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Training direct care staff working with persons with intellectual disabilities and challenging behaviour: A meta-analytic review study

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ABSTRACT

Two separate meta-analyses were conducted to examine (1) the effects of training programs on the behaviour of *direct care staff* working with clients with ID who present challenging behaviour problems (predominantly aggressive and violent behaviour), and (2) the effects of staff training on the challenging behaviour of their *clients with ID*. A 3-level random effects model was used for both meta-analyses to account for both within and between study variance. Results showed that staff training was moderately effective in changing staff behaviour, but no convincing evidence was found for an effect on the reduction of challenging behaviour of persons with ID. The type, content and goal of training did not moderate the effects of staff training, whereas sample and study characteristics (e.g., sex participant or year of publication) did. The way a training program is delivered to staff may be much more important than characteristics of a training.

1. Introduction

Direct care staff working with persons with Intellectual Disabilities (ID) and severe challenging behaviour problems (predominantly aggressive and violent behaviour) have an important and difficult job. They have to strike the balance between preventing harm and providing opportunities for growth to adequately deal with or reduce challenging behaviour. To prevent harm to themselves, to other clients or to colleagues, and to create a safe environment, staff workers may perceive they have no alternatives than to use restrictive interventions, especially when they encounter physical aggression. Unfortunately, these interventions can be counterproductive in the long term, especially when no efforts are made to provide a functional analysis of the clients' behaviour and to provide treatment for the challenging behaviour (Hastings & Remington, 1994).The use of restrictive practices can cause persons with ID to feel unsafe, frustrated, angry, stressed and anxious, and can also cause negative experiences for staff (Fish & Culshaw, 2005; Hawkins, Allen, & Jenkins, 2005). Therefore, training programs have been developed to teach direct care staff workers how to treat or to safely prevent, manage or cope with behaviour that “challenges”. The current meta-analytic study summarizes the extant knowledge on the effectiveness of these training programs that may be client-behaviour oriented or staff-behaviour oriented.

Taylor (2002) described four broad categories of methods that can be applied by staff in order to change challenging (aggressive) behaviour of persons with ID. First, strategies aimed at managing rather than reducing the challenging behaviour problems (reactive strategies). Second, ecological interventions, such as changing environmental conditions that may be antecedents of the occurrence of challenging behaviour. Third, procedures based on learning theory (contingency management) to promote new behaviours, which displace or replace challenging behaviour through the introduction of new contingencies of reinforcement and/or punishment (for instance, extinction or time-out). At last, positive programming procedures or treatment programs to teach the client new skills, abilities and strategies to cope with their environment without the need to rely on challenging behaviour (for instance, skills training, relaxation training or psycho-educational approaches).

Contrary to the methods described by Taylor (2002), which are in particular focused on changing the challenging behaviour of clients with ID, Hastings (2010) described two broad perspectives that are primarily focused on staff. The first focuses on changing the behaviour of direct care staff. This implies that the studied training targets staff behaviour, which can be measured in terms of staff outcomes and changes in clients' behaviour (for instance, a reduction in the level of

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challenging behaviours). Examples are staff training in Positive Behaviour Support (PBS; Grey & McClean, 2007) or Active Support (Smith, Felce, Jones, & Lowe, 2002). The second focuses on the emotional needs of direct care staff, including stress interventions, such as an acceptance and mindfulness-based stress management training for direct care staff (McConachie, McKenzie, Morris, & Walley, 2014). Probably, a combination of both perspectives may prove to be most effective, because interactions between staff and client are thought to be bidirectional (Hastings, 2005), with challenging client behaviour being both a cause and result of problematic interactions.

Staff behaviour (for instance, the way they provide corrective feedback to their clients with ID) and their negative attitude and communication towards their clients with ID were found to be related to aggressive behaviour of clients (Embregts, Didden, Huitink, & Schreuder, 2009). Aggressive incidents often result in staff considering themselves a victim of aggression or feeling threatened by clients (Tenneij & Koot, 2008), which may further affect their attitude and behaviour towards the challenging behaviour of clients with ID. In line with the idea that clients' behaviour impacts the behaviour of staff, Willems, Embregts, Hendriks, and Bosman (2016) found that the challenging behaviour of clients with ID was associated with less friendly and more assertive control by staff.

Staff training with a sole focus on changing *staff* behaviour in order to reduce the challenging behaviour of their *clients* may not be enough. Given that clients influence direct care staff behaviour in (bidirectional) interactions with their clients, it is also important to focus on the emotions, beliefs and psychological resources of direct care staff in training programs when they encounter dangerous situations in their work, especially when they encounter severe physical aggressive incidents on a daily basis.

Stoesz et al. (2016) conducted a review of 32 studies examining strategies for training school staff to address challenging behaviours of students with ID. They described three different domains of staff training, namely, training staff to *reduce*, *manage*, or *cope* with challenging behaviour. They concluded that the research they reviewed provided no evidence on whether it is better to focus on the reduction of the frequency of challenging behaviour or to train staff adaptive (stress) management strategies in order to manage or to cope with the impact of the challenging behaviour. They did find, however, in line with a meta-analysis of staff training by Van Oorsouw, Embregts, Bosman, and Jahoda (2009), that a combination of training methods, such as workshops and practical skill development and on-the-job feedback on performance of specific skills, seemed the most effective way of staff training.

Besides a focus on training content or training methods, it may also be important to focus on the different learning styles (training goal) of direct care staff. Farrell, Shafei, and Salmon (2010) developed a theoretical model of staff-client interaction in other domains of learning than skill acquisition alone. They assumed that staff training, first, has to focus on teaching staff to understand how challenging behaviour influences their attitudes, values, emotions and competencies before starting an intervention in which staff need to learn new skills. In line with this, Williams, Dagnan, Rodgers, and McDowell (2012) concluded in their review that it may be important to focus not solely on necessary knowledge or training skills, but also on the attributions of staff regarding their clients who show challenging behaviour.

Van Oorsouw, Embregts, and Bosman (2013) conducted a narrative review of 11 studies on staff training (2013), distinguishing three goals of staff training: to improve staff's knowledge, to improve skills, or to change staff's attitude towards challenging behaviour. Van Oorsouw et al. (2013) found that the main focus of most of the training programs was to improve staff knowledge and skills, without focusing on staff attitudes towards challenging behaviour. None of the included studies paid attention to the perspectives of clients in the evaluations of staff training programs, and only six studies assessed treatment effectiveness based on changes in clients' challenging behaviour. No conclusions about the most effective form of training for staff who encounter challenging (aggressive) behaviour of clients with ID could be drawn from the review by Van Oorsouw et al. (2013). Moreover, it was not clear from their review whether staff training can positively affect the challenging behaviour of clients with ID.

In sum, information about effective staff training has increased over the years, but it is still important that we expand our knowledge on which types of training may yield the greatest effects on staff's behaviour towards challenging incidents in their work. And finally, does staff training indeed change the way clients with ID behave, such as reducing the rate of challenging incidents? Therefore, the current meta-analytic study first focuses on training effectiveness of direct care staff when they experience challenging incidents in their work, and second on a change in clients with ID showing challenging behaviour problems.

