Qualitative investigations into a virtual CBT therapist: relational features, client experiences and implications for counselling psychology practice.

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November 2017
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Statement of Anonymity

To ensure the confidentiality and anonymity of all clients, supervisors and research participants, all potentially identifying information has either been omitted or replaced with pseudonyms throughout this portfolio.
Acknowledgements

Firstly I want to thank Dr Elena Manafi & Dr Stelios Gkouskos, who both guided me through the research process and provided me with pastoral care at points when I really needed it. I also want to thank my three placement supervisors who were models for the kind of practitioner I hope to be in the future.

The most rewarding and meaningful moments during my training have come from my therapeutic practice. Thank you to all of my clients for sharing your difficulties with me. I hope I helped as best I could. Thanks also to my research participants for generously making the time to describe their experiences to me.

To my fellow trainees, I hope some of your friendliness, your humour and your openness have rubbed off on me. I am also grateful to our reflective group facilitator Tony Ambrose for managing our eccentricities and helping us stay centred. To my personal therapist, you helped me find more balance in my personality and become a better therapist. On a personal note I want to especially thank my parents, without your support I wouldn’t be where I am now.

Finally, I would like to dedicate this thesis to my wife, because you have done so much for me over the past three years, and because you’re my favourite person.
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Preface

This dossier is an excerpt from a larger portfolio of work that was submitted for the Practitioner Doctorate in Psychotherapeutic and Counselling Psychology course at the University of Surrey. The original portfolio included reports demonstrating my therapeutic practice, a reflective essay on my identity as a counselling psychologist, and a more detailed research section including “reflections on the use of self” during the research process. For the purposes of uploading this e-thesis only the core research papers are included, with abridged appendices.

In accordance with course guidelines this research was conducted over three years and a separate report was completed in each year. These three reports follow one coherent line of inquiry and are best understood as a single interconnected piece of work. However they are written in the form of stand-alone journal articles, meaning they can be read individually.

If anyone wishes to contact me regarding this thesis they are welcome to at:
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Introduction to the Research Dossier

The dossier begins with a literature review that explores a diverse range of computer technologies that try to emulate aspects of the therapeutic relationship. The focus then narrows to one computerised cognitive behavioural therapy program, Sleepio, which is delivered by a fully automated character called The Prof. A gap in the literature is identified regarding the nature of this ‘virtual therapist’ and the manner with which he interacts with users. The first empirical study addresses this by conducting a qualitative analysis of The Prof’s algorithm to see whether elements of the therapeutic relationship are present in his design. The results highlight multiple ways that this virtual therapist is designed to emulate relational processes. The second empirical study builds upon the first by exploring participants’ experiences of The Prof. The analysis demonstrates that users can have relational experiences towards The Prof, despite awareness of the underlying technological automation. Opportunities and issues regarding the application of virtual therapists are discussed. Recommendations are made for further research, as well as a call for increased awareness of these technologies among mental health professionals.
Literature Review

A critical review of technologies designed to emulate the relational skills of the human therapist: implications from a counselling psychology perspective

**Purpose:** Well developed relational skills are a central part of the professional identity of counselling psychologists and allied psychotherapeutic practitioners. In recent years a range of computer technologies have been developed that emulate certain aspects of the human therapist’s relational skill set. This literature review provides an overview of such technologies and considers their relevance to the practice of counselling psychology.

**Methods:** An initial broad literature search exploring the intersection of therapy and technology was conducted. The search then focussed in on examples of therapist-emulating technologies that: were prevalent in the existing therapeutic landscape; emulate or supplant the role of the human therapist to a significant extent; and have consequences for professional practice.

**Findings:** While the majority of therapist-emulating technologies are intended to supplement contact with a human therapist, there are notable examples where the entire intervention is delivered by an automated virtual character. Strengths and weaknesses of these programs are highlighted. The review identifies the most relevant example, 'Sleepio', which is delivered by 'virtual therapist' called 'The Prof'.

**Conclusions:** Despite quantitative data demonstrating the effectiveness of some automated therapies there is minimal research into how virtual therapists function and what aspects of the therapeutic relationship or therapist skill set they may be designed to emulate. Recommendations are made for future research into The Prof, being the most complete and relevant example of a virtual therapist to-date.

**Keywords:** Counselling psychology; computer technology; therapeutic relationship; computerised cognitive behavioural therapy; literature review
Introduction

The expansion of computer technology into the practice of psychological therapy has been relatively gradual when compared with other industries (Hanley & Reynolds, 2009), but researchers, private companies and practitioners are increasingly making creative use of emerging computer technology (Amichai-Hamburger, Klomek, Friedman, Zuckerman, & Shani-Sherman 2014). These applications have started to encroach on abilities that psychological therapy practitioners have typically considered to be part of their professional skill set. This literature review explores such new technologies, with a particular focus on examples where computers have been designed to emulate aspects of the therapeutic relationship, and at times have even replaced human practitioners entirely.

As these automated computer therapies continue to accumulate evidence of effectiveness and acceptability to clients, the importance of the human therapist is being questioned (King, Orr, Poulsen, Giacomantonio, & Haden, 2017). These developments are of particular interest to counselling psychologists since our practice is in part defined by a humanistic understanding of the centrality of the therapeutic relationship (Douglas, Woolfe, Strawbridge, Kasket, & Galbraith, 2016), while our philosophical roots emphasise relationality as a much broader and multi-faceted concept (Manafi, 2010). This review examines examples of therapist-emulating technologies and considers some of the emerging debates about how counselling psychologists and allied professionals might view these developments.

The review begins with an overview of some of the diverse technologies and approaches that supplement or emulate various therapist skills. The focus then narrows to discuss computerised cognitive behavioural therapy (cCBT), the most common form of fully automated therapy.

Strengths and weaknesses of cCBT are summarised, which leads to examining attempts to improve cCBT by using ‘virtual agents’. These virtual agents guide clients through the process of CBT and, in some instances, have been described as ‘virtual therapists’. Some of the practical, theoretical and ethical issues that arise from these
virtual therapist systems will be discussed in relation to the literature. Finally, a gap in the literature will be identified and suggestions for future research will be made.

**Terminology**

Common terms for computer technology applications within mental health include, e-mental health (Cavanagh & Millings, 2013), telepsychology (Maheu, Pulier, McMenamin, & Posen, 2012), computer-aided psychotherapy (Marks, Cavanagh & Gega, 2007), online therapy (Harris & Birnbaum, 2015), digital therapy (Bostock, Luik, & Espie, 2016), and many similar variations. The terminology surrounding traditional psychological therapies is similarly diverse with many overlapping meanings. For the sake of brevity *computerised* will be used as a catch-all term for the above spectrum of technologies, while the terms *therapy* and *intervention* will be used interchangeably, as will *therapist* and *practitioner*. Distinctions between technologies, models and professional identities will be highlighted only where required for the purposes of this review.

**Philosophical stance**

Being aware of the philosophical presuppositions underlying all research is a defining feature of counselling psychology. Our profession has a tradition of embracing both nomothetic and idiographic approaches to the creation of knowledge (Douglas et al., 2016). In this review I will demonstrate how objectivist approaches have taken precedence in research into this subject, to the detriment of more a phenomenological understanding of how users experience these technologies. By conducting a review that holds a critical balance between these different forms of inquiry I intend to contribute an original and timely new perspective.

As I am the sole researcher it is important to acknowledge that I will approach this review from my own philosophical stance, which is most closely aligned to critical realist schools of thought (Archer, Lawson & Norrie, 1998). This philosophy argues that while the fundamental laws of nature operate independently of human knowledge, the production of knowledge is inherently limited and context-dependent. It follows that the most appropriate methodology to increase our knowledge changes depending on the subject at hand. In general, as one moves from physical science to social
Science, the most appropriate research methodologies gradually shift from more objective to constructivist approaches. This stance also fits well with counselling psychology’s principle of tolerating tensions and contradictions between different forms of knowledge. Furthermore, this is especially prudent for this review because this is an emerging field of enquiry, in which technological and relational approaches intersect in novel ways. Consequently, generating insights in this area is likely to be best achieved by adopting a flexible philosophy that allows for the diversity of research to be synthesised.

**Review strategy**
A broad literature search into the intersections between computerised interventions and therapies was conducted using major electronic databases, including Web of Science, PsycINFO and Google Scholar. Research qualified for inclusion if it examined computer technologies involved in a process that appeared to supplement or replace aspects of the therapist skill set. Further examples were identified by following references and citations from key texts. Relevant results from this initial overview are summarised in the first part of the review.

Following this one aspect of the literature particularly relevant to counselling psychologists was identified, namely systems in which the therapist-emulating technology supplants the human practitioner to a significant extent. This led to a further focus on CBT. Sleepio was then identified as the program that best matched the focus of the review due to its being supported by a significant body of research and being commonly used in a variety of relevant therapeutic settings.

Searches were initially conducted between September 2014 and June 2015. All references and information relevant to the primary focus of the review are up to date as of November 2017. Due to the rapid pace of development this review does not attempt to capture all of the most recent technological applications of this type.

**The promise of computerised interventions**
The promise of widespread computerised interventions has been heralded since at least the mid-1990s but has consistently failed to materialise (Barak, Hen, Boniel-
Nissim, & Shapira, 2008). However, as the percentage of the population in economically developed countries with internet access exploded from 1% in 1995, to almost 95% in 2017 (International Telecommunication Union, 2017), the potential for a range of widely available alternatives to face-to-face interventions has become more realistic (Amichai-Hamburger et al., 2014). The ubiquity of smartphones has also significantly changed the landscape in recent years, leading to enormous growth in mental health apps (Chan, Godwin, Gonzalez, Yellowlees, & Hilty, 2017; Donker, Petrie, Proudfoot, Clarke, Birch, & Christensen, 2013).

