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ORIGINAL ARTICLE

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Use of behaviour change techniques by direct support professionals to support healthy lifestyle behaviour for people with moderate to profound intellectual disabilities

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Abstract

Background: Behaviour change techniques (BCTs) can be employed to support a healthy lifestyle for people with intellectual disabilities. The aim of this study is to determine whether and which BCTs are used by direct support professionals (DSPs) for supporting healthy lifestyle behaviour of people with moderate to profound intellectual disabilities.

Method: Direct support professionals (n = 18) were observed in their daily work using audio-visual recordings. To code BCTs, the Coventry Aberdeen London Refined (CALO-RE-NL) taxonomy was employed.

Results: Direct support professionals used 33 BCTs out of 42. The most used BCTs were as follows: 'feedback on performance', 'instructions on how to perform the behaviour', 'doing together', 'rewards on successful behaviour', 'reward effort towards behaviour', 'DSP changes environment', 'graded tasks', 'prompt practice' and 'model/demonstrate behaviour'.

Conclusions: Although a variety of BCTs is used by DSPs in their support of people with moderate to profound intellectual disabilities when facilitating healthy lifestyle behaviour, they rely on nine of them.

KEYWORDS
behaviour change techniques, direct support professionals, lifestyle behaviour, moderate to profound intellectual disabilities

1 | INTRODUCTION

A healthy lifestyle is important for reducing health risks at an older age (Koritsas & Iacono, 2016; Warburton et al., 2006) and maintaining quality of life for individuals with moderate to profound intellectual disabilities (Bartlo & Klein, 2011). This population has various health problems such as cardiovascular risks, epilepsy, reflux, and under- and overweight (De Winter et al., 2012; Van Timmeren et al., 2017). A healthy lifestyle can help to prevent diseases and problems related to physical inactivity such as obesity and also the occurrence of behavioural problems or decreased mental well-being (Heller et al., 2011; Koritsas & Iacono, 2016; Warburton et al., 2006). Depending on the level of disability, people with moderate to profound intellectual disabilities need support from others in their daily life (Buntinx & Schalock, 2010; Nakken & Vlaskamp, 2007; Pratt & Greydanus, 2007). Specifically, in this population, mobility problems are highly prevalent because they are related to more severe intellectual disabilities (Nakken & Vlaskamp, 2007). Therefore, people with intellectual disabilities require encouragement from their direct support professionals (DSPs) for healthy lifestyle behaviour (Kuijken et al., 2018; Leser et al., 2018).

Behaviour change techniques (BCTs) can facilitate and motivate persons in order to live healthier (Michie et al., 2011). These BCTs are effective in the general population for supporting healthy lifestyle behaviour (Bird et al., 2013; Greaves et al., 2011; Michie et al., 2009). For example, to change behaviour someone can 'provide instruction on how to perform the behaviour' and tell or show how to use gym equipment or 'set graded tasks' by breaking target behaviour into smaller tasks which are easier to perform (Michie et al., 2011). Due to the dependence of people with moderate to profound intellectual disabilities, it is important to use techniques which are easy to use for them and their DSPs. Earlier research shows BCTs are frequently used in lifestyle interventions for people with intellectual disabilities (Willems et al., 2017). A first exploration that was made using BCTs for supporting persons with mild intellectual disabilities in order for them to live healthy lives showed that 24 out of 40 BCTs of the Coventry Aberdeen London Refined taxonomy (CALO-RE-NL, a Dutch translation of the original taxonomy) are considered to be suitable (Michie et al., 2011; Willems et al., 2018). Yet, it is unknown if and which of them are currently used by DSPs for supporting people with moderate to profound intellectual disabilities. Moreover, DSPs indicated in a previous study that they need tools to motivate people with intellectual disabilities for a healthy lifestyle. Consequently, knowledge about the use of BCTs is important in the support of DSPs in order for them to assist in healthy lifestyle behaviour (Overwijk et al., n.d.) and contribute to the development of training and education programs. Therefore, the objective of this study is to determine whether and which BCTs are used by DSPs for supporting healthy lifestyle behaviour for physical activity and nutrition of people with moderate to profound intellectual disabilities.

2 | METHOD

2.1 | Design

This is an observational study. DSPs who support people with moderate to profound intellectual disabilities were observed in their daily work by using audio-visual recordings to determine which BCTs they used to promote healthy lifestyle behaviour for physical activity and nutrition.