1.1. Aim of this study

This study consists of two multi-level meta-analyses, accounting for both within and between study variance in effect sizes, which prevents loss of information, and increases statistical power to examine overall effect sizes and moderators. The first meta-analysis examines the effects of staff training on the behaviour of direct care *staff* working with clients with ID who present challenging behaviour problems. The second meta-analysis examines the effects of staff training on the behaviour of their *clients* with ID. With the multilevel meta-analyses the magnitude of effects (training effects) across all eligible intervention studies were studied. Additionally, we examined if the goal of the training (attitude, knowledge or staff skills), training content (to prevent and manage CB or to cope with the impact of CB for staff), type of outcome (the frequency and severity of challenging behaviour or developing skills for their clients with ID), study characteristics (for instance, post-test, follow up and quality), intervention characteristics (for instance, training format), assessment characteristics (for instance observation or questionnaire) and characteristics of the participants (staff or clients) moderated the effects of the training programs.

2. Method

2.1. Inclusion criteria

The following inclusion criteria were formulated to select studies for the two meta-analyses. First, the study had to focus on a training for direct care staff working in a care facility (around the clock-care provided in residential or community or a combination of both settings) for people with ID. We excluded studies focusing on parents, educators, and staff working in a different field, such as staff working in psychiatry or working with elderly people without an intellectual disability. Second, we included only studies on staff training with a relation to the challenging behaviour of their clients with ID. Challenging behaviour has been defined as: "*Culturally abnormal behaviour(s) of such an intensity, frequency or duration that the physical safety of the person or others is likely to be placed in serious jeopardy, or behaviour which is likely to seriously limit use of, or result in the person being denied access to ordinary community facilities*" (Emerson, 1995). Third, the studies had to have a control group in order to compare the results of the training in the experimental group with the results of a control group (in which they received no training, treatment/care as usual or an alternative established training). Finally, the studies had to report about the effects of the training on staff or clients' outcomes in a way that made it possible to calculate an effect size.

2.2. Selection of studies

The search time frame was until August 2016. We set no limits concerning the publication year. The data search strategy (conducted by the first author) consisted, first, of an electronic data search in nine

databases: EBSCOhost, Google Scholar, Picarta, Proquest (including dissertations and Theses), PubMed, Ovid (including Medline, ERIC & PsychINFO), Science Direct, Web of Science and Wiley. After that, a manual search followed of six specialised journals and the references of eight reviews and two previous meta-analyses on this topic (Campbell, Robertson, & Jahoda, 2014; Cox, Dube, & Temple, 2015; Fix & Fix, 2013; LaVigna & Willis, 2012; McDonald & McGill, 2013; Scheltes & Loohuis, 2008; Stoesz et al., 2016; Van Oorsouw et al., 2013; Van Oorsouw et al., 2009; Williams et al., 2012). The six specialised journals, selected because of their relevance to the topic under study and their primary focus on the care for people with ID, were the American Journal on Intellectual and Developmental Disabilities (previously titled: American Journal on Mental Retardation), Journal of Applied research in Intellectual Disabilities, Journal of Intellectual and Developmental Disabilities, Journal of Intellectual Disability Research, International journal of Developmental disabilities (previously titled: British journal of Developmental Disabilities) and Research in Developmental Disabilities. A final part of the search strategy consisted of mailing experts and asking for any preliminary results of still running projects or unpublished studies. Only papers written in English or Dutch were included.

2.2.1. Search string

The search string included four combined variables (in both American and British spelling variations): training, staff, clients with ID and challenging behaviour. For training the following keywords were used: training, intervention, workshop or education. For staff the following key words were used: staff, direct care staff, care workers, social workers, nurses, personal, employee. For persons with ID the following keywords were used: clients, persons, individuals with intellectual, developmental, learning disabilities or retard*, handicap*/mental handicap*. For challenging behaviour the following keywords were used: aggress*, challenging behav* and behav* problems. Some databases provide the opportunity to search in specific parts of the publications (i.e., in the title, abstract, or key-words). The first author conducted the screening and selection process. When in doubt, the second, third or last author was consulted and a consensus decision was made after discussion.

2.2.2. Search strategy

Fig. 1 presents a flow chart of the search strategy. The initial search resulted in 209 potential articles after screening the title. This was narrowed down to 106 articles after further inspection of the abstracts and removing double article titles from the result list of the nine electronic databases. After further inspection of the method and results sections another 90 articles were excluded. Finally, a total of 11 studies (with 86 effect sizes and $N = 1079$ participants) met the inclusion criteria for the meta-analysis of *staff* outcomes, and a total of 7 studies (with 40 effect sizes and 580 participants) met the inclusion criteria for the meta-analysis of *client* outcomes.

Appendix A.1 shows the study characteristics of the included studies in the meta-analysis examining the behaviour of direct care *staff*. In six of the 11 training programs, learning staff more about the definition and causes of challenging behaviour of their clients with ID and adequate approaches is considered as a central part of the program. Giving staff insight in their stress management, emotional intelligence, and training skills to decrease their stress levels are a central part of seven of the 11 training programs. Finally, five training programs did use information on both the challenging behaviour of clients with ID and staff characteristics, such as attributions, or skills how to adequately manage or cope with the challenging behaviour of clients with ID.

Appendix B.1 shows the study characteristics of the included studies in the meta-analysis of client outcomes. Learning staff more about the definitions of choice and how to develop a choice program for clients with ID is a central part of two of the seven training programs. Two other programs especially focused on learning staff more about the importance of daily, meaningful activities for clients with ID, while the remaining two training programs focused on the importance of learning staff skills to assess the behaviour of their clients in order to develop and implement an adequate support plan. All six training programs have in common that they aim to learn staff techniques and skills how to develop an adequate support plan, although the focus of the support plans differs among programs. Finally, one training program focused on improving the quality of staff-client interactions.

2.3. Coding the studies and potential moderators

The first author coded the included studies according to the suggestions of Lipsey and Wilson (2001). All studies (study 1, *staff* and 2, *clients*) were double coded by the first and third author of this manuscript. The inter-rater reliability (after consensus meeting) proved to be perfect, with a 100% agreement between the two coders. The potential moderators were grouped into training goal and content (study 1), type of outcome (study 2) and intervention, study, sample, and assessment characteristics (both studies). Some variables (training format, techniques and content and type of outcome) were first coded as a string variable.

2.3.1. Training goal study 1 (staff)

We distinguished three types of training goals for *staff*, namely knowledge, skills and attitude. This refers to a theoretical model of staff training from Farrell et al. (2010), who distinguished between three domains of staff learning; attitude, knowledge and skills. Van Oorsouw et al. (2013) distinguished the same three domains of staff training in their review.

2.3.2. Training content study 1 (staff)

For training content, we distinguished between two types of staff training, namely, first to prevent and manage challenging behaviours (like aggression) and, second to cope with the impact of the challenging (aggressive) behaviour based on the two broad perspectives about staff training from Hastings (2010). Stoesz et al. (2016) classified articles also according to Hastings' (2010) perspectives about training into (1) reduce; (2) manage and/or (3) cope with the challenging behaviours.