It has been argued that computerised interventions hold great potential by offering the possibility of treatment to clients in areas where face-to-face treatment is not available (Andersson, 2016). Within current mental health systems, they have also been promoted as an option to relieve pressure on services by reducing the amount of time professionals spend with clients, thus reducing costs and increasing the number of clients who can be treated (Wright et al., 2014). Furthermore, a recent major report by The Chief Medical Officer for England called for computerised interventions to be a major area of growth within the NHS, since “technology has the potential to transform mental-health service delivery through earlier detection and diagnosis and by making effective interventions available to more people” (Hollis, Martin, Amani, Cotton, Denis & Lewis, 2013, p.74). Implicit in this is the idea that some of the tasks traditionally carried out by mental health practitioners can instead be delivered in an automated way by computers without having a significant negative impact on the process of therapy or on outcomes. However, computerised interventions are extremely diverse and the relative merits of each approach, and even each specific program, can vary widely. As the rate of technological development continues to outstrip the rate of research detailed empirical inquiry, including a diverse range of perspectives, is increasingly necessary.

**An overview of the range of therapist-emulating technologies**

**The history of the field**

Computer systems that directly emulate the role of the therapist are usually traced back to a famous study conducted in 1966. Computer scientist J. Weizenbaum wrote a program called Eliza that interacted with users in imitation of a person-centred
therapist: repeating the user’s language, asking open-ended questions and responding with empathic phrases. Weizenbaum was surprised at how readily people engaged with Eliza, even sharing very personal details despite knowing that they were communicating with a computer program and only being able to communicate via text (Weizenbaum, 1966). Any illusion of communicating with a conscious agent was brief and it should be kept in mind that people were significantly less aware of the capabilities and limitations of computer technology in that era. Yet the story of Eliza continues to be referenced by some researchers as an instructive moment in the history of therapist-emulating interventions (Helgadóttir, Menzies, Onslow, Packman, & O’Brien, 2009).

This example is an attempt to simulate a therapist’s use of language, but without any awareness of the impact on, or experience of, the client. A very different ability, central to the therapist’s skill set, is the ability to recognise and work with emotional affect (Mears & Cooper, 2005). Technologists have attempted to address this by making emotion comprehensible to computers too.

**Affect-sensitive technology**

In the 1990s, Rosalind Picard founded the discipline of affective computing (Picard, 1997), a field of computer science which aimed to develop our understanding of human emotion by teaching computers how to detect affect states. This research endeavour continues today, and systems have been designed that can identify emotions by measuring facial expressions (El Kaliouby & Robinson, 2005), gesture (Gunes, H., & Piccardi, 2007), as well as the pitch, volume and rhythm of speech (Dai, Han, Dai, & Xu, 2015). Wearable technology, which is now commonplace with commercial devices such as Fitbit and the Apple Watch, allows detection of affect beyond human abilities by measuring biological responses such as pulse, breathing, blood pressure and perspiration (Wilhelm, Pfaltz, & Grossman, 2006). Some devices have been used specifically for psychological purposes; for example, clients with autistic spectrum disorders who do not readily express emotion have worn heart-rate monitors so that underlying arousal can be taken into account by caregivers, even when no visible signs of distress or pleasure are visible (El Kaliouby, Picard, & Baron-Cohen, 2006). Although these technologies demonstrate success at identifying
biologically represented affect states they are limited by not having the capacity to interpret this affect state within the wider social and cultural context, which may be subtle or hold multiple possible meanings. For this richer level of sense-making another human being is still required to engage with the client.

Furthermore, counselling psychology rejects dualist separations of mind and body and instead views the human as unitary and embodied. This means that careful attention to bodily experiences in both client and therapist constitute a rich process in therapeutic practice (Madison, 2014). The importance of embodied practice is also a common factor across therapeutic modalities, including psychodynamic, cognitive and behavioural approaches (Beier & Young, 1984). A disembodied computer attempting to categorise the meaning of an affect state for a client does not recognise that emotions are felt in relation to someone or something and affect only becomes an emotion when it is given subjective meaning by the person experiencing it. Consequently, we should be appropriately sceptical of overly reductionist models of human emotion.

A related part of the therapist’s skill set involves not just observing emotions but identifying when disorder reaches a level that increases risk and warrants therapeutic intervention. Technologies have been developed to replicate this ability too. One example claims to be able to identify clinical depression through glottal features in speech (Moore, Clements, Peifer & Weisser, 2008). Another combines data from multiple sensors recording physical activity, speech and sleep in an attempt to detect early warning signs for mental illnesses (Matthews, Abdullah, Gay & Choudhury, 2014). These applications remain very much in the experimental and development phase, so their accuracy in comparison to a human therapist is untested. However they raise ethical issues regarding privacy and consent, particularly since such technology can run in the background on any smartphone (Wang et al., 2014).

There is also an ethical counter-argument that counselling psychologists must engage with. It is inevitable that the assessment methods currently available to practitioners (e.g. self-report, psychometrics, clinical assessment, intuition) all have inherent limitations, and can be subject to human error on the part of the practitioner. Some of
the arguments for technology assisted assessment include that it is not subject to human error, and can be as accurate as existing methods (Rabbi, Ali, Choudhury, & Berke, 2011). As ethical practitioners, we may need to consider a future where some of our assessment and emotion recognition skills are enhanced or replaced by technology, in the best interests of our clients. This remains a hypothetical scenario, but is a contentious strand of therapist-emulating technology that demands further research and ethical consideration. Following the example of Boehner, DePaula, Dourish and Sengers (2007), a reflective scientist practitioner could contract with their client to use such computer technologies to enhance their therapeutic practice, while integrating this with subjective and intersubjective levels of meaning that cannot simply be described by the output of a computer system.

**Technological convergence**

Some academics argue that the potential demonstrated by Weizenbaum’s Eliza experiment could be developed, alongside the other technologies noted above, to create a more complete therapeutic experience. Helgadóttir et al., (2009) state that: “The goal is to mimic the therapeutic relationship using a computer, without having any therapist involved. Consequently, thousands of users would be able to receive treatment simultaneously, reaching a wider audience” (p.245).

Lucas, Gratch, King, & Morency (2014) created a virtual human called Ellie (in reference to Eliza), who can conduct semi-structured interviews with participants via a TV display. Ellie asked therapeutic assessment questions designed to elicit an emotional charge. For example, “How close are you to your family?” and, “Tell me about an event, or something that you wish you could erase from your memory.” Ellie was also programmed with dozens of different nods, expressions and ways of saying “Mhmm”. The software simultaneously employed an affective computing program Computer Expression Recognition Toolbox (CERT), which is designed to recognise basic emotions such as sadness and happiness, as well as observing the client’s gaze as an indicator of engagement. The researchers are careful not to use the term “therapist”, but these encounters are undeniably designed to emulate a psychotherapeutic interaction.
In the study, 239 participants were recruited and randomly split into two groups. Half of the participants were being observed by a therapist in a separate room who was selecting Ellie’s responses. The other half they were interacting only with Ellie’s automated algorithm. Separately, participants were also randomly allocated whether they would be told that Ellie was being controlled by a therapist, or that Ellie was entirely automated. All participants were also informed that they were being recorded and the tapes would be listened to later. This meant that some participants thought they were interacting with a human when they weren’t and some thought they were interacting with an algorithm when they weren’t. This allowed researchers to isolate the impact of participants’ belief about the nature of the virtual interviewer on their behaviour.

The researchers found that those clients who believed there was no human listening to them “reported lower fear of self-disclosure, lower impression management, displayed their sadness more intensely, and were rated by observers as more willing to disclose” (Lucas et al., 2014, p.94). These self-report measures were backed up by anecdotal remarks from participants: “I wish you hadn’t told me that other people were in the other room listening in. It was weird, like, I don’t even know these people. I would have said a lot more stuff if they weren’t there” and “This is way better than talking to a person. I don’t really feel comfortable talking about personal stuff to other people” (p.98).

This led the researchers to conclude that the use of virtual humans in clinical settings should be pursued because it provides the benefits of face-to-face interpersonal rapport without the trade-off of reduced self-disclosure due to fear of judgement. Additionally, they highlight the potential cost-saving and accessibility benefits if such a system is rolled out on a large scale.

However, this study has a many limitations. The sessions were one-offs and their duration was not reported. It is highly questionable whether these effects would be maintained over a longer intervention. Also, the test condition was not compared to a face-to-face interview with a real human. Instead, in the second condition the participants were told that an unseen person was watching them. The disparity in
willingness to disclose may be because these participants were uncomfortable in the unusual situation of being told that someone they haven’t met is watching them from another room, rather than being a sign that virtual agents increase self-disclosure.

The researchers also excluded over 80 participants who indicated that they did not believe what they had been told (that Ellie was or wasn’t being controlled respectively). It may be that these participants simply realised the illusion faster than the other clients, and were the assessment to continue for long enough, more participants would also challenge the test condition. Yet despite its limitations, this study is an interesting demonstration of the experimental edge of therapist-emulating technologies and indicates potential future developments that, as will be demonstrated later in this review, are perhaps closer than some may assume.

**Self-help and psychoeducation**

*Psychoeducational websites*

Another part of mental health practitioners’ role is to provide information and guidance to people concerned about their mental wellbeing. In a recent major survey over 50% of UK internet users reported regularly searching for health and wellbeing related information online (Office for National Statistics, 2017). Although there is limited data specifically on mental health searches it is hard to doubt that psychoeducational websites, rather than direct contact with a qualified practitioner, will be the most common first step for most people seeking psychological information. As ethical practitioners it is therefore important that we engage with and contribute to the content of online psychological advice.

