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**Characterising client's verbal statements in behavioural support interventions: the case of
smoking cessation**

Abstract

Background: Reliable methods have been developed for characterising behavioural interventions in terms of component practitioner-delivered behaviour change techniques (BCTs). As yet no corresponding methods have been developed for characterising client responses. **Purpose:** To develop a method for characterising clients' verbal statements in audio-recordings of smoking cessation behavioural support consultations. **Methods:** An established framework for specifying practitioner-delivered BCTs was adapted to account for corresponding BCTs in clients' verbal statements. 1429 client statements within 15 transcripts of audio-recorded consultations were independently coded using the framework. **Results:** Of the 58 BCT categories in the practitioner framework, 53 corresponding client BCTs were included and five codes unrelated to smoking cessation were added. Forty client BCTs were reliably identified at least once across sessions (75.1% agreement; PABAK = 0.77). **Conclusions:** It is possible to reliably categorise clients' verbal statements in smoking cessation consultations in terms of responses to BCTs delivered by the practitioner. When used alongside the taxonomy of practitioner-delivered BCTs, this method could provide a basis for investigating the dyadic interaction between the practitioner and client.

Keywords: behaviour change, smoking cessation, client, intervention delivery, fidelity

Words: 171/200

Introduction

Behavioural support interventions can be effective in promoting health (Ezzati et al., 2002; Michie, 2008; Mokdad, Marks, Stroup, & Gerberding, 2004; National Institute for Health and Care Excellence, 2007, 2014; Solomon & Kington, 2002). These interventions consist of 1) multiple, potentially interacting, component behaviour change techniques (BCTs)¹ and 2) modes of delivering these techniques (Craig et al., 2008; Michie et al., 2011a; Michie et al., 2013). Taxonomies of BCTs have been developed to characterise and specify the ‘active ingredients’ in behavioural support interventions (Michie et al., 2011a; Michie et al., 2013). A BCT can be defined as ‘an observable, replicable and irreducible component of an intervention designed to alter or redirect causal processes that regulate behaviour’ (Michie & Johnston, 2011).

BCT taxonomies have been used to reliably specify the content of behavioural support interventions in published reports, manuals and transcripts (Lorencatto, West, & Michie, 2012a; Lorencatto, West, Stavri, & Michie, 2012b; Michie, Churchill, & West, 2011b; Michie et al., 2012). They have also been used to assess the fidelity with which practitioners deliver behavioural support interventions for physical activity (Hardeman et al., 2008), and smoking cessation (Lorencatto, West, Bruguera, & Michie, 2013a; Lorencatto, West, Christopherson, & Michie, 2013b). By coding audio-recorded interventions using pre-defined criteria, these methods constitute a ‘gold-standard’ approach for monitoring and objectively verifying fidelity to intervention protocols (Borrelli, 2011).

Face-to-face behavioural support interventions usually involve BCTs delivered within a dyadic conversation between a practitioner and a client. This means that client responses and contributions are an important part of the behaviour change process. Current taxonomies used to specify BCTs and assess fidelity in face-to-face behavioural support interventions do not account for the verbal statements made by the client (Lorencatto, West, Seymour, & Michie, 2013c; Lorencatto et al., 2012b; Michie et al., 2011b). In order to assess fidelity, frameworks recommend that the client’s *receipt* (i.e. understanding, knowledge and skill to use the intervention) and *enactment* (i.e.

¹ Abbreviations: BCT (behaviour change technique)
Characterising Client Statements

performance of intervention-related skills and strategies) of intervention content should be measured (Borrelli, 2011). Successful implementation of behavioural support interventions requires that BCTs are not only delivered by practitioners with fidelity, but that the BCTs are acted upon by recipients of the intervention as intended. By examining the delivery of BCTs by the practitioner alongside receipt and enactment of BCTs by the client, there is potential to add explanatory value to the outcomes of interventions (Borrelli, 2011; Greaves, 2014; Hankonen et al., 2014).