2.3.3. Type of outcome study 2 (clients)

In relation to *clients*' behaviour two types of outcomes were distinguished based on the four categories of methods to deal with CB from Taylor (2002), namely: staff teaching clients with ID adaptive behaviour (such as providing more opportunities for clients to make choices in their daily program); or as a result of staff training (ecological changes), decreases in the frequency or severity of CB of clients with ID. The type of outcome of clients' behaviour could moderate the effect size of staff training according to a meta-analysis of Van Oorsouw et al. (2009).

2.3.4. Study characteristics (both studies)

We coded several study characteristics that may influence the effect sizes for both studies. First, the impact factor of the journal in which the study was published (continuous variable) was coded, as a first indication of study quality (Saha, Saint, & Christakis, 2003). Second, the year of publication (continuous variable) was coded, because we expected the quality of studies to improve through the years, as the statistical and methodological knowledge have increased in social research over the last decades.

Third, the quality of the study (categorical variable) was coded by using the study quality checklist from Van der Stouwe (2016). Van der Stouwe (2016) constructed a new study quality coding list, based on the Quality Assessment Tools for Quantitative Studies (QATQS, Thomas, Ciliska, Dobbins, & Micucci, 2004), the Quality Index (QI, Downs & Black, 1998), and the Cochrane Collaboration's tool for assessing risk of bias (Higgins et al., 2011). The quality checklist consists of 15 items

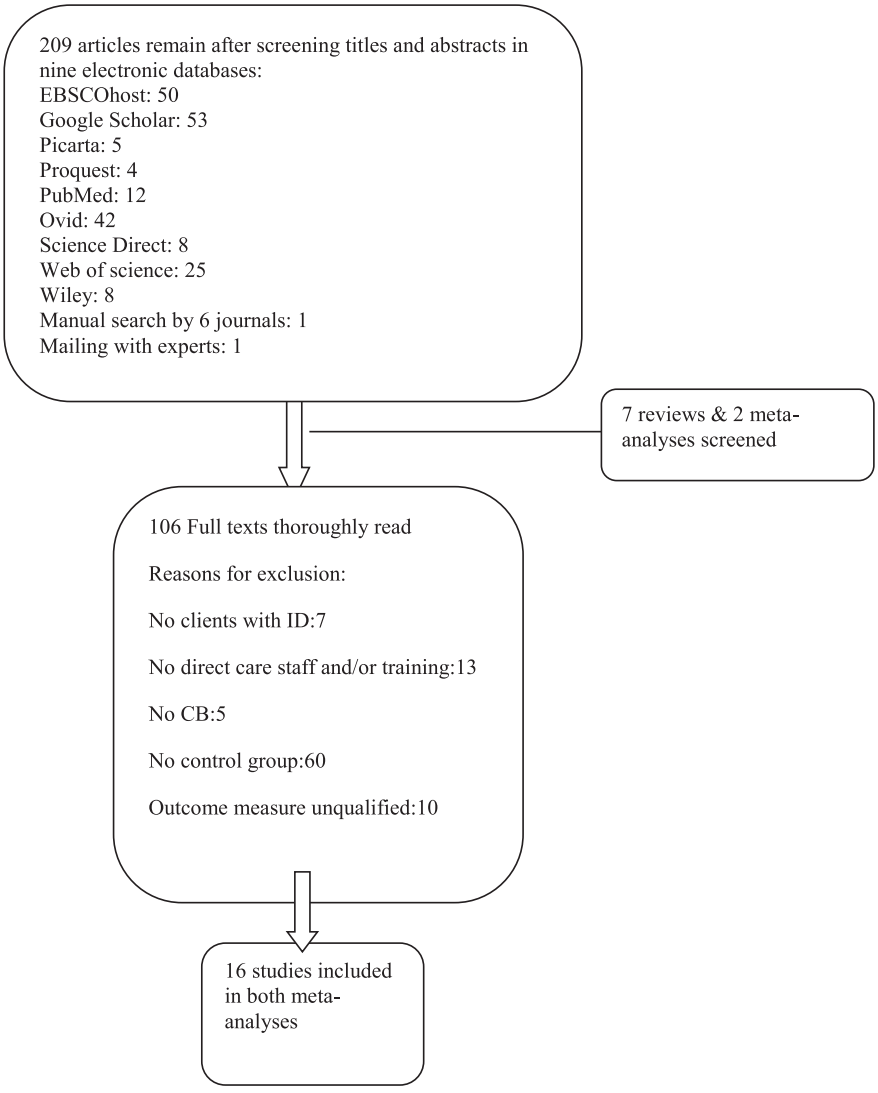

Fig. 1. Flow chart of the search strategy.

assessing publication status (one item), selection bias, study design, blinding/dependence of authors, outcome measures, attrition and dropout, intervention, and sample description (each consisting of two items). Every item had four response options, with the least study quality assigned zero, and the maximum study quality assigned 3 points. Studies could therefore receive a score between 0 and 45 points for study quality.

In the present study, scores ranged from 13 to 25 points (mean = 20.90, median = 20) for the meta-analysis of staff behaviour, and for clients outcomes the scores of the quality index ranged from 12 to 23 points (mean = 19,63, median = 20). Overall the studies included in both meta-analyses varied between low (12 points for instance the study of Ip & Szymanski, 1994) and medium (25 points for instance the study of McConachie et al., 2014) quality. The distribution of the scores of the quality index was not normally distributed. We therefore transformed the continuous quality checklist scores into a dichotomous variable by means of a median split, which proved to be the most straight forward (i.e., natural) cut-off point given the distribution of effect sizes: 1.medium quality (> 20 points) and 2. low quality (< 20 points).

Finally, the design of the study was coded (pre-post versus follow-up: studies with only pre- and post-measurement versus studies with a follow up measurement as well).

2.3.5. Intervention characteristics (both studies)

We distinguished two types of training format (in service or in service combined with "coaching on the job"; COJ) and two types of techniques (a single training technique or a combination of techniques) for both meta-analyses. This was done because of the findings of a meta-analysis conducted by Van Oorsouw et al. (2009) and a review from Stoesz et al. (2016), who found that training formats combined with COJ and a combination of training techniques, such as feedback, instruction and practicum, could moderate the effect size of a training. Third, we coded the duration of the training (in hours) as a potential moderator. Stoesz et al. (2016) in their review also investigated the influence of the training's duration, and found evidence that although extensive training (> 5 days) may lead to better results, better results can also be accomplished with moderate (1–5 days) and brief (< 1 day) training. So, the duration of a training might moderate the effect size. Finally we coded the time of the total intervention (including post versus follow-up period) and attrition.

2.3.6. Assessment characteristics (both meta-analyses)

Assessment of the effect of the training was coded in terms of observational measures, such as video recordings of staff-client interactions and questionnaires, such as the Challenging Behaviours Attributions Scale (CHABA; Hastings, 1997). See Appendices A.1 & B.1 for the included measurements per study.