2.2 | Participants

Representatives from six care providers selected 27 DSPs complying with the inclusion criteria.

Inclusion criteria of DSPs:

- Supporting adults with moderate and/or severe/profound intellectual disabilities in residential facilities and day activity centres or a combination;
- Minimum work experience of six months at the current workplace;
- Minimum education level of senior secondary vocational education or university of applied sciences.

Participation of the DSPs was voluntary. Of the 27 selected DSPs, 18 provided written informed consent for the study. After this was obtained from the DSP, it was acquired from the legal representative (family member or curator) of the involved people with moderate to profound intellectual disabilities.

Of the 27 DSPs that were approached, nine declined participation. The reasons for not participating were as follows: physical illness (n = 1); not being able to perform the recordings during the available research time (n = 1); possible unrest of people with intellectual disabilities because of recording in the group (n = 2); not receiving support from colleagues to participate in the study (n = 2); no longer interested in the study (n = 2); not getting written informed consent of people with intellectual disabilities in time (n = 1); and dropping out without a clear reason (n = 1). One participant had two reasons for dropping out.

In this study, a total of 18 DSPs participated from six care providers. Table 1 depicts the characteristics of the DSPs. These DSPs supported 74 people with moderate to profound intellectual disabilities. The distribution of moderate, severe and profound intellectual disabilities was, respectively, as follows: 50% (n = 37), 23% (n = 17) and 27% (n = 20). The mean (SD) age of people with intellectual disabilities was 48.0 years (17.4), and 50% was female (n = 37). Of the people with intellectual disabilities, 27 were wheelchair bound, and six people with intellectual disabilities walked with support such as with a walker. Additional problems were as follows: health issues (n = 32), visual problems (n = 32), motor problems (n = 30), psychiatric problems (n = 20), behavioural problems (n = 13), hearing problems (n = 13) and dementia (n = 3). Of the people with intellectual disabilities, 47 (64%) had multiple disabilities. In total, 12 people with

TABLE 1 Characteristics of DSPs (n = 18)

Age in years, mean (*SD*)	44.7 (12.5)
Gender, *n* (%)	
Female	15 (83)
Male	3 (17)
Education, *n* (%)	
Senior secondary vocational education: Educational theory	9 (50)
Senior secondary vocational education: Nursing	4 (22)
University of applied sciences: Educational theory	4 (22)
Other	
University of applied sciences: creative therapy	1 (6)
Supplemental lifestyle training, yes (%)	7 (39)
Work setting, *n* (%)	
Residential facility	11 (61)
Day activity centre	4 (22)
Combination group	3 (17)
Years of experience with people with intellectual disabilities, mean (*SD*)	21.6 (12.2)
Years working on current workplace, mean (*SD*)	10.9 (11.4)
DSP-to-people with intellectual disabilities ratio, mean (*SD*)	2.3 (1.2)

intellectual disabilities were supported by two DSPs from the sample in this study.

2.3 | Protocol

A protocol was made to structure the recordings which occurred on three weekdays during two hours (e.g. 8.00–10.00, 12.00–14.00 and 16.00–18.00) in order to determine an adequate representation of the daily situation. DSPs were asked to perform their regular activities as if there was no observer. Because of the privacy of the people with intellectual disabilities, activities concerning personal hygiene (e.g. showering and changing) were not recorded. Those for whom there was no written informed consent to participate in the current study were kept out of view during the recordings, or the recordings were stopped if the DSP was interacting with that specific person. If the people with intellectual disabilities (for whom written informed consent was given by legal representatives) indicated at a specific moment they did not want to be recorded, the recordings were stopped or that person was kept out of view. A pilot recording with one DSP was held to test the protocol and instruction as well as to improve the procedure. The pilot recording was judged by three authors (AO, AW and MW) for usability of the data in relation to the data analysis. Because there were no changes made in the protocol after the pilot, these recordings were also included in the results. Data collection occurred from November 2017 until February 2019.

2.4 | Procedure

The characteristics of both DSPs and persons with intellectual disabilities were collected with an online questionnaire, and the characteristics of persons with intellectual disabilities were filled in by the DSP. Data were aggregated on the following characteristics of the DSPs: age, gender, education, work setting, years of experience with people with intellectual disabilities/on current workplace, number of people with intellectual disabilities and number of professionals. For people with intellectual disabilities, age, gender, level of intellectual disabilities, mobility and additional disabilities were described.