Methods for characterising statements made by clients in behavioural support interventions have been developed (Coleman, Stevenson, & Wilson, 2000; Hardeman et al., 2008; Miller, Moyers, Ernst, & Amrhein, 2003; Verbiest et al., 2014). However, these methods have focused on categories derived from specific theories or approaches (e.g., ‘change talk’ or ‘resistance to change’) rather than the full range of BCTs that may be delivered or responded to. The ability to reliably categorise clients’ verbal statements within behavioural support interventions has potential to advance our understanding of the effective application of BCTs by practitioners. BCT taxonomies have been used to understand which components of an intervention contribute to effective outcomes (Dombrowski et al., 2012; French, Olander, Chisholm, & Mc Sharry, 2014; Michie et al., 2011b; Olander et al., 2013; West, Walia, Hyder, Shahab, & Michie, 2010). To date, these evaluations have typically examined the presence (or absence) or frequency of BCTs applied by practitioners in interventions. By accounting for client statements, the interaction between the practitioner and the client can be examined as a dynamic system (i.e. practitioner-client dyad). The trajectory of the system can then be mapped by assessing the sequence and frequency of BCTs applied by the practitioner in the context of statements made by the client, i.e. state space grids (Lewis, Lamey, & Douglas, 1999). In addition to increased explanatory power, such approaches may allow researchers to better understand the complexity and ‘messiness’ of face-to-face behavioural support interventions, whereby practitioners must continually respond and adapt to clients’ statements (or lack thereof), both within and across sessions. In essence, better capturing, describing and analysing the full real-world application of BCTs. To our knowledge,

methods to characterise and categorise clients' verbal statements that correspond to BCTs delivered by a practitioner in a behavioural support intervention have not been developed.

Behavioural support for smoking cessation delivered face-to-face has been demonstrated to be effective (Lancaster, Stead, Silagy, & Sowden, 2000; Lancaster & Stead, 2005; West, Evans, & Michie, 2011; West et al., 2010). Therefore, these consultations represent a good starting point for developing a method to characterise client statements. The aims of this research were to 1) develop a method to categorise clients' verbal statements in smoking cessation behavioural support interventions, 2) assess the reliability of the method, and 3) apply the method to characterise clients' verbal statements. For the purpose of this research, reliability was defined as the consistency with which the same statements are similarly categorised by independent researchers. Client statements were defined as a distinct unit (or chunk) of transcribed client verbal behaviour representing a single conversational 'turn' following (or preceding) practitioner verbal behaviour.

Methods

The study received ethical approval from the University College London departmental ethics committee (CEHP/2010A/015).

Design

The study was conducted in two phases (see Figure 1). In Phase 1, inductive and deductive methods were used to developing a method for characterising clients' verbal statements in smoking cessation behavioural support interventions (aim 1). In Phase 2, the reliability of the resulting method was tested (aim 2) and the method was used to characterise clients' verbal statements (aim 3).

Sample and Materials

Transcripts. Audio-recordings of one-to-one routine behavioural support consultations occurring in regular practice in two NHS Stop Smoking Services were recorded by practitioners using discrete audio recording devices. Consent was obtained from practitioners and clients. In Phase 1, 304 client statements within three transcripts were used. In Phase 2, 1429 client statements within an additional 15 transcripts were used. This sample size was similar to that used to establish the reliability of the

BCT taxonomy for published descriptions of individual behavioural support for smoking cessation (n = 14 transcripts; Michie, Hyder, Walia, & West, 2011c) and for delivery in practice (n = 15 transcripts; Lorencatto et al., 2013c). Audio-recordings represented a mixture of consultations with smokers at different stages of quitting. Table 1 indicates the type and number of transcripts used in each phase.

Behaviour Change Technique Taxonomy. A coding framework for specifying practitioner-delivered BCTs in transcripts of audio-recorded smoking cessation behavioural support consultations (Lorencatto et al., 2013c) was adapted to characterise clients' verbal statements. This framework was based on the original published smoking cessation taxonomy and list of competences (Michie et al., 2011c) and included additional sections for data extraction and accompanying coding guidelines.