2.3.7. Sample characteristics (meta-analysis 1, staff)

Sample characteristics coded were the proportion of males, age, gender, working experience of direct care staff, the setting (only residential or both residential and community settings), age of clients (adults and mixed age, such as youth and adults) and level of ID (mild and more severe forms of ID) of the clients. It seems important to include sample characteristics, because the frequency and severity of challenging behaviour (e.g., aggressive behaviour) can vary by different sample characteristics. For instance, aggressive behaviour (as part of CB) is often a reason for referral to residential services of persons with ID. The prevalence rates and severity of aggression may therefore be higher in residential settings than in community settings (Taylor, 2002).

2.3.8. Sample characteristics (meta-analysis 2, clients)

The following sample characteristics were coded for the second meta-analysis: proportion male clients, age (continuous variable) and level of ID (mild and more severe forms of ID).

2.4. Calculation and analysis

Effect sizes were transformed into Cohen's *d* by using the calculator of Wilson (2013) and formulas described by Lipsey and Wilson (2001). Most *d*-values were calculated based on reported means and standard deviations. If authors only mentioned that the relation was not significant, the effect size was coded as zero (Lipsey & Wilson, 2001).

For both meta-analyses, we centred continuous variables around their mean, and transformed categorical variables into dummy variables. Extreme effect size values (> 3.29 *SD* from the mean; Tabachnik & Fidell, 2013) were adjusted by winsorizing these outliers. In winsorization procedures extreme values are replaced by less extreme values, effectively moving the original extreme values towards the centre of the distribution (Mulry, Oliver, & Kaputa, 2012). Three outliers were identified and were winsorized. Standard errors and sampling variance of the effect sizes were estimated using formulas by Lipsey and Wilson (2001).

In the majority of the studies, it was possible to calculate more than one effect size. That is, most studies reported on multiple outcome variables, multiple scales to assess the effect of a staff training or had multiple informants (for instance, staff and clients with ID). It is possible that effect sizes from the same study are more alike than effect sizes from different studies, violating the assumption of independency underlying classical meta-analytic strategies (Hox, 2010; Lipsey & Wilson, 2001). To deal with the dependency of effect sizes, we applied a multilevel approach to the present meta-analyses as suggested by Van den Noortgate and Onghena (2003). The advantage of a multilevel approach is that it accounts for the hierarchical structure of the data, where the effect sizes are nested within the studies. Therefore, all information in the studies can be preserved and maximum statistical power is generated, which allows comprehensive moderator analyses (Assink et al., 2015).

We used a 3-level random effects model to account for three levels of variance. Level 1 is the sampling variance of the effect sizes. Level 2 is the variance between effect sizes within a study, and level 3 is the variance between studies (Wibbelink & Assink, 2015). The sampling variance for the observed effect sizes (level 1) was estimated by using the formula of Cheung (2014). Log-likelihood-ratio-tests were performed to compare the deviance of the full model to the deviance of the models excluding one of the variance parameters, making it possible to determine whether significant variance was present at the second and third level (Wibbelink & Assink, 2015). Significant variance at level 2 or 3 indicates a heterogeneous effect size distribution, meaning that the effect sizes cannot be treated as estimates of an overall (mean) effect size. In that case, we proceeded to moderator analyses, because the differences between the effect sizes may be explained by outcome, study, sample, and/or intervention characteristics. For each of the two meta-analyses, each category of the potential moderator was filled with at least three independent studies.

The two meta-analyses were conducted in R (version 3.3.1) with the metapor-package, employing a multilevel random effects model (Houben, van den Noortgate, & Kuppens, 2015; Van den Bussche, Van den Noortgate, & Reynvoet, 2009; Viechtbauer, 2010). To estimate the model's parameters the restricted maximum likelihood estimate (REML) was applied (Van den Noortgate & Onghena, 2003). The Knapp and Hartung (2003) method was performed to test individual regression coefficients of the models and for calculating the corresponding confidence intervals (see also Assink et al., 2015; Houben et al., 2015; Wibbelink & Assink, 2015). The advantage of the Knapp and Hartung (2003) method is that the chance of making Type I-errors is better under control (Wibbelink & Assink, 2015).

2.5. Publication bias

We made several efforts to prevent publication bias. For instance, by extending our search strategy to retain non-published material as well, but this could not guarantee the absence of publication bias. In order to assess the possible influence of publication bias, we performed a trim and fill procedure (Duval & Tweedie, 2000) by drawing a trim and fill plot in R (version 3.2.0) using the function “trimmfill” of the metaphor package (Viechtbauer, 2010). The trim and fill procedure corrects for funnel plot asymmetry by imputing estimated missing effect sizes that are calculated on the basis of existing effect sizes.

3. Results

The results of each meta-analysis are described below. Table 1 shows the overall effects of staff training programs on staff behaviour and on behaviour for clients with ID.

3.1. Effect training in staff behaviour

The meta-analysis of the effect of training programs on staff behaviour contained 11 independent studies (*s*), reporting on 86 effect sizes (*k*), and a total of $N = 1286$ subjects. The total sample consisted of $n = 579$ subjects in the experimental groups, and $n = 707$ subjects in the control groups.

3.1.1. Overall effect on staff behaviour

A significant medium effect ($d = 0.411$) of the training on staff behaviour was found, indicating that, on average, the training

Table 1
Overall effects of staff training on staff behaviour and behaviour of clients with ID.

Outcome	*s*	*k*	Mean *d*	*95% CI*	*p*	Level 2	Level 3	%Var. Level 1	%Var. Level 2	%Var. Level 3
Staff	11	85	0.411	0.221–0.600	< 0.001***	0.006	0.080	27,4	5,04	67,6
Client	7	40	0.305	−0.103–0.712	0.138	0.130	0.209	11,1	34,1	54,8

Note: *s* = number of studies, *k* = number of effect sizes, *p* = *p*-level, level 2 and level 3 = variance, %variance = explained variance.
*** Significant by $p < 0.001$.

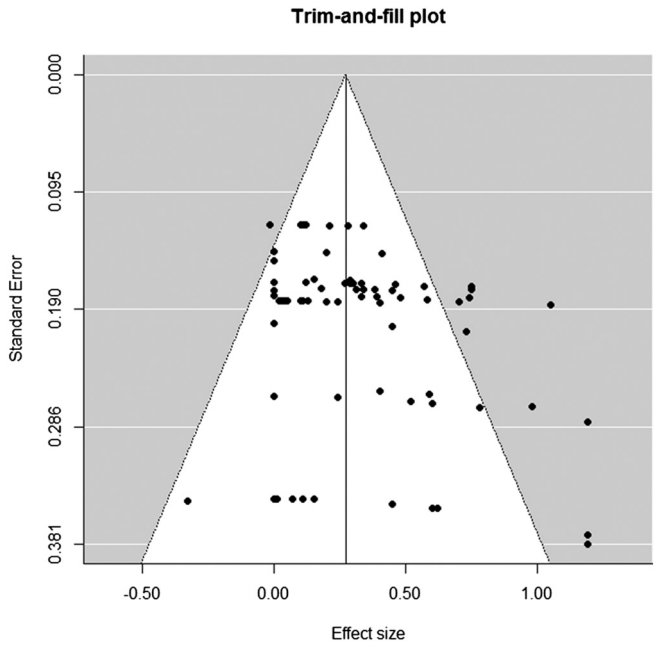

Fig. 2. Trim and fill plot staff.

programs positively influenced staff's behaviour. The presence of publication bias is unlikely, as the trim-and-fill plot did not show any imputed effect sizes on the left side of the funnel (see Fig. 2). Since the variance was significant at the third level, we conducted moderator analyses of outcome, training content, study, intervention, assessment and sample characteristics to examine which factors moderated the effect of training on staff's behaviour. Table 2 shows the results of these moderator analyses.

