.74	2	0.63	0.32<>0.93
Staff contact	3	-0.02	-0.20<>0.16	1	0.32	-0.15<>0.78	1	0.76	-0.10<>1.61	-	-	-	-	-	-	-	-	-
Quality of assistance	1	0.31	-0.06<>0.69	2	0.44	0.15<>0.72	-	-	-	1	1.03	0.61<>1.44	1	1.00	0.63<>1.38	-	-	-

## Appendix with Supplementary Tables

Table A1. Example search string

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<b>Search terms as entered into Medline</b>
1. exp intellectual disability/
2. exp learning disability/
3. (mental or learning or intellectual) adj (disab* or impair* or handicap* or subnormal* or deficien* or retard*).ti,ab.
4. retard*.ti,ab.
5. autis*.ti,ab.
6. (Smith-Magenis or Rett* or Lesch-Nyhan or Prader-Willi or Angelman or fragile X or Cri-du-chat or Cornelia de Lange or de Lange or Rubinstein-Taybi or velocardiofacial or DiGeorge or Down*) adj2 (syndrome).ti,ab.
7. or/1-6
8. Active Support
9. Person?Cent??d Active Support
10. (Andover adj3 (project* or model*))
11. (meaningful or purposeful) adj (activit* or engage*)
12. (ordinary or normal*) adj (lifestyle or activit* or liv*)
13. small community home model
14. or/8-13
15. 7 and 14

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Table A2. Reasons for exclusion at full-text review stage

<b>Author name (date)</b>	<b>Reason for exclusion</b>
Beadle-Brown, Mansell, Ashman, Ockenden, Iles, & Whelton (2014)	Not evaluating the implementation of Active Support
Bigby & Beadle-Brown (2016)	Not focused on Active Support
Bould, Beadle-Brown, Bigby, & Iacono (2016)	Not evaluating the implementation of Active Support
Coates, Barna, & Walz (2004)	No data presented within this paper
Cocks, Thoresen, Williamson, & Boaden (2014)	Not focused on Active Support
Crisp & Sturmey (1984)	Not focused on Active Support
Crisp & Sturmey (1988)	Not focused on Active Support
Dagnan (1996)	Not focused on Active Support
Dhooper, Royse, & Rihm (1989)	Not focused on Active Support
Di Terlizzi (1994)	Not focused on Active Support
Felce, Bowley, Baxter, Jones, Lowe, & Emerson (2000)	Conference abstract
Felce & Perry (1995)	Not focused on Active Support
Felce & Perry (1996)	Not focused on Active Support
Golding, Emerson, & Thornton (2005)	Not focused on Active Support
Harman & Sanderson(2008)	No data presented within this paper
Jones, Moulin, & Richardson (1999)	Not residential services
Jones, Lowe, Brown, Albert, Saunders, Haake, & Leigh (2013)	Ineligible design
Joyce (1994)	Not focused on Active Support
Kottorp, Hallgren, Bernspang, & Fisher (2003)	Not focused on Active Support
Mansell, Felce, De Kock, & Jenkins (1982)	Not focused on Active Support
Mansell, Beadle-Brown, Macdonald, & Ashman (2003a)	Not evaluating the implementation of Active Support
Mansell, Beadle-Brown, Macdonald, & Ashman (2003b)	No baseline measurement
Mansell, Beadle-Brown, & Bigby (2013)	No baseline measurement
Pedlar (1999)	No data presented within this paper
Perry & Felce (2003)	Not focused on Active Support
Perry, Felce, Allen, & Meek (2011)	Not focused on Active Support
Qian, Tichá, Larson, Stancliffe, & Wuorio (2015)	No information about the intervention
Qian, Tichá, Larson, & Stancliffe (under review)	Unable to retrieve from authors after requests
Rapley & Beyer (1996)	Not focused on Active Support
Stancliffe, Jones, & Mansell (2008)	No data presented within this paper
Thompson & Carey (1980)	Not focused on Active Support
Ward (1985)	Not focused on Active Support
Ward (1987)	Not focused on Active Support
Young & Ashman (2004)	Not focused on Active Support

Table A3. Characteristics of k=14 studies included in RQ1 (20 papers)

Study characteristic	Study N
<b>Study design</b>	
Single group	7
SCED	4
Control group (support as usual)	3
<b>Mode of training</b>	
Classroom and onsite interactive training	10
Onsite interactive training only	1
Classroom and onsite video coaching	1
Not reported	2
<b>Manual used</b>	
Jones et al. (1996)	2
Mansell et al. (2005)	2
Combination of Jones et al. (1996) and Mansell et al. (2005)	1
	8
No manual reported, but method of Active Support training described	
No manual, but operational model is consistent with Active Support	1
<b>Mean number of workshop days (SD)</b>	1.91 (.70)
<b>Mean number of 1-1 interactive training (IT) sessions (SD)</b>	1.09 (.30)
<b>Mean IT time in minutes per person (SD)</b>	108.57 (14.64)
<b>Trained staff</b>	
Support staff and managers	2
All levels of staff	1
Support staff only	1
Supervisors and managers only	1
Not reported	9
<b>Density of training</b>	
IT immediately followed the workshop training	2
One week between	2
Consecutive days	1
Not reported	9
<b>Extent of reported Active Support implementation</b>	
Activity Plans, Support Protocols and Opportunity Plans	1
Activity and Support Plans and Participation Record	1
Activity and Support Plans only	1
Participation Record only	1
No technologies used or not reported	10
<b>Mean number of residents per house (SD)</b>	4.26 (1.12)
<b>Mean staff:resident ratio (SD)</b>	1.73 (1.05)
<b>Mean staff years in role (SD)</b>	3.22 (1.79)