Procedure and analysis

Aim 1: Method Development. Both inductive and deductive methods were used to inform the adaptation of the existing coding framework for specifying practitioner-delivered BCTs in transcripts of audio-recorded smoking cessation behavioural support consultations (Lorencatto et al., 2013c) to clients' verbal statements. The inductive method consisted of three researchers with prior experience of coding interactions (KE, HG and FL) developing coding categories for two session transcripts (168 segments). Coders were asked to sort transcript segments (a segment being one practitioner statement followed by one corresponding client statement) into similar groupings based on content of the segments and create category labels for these groupings.

The coders arrived at 12 groupings (see Table 2) which were discussed. It appeared that all categories related to smoking or smoking cessation could be matched to corresponding BCTs in the 'practitioner' framework (see Supplementary File 1). The validity of this observation was tested by coding more material and examining inter-rater reliability. Coders (HG and FL) independently examined the same two transcripts using the 'practitioner' framework (Lorencatto et al., 2013c). In the process, coders developed BCT labels and definitions for client statements that corresponded with the labels and definitions used for characterising practitioner-delivered BCTs. Following this,

they coded 136 client statements from a third transcript using the coding framework. Inter-rater reliability was 81.6% agreement, having previously been 60.9%. Discrepancies were resolved through discussion, and the resulting framework was adapted to resolve disagreements.

Aim 2: Assess the reliability of the method. HG and FL identified and categorised 1429 client statements in three waves of five transcripts per coding wave. Following each wave, inter-rater reliability was assessed, discrepancies were resolved through discussion, and adaptations were made to the framework to improve agreement (i.e. clarifying definitions, adding notes on alternative or additional coding where relevant). The final coding framework is described in the results.

Consistent with previous research, inter-rater reliability for each client statement was assessed using percentage agreement (Lorenatto et al., 2013c; Michie et al., 2011c). If both coders assigned the same code(s) to a client statement, agreement was registered. If coders identified different code(s), disagreement was registered. To assess the presence or absence of codes within each transcript, the ‘prevalence and bias adjusted Kappa’ statistic was used (i.e. PABAK)(Byrt, Bishop, & Carlin, 1993). PABAK adjusts for 1) coders sharing bias in the use of categories and 2) high prevalence of negative agreement (i.e. when both coders agree that codes are not present). Inter-rater reliability values of 0.60-0.79 indicate ‘substantial’ reliability and those above 0.80 would be considered ‘outstanding’(Landis & Koch, 1977).

Aim 3: Apply the method to characterise clients’ verbal statements. For each transcript, the frequency with each category within the coding framework was observed was recorded. The percentage of statements across the 15 transcripts represented by each category in the framework was calculated.

Results

Aim 1: The coding framework

The coding framework includes 53 types of client statements which corresponded to practitioner-delivered BCTs (see Figure 2). Five BCTs from the existing ‘practitioner’ taxonomy did not have a

client statement category because a corresponding client BCT was deemed not applicable or a different client BCT was deemed more appropriate (see Supplementary File 1). The four function categories from the ‘practitioner’ taxonomy (Michie et al., 2011b) were used to categorise ‘client’ BCTs: 1) specific focus on behaviour addressing motivation (13 BCTs; e.g. ‘recognises importance of abrupt cessation’); 2) specific focus on behaviour maximising self-regulatory capacity or skills (15 BCTs; e.g. ‘changes routine’); 3) adjuvant activities (4 BCTs; e.g. ‘discusses stop smoking medication’); 4) general aspects of the interaction focusing on delivery of the interventions, information gathering or general communication (21 BCTs; e.g. ‘reports level of social support’). The coding framework includes five types of statements that were unrelated to smoking or smoking cessation and did not map onto ‘practitioner’ BCTs (e.g., listening, social smoothers, other; see Supplementary File 1).

Aim 2: Reliability of the framework

Coders identified 40 corresponding client BCTs and 5 codes that were unrelated to smoking or smoking cessation at least once (see Figure 2). Across the three coding waves, average inter-rater reliability was substantial (75.1% agreement; PABAK = 0.77) (see Table 3).

Aim 3: Characterise clients’ verbal statements.