A review of internet-based interventions suggests that non-interactive psychoeducational websites can be considered a form of ‘bibliotherapy’ (self-help therapy by reading) (Barak et al., 2008), but there are no systematic studies into the effect of using these websites on clients. Additionally, the application of technology to mental health is an unregulated marketplace and the quality of information can vary widely (Barak & Grohol, 2011). Despite this there remains a significant gap in the literature as to the effects of psychoeducational websites.
**The rationale for self-help interventions**

The self-help market has often been overlooked by psychologists and allied professionals. Yet evidence suggests that the general population is seeking psychological input via self-help, with the most common self-help books covering topics such as *personal growth, relationships, coping with stress* and *identity* (Bergsma, 2008). A meta-analysis of 14 randomised control trials (RCTs) of self-help bibliotherapies for moderately severe depression and anxiety found a large effect size ($d = 0.84$), leading the authors to conclude they were as effective as psychiatric treatment (den Boer, Wiersma, & van den Bosch, 2004). However almost all of the self-help interventions included some contact with a professional, meaning that the influence of self-help vs. face-to-face on outcomes cannot be distinguished.

Qualitative research has also suggested that clients choose self-help over face-to-face support due to cost, accessibility and privacy (Starker, 1989). This may mean that there are large numbers of people actively seeking effective non face-to-face therapeutic input. Counselling psychologists are well placed to design self-help interventions, researching how they work, and shed light on potential differences in effect and acceptability of self-help vs. face-to-face interventions.

**Computerised Cognitive Behavioural Therapy**

The majority of empirically researched computer mediated interventions fall into the category of computerised cognitive behavioural therapy (cCBT) (Hedman, Ljótsson, & Lindefors, 2012). CBT has become one of the most common psychotherapeutic approaches worldwide (Butler, Chapman, Forman, & Beck, 2006), but it is even more predominant online (Barak & Grohol, 2011). This has been attributed to common CBT methods being better suited to manualisation and automation than most forms of psychotherapy (Marks, Cavanagh & Gega, 2007); such as the use of psychoeducation, self-report measures, worksheets, and homework (Kazantzis, Deane, & Ronan, 2000). Computerised CBT programmes are as diverse as face-to-face CBT approaches (Marks et al., 2007), but they are linked by the computer assuming a significant proportion of the tasks of a cognitive-behavioural intervention that would usually be conducted by a therapist.
Meta-analyses have concluded that cCBT can be effective in the treatment of both anxiety and depression (Christensen, Batterham & Calear, 2014; Mewton & Andrews, 2015; Reger & Gahm, 2009), with some finding that cCBT is as effective as conventional CBT (Andrews, Cuijpers, Craske, McEvoy & Titov, 2010). However, the conclusions of these meta-analyses may be limited by their inclusion criteria, since they compare outcomes of cCBT and conventional CBT across different published studies, rather than looking at results when cCBT is compared with conventional CBT within the same trial.

A recent meta-analysis by Andersson, Topooco, Havik and Nordgreen (2016) tried to address this research design flaw. When only including studies in which face-to-face CBT for depression was directly compared with cCBT, their analysis found a small effect size (Hedges’s $g = .12$) and concluded that there was no clinically significant difference in outcomes between the two interventions, with cCBT actually producing marginally better results on average. The equivalent outcomes of the two types of is perhaps the most convincing evidence to date that cCBT is effective enough to play a significant role in mental healthcare provision going forward. However, this review remains limited by the fact that most cCBT interventions still included some guidance, and only five studies, totalling 429 participants, met the criteria for inclusion. This sample size increases the scope for publication bias, researcher bias or statistical errors. It is also of note that that the majority of the research that supporting cCBT, including this meta-analysis, comes from a relatively small community of advocates and developers of the approach.

When looking at larger reviews conducted by more impartial researchers, the claim that the two forms of therapy produce equivalent outcomes is questioned. The largest systematic review of cCBT for anxiety to-date was conducted by the highly respected Cochrane organisation (Mayo-Wilson & Montgomery, 2013). The researchers found evidence of medium effects compared to no intervention (standardised mean difference (SMD) = 0.67; 95% CI = 0.55, 0.88; 72 studies, 4537 participants) but small effects favoured face-to-face therapy (SMD = -0.23; 95% CI = -0.36, -0.09; 24 studies, 1360 participants). The authors conclude that face-to-face CBT is probably clinically superior, but the current evidence is only of low to moderate quality. IT is
also of note that these findings only apply to short-term interventions, there is no evidence yet regarding potential harm, and while there are initial indications that clinician support improves outcomes the trials are too heterogeneous to make any firm conclusions regarding this issue.

The issue of supplementary human contact in self-help cCBT

On top of the question of effectiveness cCBT may also have a problem with adherence rates. A systematic review of 36 studies found that substantially more participants drop out of cCBT in comparison to traditional CBT (odds ratio 2.03, 95% CI = 0.81, 5.09) with a mean average dropout rate of 44% (Waller & Gilbody, 2009). The problem of acceptability to clients may actually be significantly larger than this since these figures do not include the substantial number of participants who drop out before even commencing the intervention. The authors suggest that the lack of human interaction in many of the trials may explain this disparity. However, the generalisability of this is limited since there may be multiple other differences between the CBT vs. cCBT trials that could contribute to this finding. For example, cCBT does not have the widespread recognition that CBT has as a reputable intervention, so participants may drop out due to cultural preconceptions about cCBT, rather than because of a fundamental problem with the approach that couldn’t be addressed by changing preconceptions.

Another review by Christensen, Griffiths and Farrer (2009) concluded that on average dropout rates were not significantly different between cCBT and CBT under trial conditions. However, their review did not try to separate out whether the quantity or quality of supplementary human contact within a cCBT intervention was a factor in dropout rates. A recent review of over 100 controlled trials concluded that interventions with some level of human support show improved adherence rates (Andersson, 2016). Unfortunately, this review does not attempt to quantify the difference human contact makes.

Mohr et al. (2013) attempted to measure whether non-specifically therapeutic human support might make a difference to adherence or outcomes. They conducted an RCT of cCBT for depression in which participants received either cCBT with no
supplementary contact; cCBT plus *supportive contact*; or treatment as usual. The human contact consisted of a 30 minute phone call at the start of the intervention “to establish a bond, convey benevolence and expertise, and discuss treatment expectations” (p. 3) followed by 5-10 minute weekly calls to provide encouragement. Participants could also email questions to their coach during the week, but all interactions followed a set protocol and participants were not given any advice beyond being redirected to the cCBT program (outlined in Mohr et al., 2010). They found that while the addition of coaching increased adherence this was not reflected in any difference in depressive symptoms between the cCBT groups as measured by one of the most widely used depression psychometrics. The null result regarding outcomes may be because this was a pilot study with only 35 participants in each of the three conditions, meaning the analysis was underpowered. But this study is initial evidence that human contact may add some relational factors that at least improve adherence.

Other RCTs have compared cCBT with and without telephone support and found no statistically significant effects on either adherence or outcomes. (Berger, Hämerli, Gubser, Andersson, & Caspar, 2011; Farrer, Christensen, Griffiths, & Mackinnon (2011). However when more data is included in the analysis the evidence that human interaction has positive effects on therapy becomes clearer.

Spek, Cuijpers, Nykliček, Riper, Keyzer and Pop (2007) analysed 11 RCTs and found that that trials with some human support produced large mean effect sizes, while those without support produced small mean effect sizes. A follow-up analysis of 12 RCTs testing cCBT for depression, totalling 2446 participants, also found that outcomes were significantly better for supported cCBT ($d= 0.61; 95\% \text{ CI} = 0.45, 0.77$) vs unsupported cCBT ($d= 0.25; 95\% \text{ CI} = 0.14, 0.35$) (Andersson & Cuijpers, 2009). The divergence in results between the RCTs and the meta-analyses may be understood in opposing ways. The majority of studies examined by the meta-analyses did not compare human interaction vs no human interaction conditions within the same trial, instead the conclusion that human interaction is beneficial is primarily drawn from comparing trials with human contact and separate trials without human contact. This attempt to statistically compare heterogeneous trials could be contributing to false positive correlations. On the other hand, it may be that human interaction does indeed
help and the reason it was not uncovered by the RCTs mentioned above is because each study is relatively small, which is known to increase the likelihood of researcher bias and publication bias, as well as result in statistical analysis without sufficient power (Ioannidis, 2005).

Despite some continued debate about the size of the effect, one of the most consistent findings to-date is that some amount of supplementary human-to-human contact does improve outcomes. Furthermore, several research teams have suggested that the quantity of supplementary contact with a mental health professional may be one of the most consistent indicators of positive outcomes in cCBT (Helgadóttir, Menzies, Onslow, Packman, & O'Brien, 2009; Palmqvist, Carlbring & Andersson, 2007; Richards & Richardson, 2012). In line with this widely held opinion most of the trials included in major the meta-analyses tend to supplement the self-help elements of cCBT with around 2-3 of supplementary face-to-face contact with a professional.

Other reviews indicate that while fully automated self-help interventions are effective for more motivated clients, and those with milder depression and anxiety symptomatology, supplementary human contact appears to increase adherence and outcomes for more complex presentations (Newman, Szkodny, Llera, & Przeworski, 2011a). Similar patterns can also be found in cCBT for drug, alcohol and smoking interventions (Newman, Szkodny, Llera, & Przeworski, 2011b), as well as for insomnia (Ho et al., 2015).