3.2. Results of moderator analyses on training for staff behaviour

Statistical power proved to be insufficient to detect small effects. Notably, age of staff just failed to reach statistical significance at $p < 0.10$ (see Table 2).

3.2.1. Training goal and training content

Regarding staff behaviour, the specific training goal (skills, knowledge, attitude) and training content (to prevent or manage CB or to cope with the impact of CB) did not moderate the effect of a training program.

3.2.2. Study characteristics

The following study characteristics: study quality, year of publication, impact and design of the study did not significantly moderate the effect of staff training.

3.2.3. Intervention characteristics

Intervention characteristics (training hours, time intervention, attrition, format and training techniques) did not moderate the effect of staff training.

3.2.4. Assessment characteristics

The type of measurement (observation vs. questionnaires) significantly moderated the effect of training programs' effectiveness on staff behaviour. Assessment of the outcome through observation ($d = 1.030$) yielded larger effect sizes than by means questionnaires ($d = 0.338$).

3.2.5. Sample characteristics

The percentage male staff in the experimental group significantly moderated the effect of staff training programs on staff behaviour. The higher the percentage of male staff workers in the experimental group the higher the effect size of a training ($b = 0.591$). Other sample characteristics (age, working experience of direct care staff or setting and characteristics of the clients with ID) did not significantly moderate the effects of a staff training program on staff outcomes.

3.3. Effect of staff training on clients' behaviour

The meta-analysis of the effect of staff training on behaviour of clients with ID contained 7 independent studies (s), reporting on 40 effect sizes (k), and a total sample of $N = 583$ subjects. The total sample consisted of $n = 333$ subjects in the experimental groups, and $n = 250$ subjects in the control groups.

3.3.1. Overall effect on clients' behaviour

Table 1 shows that there was no significant overall effect for staff training programs on the behaviour of clients with ID ($d = 0.305$), which means that the power of this meta-analysis was insufficient to test small effect sizes. The presence of publication bias is unlikely, as the trim-and-fill plot showed no imputed effect sizes on the left side of the funnel (see Fig. 3). Because of significant effects on level 2 and 3, moderator analyses were performed in order to examine which factors moderated the effect of staff training on clients' behaviour within and between studies (see Table 3 for the results).

3.4. Results of moderator analyses on training for the behaviour of clients with ID

None of the moderators used in this meta-analysis (e.g., type of outcome, study characteristics, intervention, assessment and sample characteristics) did moderate the effect of staff training on clients' behaviour. However, type of outcome (adaptive behaviour and frequency or severity of CB) as well as amount of staff training hours showed small effects that just failed to reach significance at $p < 0.10$, which indicates lack of statistical power to detect small moderator effects.

4. Discussion

By conducting two separate meta-analyses, the current study aimed to assess the effect of staff training programs on *staff* behaviour working with clients with ID and challenging behaviour and on *client* behaviour. Further, it was aimed to examine which outcome, study, intervention and sample characteristics influenced the strength of the effects of staff training programs. Overall, we found a significant and moderate effect size for staff training programs on direct care *staff* behaviour.

Several factors influenced the effect of training on staff behaviour. For instance, observations yielded larger effects than questionnaires. An explanation would be that observation is a more valid method to assess whether staff change their behaviour in daily practice after training than questionnaire self-report, which might be less objective. Another explanation is the risk of dependency of researchers involved with the development, implementation and evaluation of their own training program (Petrosino & Soydan, 2005). Perhaps in those studies with dependent researchers the risk for bias is greater when observation is used, which may be sensitive to the biased perception of researchers who are not blind to the hypothesis that their intervention is expected to have an effect. Notably, also non-dependent researchers may be biased in their observations if not blind to the hypotheses they are testing (Hoyle, Harris, & Judd, 2002).

A higher frequency of male participants in the experimental group yielded a larger effect size in the meta-analysis of staff outcomes. A possible explanation would be gender differences in learning styles (Severiens & Ten Dam, 1994) to the extent that formats of the included training programs might provide more or better opportunities for male staff and/or can be more appealing for males, who may have

Table 2
Meta-analysis of staff training on staff outcomes.

Moderator variables	*s*	*k*	β_0 (mean *d*)	t_0	β_1	t_1	$F(df_1,df_2)$
Training goal	11	85					$F(2,83) = 0.810$
Skills			0.362	3.101**			
Knowledge			0.453	4.445***	0.091	0.976	
Attitude			0.375	3.536***	0.013	0.149	
Training content	11	85					$F(1,84) = 0.057$
Cope with CB			0.394	2.825**			
Reduce or managing with CB			0.692	2.227*	0.049	0.239	
Study characteristics							
Study quality	11	85					$F(1,84) = 2.132$
Low			0.558	4.046**			
Medium			0.297	1.460*	−0.261	−1.460	
Year of publication	11	85	0.408	4.035***	−0.012	−0.527	$F(1,84) = 0.278$
Impact factor	10	84	0.362	3.879***	−0.131	−1.045	$F(1,83) = 1.093$
Post or follow-up	11	85					$F(1,84) = 0.007$
Post			0.409	4.218***			
Follow-up			0.414	3.984***	0.005	0.083	
Assessment characteristics							
Measure	11	85					$F(1,84) = 6.523$**
Observation			1.030	3.887***			
Questionnaire			0.338	4.780***	−0.692	−2.554*	
Intervention characteristics							
Training hours	11	85	0.383	3.769***	−0.001	−0.957	$F(1,84) = 0.916$
Time baseline-post-intervention	10	61	0.361	3.201**	−0.037	−1.110	$F(1,60) = 1.231$
Time baseline-follow up	6	24	0.243	2.561*	−0.012	−0.636	$F(1,22) = 0.405$
Attrition	10	84	0.386	4.081***	−0.002	−0.846	$F(1,73) = 0.716$
Format intervention	11	85					$F(1,84) = 0.074$
In service			0.401	3.401**			
In service and COJ			0.466	2.525	0.065	0.272	
Techniques intervention	10	75					$F(1,84) = 0.182$
Instruction	11	85	0.506	2.134*			
Combination of techniques			0.395	3.618***	−0.112	−0.427	
Characteristics direct care staff							
Percentage male staff	11	77	0.429	4.528***	2.292	2.434*	$F(1,76) = 5.927$*
Age care staff	10	74	0.379	4.597***	−0.031	−1.488	$F(1,73) = 2.215$
Working experience staff	11	77	0.413	3.949***	0.004	0.140	$F(1,76) = 0.020$
Characteristics setting & clients							
Setting	11	85					$F(1,84) = 0.421$
Residential			0.353	2.575			
Mixed			0.483	3.341**	0.129	0.648	
ID clients	6	42					$F(2,40) = 0.931$
Mild			0.369	0.879			
Severe			0.169	0.401	−0.200	−0.337	
Mixed			0.765	3.256**	0.395	0.788	
Age clients	6	57					$F(1,56) = 0.033$
Adults			0.448	1.524			
Mixed age			0.526	1.700	0.078	0.183	