Corresponding BCTs were identified for 53% of client statements, with the most frequent being ‘reports experiences of stop smoking medication’ (10.58% of BCT codes); ‘provides feedback on cessation or progress’ (9.34% of BCT codes); and ‘discusses stop-smoking medications’ (8.38% of BCT codes) (see Figure 2). Of the 47% of statements that were unrelated to smoking or smoking cessation, 22.5% were categorised as ‘social smoothers’, 5.4% as ‘agreement and 19.1% as ‘other’.

Discussion

It is possible to adapt an existing BCT taxonomy to develop a coding framework for reliably categorising clients’ verbal statements in smoking cessation behavioural support interventions. The coding framework for specifying practitioner-delivered smoking cessation BCTs (Lorencatto et al., 2013c) provided a foundation for developing corresponding client BCT labels and definitions. The

coding framework demonstrated substantial inter-rater reliability. To our knowledge, this coding framework represents the first published attempt to develop a method to specify clients' verbal statements that correspond to practitioner-delivered BCTs. The coding framework expands upon the current BCT taxonomy literature, which to date has focused on the behaviour of practitioners or others delivering interventions (Lorencatto et al., 2013c; Lorencatto et al., 2012b; Michie et al., 2011b).

Though within acceptable ranges, the level of agreement observed was lower than previous studies that have applied BCT taxonomies to published trial reports, NHS service protocols, and transcripts of audio-recorded behavioural support consultations (percent agreement = 86 - 95%) (Lorencatto et al., 2013c; Michie et al., 2011b; Michie et al., 2011c). This difference may reflect the complexity of specifying clients' statements in behavioural support interventions. Clients, in contrast to practitioners and published reports, are not directed by existing intervention protocols or guidance. It may also reflect less precise definitions necessary to account for the variable ways in which clients make statements in response to BCTs.

The most frequent client BCTs related to providing information to the practitioner and to discussing adjuvant activities (i.e. medication and additional support). These BCTs corresponded to the most frequently observed practitioner-delivered BCTs, that is, 'information gathering' and 'assessment and advise on stop smoking medication' (Lorencatto et al., 2013c). This suggests a correspondence between the delivery and receipt of BCTs. This method advances the possibilities for investigating fidelity to intervention protocols and its translation to client engagement. Such research has the potential to lead to recommendations for service monitoring, training and evaluation.

The current method could also be further developed to investigate the dyadic interaction between practitioners and clients in behavioural support interventions and would represent a first step to conducting systems-oriented analyses of dyadic interactions (e.g., state space grids, Hollenstein, 2007; Lewis et al., 1999). This would allow for the investigation of the delivery of BCTs by practitioners in the context of client responses and the effect of dyadic interactions processes on outcomes of interventions. In doing so, the current method potentially allows for more nuanced

systems-oriented analysis of corresponding time-series verbal data of both practitioner and client. By examining how practitioners' use of specific BCTs may be influenced by clients' statements and vice versa, we can examine how real-time adaptations and adjustments of back-and-forth interactions may influence the outcomes of behavioural support interventions.

This study had a number of limitations. First, it only included a small number of consultations from one behavioural domain in one country. However, given the range and frequency of BCTs canvassed, we are able to establish proof of principle. Secondly, the coding framework only assessed the presence or absence of client responses. No attempt was made to qualify this, for example in terms of the degree of enthusiasm with which a response was made. Such qualification could be important but represents a major challenge. Thirdly, we did not document non-verbal communication, although this is likely only relevant for a few categories (e.g., 'build rapport', 'reports motivation and self-efficacy'). The characterisation of clients' nonverbal responses may further inform our understanding of the impact of practitioner-delivered BCTs in behavioural support interventions. Fourthly, the study only involved two coders. It will require further studies to build a comprehensive picture of the extent to which the coding system can be reliably used by different coders with different levels of experience.

In conclusion, this study established what we believe to be the first method for reliably identifying and categorising verbal statements made by clients in smoking cessation behavioural support interventions. When used alongside the taxonomy of practitioner-delivered BCTs, this method lays the basis for investigating the dyadic interaction between the practitioner and client.