In summary, although there remain some contradictory findings within the research literature, there is growing evidence that self-help cCBT is an effective intervention for a wide variety of problems but that adherence and outcomes are both improved by some level of supplementary human contact. A proposed reason for these differences is that there are important relational factors at play in human-to-human interaction that are not present in pure computerised self-help (Ly, Ly, & Andersson, 2017). This is congruent with long-standing evidence that there are common factors within the therapeutic relationship that play an important role in therapy regardless of modality (Wampold & Imel, 2015).
However, one of the driving forces behind the development of cCBT systems is that they reduce the amount of therapist interaction with each client, thereby reducing cost (Nordgren et al., 2014; Hedman, Ljotsson & Lindefors, 2012). Some developers have attempted to harness the positive effects of human contact without the increased cost of real humans by drawing on the virtual agent principles described previously with Eliza and Ellie. Virtual characters with the ability to interact with clients have been developed for a variety of uses. Advances in natural language processing and machine learning have been combined to develop what has been called conversational artificial intelligence (Miner, Milstein, & Hancock, 2017), and which builds on observations dating back to the 1990’s that people can be encouraged to respond to virtual agents as though they were human (Reeves & Nass, 1996). With the growth in cCBT these virtual and conversational agents are now being empirically researched in earnest.

**Recent developments in therapist-emulating computer technologies**

**Therapeutic chatbots**

The same basic technology that lay behind Eliza is described as a *chatbot* or *bot*. Communication happens through text and primarily consists of a set of stock phrases selected by an algorithm depending on user input. But increasingly natural language processing is being applied to allow more complex responses (Ghose & Barua, 2013). Bots can blend this with multiple choice questions, multimedia and links to other online resources. They also tend to adopt a friendly conversational style to engage with users.

The most significant recent event in this field occurred in 2015 when the *Facebook Messenger* service was opened up to developers, and a new wave of mental health chatbots emerged. Some market themselves as ways to “feel calm in stressful moments” and “forget expensive therapy” (pogorapp.com), or “feel less anxious” because “therapy is expensive” (littleshift.co). These apps claim to be “backed by science” (pogorapp.com) because they use the principles of CBT, but they have not undergone empirical testing and the credentials of their creators to advise on mental health are unclear. Other chatbots, however, are more sophisticated.
Joy uses upbeat and amiable language to complete daily check-ins with users, including Likert scale psychometrics as well as open questions about their day. Based on this the developers claim that, “Joy can interpret your emotions” and offer “tips on how to reduce your anxiety” (hellojoy.ai). For a fee, therapists can sign clients up and Joy will “generate a weekly report” giving the opportunity to “gain insights into your patients’ mood patterns in between appointments”. Users can also pay for online sessions with one of Joy’s network of “coaches”. Again, there is minimal transparency around the details of these interventions, but their website suggests that coaches are masters-level psychology graduates who would give advice via Facebook Messenger. This is an ambitious blend of services which is indicative of the future development of such applications. However, again this exists in an entirely unregulated frontier of mental health support and users have none of the assurances that cover regulated mental health professionals. This should concern all those who believe in the importance of the regulation and accreditation of mental health professionals in order to protect clients. And chatbots are not merely niche curiosities – some have undergone empirical research and peer review.

**Empirical research into therapist-emulating chatbots**

Shim is a standalone mobile phone app (helloshim.com). Designed to promote mental health in non-clinical populations, Shim uses a “warm” and “supportive” conversational style to encourage users to complete positive psychology techniques such as “expressing gratitude, engaging in enjoyable activities and replaying positive experiences” and third wave CBT strategies including “present moment awareness” (Ly, Ly & Andersson, 2017). 28 participants, mainly university students, were randomised to receive access to Shim for two weeks or a placed in a wait-list control group. Outcomes were measured using The Flourishing Scale (FS), The Satisfaction With Life Scale (SWLS), and The Perceived Stress Scale (PSS-10). A mixed effect models analysis (similar to an ANOVA) showed that Shim produced a significant improvement on PSS-10 scores: \(F_{1,27} = 4.30, \ p = 0.048\) with a large between-group effect size \(d = 1.06\). However, this result was only significant when the sample was limited to those who were moderately adherent (using Shim at least one in four days). All other results showed no statistically noteworthy effects.
This was a small pilot study, and it is not clear whether RCT procedures adhered to best practice guidelines (e.g. Schulz, Altman & Moher, 2010), so no conclusions should be drawn as to the efficacy of the intervention. However, in an emerging field of computerised interventions this provides an interesting example of chatbots moving into evidence-based practice, as well as one of the few examples of an intervention aimed at a non-clinical population and the application of an approach other than pure CBT. Given the small sample size the quantitative results are of limited importance, however when considering the relationship between user and chatbot the qualitative results the researchers collected are interesting.

In the study, semi-structured telephone interviews lasting up to 30 minutes were conducted with questions asking participants about both positive and negative experiences of the intervention. The themes identified by the researchers cover issues of Content, Functionalities, and Medium of the intervention, but interestingly users also spontaneously discussed their experience of Shim using relational concepts. When discussing times where Shim’s limitations became apparent, participants complained that:

“A real person would not ask the exact same question about all my friends”.
“Shim could talk to me about stuff on the surface, but not really deepen the relationship. At that point, I felt Shim couldn’t take any more steps in our relationship”

And:
“When I talked to Shim about my grandparents, Shim didn’t ask and understand they had passed away. I felt disappointed when this happened, and felt that this relationship will have boundaries, it won't get too deep”.

The researchers suggest that these statements “have an underlining tone of Shim being perceived as a living character”, at least initially. Like Eliza, the illusion of communicating with a conscious agent seems to have been superficial, transitory, and could be disrupted by the limitations of the program once conversations became complex.

An extremely similar study was conducted by Fitzpatrick, Darcy and Vierhile (2017). They recruited a convenience sample of 70 students from Stanford University who
self-identified as experiencing anxiety or depression. Half were randomly allocated to receive access to Woebot, an intervention consisting of daily check-ins, self-ratings, and CBT-based guidance delivered in a conversational style through Facebook Messenger. The other half received the control condition – a link to an e-booklet with evidence-based self-help tips for college students with depression, similar to the information offered by Woebot (nimh.nih.gov/health/publications/depression-and-college-students). Participants completed the Patient Health Questionnaire (PHQ-9) depression scale, the Generalized Anxiety Disorder scale (GAD-7), as well as a positive and negative affect measure at baseline and two weeks later. At baseline, 46% of the sample was in the moderately-severe or severe range as measured by the PHQ-9 and 74% were in the severe range of the GAD-7.

Univariate ANCOVA analysis showed that the PHQ-9 scores of the Woebot group significantly reduced in comparison with controls ($F_{1,48}=6.03; P=.017$), with a moderate between-groups effect size ($d=0.44$). No significant differences were observed for anxiety or affect. As with the research into Shim, this pilot study does not meet the sample size or methodological rigour required to draw a meaningful conclusion about the usefulness of this particular intervention or the use of chatbots in mental health. However, both studies suggest that with more empirical research, chatbots could potentially reach the level of outcomes needed to form an accepted part of a stepped care approach to mental wellbeing services.

Again, the Woebot study complemented the quantitative results by collecting qualitative data. Participants were sent questions via Facebook Messenger asking them for the best and worst things about their experience of Woebot, as well as whether they had any other comments. A frequency-driven thematic analysis resulted in two superordinate themes, “process” and “content” but, as with Shim, multiple users described their experience of Woebot in relationally framed ways. For example:

“I love Woebot so much. I hope we can be friends forever. I actually feel super good and happy when I see that it ‘remembered’ to check in with me!”

And:

“Woebot is a fun little dude and I hope he continues improving.”
Fitzpatrick et al. (2017) state that “The number of participants reporting that the bot felt empathic is noteworthy, and comments that referred to the bot as “he”, “a friend”, and a “fun little dude” suggest that the perceived source of empathy was Woebot rather than the bot’s developers.” They propose that this “therapeutic relationship” element be studied further, including being measured using tools such as the Working Alliance Inventory (Horvath & Greenberg, 1989).

It is interesting to observe the confluence of different approaches: a measure of the therapeutic relationship that was created by two distinguished counselling psychologists, Adam Horvath and Les Greenberg, is now being proposed as a meaningful measure to apply to the interaction between a client and an inanimate algorithm (Fitzpatrick et al., 2017).

In line with counselling psychology’s principle of considering the entire context within which a phenomenon sits, it is important to not only refer to published academic literature, but to take in other information relevant for practitioners who want to develop an informed opinion on this development. A sense of how Woebot is being positioned in the mental wellbeing market comes from the organisation’s website, which leads with this message ‘from’ Woebot: “I'm ready to listen, 24/7. No couches, no meds, no childhood stuff. Just strategies to improve your mood” (woebot.io). Clearly the team¹ behind Woebot see their system as a viable alternative to the therapeutic interventions currently available, and staff have reported that after being online for one week Woebot reached 50,000 daily active users.

Although privacy has been suggested as one of the reasons why clients might choose a computerised intervention over face-to-face therapy (Midkiff & Wyatt, 2008), the security of chatbots is unclear. Facebook messenger is an end-to-end encrypted messaging service, so offers high privacy for communication between two individuals. However, users are not communicating with someone they know. Anything users type to a Facebook Messenger chatbot is visible to the administrator of the software at the other end (as described in the Woebot study). This is certainly not made clear to users

¹ According to their website, this is currently eight employees including two psychologists with eight further posts being recruited.
who may be divulging personal details attached to Facebook profiles that give their names, locations and any number of other identifying details. The potential for private information to be unwittingly shared or for outright dangerous abuse is huge given that there are no restrictions on who can create such bots. In terms of accountability, there are also ethical grey areas. None of the chatbots mentioned above give users a formal contract or ask for informed consent. The extent of their ethical policies seems typically to be to state that use of their chatbot is not the same as therapy and if users have any serious concerns about their wellbeing they should see a mental health professional. In comparison to the responsibilities of professionals such as counselling psychologists, this unregulated approach seems highly ethically questionable.