* Significant by $p < 0.05$.
** Significant by $p < 0.01$.
*** Significant by $p < 0.001$.

experienced more exposure to injury in containment compared to females (Carmel & Hunter, 1989, 1993). Another explanation may be that male and female staff display different behavioural tendencies in contact with their clients with ID. For instance, studies by Knotter, Wissink, Moonen, Stams, and Jansen (2013) and Knotter, Stams, Moonen, and Wissink (2016) showed that teams with a higher proportion of male staff showed more negative attitudes towards aggression and used more intrusive and coercive interventions than teams with a lower proportion of male staff (or female only teams) when confronted with aggressive behaviour of their clients with ID. In particular team dynamics might account for this finding.

Furthermore, we did not find a significant overall effect of staff training on changing *clients'* behaviour (i.e., aggressive behaviour). This possibly indicates that training direct care staff will not directly result in changing the aggressive behaviour problems of their clients with ID. This may be due to the small amount of (small) included studies and a resulting low power to find prove for training effectiveness on client's behaviour.

Another explanation for a lack of significant overall effect of staff training on *clients'* behaviour could be that it is difficult for staff to transfer learned skills or knowledge from a training setting to daily practice in which they care for clients with ID who also show behaviour that challenges. Van Oorsouw et al. (2009) also conducted a meta-analysis of staff training and found that the type of goal of a training could moderate the effect size of a training. They found that staff skills not aimed at changing client skills or client behaviour were trained more effectively than skills that aimed at improving clients' skills or behaviour. The explanation of Van Oorsouw et al. (2009) for their

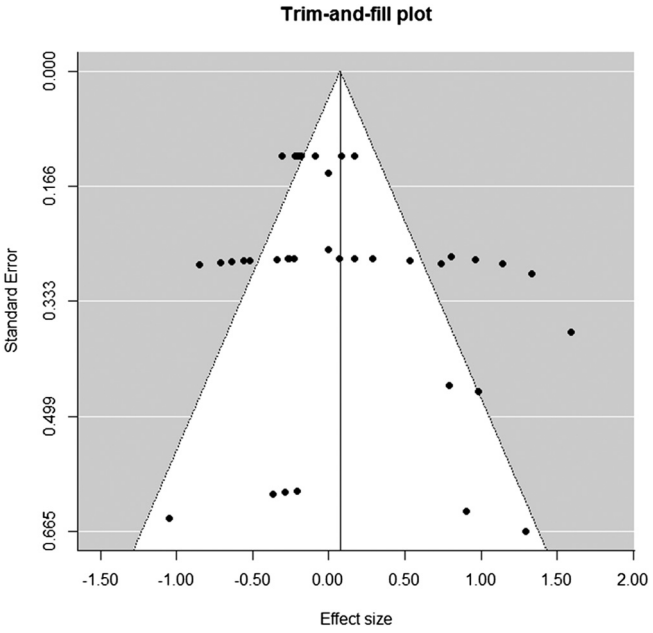

Fig. 3. Trim and fill plot clients with intellectual disabilities.

results is that training staff how to change clients' skills or behaviour is more difficult, which also requires a more comprehensive training format (for instance, a combination of in-service training and coaching-on-the-job). It is remarkable that none of the training programs for staff in our study focused on a team approach or an organizational approach to change not only the skills and knowledge of direct care staff, but also to obtain the most optimal ecological conditions for the delivery of the intervention (Campbell et al., 2014).

Another explanation for the finding that staff training overall did not seem to change *clients'* behaviour could be that the majority of the training programs included in this meta-analysis did not make a clear distinction between the types of challenging behaviour of the clients with ID who were included. The concept of 'challenging behaviour' refers to several types of problem behaviour, such as aggression, destructive behaviour and self-injury (Emerson et al., 2001). Those types of behaviour in turn have, according to a study of Emerson et al. (2001), several topographies, and therefore will differ not only in appearance, but also in the impact on staff psychological well being and behaviour. For instance, aggression can be hitting others with hands or feet, verbal aggression, hitting others with objects, meanness/cruelty, scratching others, pulling other's hair, pinching others and biting others. This example underpins the broad spectrum of behaviours covered by one word: aggression. Giving more attention to the specific types of aggression (for instance, verbal versus physical aggression) or to the function of aggression (for instance, reactive versus proactive aggression) in staff training programs seems important, because

Table 3
Meta-analysis of staff training on client outcomes.

Moderator variables	*s*	*k*	β_0 (mean *d*)	t_0	β_1	t_1	$F(df_1,df_2)$
Type of outcome	7	39					$F(1,37) = 3.276$
Skills			0.535	2.048*			
Challenging behaviour			0.151	0.593	−0.391	−1.810	
Study characteristics							
Study quality	7	40					$F(1,38) = 0.797$
Medium			−0.096	−0.189			
Low			0.406	1.713	0.502	0.893	
Impact factor	6	39	0.073	0.433	−0.152	−1.312	$F(1,37) = 1.722$
Post or follow up	7	40					$F(1,38) = 0.074$
Post			0.316	1.510**			
Follow up			0.269	1.251***	−0.046	−0.272	
Assessment characteristics							
Measure	7	40					$F(1,38) = 1.618$
Observation			0.662	1.918			
Questionnaire			0.118	0.465	−0.545	−1.272	
Intervention characteristics							
Training hours	6	34	0.247	1.316	0.014	1.751	$F(1,32) = 3.066$
Time intervention (including baseline & follow-up)	7	40	0.353	1.555	−0.025	−0.705	$F(1,38) = 0.497$
Attrition	5	33	0.216	0.946	−0.001	−0.047	$F(1,31) = 0.002$
Format intervention	7	40					$F(1,38) = 0.014$
In service and COJ			0.345	1.271			
In service			0.284	0.661	−0.061	−0.119	
Techniques intervention	7	40					$F(1,38) = 0.014$
Combination of techniques			0.542	1.271			
Instruction			0.284	0.661	−0.061	−0.119	
Characteristics clients							
Percentage male clients	6	39	0.143	0.813	−0.012	−0.824	$F(1,37) = 0.679$
Age clients	7	39	0.358	1.573	−0.029	−0.718	$F(1,37) = 0.515$
Clients mild ID	5	35	0.324	1.152	0.011	1.150	$F(1,33) = 1.322$
Clients severe forms ID	5	35	0.324	1.152	−0.011	−1.150	$F(1,33) = 1.322$

* Significant by $p < 0.05$.
** Significant by $p < 0.01$.
*** Significant by $p < 0.001$.

different types of aggressive behaviour can have different antecedents and consequences, and these types could ask for different approaches from staff (Polman, Orobio de Castro, Koops, Van Boxtel, & Merk, 2007).