Interns or an employee of the participating DSP made the recordings (from now on 'recorder') to maintain normalcy in the observed situation as much as possible. Recorders were instructed with a protocol and face-to-face. The face-to-face instruction consisted of (a) an explanation of the study; (b) observation methods; (c) answering questions about the script; and (d) practical and important aspects, for example technical instruction about how to use the camera and how to safely store data after recording. During the recordings, the first author (AO) was available for questions.

After the data collection, the recordings were saved on two separate external hard drives (secured with different passwords). The passwords were only accessible by the involved researchers and were saved separately from the data. After copying the data and making a back-up, the memory cards in the video cameras were formatted.

2.5 | Coding of BCTs

The Coventry Aberdeen London Refined (CALO-RE-NL) taxonomy (Michie et al., 2011; Willems et al., 2018) was used to code the BCTs that were applied by the DSPs. This theoretical evidence based taxonomy is developed for behaviour change interventions to increase a healthy lifestyle related to physical activity and healthy food consumption (Abraham & Michie, 2008; Michie et al., 2011). In this study, the provoking of behaviour related to physical activity and nutrition was coded, for example drinking a cup of water or move along when getting dressed. Examples of the BCTs for people with mild intellectual disabilities were operationalized and adapted for people with moderate to profound intellectual disabilities (Willems et al., 2018). For example, in BCT 21, instructions were proposed on how to perform the behaviour. Instead of explaining in which order to dress, for people with moderate to profound intellectual disabilities, it was explained that they could lift their arm to put on a sweater. In BCT 9, it was encouraged to set graded tasks, for people with moderate to profound intellectual disabilities, the tasks were already set, for example, by first lifting the head, then putting the arm in the right position to finally turn around. Using the first recording, a validity check within the research team (AO, AvdP, MW, TH and AW) was conducted to

confirm the coding. Subsequently, after the first coding and validity check, two BCTs were added to the original list (Michie et al., 2011). Certain tasks were completed together with the individuals with intellectual disabilities instead of doing it themselves (e.g. throw a ball together or put aside a stuffed animal in order to make space available to do a task). Therefore, 'Doing together' (BCT code 22a) and 'DSP changes environment' (BCT code 24a) were added to the coding list. With these additions, a total of 42 BCTs were used to code the recordings. All recorded time was coded with these BCTs.

Inter-rater reliability (IRR) was calculated between two authors (MW and AO) and between the first author and four trained students of the Hanze University of Applied Sciences (Groningen, the Netherlands). First, a third of the recordings were coded independently by AO and MW. A total of 92 min and 15 s of six different DSPs were scored (seven fragments at the beginning of the coding and nine fragments halfway). For each fragment, 42 BCTs were coded on 'use' or 'non-use' and the IRR was calculated as the percentage of absolute agreement. The IRR was 90.0% (we considered an agreement of 80% as sufficient). Second, recordings were separately coded by the first author and the four trained students. At the beginning of the coding, the IRR was calculated using the same recording moments as AO and MW. The coding was compared, and disagreements were solved by consensus discussion. The IRR score with the four students in the first round was 86.7%–87.8%. Subsequently, the students coded half of the available recordings. Halfway through the coding, the IRR was recalculated with the same recording moments as AO and MW; in this second round, the IRR was 90.7%–92.1%. Thereafter, the students coded the remaining recordings.

To guarantee the reliability of the coding, the following procedure was followed: after the BCT coding by the students, a check was done by the first author. The students encountered three debatable codings that were checked and discussed until consensus was reached. Lastly, the first author performed a sample check on the coding. Because of earlier coding and collaboration between AO and MW, 45 earlier coded BCTs were added to the coding.

2.6 | Analysis

Characteristics of both DSPs and persons with intellectual disabilities were described by calculating means, standard deviations, numbers and percentages. The frequency of used BCTs for all of the recording moments was calculated, and the sum of 'uniquely used BCTs' was calculated on the total number of recordings per DSP. To avoid bias of which BCTs were mostly used, the frequency score of 'uniquely used BCTs' was used as a correction for the number of measurements.