Table A4. Quality appraisals (CASP, 2014) for single group (n=7) and controlled (n=3) studies in RQ1

	<b>Beadle- Brown et al. (2012)</b>	<b>Bradshaw et al. (2004)</b>	<b>Chou et al. (2011)</b>	<b>Felce &amp; Repp (1992)</b>	<b>Koritsas et al. (2008)</b>	<b>Mansell et al. (2002)</b>	<b>Riches et al. (2011)</b>	<b>Jones et al. (2001b)</b>	<b>Stancilffe et al. (2010)</b>	<b>Totsika et al. (2010)</b>
<b>Validity of the results</b>										
Study addresses clearly focussed issue	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cohort recruited in an acceptable way	Yes	-	-	Yes	Yes	-	Yes	Yes	Yes	Yes
Random assignment of patients to treatments	-	No	No	-	-	No	-	-	-	-
Blinding of participants and study personnel	-	No	No	-	-	No	-	-	-	-
Were the groups similar at the start of the trial?	-	Yes	Mostly	-	-	Yes	-	-	-	-
Equal treatment of participants (except treatment)	-	Yes	Yes	-	-	Yes	-	-	-	-
All participants accounted for at study conclusion	-	Yes	Yes	-	-	Yes	-	-	-	-
Exposure accurately measured to minimise bias	Yes	-	-	Yes	Yes	-	Yes	Yes	Yes	Yes
Outcome accurately measured to minimise bias	Yes	-	-	Yes	Yes	-	Yes	Yes	Yes	Yes
Identification of important confounding factors	Yes	-	-	Yes	Yes	-	Yes	Yes	Yes	Yes
Design/analysis account for confounding factors	Yes	-	-	Yes	Yes	-	Yes	Yes	Yes	Yes
Complete enough participant follow-up	Yes	-	-	Yes	Yes	-	Yes	Yes	Yes	Yes
Long enough participant follow-up	Yes	-	-	No	Yes	-	No	No	Yes	Yes
<b>Scope of the results</b>										
Description of the study results	Yes	-	-	Yes	Yes	-	Yes	Yes	Yes	Yes
Precision of study results	Yes	-	-	No	Yes	-	Yes	Yes	Yes	Yes
Believability of study results	Yes	-	-	Yes	Yes	-	Yes	Yes	Yes	Yes
Sufficient treatment effect	-	Yes	Yes	-	-	Yes	-	-	-	-
Precision of estimated treatment effect	-	Unclear	Unclear	-	-	Unclear	-	-	-	-
<b>Impact of the results</b>										
Results applicable to local population	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Results in line with available evidence	Yes	-	-	Yes	Yes	-	Yes	Yes	Yes	Partly
Description of implications for practice	Yes	-	-	Yes	Yes	-	Yes	Yes	Yes	Yes
Consideration of all clinically important outcomes	-	Yes	Yes	-	-	Yes	-	-	-	-
Benefits worth the harms and costs	-	Yes	Yes	-	-	Yes	-	-	-	-

Table A5. Quality indicators for Single Case Experimental Designs (SCEDs=4) (Horner *et al.*, 2005) in RQ1

	Jones et al. (1999)	Baker et al. ( <i>in press</i> )	Rhodes & Toogood	Stancil et al. (2007)
<b>Description of Participants and Settings</b>				
Participants are described in sufficient detail	Yes	Yes	Yes	Yes
Participant selection is described in sufficient detail	Yes	Yes	Yes	Yes
The setting is described in sufficient detail	Yes	Yes	Yes	Yes
<b>Dependent Variable</b>				
Dependent variables are described with operational precision	Yes	Yes	Yes	Yes
Dependent variables are quantifiably measured	Yes	Yes	Yes	Yes
Measurement of the dependent variable is valid and described with replicable precision	Yes	Yes	Yes	Yes
Dependent variables are measured repeatedly over time	Yes	Yes	Yes	Yes
Reliability or inter-observer agreement associated with each dependent variable meet minimal standards (e.g. IOA = 80%; Kappa = 60%)	Yes	Yes	Yes	Yes
<b>Independent Variable</b>				
Independent variable is described with replicable precision	Yes	Yes	Yes	Yes
Independent variable is systematically manipulated and under the control of the experimenter	Yes	Yes	Yes	Yes
Overt measurement of the fidelity of implementation for the independent variable	Unclear	Unclear	Unclear	Unclear
<b>Baseline</b>				
Inclusion of a baseline phase	Yes	Yes	Yes	Yes
Baseline conditions are described with replicable precision	Yes	Yes	Yes	Yes
<b>Experimental Control/Internal Validity</b>				
The design provides at least three demonstrations of experimental effect at three different points in time	Yes	Yes	Yes	Yes