A final explanation for not finding a significant overall effect on clients' behaviour could be that many training programs did not aim to reduce the frequency or severity of the challenging (aggressive) behaviour in the first place, but aimed to improve, for instance, the daily structure (active support). Diminishing aggression or other types of challenging behaviour was a long-term outcome measure of the training, but was often not directly addressed in the training. This may explain the lack of evidence of training effectiveness in reducing the frequency and severity of the challenging behaviour of clients with ID. We should note that it is often difficult to change the (often long existing) challenging (aggressive) behaviour patterns of clients with ID, because they represent their way of coping with difficult situations in their daily life (Campbell, 2010).

4.1. Limitations

An important limitation of both meta-analyses is that the amount of studies that could be included was limited. The power of both meta-analyses to test small effects was therefore low, which indicates that we must be cautious when interpreting the (non-significant) results. Especially the exclusion of weaker studies, that is, studies not using a control group design, reduced the total number of studies to be included in our meta-analyses. Moreover, most studies examining staff or client behaviour outcomes did not use a standardized criterion measure, which should be regarded as a major shortcoming of these studies. There is obviously a need for more robust studies on the effectiveness of staff training programs, especially with a focus on the translation of the learned knowledge, skills or changing attitude of staff into practice. Even less is known about the effect of staff training on the decrease of challenging behaviour by clients with ID. Using an intervention matrix for psychological therapies for challenging behaviour (including staff training programs), Campbell et al. (2014) concluded that much of the research on challenging behaviour research has been small '*n*' experimental work in specialist or laboratory settings. They plead for more and better research under clinically representative conditions resulting in sustainable interventions that can be generalised to ordinary community settings. Another limitation is the lack of information about the level of intellectual disability of the clients in studies that focused solely on staff outcomes, which impeded moderator analyses of the level of ID in the staff outcome meta-analysis.

4.2. Recommendations

Based on the results of our meta-analyses, several recommendations can be made. First, it should be noted that the choice of assessment within a study design could influence the effect size. The risk of dependency should be taken into account when authors are involved with the implementation and evaluation of the training. Furthermore, the choice of standard criterion measures within future studies about staff training programs provides more opportunities to compare results with each other and calculate the effects of those training programs.

Second, attention should be paid to gender differences in learning styles by direct care staff in developing staff training programs in future research.

Third, staff training programs should take the function of the aggressive behaviour into account. It is difficult to focus on "average challenging behaviour of clients with ID", because the antecedents, type, goal and impact of the behaviour that "challenges" may differ from person to person. It is therefore recommended to pay attention to the individual, multi-causal nature of most of the aggressive incidents in training programs (Farrell et al., 2010; Hastings, 2005), for example, by using an individual Client-Focused Training concept.

A fourth recommendation is that future research on the effectiveness of staff training should use (besides a randomized control group design) a follow-up period for a sufficiently long period (i.e., 12 month) after training in order to investigate long term effects of staff training on clients' aggressive behaviour. Because of long lasting patterns of many aggressive behaviour problems, the effect of a change in the way staff behave towards their clients with ID who show aggressive behaviour may take time.

Fifth, we recommend that in research on the effectiveness of staff training attention be paid to the (correct) transfer of staff skills acquired in the training to the daily work setting (Jahr, 1998). It was remarkable that none of the training programs included in our meta-analysis focused on training team beliefs and team interaction of direct care staff (Knotter et al., 2013). Besides a functional analysis of the clients' behaviour which "challenges" the relation with an individual direct care worker in the environment in which the behaviour occurs, it is recommended to investigate the interactions in the team (attitude and team climate) and organization characteristics (support, culture, beliefs) on staff-client interactions (Knotter et al., 2016).

Despite the conclusion of Van Oorsouw et al. (2013) and Hastings (2010) that clients should no longer be excluded in the evaluation of staff training programs, this is still scarcely done. Our finally recommendation is that the perspectives, attributions and behaviour of the clients with ID, which could reveal unknown and rich information, are combined with other staff oriented information before starting a training program for staff or evaluating the effects of a training program for staff especially when they are confronted with aggressive behaviour problems from their clients with ID.

5. Conclusion

The overall conclusion is that staff training seems effective in changing staff behaviour, but also that the type of training and content or training goal did not significantly influence the effects of staff training. In future research attention should be paid to study, assessment, and sample characteristics (proportion male staff in experimental group), because we showed that these variables moderated the effects of interventions. We should conduct further research to expand our knowledge on training effectiveness of direct care staff training programs in relation to the challenging behaviours of clients with ID. Ecological variables, such as team climate or organization culture or the motivations of direct care staff attending staff training programs, should be taken into consideration. Last but not least, further attention should be paid to the perspectives of clients involved in training programs, addressing their needs and the quality of their relationship with direct care staff.

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Appendix A

Appendix A.1
Characteristics of included studies of meta-analysis on staff outcomes.