These examples of therapeutic CBT chatbots demonstrate a number of features that show the potential of chatbots to supplement, or in some circumstances supplant, portions of the traditional therapist’s role in novel and relational ways. However, the relevance of these two examples is limited by the fact that they are not yet supported by a significant research base. The following example of a therapist-emulating cCBT program uses a different approach, takes the application of a virtual agent to a new depth and is supported by a significant research base. It will therefore form the focus of the rest of this review and will provide the subject for a research question to be attended to in a subsequent empirical study.

**Sleepio**

*Introduction to Sleepio and The Prof*

Sleepio is an unguided self-help cCBT program for insomnia. It represents a novel application of therapist-emulating technology because the entire course content is delivered by an interactive on-screen animated character called The Prof. The creators of The Prof have described him as a *virtual therapist* in published research (Bostock et al., 2016; Espie, Kyle, Miller, Ong, Hames, & Fleming, 2014; Espie et al., 2012) and The Prof has also been described using this term by independent researchers (Voinescu, Szentagotai, & David, 2013).

Because insomnia is not one of the traditional focuses of psychological therapy, before I go on to assessing the relevance of The Prof as a virtual therapist I will
demonstrate why a sleep disorder intervention is relevant to counselling psychologists and all practitioners.

**CBT for insomnia**

Although insomnia may not commonly be considered a typical mental-health condition, diagnostic manuals do categorise it as a primary disorder (American Psychiatric Association, 2013). Prolonged sleep disturbance has been shown to have a causal effect on anxiety and depression (Alvaro, Roberts, & Harris, 2013; Baglioni et al., 2011), psychotic experiences (Reeve, Sheaves, & Freeman, 2015), aggression (Kamphuis, Meerlo, Koolhaas, & Lancel, 2012), and even suicidality (Pigeon, Pinquart, & Conner, 2012). Insomnia is also correlated with reductions in quality of life, relationship satisfaction, productivity, physical health and life expectancy (Buysse, 2014; Kyle, Morgan, & Espie, 2010).

Insomnia is also very common (National Collaborating Centre for Mental Health, 2011), with chronic clinical insomnia estimated to affect around 10% of the population (Ohayon, 2002) and around a third of adults reporting insomnia at any one time (Roth & Roehrs, 2003). Despite this it remains an under-recognised and under-treated mental wellbeing issue (Falloon, Arroll, Elley, & Fernando, 2011).

CBT for insomnia (CBT-i) has a very thorough and well established evidence base as the most effective therapeutic modality for the treatment of sleep disturbance (for a comprehensive review see Morin, Bootzin, Buysse, Edinger, Espie, & Lichstein, 2006), and when applied as a cCBT intervention is as effective as cCBT for other common mental wellbeing problems (Cheng & Dizon, 2012; Ström, Pettersson, & Andersson, 2004; Vincent & Lewycky, 2009). CBT is a very diverse model of psychotherapy (Westbrook, Kennerley, & Kirk, 2007) but CBT-i follows an established set of procedures (Harvey & Tang, 2003) and can be regarded as characteristic of the more manualised end of the CBT spectrum (Voinescu et al., 2013).
**Sleepio’s format and efficacy**

Sleepio is an unguided cCBT program in which the user is guided through all stages of the intervention by an on-screen animated character called *The Prof*. The core content consists of six twenty-minute sessions, which are made available to the user weekly. The Prof greets users in a highly personalised and conversational manner at the start of each session. He collects their sleep diary data and, according to an algorithm, then provides feedback and responses based on the user’s progress. The sessions are media-rich, featuring animations and opportunities for interactivity and personalisation of course content, all delivered by The Prof. Users can also choose to receive automated text message and email reminders, access a back-catalogue of session content, read a library of relevant ‘Wikipedia-style’ psychoeducation articles, and access the website’s moderated community forum. Treatment is based on manualised CBT-i and includes behavioural techniques (sleep restriction, stimulus desensitisation, progressive relaxation); cognitive techniques (cognitive restructuring, paradoxical thinking, positive imagery, putting the day to rest, mindfulness); as well as psychoeducation and sleep hygiene information.

Sleepio’s efficacy is supported by the first randomised, placebo-controlled trial for cCBT-i (Espie et al., 2012). 164 participants were randomly assigned to one of three conditions: the standard Sleepio course; a convincing placebo condition also presented by The Prof (a series of guided imagery practices that do not have any evidence as being effective in improving sleep); or ‘treatment as usual’. Participants kept a sleep diary and changes were measured based on *sleep efficiency* (total time asleep expressed as a percentage of the total time in bed). Results showed that Sleepio is highly effective in the treatment of sleep disturbance, leading to a 20% improvement in mean sleep efficiency at post-treatment (from 60% to 80%) relative to both treatment as usual (+6%; d = 0.95) and the control condition (+6%; d = 1.06), and changes were sustained after eight weeks.

From their report this study appears to have been rigorously designed and meets high RCT procedural standards (Schulz et al., 2010). Sleepio can reasonably claim to be one of the most effective cCBT programs widely available at the moment. However,
there is no attempt to separate out the effects of the virtual therapist on outcomes, or to describe in detail his role or what principles have been applied in his design.

**Sleepio’s wider relevance**

Although Sleepio is focused on insomnia, its makers are working on applying it to a range of psychological wellbeing issues (Wired UK, 2014). Pilot trials suggest that Sleepio reduces anxiety (Pillai et al., 2015), depression (Bostock, 2015;), and workplace absence (Bostock et al., 2016). A trial by Luik et al., (2017) provided access to Sleepio to 98 clients from an NHS Improving access to Psychological Therapies (IAPT) service. Results showed that when assessed using standardised IAPT outcome measures, Sleepio achieved the equivalent of a 65% IAPT recovery rate for anxiety and depression. This lends weight to the evidence that Sleepio is a significant intervention with potential to become more widely available in the future. However, in this trial clients received weekly supportive phone calls from a member of the research team to support their CBT progress. Therefore, this shows Sleepio’s effectiveness as a therapy supporting intervention but does not give any information on the significance of the role of the virtual therapist within the experience.

The most significant evidence of Sleepio’s importance as a mental health intervention is that it was the intervention applied in “the largest randomised controlled trial to date of a psychological treatment” (Freeman et al., 2017, p.750). 3755 students across 26 UK universities with insomnia were randomly assigned Sleepio or left without any intervention. Using a linear mixed effects model adjusted for gender and the student’s status within the university, among other factors, results showed that at 10 weeks, Sleepio produced large effect sizes in the reduction of insomnia (adjusted difference = 4.78; 95% CI = 4.29, 5.26, d = 1.11; p<0.0001), and that this change was a mediator for associated reduction in paranoia (adjusted difference = -2.22; 95% CI = -2.98, -1.45; Cohen's d = 0.19; p<0.0001), and hallucinations (adjusted difference = -1.58, -1.98, 1.18; Cohen's d= 0.24; p<0.0001). There were also moderate effect sizes for measures of depression, anxiety, mania, functioning and wellbeing.

Because of the enormous sample size these results reach an extremely high level of statistical significance, suggesting that Sleepio is consistently effective at reducing
insomnia, and this appears to have knock on benefits for wider mental wellbeing. Importantly, in this trial users did not receive any additional human support. Limitations include the fact that the participants were all UK university students, who are not necessarily indicative of other populations, not least in terms of sleep styles and openness to technology. Outcomes were also based on self-reports, which are often unreliable, and half of all participants dropped out. Despite these flaws this study marks a significant milestone in the expansion of Sleepio, of self-help cCBT, and of virtual therapists.

Sleepio’s relevance to the current mental health landscape is further demonstrated by its inclusion on the NHS Choices website, where it is described as being useful for “depression or anxiety” (Sleepio, 2015). It is also currently available on prescription from IAPT services in Manchester, Bolton, Camden and Islington (Bostock, 2015), and is offered by BUPA health insurance and Boots pharmacy. Despite the abundance of high-quality quantitative research, there remains no detailed exploration of what the virtual therapist does, its relevance to outcomes, or upon what principles it has been designed. Because of this significant gap in the Sleepio research it is necessary to look for evidence from other sources. These sources provide strong evidence that that the creators of Sleepio have deliberately tried to employ relational features into The Prof’s design in order to emulate the therapeutic relationship, and supports the case that their application of a virtual therapist is an interesting development worthy of further academic investigation

**The Prof as a therapist-emulating technology**

The co-founder and CEO of Sleepio, Peter Hanes, has publicly commented on the relational qualities that The Prof aims to capture. In an interview with The New Yorker, Hanes is quoted as saying that the Scottish actor who voices The Prof was chosen because his voice “combined authority with approachability, but yet with a sort of a no-nonsense streak that can nudge you towards doing a bit better”, and that “in face-to-face therapy … there’s some kind of dark-matter effect that people really like, and that has a really positive effect on outcomes” (Halperin, 2014).
Similarly, Sleepio’s US patent states that The Prof completes actions that replicate the tasks of a CBT therapist, such as presenting the user with a therapeutic contract “designed to establish a relationship between the sleep improvement system and the user” (Hames & Espie, 2014, U.S. Patent No. 20,140,222,720, p.8). Furthermore, the graphic designer who animated Sleepio notes that The Prof was intended to convey relational qualities, such as being “authoritative, approachable and reassuring” (Simpson, n.d.).

Conference presentations by Peter Hanes also point directly to their intention to emulate the therapeutic relationship:

[The] attempt to mimic the bits that work from … face-to-face therapy is a really, really core hypothesis in what we’re doing, which is that if we can humanise the experience, so even borrow 20% of what people really like about face-to-face interaction … then there’s potentially huge rewards. (Wired UK, 2014).

[The] human element that we’re trying to synthesise is a big part of our hypothesis as to how we can capture that active element … [from] face-to-face therapy in an automated and therefore scalable way. (Startupfood, 2015).