To gain insights in the use of the top nine uniquely used BCTs related to the characteristics of the people with intellectual disabilities, the Mann–Whitney test was executed. For this test, two groups were made: DSPs who support people with moderate intellectual disabilities and DSPs who support people with severe to profound intellectual disabilities. Five DSPs were excluded because they supported people with moderate to profound intellectual disabilities or people with moderate to severe intellectual disabilities in both groups; included were 8 DSPs supporting people with moderate intellectual disabilities, and 5 DSPs supporting people with severe or profound intellectual disabilities.

In addition, analysis were performed on the frequency of use of the top nine used BCTs for the following characteristics of DSPs: gender, education, additional training. Correlations (Pearson Correlation and Spearman's rho) were calculated for work experience of DSPs and policies of the organization on the frequency of the top nine used BCTs.

2.7 | Ethics

The Medical Ethical Committee of the University Medical Centre Groningen gave dispensation to conduct the study (study number: 201700164). All of the participants provided written informed consent for the study. Recorders signed a declaration of confidentiality.

3 | RESULTS

The total number of recording hours was 55:36:54 (hh:mm:ss). The total recording time per participant ranged from 01:02:15 to 05:05:50. Due to practical circumstances, not all of the recordings were performed as intended. The number of observation moments, recording days and time range differed from the protocol. Seven DSPs performed one or two observations, and 11 DSPs (out of 18) reached the intended number of three observation moments. Three DSPs recorded on weekend days instead of week days. Lastly, from eleven DSPs, the observation moments were on two of three moments recorded in the same time range of the day caused by the schedule of the people with intellectual disabilities, for example, because they were mostly recorded during active moments.

Table 2 provides an overview of the used BCTs. Every DSP used BCTs to support healthy lifestyle behaviour for physical activity and nutrition. Out of 42 BCTs, 33 were utilized by DSPs. However, nine of the used BCTs account for 116 of the 226 uniquely BCTs that were used; this is more than half of all of the uniquely used BCTs. The following BCTs were most frequently observed: 'feedback on performance' (n = 16), 'instructions on how to perform the behaviour' (n = 16), 'doing together' (n = 15), 'rewards on successful behaviour' (n = 14), 'reward effort towards behaviour' (n = 12), 'DSP changes environment' (n = 12), 'graded tasks' (n = 11), 'prompt practice' (n = 10) and 'model/demonstrate behaviour' (n = 10). The DSPs who used the most BCTs in total (highest coding of 42 BCTs) also employed the most uniquely BCTs (highest coding of 24 BCTs). There is a wide variance in the uniquely used BCTs with the highest coding at 24. On the other hand, the lowest coding of uniquely used BCTs is two.

TABLE 2 Frequency of used BCTs (ranked by mostly used)