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Author(s) Statement of Conflict of Interest and Adherence to Ethical Standards

Heather Gainforth, Fabiana Lorencatto and Karl Erickson declare no competing interests. Robert West has undertaken research and consultancy for companies that develop and manufacture smoking cessation medications. Susan Michie has received travel funds and hospitality from Pfizer, which manufactures Champix. She has received fees for speaking at educational events sponsored by Pfizer. Susan Michie has received research funds and consultancy payments from the Department of Health.

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Table 1. Types and number of behavioural support consultations used in each phase

Phase	Source (n)		Stage of quitting (n)		
	face-to-face	telephone	pre-quit	quit day	post-quit
1	3	0	0	1	2
2	6	9	7	1	7

Table 2. Categories identified by each coder in the inductive sort task

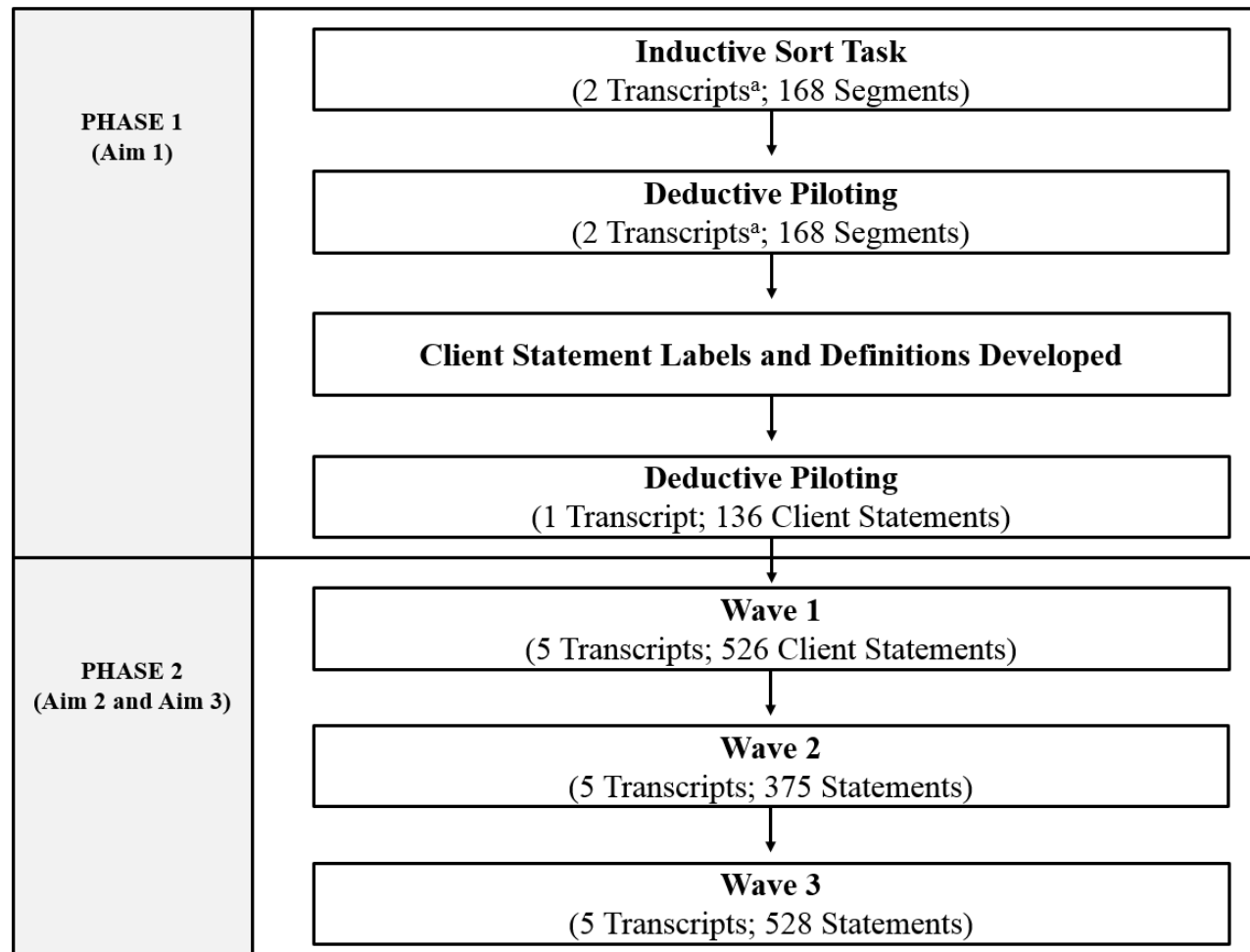
Groupings	Coder 1 (HG)	Coder 2 (FL)	Coder 3 (KE)
1. Social smoothers	Social smoothers	Social smoothers	Social smoothers
2. Listening	Listening	Listening	Listening
3. Agree	Agree	Agree	Agree
4. Clarify or ask question	Clarify or ask question	Clarify or ask question	Clarify or ask question
5. Other or unrelated	Other or unrelated	Other or unrelated	Other or unrelated
6. Past, present and future behaviour	Past, present and future behaviour	Past, present and future behaviour	Past, present and future behaviour
7. Reasons for quitting	Reasons for quitting	Reasons for quitting	Negative effects of smoking & positive effects of smoking cessation
8. Barriers to smoking cessation, cravings, negative side effects	Barriers to smoking cessation, cravings, negative side effects	Barriers to quitting	Barriers to and Negative Side Effects of Smoking Cessation, Triggers
9. Current plans and strategies	Current plans, strategies, behaviours	--	Current strategies/success/intentions
10. Feedback on progress	--	Feedback on progress	--
11. Positive thoughts about smoking	--	--	Positive thoughts about smoking
12. Reaction to successful cessation	Reaction to CO result	Expression of motivation/excitement	Celebrating success