Despite this evidence that the use of a virtual therapist designed to replicate relational features is central to the design of one of the most widely used eCBT interventions, The Prof has not been directly researched at all. This represents a gap in the literature, where this review and subsequent studies can contribute original and important knowledge.

**Plan for future study**

The aim of research in this area is to address the fact that there is currently no understanding of the most prominent existing example of a ‘virtual therapist’. However, this lack of research means that there is not one obvious way to approach the development of knowledge regarding The Prof.
Previous research has hypothesised that cCBT could be assessed in terms of the therapeutic relationship and the extent to which it conveys features such as attention, positive regard, empathy, communication of hope, motivational techniques and alliance (Ormrod, Kennedy, Scott, & Cavanagh, 2010; Peck, 2010). A strategy to apply this principle comes from two previous studies. Richardson, Richards and Barkham (2010) and Barazzzone, Cavanagh and Richards (2012) qualitatively analysed self-help CBT books and cCBT programs to see whether they can be usefully conceptualised as replicating aspects of the therapeutic relationship. These studies began by taking a broad conceptual map that attempts to summarise all major conceptualisations of the therapeutic relationship (Cahill et al. 2008). This provided a framework model of the therapeutic relationship, which was then compared to self-help CBT using Framework Analysis (Ritchie & Spencer, 1994). The studies concluded that each example of self-help CBT they analysed had been designed to convey features that could be conceptualised as trying to engender a therapeutic relationship between the user and the authors or with the intervention in and of itself.

The study that will emerge from this literature review will apply the same approach, which should be even more applicable to Sleepio since the addition of a virtual therapist may well provide more overt opportunity for relational emulation within the intervention. The rationale behind this research approach will be further clarified in the methodology of the study.

**The nature of the therapeutic relationship**

As this literature review has progressed the focus of enquiry has gradually moved from examples of technology that emulate not only the tasks of therapy but the therapeutic relationship. A theoretical issue is how we define the therapeutic relationship.

There is well-established evidence that the quality of the therapeutic relationship is one of the most important factors that determines adherence and outcomes across therapeutic models (Cooper, 2008; Hubble, Duncan, & Miller, 1999). However what different therapeutic schools of thought consider as constituent parts of the therapeutic relationship varies. Person centred therapy places congruence, unconditional positive
regard and empathy at the centre of a productive therapeutic relationship (Rogers, 1957), while psychoanalytic schools typically emphasise transferential processes (Gelso & Carter, 1994).

CBT has typically paid more attention to the working alliance, which can be understood as the degree of alignment regarding tasks, goals and interpersonal bond. Since Sleepio is a CBT intervention it is reasonable to assume that it might prioritise emulation of these same components of the therapeutic relationship. But the cognitive approach does not, in fact, view the therapeutic relationship using any one specific model (Beck, 2011). Therefore narrowly focussing on the alliance alone, as was done in the studies upon which the proposed research is based, is not justified. More integrative models (e.g. Clarkson, 2003) tend to involve a high degree of abstraction and grouping. This makes them interesting models for theoretical debate, but less useful when looking to identify specific factors in a structured qualitative research project such as the one being proposed. Since the behaviour of The Prof has never been fully described it makes sense to take as broad a definition as possible (e.g. Cahill et al., 2008). This will allow me to cast a wide net and not unnecessarily constrain my results.

The wider technological relationship
The medium through which computerised therapies are delivered means that the user’s relationship to computer technology plays a role in their experience of virtual therapists. Phenomenological philosophers Rosenberger and Verbeek (2015) have written on human-technology interactions. They suggest that there is an underlying assumption amongst those who are evangelical about computer technology that the in-person relationship can be fully simulated by the virtual relationship. They argue that this is mistaken, since it is based on a false Cartesian-dualist notions that our online existence can be divorced from our embodied physical reality. A philosophical critique of Sleepio could be that the developers make this same mistake when they promote Sleepio in place of face-to-face therapy, implying equivalency in all the ways that matter. Also, since users can only interact with The Prof via a series of multiple choice options this further implies a reductionist approach to the therapeutic relationship.
Turkle (2011) takes up a similar idea, that modern trends to engage in online relationships as a substitute for in-person and embodied relationships are causing young people to lose the ability to communicate face-to-face. She argues that the generation of *digital natives* is desperately in need of human, embodied and relational psychotherapeutic support to counteract the effects of living life online. If this is the case, then the expansion of virtual therapists might prove to be a popular choice among clients, but could contribute to unintended negative side effects by further reducing opportunities for human relationships. However, counselling psychology advocates engaging with clients in ways that are culturally appropriate, and for many people their online cultural groups, identities and relationships are experienced as being as important as their ‘real world’ ones (Kirmayer, Raikhel, & Rahimi, 2013). Psychological support via a virtual therapist may be an appropriate and ethical therapeutic option for a subgroup of clients who would not feel comfortable engaging in a human-to-human relationship and would otherwise be neglected. Initial evidence suggests that younger age is a positive predictor of benefit from eCBT (Luik, et al., 2017) but may only account for 2.2% of outcome variance. The effect of age on acceptability of virtual therapists and the nature of the relationship experienced towards them remains a gap in the literature and should be a topic for future research.

**Relevance to counselling psychology and therapy practitioners**

One of the most obvious concerns about the growth of therapist-emulating technology is whether human therapists might gradually be replaced by computer programs (Barrett & Gershkovich, 2014). This literature review demonstrates that despite some advances in attempts to emulate the therapeutic relationship, most programs still offer only a very limited emulation of a real human therapeutic relationship. The more relevant issue is that computer-assisted therapies and automated self-help programs are becoming an established part of stepped-care approaches to psychological treatment (Amichai-Hamburger et al., 2014), meaning that counselling psychologists and allied professions need to have a good understanding of such technologies before we can ethically recommend them.
Most applications of technology supplement human-to-human therapy while keeping the human therapeutic relationship at the centre of treatment. However, in both public and private mental health provision there are a growing number of examples where the necessity of the human therapist is being questioned (Fitzpatrick et al., 2017; Luik et al., 2017; Ly et al., 2017). It is this unique, emerging application of virtual therapists to large scale interventions that the proposed empirical studies will seek to investigate and contribute useful new information.

The limited information available suggests that virtual therapists may well simulate or stimulate aspects of the therapeutic relationship. This includes social skills such as active listening and the appropriate use of gestures, and there is some evidence that these features can engender feelings of rapport and emotional resonance in users (Gratch, Kang, & Wang, 2013). Emerging evidence also suggests that entirely text-based conversational agents seem able to enhance the client experience of automated mental-health interventions by tapping into relational responses (Fitzpatrick et al., 2017; Ly et al., 2017). Counselling psychology has its philosophical roots in the existential-phenomenological tradition (Langdridge, 2013) and sees humans as inherently inter-relational beings (Gergen, 2009; Gorner, 2007; Spinelli, 2014). The reparative power of human relationship is therefore seen as central to our praxis (Strawbridge & Woolfe, 2010; Woolfe, 1990) and there is therefore strong emphasis on working at relational depth in counselling psychology training programmes and literature (Mearns & Cooper, 2005, Laughton-Brown, 2010). Further research from a counselling psychology perspective is clearly needed so that individual practitioners can make an informed decision on whether these are helpful applications of relational theories, or conversely, are unhelpful oversimplifications of a ‘real’ therapeutic relationship.

Our profession also aims to be pluralistic, and generally supports the principle that diverse approaches can lead to improved psychological wellbeing. However, trainee counselling psychology research received criticism for being inward-looking and failing to create knowledge relevant to real-world therapeutic applications (Kasket & Gil-Rodriguez, 2011). This research endeavour represents an opportunity for
counselling psychology to engage with an emerging intervention that is growing in popularity from a distinctly relational perspective.

Finally, complex legal and ethical issues surround the use of therapist-emulating technology and increased awareness of these developments are needed within the mental health professions (Evans 2008; Ivey, D'Andrea & Ivey, 2011; Koocher, 2007). Despite evidence of effectiveness and acceptability among clients, initial evidence suggests therapists may hold a bias against computerised therapies (Rees & Stone, 2005; Waller & Gilbody, 2009). Greater awareness of computerised therapies is needed within the therapeutic community to determine whether this bias is justified or unjustified. This literature review, and the subsequent empirical studies that stem from it, will enhance the debate by raising the profile of therapist-emulating technologies and by allowing therapists to better assess their relative advantages and disadvantages.
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Template analysis of an automated ‘virtual therapist’ within a computerised CBT program: Are elements of the therapeutic relationship present?

**Aims:** Self-help computerised therapies may make effective treatments available to more people at lower cost because they do not require human therapists. However, research suggests that supplementary contact with a therapist can significantly improve adherence and outcomes. Some developers have attempted to address this by designing ‘virtual therapists’ to guide users through the intervention. To date there has been minimal research into whether ‘virtual therapists’ are designed to emulate aspects of the therapeutic relationship. This study addresses this gap by analysing Sleepio, a prominent computerised Cognitive Behavioural Therapy for insomnia (cCBT-i) delivered by a fully-automated interactive virtual therapist called The Prof.

**Methodology:** The Prof’s script and actions during the Sleepio course were recorded and transcribed. A Template Analysis (TA) was conducted, in which a comprehensive and pan-theoretical model of the therapeutic relationship was compared against the data to see whether elements of the therapeutic relationship could be seen in the design of the virtual therapist.

**Findings:** Analysis indicated that The Prof is designed to emulate the therapeutic relationship in a variety of ways. Superordinate themes covered: the role of the therapist; the role of the user; establishing and developing the relationship; maintaining the relationship; and context. Novel features that draw on the interactive capabilities of a virtual therapist algorithm include: personalised communications; interpersonal responsiveness; and expressions of empathy. Limitations and counter-evidence are also noted.