Participants	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	Sum of frequency in use	Sum of uniquely used BCTs
No. of measurements per participant	3	3	2	3	3	3	2	2	3	2	3	3	3	2	1	2	3	3		
BCTs																				
#19[a] Feedback on performance	3	3	2	3	3	2	1	2	3	0	3	2	2	2	1	2	1	0	35	16
#21 Instructions on how to perform the behaviour	3	2	2	3	3	2	2	2	3	2	2	2	0	1	1	2	1	0	33	16
#22a Doing together	3	1	2	1	3	2	1	1	2	1	2	0	1	0	1	1	1	0	23	15
#13 Rewards on successful behaviour	3	2	2	2	3	2	2	1	3	1	0	0	0	1	1	2	1	0	26	14
#12 Reward effort towards behaviour	2	1	2	0	3	2	2	1	1	0	1	0	0	1	1	2	0	0	19	12
#24a DSP changes environment	2	1	2	1	2	2	1	0	2	2	0	0	0	1	1	1	0	0	18	12
#9 Graded tasks	2	3	1	3	1	2	1	1	1	0	1	0	0	0	0	0	2	0	18	11
#26 Prompt practice	1	2	1	2	3	2	1	2	3	0	0	0	1	0	0	0	0	0	18	10
#22 Model/demonstrate behaviour	2	0	2	1	1	2	2	0	1	1	0	1	1	0	0	0	0	0	14	10
#5 Goal setting (behaviour)	2	3	2	2	1	2	2	2	0	0	0	0	1	0	0	0	0	0	17	9
#23 Teach to use prompts/cues	2	0	2	3	2	2	1	2	1	0	0	0	1	0	0	0	0	0	16	9
#20 Information where and when to perform behaviour	2	1	0	2	2	0	1	1	0	1	0	0	1	0	1	0	0	0	12	9
#11 Review outcome goals	1	0	2	1	2	2	1	1	0	0	0	0	0	1	0	0	0	0	11	8
#24 Environmental restructuring	2	0	2	0	1	0	1	1	1	0	0	1	0	1	0	0	0	0	10	8
#7 Action planning	1	2	2	3	0	0	0	0	0	0	2	0	0	0	0	0	1	0	11	6
#6 Goal setting (outcome)	1	3	2	2	0	1	0	1	0	0	0	0	0	0	0	0	0	0	10	6
#1 Information on consequences in general	1	0	0	0	0	1	0	0	0	2	0	1	0	0	0	0	0	1	6	5
#38 Time management	1	0	0	0	0	0	0	0	0	2	0	0	0	1	1	0	1	0	6	5
#4 Normative information others' behaviour	0	0	1	0	0	1	0	0	0	1	0	1	0	0	0	0	0	1	5	5
#40 Stimulate anticipation of future rewards	1	1	0	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	5	5
#10 Review behavioural goals	0	0	0	1	3	0	1	1	0	0	0	0	0	0	0	0	0	0	6	4
#30 Identification as role model	2	1	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	6	4
#28 Facilitate social comparison	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	1	0	0	4	4
#16 Self-monitoring of behaviour	1	3	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	5	3
#2 Information to the individual	1	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	4	3
#34 Use of imagery	2	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	4	3
#8 Barrier identification	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3	3
#17 Self-monitoring of outcome	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
#18 Focus on past success	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	3	3
#25 Behavioural contract	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
#15 Generalization of behaviour	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1
#31 Prompt anticipated regret	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1
#32 Fear arousal	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1
#3 Information about others' approval	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
#14 Shaping	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
#27 Use of follow-up prompts	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

(Continues)

TABLE 2 (Continued)

Participants	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	Sum of frequency in use	Sum of uniquely used BCTs
#29 Plan social support/social change	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
#33 Self-talk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
#35 Relapse prevention/coping planning	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
#36 Stress management /emotional control training	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
#37 Motivational interviewing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
#39 General communication skills training	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sum of used BCTs per DSP	42	35	33	33	35	30	21	20	23	14	14	10	9	9	8	11	8	2	357	
Sum of uniquely used BCTs per DSP	24	20	20	18	17	17	16	15	13	10	8	8	8	8	8	7	7	2		226

[a]Number of BCT in CALO-RE taxonomy (Michie et al., 2011).

To gain insights in the use of BCTs for people with moderate intellectual disabilities and people with severe to profound intellectual disabilities, the Mann–Whitney test was executed. No statistical significant differences were found between the use of the top nine uniquely used BCTs and the degree of intellectual disabilities ($U = 8.5$, $z = -1.732$, $p = .093$). See Table 3 for the descriptive statistics. Almost all DSPs ($n = 12$) use three or more BCTs from the top nine used BCTs. Notable is the use of the BCT 'prompt practice' (BCT 26), which is only used by one DSP supporting people with moderate intellectual disabilities, all of the DSPs supporting people with severe to profound intellectual disabilities used this BCT. Also the BCTs 'graded tasks' and 'model/demonstrate behaviour' (BCT 9 and 22) were less used by DSPs supporting people with moderate intellectual disabilities.

For the association between the frequency of the top nine used BCTs and the characteristics of DSPs (gender, education and additional training), no statistical significant differences were found. See Table 3 for the descriptive statistics. Correlations (Pearson Correlation and Spearman's rho) were calculated for work experience of DSPs and policies of the organization on the frequency of the top nine used BCTs; no correlations were found.