Authors	Year	N	Post/ follow	Training content	Type of outcome	Measurement
1. McKenzie et al.	2000	132	Follow up[b]	One-day session CB course about: criteria of a learning disability, definition & management CB, client choice & duty of care **(m)**	Knowledge	Questionnaire developed for training (McKenzie, McIntyre, Matheson, & Murray, 1999; McKenzie, Murray, Higgon, & Matheson, 1999; McKenzie, Paxton, Patrick, Matheson, & Murray, 2000)
2. Campbell & Hogg	2008	276	Follow up	Cognitive representation course: 8 sessions about definition CB Role of staff, constructional approach Behavioural principles e.g. aversive non-aversive approaches, observation, changing settings & quality **(m)**	Attitude/ knowledge	The Challenging Behaviour Representation Questionnaire (CBRQ; Campbell, 2007)
3. Van Oorsouw et al.	2010	70	Post	Managing CB course: 7 sessions bout causes CB and signs by clients with ID but also symptoms of trauma and needs of staff after incidents, combined with use of physical interventions e.g. basic posture, transfer, sidestep, reactions at client's aggressive behaviour **(m)**	Knowledge & skills	Questionnaire developed for training (Van Oorsouw, Embregts, Bosman, & Jahoda, 2010) Observation video recorded physical intervention techniques
4. Zijlmans et al.	2011	60	Post	Emotional intelligence (EI): 3 sessions about concept EI and individual development plans about staff's own EQ-i profiles **(c)**	Knowledge & skills	The Dutch version of the Bar-On Emotional Quotient-inventory (EQ-i, Bar-On, 1997)
5. Bethay et al.	2013	34	Follow up	Acceptance & commitment: 3 sessions about mindfulness & acceptance skills	Skills	The General Health Questionnaire-12 (Goldberg, 1978) Burnout Believability Scale (BBS: Bethay, Wilson, Schnetzer, Nassar, & Bordieri, 2013) in combination with applied behaviour analysis **(c)**
6. McConachie et al.	2014	120	Follow up	Acceptance & mindfulness: One-day session and half day refresher session about mindfulness & acceptance skills **(c)**	Attitude, Knowledge and skills	The General Health Questionnaire-12 (Goldberg, 1978) The Warwick-Edinburgh Mental Well-Being Scale (WEMBS: Tennant et al., 2007) The Staff Stressor Questionnaire (SSQ: Hatton et al., 1999) The Acceptance and Action Questionnaire-II (AAQ-II: Bond et al., 2011) The White Bear Suppression Inventory (WBSI: Wegner & Zanakos, 1994)
7. Van Oorsouw et al.	2014	62	Post	Stress management: 4 sessions about stress physiology, combined with elements from acceptance & commitment **(c)**	Knowledge & skills	Writing assignment about self-awareness regarding personal stress management developed for training (Van Oorsouw, Embregts, Bosman, & Jahoda, 2014)
8. Zijlmans et al.[a]	2014	37	Post	Staff-client interaction & EI: 8 sessions and also 2 subgroup sessions about the concept of emotional intelligence, feedback on their own EQ-i profile in relation to their interaction with clients **(c)**	Skills	Observation by video recordings of staff-client interactions observation system (Custers, Westerhof, Kuin, & Riksen-Walraven, 2011)
9. Zijlmans et al.	2015	214	Post	EI & staff-client interaction: 7,5 sessions about the concept of emotional intelligence, feedback on their own EQ-i profile in relation to their interaction with clients **(c)**	Attitude & skills	Dutch version of the Bar-On Emotional Quotient-Inventory (EQ-i, Bar-On, 1997) Emotional Reactions to Challenging Behaviour Scale (ERCBS, Mitchell & Hastings, 1998) Dutch version of the Coping Inventory for Stressful Situations (CISS, Endler & Parker, 1994)

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Appendix A.1 (*continued*)

Authors	Year	N	Post/ follow	Training content	Type of outcome	Measurement
10. Pruijsers et al.	2015	59	Follow up	Guideline for diagnosis anxiety & CB: 2 sessions about the theoretical background of the guideline and practical skills for the use of the guideline **(m)**	Skills	Self-Efficacy Scale Managing anxiety and CB (Pruijsers et al., 2015)
11. Poppes et al.[a]	2016	195	Follow up	Relabelling behaviour: 1 session (1,5 h) about CB by clients with profound intellectual and multiple disabilities (PIMD): characteristics of CB and health problems, definition causes and consequences but also about attributions of staff and intervention options **(m)**	Attitude	Challenging Behaviour Attributions Scale (CHABA: Hastings, 1997)

Hastings (2010) two broad perspectives about training staff: **(c)** To cope with the impact of CB (knowledge or skills improving the emotional needs of staff); **(m)** to prevent or manage CB (training staff new knowledge or skills).

[a] Inclusion in both meta-analyses.

[b] No baseline-post-follow-up only baseline- follow up.

Appendix B

Appendix B.1
Characteristics of included studies of meta-analysis on client outcomes.

Authors	Year	N	Post/ follow	Training Content	Type of outcome	Measurement
1. Ip & Szymanski	1994	21	Post	Choice program on CB: Sessions for staff within a 3 weeks period about: definition of choice and alternatives, instructions and feedback about development & implementation of a Daily Choice Plan	Decrease CB	Observation Sheet for Challenging Behaviors and Choices (Ip & Szymanski, 1994)
2. McKnight & Kearney	2001	11	Follow up	Choice availability: 5 sessions and a post-intervention session about: definition of choice and effects on adaptive and maladaptive behaviour of clients with ID Instruction and feedback to improve choice availability at eating leisure and personal hygiene activities for their clients	Decrease CB & increase adaptive behaviour	Resident Choice Assessment Scale (RCAS, Kearney, Durand, & Mindell, 1995) Vineland Adaptive Behavior Scale (VABS-M; Sparrow, Balla, & Cicchetti, 1984) Vineland Maladaptive Behavior Scale (VMBS, subscale VABS-M)
3. Smith et al.	2002	188	Follow up[b]	Active support: Consisted of 3 phases. Phase one is 1 session (1,5 h) about: considering clients' activity preferences, domestic requirements (e.g. household routine), and the breadth of recreational activities. Developing and implementing daily activity planning & monitoring system In second phase 3 sessions with instructions and feedback during working situation by trainer. Third phase weekly sessions by managers.	Increase adaptive behaviour	Adaptive Behavior Scale Part One (ABS, community And Residential Version, Nihira, Leland, & Lambert, 1993) Observations by video records Staff-client interactions
4. Grey & McClean	2007	60	Post	Multi-element Behaviour Support: 9 sessions (case training) about behaviour assessment report, behaviour support plan and reviewing progress support plan	Decrease CB	Incident & Analysis Sheet (LaVigna, Willis, Shaull, Abedi, & Sweitzer, 1992)
5. Chou et al.	2011	68	Follow up	Active support: Consisted of 3 phases. Phase one: 2 sessions about concept active support Phase two: 2 sessions and one half post-session about developing and implementing daily activity planning Phase three: interactive training about techniques during working by participants, supervisors and managers	Decrease CB & increase ad. beh.	Index of Participation in Domestic Life (IPDL; Raynes, Wright, Shiell, & Pettipher, 1994) Index of Community Involvement-Revised (ICI-R; Raynes et al., 1994) The Choice Questionnaire (CQ; Stancliffe & Parmenter, 1999) The Mood Scale (MS; Evans, Cotton, Einfeld, & Florio, 1999)

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Appendix B.1 (*continued*)

Authors	Year	N	Post/ follow	Training Content	Type of outcome	Measurement
						The Social Network Index (SNI; Center for Developmental Disability Studies, 2004) The ICAP Maladaptive Index (Bruininks, Hill, Weatherman, & Woodcock, 1986) The Adaptive Behaviour Scale (ABS)-Taiwanese version (Shu, 2006)
6. Zijlmans et al.[a]	2014	37	Post	Staff-client interaction & EI 8 sessions and also 2 subgroup sessions about the concept of emotional intelligence, feedback on their own EQ-i profile in relation to their interaction with clients	Decrease CB	Video recordings of staff-client interactions observation system (Custers et al., 2011)
7. Poppes et al.[a]	2016	195	Follow up	Relabelling behaviour: 1 session (1,5 h) about CB by clients with profound intellectual and multiple disabilities (PIMD): characteristics of CB and health problems, definition causes and consequences but also about attributions of staff	Decrease CB and intervention options	Behaviour Problem Inventory (Rojahn, Matson, Lott, Esbensen, & Smalls, 2001) adaptive version for Profound Intellectual and Multiple Disability (BPI-PIMD, Poppes, Van der Putten, Post, & Vlaskamp, 2016)

[a] Inclusion in both meta-analyses.
[b] No baseline-post-follow-up only baseline- follow up.

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