**Conclusions:** As an example of a virtual therapist, The Prof demonstrates that technology is being used in novel ways to emulate aspects of the therapeutic relationship. Strengths and limitations of the method used in this study are discussed and recommendations for future research are made. Issues regarding how the
**therapeutic relationship is defined, and the relevance to therapeutic practice are raised.**

**Keywords:** Computerised CBT; Sleepio; The Prof; virtual therapist; therapeutic relationship.

### Introduction

**The psychotherapy treatment gap**

Research suggests that the need for psychotherapeutic interventions is significantly greater than their availability (Andrews, Cuijpers, Craske, McEvoy, & Titov, 2010; Mind, 2013; World Health Organization, 2013). Cognitive behavioural therapy (CBT) has been promoted as one way to meet this treatment gap because it can be delivered in a time-limited format, requires less therapist training than some other approaches (Shafran et al., 2009) and is supported by a large evidence base demonstrating effectiveness for a range of issues (Hofmann, Asnaani, Vonk, Sawyer & Fang, 2012). Yet face-to-face CBT can still be prohibitively expensive, difficult to access and demand far outstrips supply (Shafran et al., 2009).

Self-help CBT has been suggested as a further step towards expanding psychological provision due to its being even more cost-effective and easy to distribute that traditional CBT (Dobson, 2003; Williams & Martinez, 2008). Self-help CBT has also been recommended by the National Institute for Health and Care Excellence (NICE) for common mental health disorders (NICE, 2009, 2011). Computerised Cognitive Behavioural Therapy (cCBT) has been offered by the NHS for over a decade (NICE, 2002), and the Chief Medical Officer for England recently called for a significant increase in the use of computer technology “to transform mental-health service delivery … by making effective interventions available to more people” (Hollis et al., 2013, p. 74).

**cCBT**

CBT is the predominant model used in computerised self-help (Barak & Grohol, 2011; Cavanagh, 2010a; Hedman, Ljótsson, & Lindefors, 2012). This is partly a mirroring of the prevalence of CBT in contemporary mental-health, but can also be
attributed to CBT’s manualised aspects being seen as suited to automated delivery (Marks, Cavanagh, & Gega, 2007), as well as the emphasis on the client taking an active role in planning and carrying out cognitive and behavioural exercises (Waller, 2009).

cCBT typically consists of a structured program of psychoeducation and techniques, delivered through an automated computer interface rather than face-to-face with a therapist (Williams & Martinez, 2008). Reviews and meta-analyses provide consistent evidence that cCBT can be effective for a variety of conditions, including anxiety, depression, insomnia and eating disorders (Cheng & Dizon, 2012; Christensen, Batterham, & Calear, 2014; Schlegl, Bürger, Schmidt, Herbst, & Voderholzer, 2015).

Although cCBT has consistently been found to be an effective intervention the efficacy of different programs and the rate of dropout varies widely (Cavanagh, 2010b; Kaltenthaler, Parry, Beverley, & Ferriter 2008). This raises the question of which factors might be influencing these variations. One variable which has come under particular scrutiny is whether the program is unguided (involving zero human contact), or guided (some human support is provided face-to-face, by phone, or by text).

**Human contact as a moderating factor**

Several meta-analyses have suggested that cCBT can be as effective as traditional face-to-face CBT (Andrews et al., 2010; Grist & Cavanagh, 2013; Hedman, Ljótsson, & Lindefors, 2012). Although some meta-analyses find that human contact does not improve cCBT (Farrand & Woodford, 2013; Grist & Cavanagh, 2013), the majority of reviews indicate that there is a correlation between the addition of supplementary human interaction and improved outcomes and adherence (Andersson & Cuijpers, 2009; Cowpertwait & Clarke, 2013; Cuijpers, van Straten, & Andersson, 2008; Cuijpers, et al., 2009; Cunningham, Gulliver, Farrer, Bennett, & Carron-Arthur, 2014; Hirai & Clum, 2006; Mayo-Wilson & Montgomery, 2013; Spek et al., 2007).
This literature is consistent with long-established evidence that the therapeutic relationship plays a central role in outcomes across modalities (for a review, see Lambert & Barley, 2001). This debate is of particular relevance to the profession of counselling psychology, which views the therapeutic relationship as central to the process of change and the ability to work with interpersonal processes as a defining part of our professional skill set (Clarkson, 2003; Milton, 2016).

My recent literature review (Marrinan, 2015) showed that some researchers and developers have responded to the findings outlined above by arguing that it might be possible for elements of the therapeutic relationship to be incorporated into cCBT without any actual human contact (Cavanagh & Millings, 2013; Helgadóttir, Menzies, Onslow, Packman, & O'Brian, 2009; Peck, 2010). As part of this effort, computerised psychotherapy programs are increasingly experimenting with the use of virtual therapists.

**The development of virtual therapists**

*Virtual agent, chatbot, or conversational agent* are all terms used to refer to a range of automated characters that interact with users by text, audio or on-screen representation. To date, virtual agents have most commonly been used for commercial purposes, but they are increasingly being used for a variety of psychotherapeutic interventions. These have been described using various terms, each of which gives an indication of the human role they are designed to perform: *virtual coaches* (Tielman, van Meggelen, Neerinckx, & Brinkman, 2015); *virtual peers* (Tartaro & Cassell, 2008); *virtual human interviewers* (Morency et al., 2015); *robo-therapists* (David, Matu, & David, 2014); *virtual counsellors* (Lisetti, Amini, Yasavur, & Rishe, 2013); and *virtual therapists* (Pontier & Siddiqui, 2008).

Despite this surge in virtual agents specifically designed to fulfil roles characteristic of counsellors, psychologists and psychotherapists, so far there has been no research into this development by our profession (Marrinan, 2015). This investigation aims to contribute original knowledge by analysing how the use of virtual therapists might be conceptualised using current models of the therapeutic relationship.
There are many examples of virtual mental-health agents (e.g. Anderson et al., 2013; Bickmore, Mitchell, Jack, Paasche-Orlow, Pfeifer, & O’Donnell, 2010; Bickmore, Puskar, Schlenk, Pfeifer, & Sereika, 2010; Burton et al. 2015; Lisetti & Wagner, 2008; Lucas, Gratch, King & Morency, 2014; Ranjbartabar & Richards, 2016; van Vuuren & Cherney, 2014) but each of these programs is currently of limited relevance for one of several reasons: they are in the early stages of development; they address niche issues or populations; they are based on applying non-standard psychotherapeutic models; or they are privately owned. One software developer, Big Health, has taken the application of these ideas far further than any other by using a virtual therapist extensively in Sleepio, a cCBT for insomnia (cCBT-i) program.

**CBT for insomnia**

Insomnia might not commonly be considered a mental-health condition but diagnostic manuals categorise it as a primary disorder (American Psychiatric Association, 2013). Around a third of adults will struggle with insomnia at some point in their lives (Roth & Roehrs, 2003) and there is evidence that it can increase anxiety and depression (Alvaro, Roberts, & Harris, 2013; Baglioni et al., 2011), psychosis (Reeve, Sheaves, & Freeman, 2015), aggression (Kamphuis, Meerlo, Koolhaas, & Lancel, 2012), suicidality (Pigeon, Pinquart, & Conner, 2012), and decreased life expectancy (Buysse, 2014; Kyle, Morgan, & Espie, 2010). Despite this it is under-recognised and under-treated (Falloon, Arroll, Elley, & Fernando, 2011).

Computerised CBT for insomnia (cCBT-i) is a well-established and effective treatment (Cheng & Dizon, 2012; Ström, Pettersson, & Andersson, 2004; Vincent & Lewycky, 2009) and follows an established set of manualised procedures that are common to many CBT protocols (Harvey & Tang, 2003).

**Sleepio**

Sleepio is an unguided cCBT program. The course consists of six sessions delivered by an on-screen animated character called *The Prof*, who its makers describe as a “virtual therapist” (Bostock et al. 2016; Espie et al., 2012). The program is interactive
and personalised, and session content includes a variety of audio, animation and text. Users can also choose to receive automated text message and emails, access to a range of psychoeducational resources, and access to a moderated community forum for users. Treatment includes behavioural techniques (sleep restriction, stimulus desensitisation, progressive relaxation); cognitive techniques (cognitive restructuring, paradoxical thinking, positive imagery, putting the day to rest, mindfulness); as well as sleep hygiene information.

Sleepio’s efficacy is supported by the first randomised, placebo-controlled, trial for cCBT-i (Espie et al., 2012). Results showed that Sleepio is highly effective in the treatment of sleep disturbance, leading to a 20% improvement in mean sleep efficiency at post-treatment, with changes sustained after eight weeks.

**Sleepio’s wider relevance**

Although Sleepio is focused on insomnia initial evidence suggests that it also reduces anxiety and depression (Bostock, 2015; Luik et al., 2017; Pillai et al., 2015) and “the largest randomised controlled trial to date of a psychological treatment” (Freeman et al., 2017, p. 750) concluded that in a sample of 2,614 university students, Sleepio was effective at reducing insomnia (d = 1.11), which was a mediator for associated reductions in psychotic experiences.

Sleepio is also recommended on the NHS website as useful for “depression or anxiety” (Sleepio, 2015) and is freely available in some NHS primary care services (Bostock, 2015). Despite the abundance of quantitative research into Sleepio the design and function of the virtual therapist has never been described or studied. However evidence from other sources indicates the central importance of The Prof to the intervention.

**The Prof**

The Sleepio website describes The Prof as a *virtual sleep expert* and *your personal sleep coach*, but academic publications by the academics behind Sleepio also describe his role as that of a ‘virtual therapist’ (Bostock, Luik, & Espie, 2016; Espie et al.,
The co-founder and CEO of Sleepio, Peter Hanes, also commented that “[The] human element that we’re trying to synthesise is a big part of our hypothesis as to how we can capture that active element … [from] face-to-face therapy in an automated and therefore scalable way. (Startupfood, 2015), and Sleepio’s US patent also states that The Prof’s actions are “designed to establish a relationship between the sleep improvement system and the user” (Hames & Espie, 2014, U.S. Patent No. 20,140,222,720, p. 8).