TABLE 3 Use of top 9 BCTs in relation to characteristics of people with intellectual disabilities and characteristics of DSPs

	n (DSPs)	Mean	*SD*
Moderate intellectual disabilities	8	4.8	2.6
Severe to profound intellectual disabilities	5	7.8	2.2
Female DSPs	15	6.4	2.7
Male DSPs	3	6.3	2.5
Education DSPs: Senior secondary vocational education	13	6.9	2.2
Education DSPs: University of applied sciences	5	5.4	3.4
Additional training, no	11	6.2	2.9
Additional training, yes	7	6.9	2.2

4 | DISCUSSION

4.1 | Principal findings

The aim of this study was to determine the use of BCTs by DSPs in supporting healthy lifestyle behaviour for physical activity and nutrition of people with moderate to profound intellectual disabilities. Results show that DSPs use most of the BCTs (33 out of 42 BCTs); however, they rely heavily on only nine of them. More than half of the DSPs use these nine BCTs. These most frequently used BCTs were as follows: 'feedback on performance', 'instructions on how to perform the behaviour', 'doing together', 'rewards on successful behaviour', 'reward effort towards behaviour', 'DSP changes environment', 'graded tasks', 'prompt practice' and 'model/demonstrate behaviour'. DSPs who use the most BCTs also utilize more different BCTs then DSPs who use less BCTs. There is a wide variance in uniquely used BCTs between DSPs (range 2–24 BCTs). Nine BCTs were not employed at all. These nine BCTs, for example, 'shaping' and 'relapse prevention/coping planning', are probably difficult to use for people with moderate to profound intellectual disabilities. For example, in 'shaping', the encouragement is being phased out; however, because of the support needed by people with intellectual disabilities (Buntinx & Schalock, 2010; Nakken & Vlaskamp, 2007; Pratt & Greydanus, 2007), this encouragement is required. The degree of intellectual disabilities may be related to the use of BCTs, DSPs use more BCTs for people with more severe intellectual disabilities. DSPs of people with more severe intellectual disabilities use three BCTs more often than DSPs supporting people with moderate intellectual disabilities, these BCTs are as follows: 'prompt practice',

'graded tasks' and 'model/demonstrate behaviour'. So DSPs who support people with severe to profound intellectual disabilities are more aware of demonstrating, set graded tasks and encourage people with intellectual disabilities to practice a healthy lifestyle. This encouragement for people with more severe intellectual disabilities could be adapted to care plans and evaluated if this leads to a healthier lifestyle of people with severe to profound intellectual disabilities. No statistical significant differences or correlations were found for the characteristics of DSPs and the use of the top nine BCTs. However, these results should interpreted with caution.

In comparison with an observational study in people with mild intellectual disabilities (Willems et al., n.d.) examining the nine most frequently uniquely used BCTs, in our study, the authors determined three similar BCTs used by DSPs: 'instructions on how to perform the behaviour', 'rewards on successful behaviour' and 'model/demonstrate behaviour'. The BCTs 'set graded tasks' and 'reward effort towards behaviour', which were observed in the top nine of this study, were also mentioned as being suitable by professionals working with people with mild intellectual disabilities (Willems et al., 2018) indicating that these BCTs appear to be applicable for both people with mild intellectual disabilities and people with moderate to profound intellectual disabilities.

Of the five BCTs ('barrier identification', 'set graded tasks', 'reward effort towards behaviour', 'motivational interviewing' and 'action planning') that seemed most suitable for supporting people with mild intellectual disabilities (Willems et al., 2018), only two of them were in the top nine used by DSPs in this observational study ('set graded tasks' and 'reward effort towards behaviour'). On the other hand, the BCT 'feedback on performance' was marked as less suitable for people with mild intellectual disabilities (Willems et al., 2018) while this BCT was at the top list for people with moderate to profound intellectual disabilities. This may indicate that those BCTs that were not used frequently by DSPs may be less suitable for people with moderate to profound intellectual disabilities because of their functioning, for example, on the conceptual domain with impairments in practical knowledge and memory (American Psychiatric Association, 2013). The level of dependency of people with intellectual disabilities should be taken into account by using BCTs; people with moderate to profound intellectual disabilities probably require more help and feedback during their performance of behaviour. The use of the two BCTs 'doing together' and 'DSP changes environment' in the top nine of mostly used BCTs shows this dependency of people with intellectual disabilities. In addition, taking the social and emotional development of people with intellectual disabilities into account might have led to the use of only nine BCTs (Willems et al., n.d.).