Table 3. Results of phase 2 inter-rater reliability across three coding waves

	Transcript	Total Statements	Frequency of Coder Agreement	Frequency of Coder Disagreement	Percent Positive Agreement	PABAK
<i>Wave 1</i>						
	1	50	37	13	74.00	0.83
	2	71	54	17	76.06	0.86
	3	136	114	22	83.82	0.66
	4	38	28	10	73.68	0.76
	5	231	151	80	65.37	0.55
	<i>Wave Total</i>	526	384	142	73.00	0.73
<i>Wave 2</i>						
	6	67	48	19	71.64	0.76
	7	78	63	15	80.77	0.76
	8	113	91	22	80.53	0.79
	9	38	24	14	63.16	0.79
	10	79	58	21	73.42	0.83
	<i>Wave Total</i>	375	284	91	75.73	0.79
<i>Wave 3</i>						
	11	60	47	13	78.33	0.83
	12	63	44	19	69.84	0.83
	13	125	90	35	72.00	0.66
	14	244	194	50	79.51	0.69
	15	36	30	6	83.33	0.83
	<i>Wave Total</i>	528	405	123	76.70	0.77
<i>Across all waves</i>		1429	1073	356	75.09	0.77

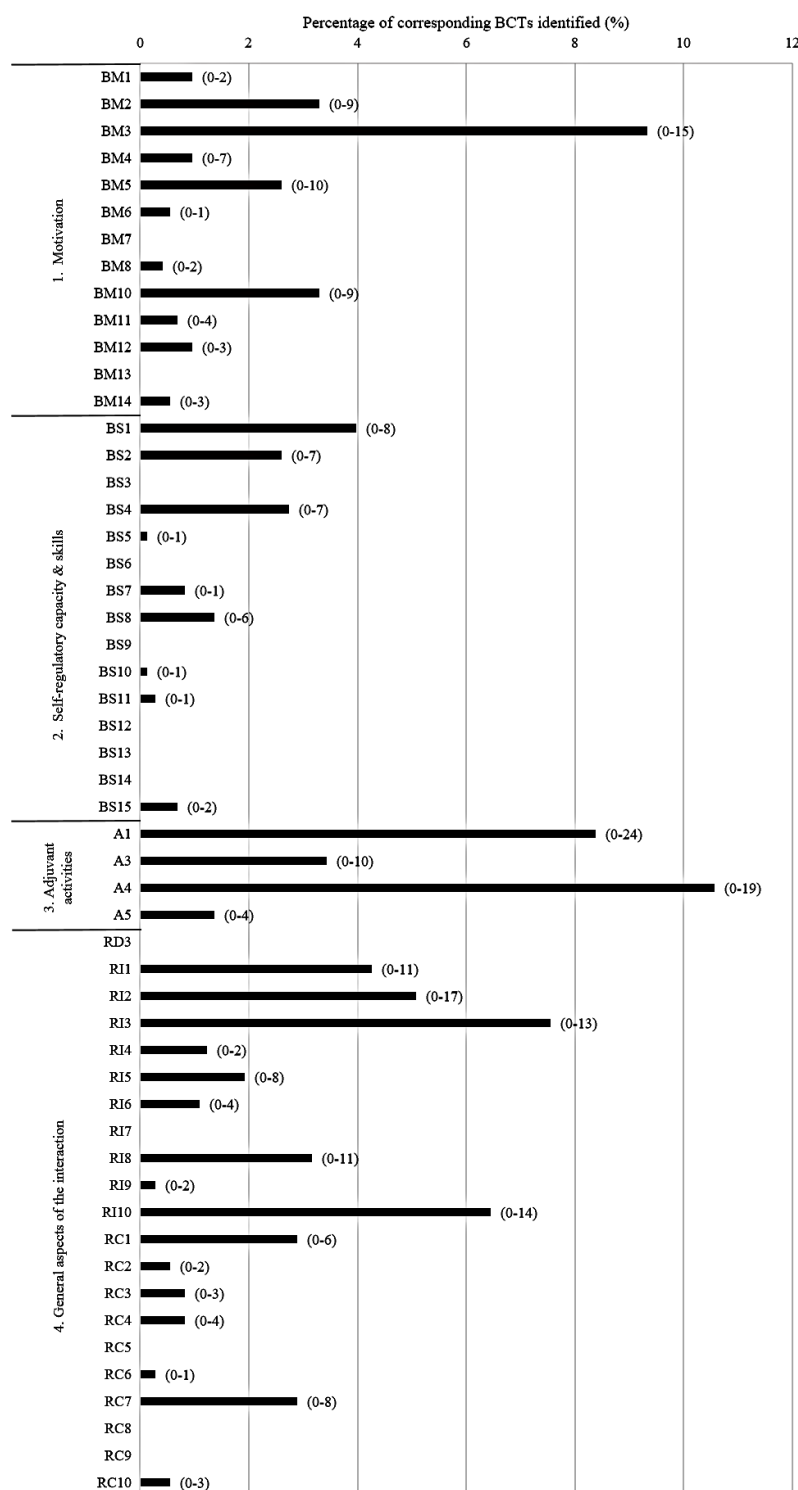
Note. Percent agreement was calculated for *each* client statement. PABAK scores assessing the presence or absence of codes was calculated for each transcript. The wave total PABAK scores represent the mean score across waves.

Figure 1. Study design and number of transcripts coded at each phase



Note. Reliability was assessed between each wave of deductive piloting and reliability testing. Adaptations to the coding framework were made between each wave. ^aThe same transcripts were used for the inductive sort task and deductive piloting.

Figure 2. Client BCTs identified as corresponding with practitioners BCTs across the 15 transcripts coded in Phase 2



Note. Client BCTs are divided into four sections: 1) specific focus on behaviour addressing motivation; 2) specific focus on behaviour maximising self-regulatory capacity or skills; 3) adjuvant activities; 4) general aspects of the interaction focusing on delivery, information gathering and general communication. Labels for each BCT are presented in Supplementary File 1. The range of frequencies observed for BCT across transcripts are reported in brackets.

Figure Captions

Figure 1. *Note.* Reliability was assessed between each wave of deductive piloting and reliability testing. Adaptations to the coding framework were made between each wave. ^aThe same transcripts were used for the inductive sort task and deductive piloting.

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