Our study demonstrates that DSPs already used most of the available techniques to motivate a healthy lifestyle; however, they rely heavily on just nine BCTs. Nevertheless, based on this study, the authors do not know if DSPs use the most promising BCTs. Compared to earlier research in which DSPs indicated they required skills to motivate people with intellectual disabilities for healthy lifestyle behaviours (Overwijk et al., n.d.), this study shows that they indeed use BCTs. This may indicate that DSPs may be unaware of their use of BCTs for healthy lifestyle behaviour and may need additional skills in order to use a variation of them. The use of only nine BCTs can also be an indication for a knowledge gap regarding the availability of BCTs. It is unclear if DSPs use BCTs purposefully and what are the effects; they may use them implicitly which is also known as 'tacit knowledge', which is implicit knowledge based on experience (Asher & Popper, 2019; Linde, 2001). By making this knowledge explicit and sharing it, more DSPs could benefit from this in daily practice and use BCTs to support people with intellectual disabilities. Also, because of the needs of DSPs for motivating skills, raising awareness for the used BCTs can help to overcome this need and make DSPs more confident in supporting healthy lifestyle behaviours.

4.2 | Methodological considerations

For this study, the CALO-RE-NL taxonomy (Michie et al., 2011; Willems et al., 2018) was used and adapted for people with moderate to profound intellectual disabilities. BCTs were already operationalized for people with mild intellectual disabilities (Willems et al., 2018); the authors (AO, MW) added suitable examples for people with moderate to profound intellectual disabilities to the list. For example, an adjusted example to 'set graded tasks' was as follows: 'lift your head first, then I will put your arm into the right place and then you can turn around'. In this example, the DSP supported the steps of the task instead of the people with more severe intellectual disabilities doing it all by themselves because thinking of different steps in a task is difficult for this population.

In this study, two additional BCTs were added to the CALO-RE-NL taxonomy (Michie et al., 2011; Willems et al., 2018): 'Doing together' and 'DSP changes environment'. With adding these BCTs, the support needs of people with moderate to profound intellectual disabilities were taken into account for helping them with healthy behaviour. These additional BCTs show the specific way in which the use of BCTs should be examined for people with moderate to profound intellectual disabilities and the role of DSPs. Depending on the level of the disability, people with moderate to profound intellectual disabilities require support from others in their daily life (Buntinx & Schalock, 2010; Nakken & Vlaskamp, 2007; Pratt & Greydanus, 2007). In some situations, a DSP or someone else must change the environment to perform the behaviour instead of the persons doing this by themselves. Because people with moderate to profound intellectual disabilities were not always capable of performing the behaviour on their own, the authors also experienced DSPs performing the target behaviour with them instead of doing it by themselves.

4.3 | Strengths and limitations

This is the first time the actual use of BCTs for people with moderate to profound intellectual disabilities has been explored by recordings.

Earlier research of BCTs focused on the general population and people with mild intellectual disabilities (Bird et al., 2013; Greaves et al., 2011; Michie et al., 2009; Willems et al., 2018). Objective coding was made possible by recordings instead of self-reported use of BCTs. This is important as limited memory reduces the accuracy of self-reported behaviour (Peterson & Kerin, 1981). Also, unknowingly using BCTs could be coded using the recordings. A study protocol ensured structural data collection for all of the participating DSPs. To exert little influence on regular activities in the observed situation, the recordings were conducted by student interns or an employee of the participating DSP. Finally, the IRR was checked at the beginning and halfway through the procedure of coding which ensures reliable results.

A limitation of this study is the relatively small sample of DSPs (n = 18). The results of the used BCTs related to the degree of intellectual disabilities cannot be generalized because of the small sample of people with severe intellectual disabilities within this analysis. More research is needed into the use of specific BCTs for different groups of people with intellectual disabilities and the effectiveness of these BCTs. The results of the relation between the characteristics of DSPs and the use of BCTs should be interpreted with caution; the group of participants is heterogenic with 18 different DSPs, supporting a heterogeneous group of people with intellectual disabilities using nine different BCTs.

5 | CONCLUSIONS

DSPs use most of the available BCTs in their support for healthy lifestyle behaviour of people with moderate to profound intellectual disabilities; however, they rely heavily on just nine BCTs, and there is a wide variance in uniquely used BCTs between DSPs. To support DSPs in clinical practice, they can use BCTs explicitly to stimulate healthy lifestyle behaviours for people with intellectual disabilities.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interests.

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