Despite this evidence that the use of the therapeutic relationship is central to the intended effect of The Prof, this has not been directly investigated by any affiliated or independent researchers. This represents a gap where this study can contribute original and relevant knowledge.

**Precedent for this investigation**

The principle of analysing self-help CBT in terms of the therapeutic relationship has precedent. Richardson and Richards (2006) suggested that one reason why unguided self-help CBT books (bibliotherapy) had produced minimal effect sizes (e.g. Gellatly, Bower, Hennessy, Richards, Gilbody, & Lovell, 2007) was because common factors in the therapeutic relationship (such as responsiveness and alliance) had been overlooked. They argued that it might be possible for such elements to be written into unguided self-help CBT. They then conducted a study where they selected a pan-theoretical model of the therapeutic relationship (Cahill et al. 2008) and applied it to a thematic analysis on three unguided CBT self-help books. They concluded that elements of the therapeutic relationship were identifiable in the way the texts had been constructed and suggested that authors deliberately aim to incorporate relational features to make unguided CBT more effective and agreeable to users (Richardson, Richards, & Barkham 2010). Other researchers have promoted the idea that unguided cCBT can be improved by incorporating therapeutic relationship concepts; such as attention, positive regard, empathy, communication of hope, motivational techniques
Barazzone, Cavanagh and Richards (2012) replicated Richardson et al.’s (2010) methodology to analyse three cCBT programs. They concluded that there was substantial evidence that cCBT offers “unique features that build on … bibliotherapy”, and that “computerised therapy is capable of conveying relational features such as empathy and responsiveness that are thought to be so unique to human interaction” (Barazzone et al. 2012, p. 410). They argued that their research could prompt practitioners and theorists to examine the boundaries of how we define the therapeutic relationship. They suggested that further exploratory investigations of this type were needed. The investigation described hereafter evolved out of these two studies.

The therapeutic relationship
Definitions of the therapeutic relationship vary considerably across models (e.g. Beck, 2011; Laughton-Brown, 2010; Rogers, 1957) but the therapeutic relationship can broadly be understood as any and all processes that occur between therapist and client in the context of a therapeutic setting (Gelso & Carter, 1994). However, Richardson et al. (2010) and Barazzone et al.’s (2012) conclusions are partly limited because they claim to have used a broad pan-theoretical model of the therapeutic relationship but their reports suggest that they significantly narrowed the scope of their definition at an early stage. This research will address that limitation by maintaining as broad a range of features that could be considered aspects of the therapeutic relationship as possible, only narrowing the scope based on what is observed in the data.

The other main limitation in the research design employed by Richardson et al. (2010) and Barazzone et al. (2012) is that the self-help CBT systems they studied are inanimate, and therefore any analysis in terms of the therapeutic relationship is missing the bi-directional process central to the traditional conceptualisation of the phenomenon. However, having meaningful emotional experiences towards inanimate objects is not a new phenomenon. For example Winnicott (1953) described how transitional objects can be imbued with relational feelings as part of natural
attachment processes. Furthermore, The Prof may represent an example of the division between inanimate object and interactive personhood becoming indistinct.

This research does not aim to force relational characteristics onto The Prof as fact. Instead the novel form of analysis of being proposed represents a first step in understanding a new kind phenomenon that has not previously been described. In this sense my decision to analyse The Prof in terms of the ‘therapeutic relationship’ is being used as a conceptual tool so that The Prof can be described in a language that might be understood by the wider therapeutic community.

**Aims**

A broad model of the therapeutic relationship will be developed and used to analyse program content to see if elements of the therapeutic relationship are evident in The Prof, as an important example of a virtual therapist.

**Method**

**Ontological and epistemological position**

Conducting research from a counselling psychologist identity necessitates an acknowledgement of the underlying ontological and epistemological assumptions in any methodology (Rafalin, 2010). The stance taken in this study combines elements of positivist and constructivist ontologies that most closely align to the philosophical schools of critical realism (CR) (Bhaskar, 1975).

CR views different methodologies as having strengths and weaknesses depending on the type of system one is aiming to understand. Empirical approaches are appropriate when trying to understand closed and well-defined systems, but as systems become more open and complex, as is the case for social systems, causal factors become more disparate and far harder to isolate. Social phenomena are understood as inherently being more concept-dependent, and thus better suited to interpretive explanations (Bhaskar, 1986/2009). However, unlike pure interpretivism, causal explanations for social phenomena are not excluded (Sayer, 2000). A critical realist stance is justified because this study aims to investigate a closed and well-defined non-human subject,
The Prof, but is looking at this inanimate object through the lens of a complex social phenomenon, the therapeutic relationship. This atypical research project required a method flexible enough for findings to be built out of existing theories of the therapeutic relationship, but without constraining the analysis (Crabtree and Miller, 1992). Template Analysis (TA), as outlined by King (1998, 2012), offers such a method.

**Description of template analysis**

TA refers to a method of thematically analysing qualitative data rather than a specific methodology. It is similar in approach to the *framework analysis* method used in the two studies examining the therapeutic relationship in self-help CBT upon which the current study is based (Barazzzone et al., 2012; Richardson et al., 2010). TA is more flexible than framework analysis and better suited for use by a single reflexive researcher because it doesn’t require the a-priori themes to be fixed at the point of starting the analysis, meaning unexpected themes can emerge from the data.

The first step of TA is the development of a coding template of a-priori themes expected to be relevant to the analysis. For this study, these come from existing theoretical conceptualisations of the therapeutic relationship. Although codes are developed in advance they can be changed, condensed or discarded if they are found to be irrelevant to the data or the research aims. Emergent themes can be introduced to the coding template if they will improve the extent to which the analysis answers the research question. Hierarchical coding can also be applied, for example the broad theme of ‘developing the relationship’ can encompass successively narrower themes of ‘non-verbal communication’ and within that, ‘tone of voice’.

In the first step of analysis the data is read through and any sections relevant to the research question are marked. The template is then used to code the data and new themes are added if appropriate. This revised template is then applied to the entire data set, after which a reflexive check is carried out to ensure the analysis is not being distorted by researcher bias and remains a fair reflection of the source data. The template can then be further refined to capture the data that best answers the research
question in a coherent manner. The final template and the coded data associated with each theme are used as the basis for the researcher to present the data set, but the decisions regarding what themes within the final template to focus on in the analysis are based on the researcher’s judgement as to what will best illustrate the findings to the reader.

**Conducting the analysis**

**Data collection procedure**

I aimed to collect a comprehensive sample of The Prof’s role within Sleepio. However, the system is dynamic and can give different responses based on the user input. To address this, two Sleepio accounts were created and paid for at the commercial rate. The second account was opened three weeks after the first so as to steer it along different lines and elicit different responses from The Prof. All interactions, via both the Sleepio website and the mobile app, were recorded using audio-visual technology with text directly transcribed and descriptions of what was happening visually made as appropriate.

**Ethics**

Sleepio is a private program covered by copyright law. Its use as a data source is justified since it is promoted to the public as a psychological treatment and the content is available in the public domain. I am analysing Sleepio’s content to assess its scientific value rather than for commercial gain, in accordance with ethical guidelines (BPS, 2013; BPS, 2014a). Ethical and legal precedent for this approach was established by previous research (Barazzone et al., 2012; Richardson et al., 2010) and an author of both reports confirmed to me that no permission from the copyright holders was deemed necessary on the grounds given above (D. Richards, personal communication, November 3, 2015). Text and images are reproduced only to the extent necessary for readers to make an assessment of the program.

I did not interact with the community forum feature, where users can post messages of encouragement or advice to each other on publicly viewable notice boards. As a researcher, it would be unethical to engage with ‘real’ users who are there to receive
support for a personal difficulty and had not consented to take part in a research project (Rodham & Gavin, 2006).

I also adhered to the British Psychological Society (BPS) Ethics Guidelines for Internet-Mediated Research (BPS, 2006). Ethical approval was granted by the University of Surrey. I have no personal relationship with Big Health and they were not contacted about this research to ensure independence and reduce risk of bias.

**Defining the therapeutic relationship for the initial template**

The a-priori themes were developed from a model of the therapeutic relationship created by Cahill et al. (2008) (a full list of the model’s themes and sub-themes is included in the appendices). This model fits the needs of this study in a number of ways. It was developed as part of a large-scale NHS review and is based on contemporary psychometric and clinical measures of the relationship, so results developed using Cahill’s terminology will help ground my findings in contemporary practice. The studies conducted by Richardson et al. (2010) and Barazzzone et al. (2012), which heavily influenced this project, also based their results on this model, allowing some comparison with their findings. Most importantly, Cahill et al.’s model (2008) is based on a pan-theoretical approach, which complements counselling psychology’s pluralist stance (BPS, 2014b; Draghi-Lorenz, 2010). This also leaves the analysis as open as possible in order to allow unexpected aspects of the therapeutic relationship, including concepts from outside of CBT, to be observed if they are present in the data.

However, such a broad model has both strengths and weaknesses, as its authors note:

> This map contains a number of weaknesses. When summarising such a vast literature, inevitably areas will have been neglected. However, attempts to prevent this have been made through the rigorous methods used to identify and summarise the literature. This method, though, has led to a second potential weakness. The map was not based on a specific theory of human interaction or on a specific psychological model. In many ways, however, this is a strength.
The model encompasses a number of theoretical approaches. … [and] is intended as an organising framework” (Cahill et al., 2008, p. 16).

In contrast to Richardson et al. (2010) and Barazzone et al. (2012), this organising framework was repeatedly referred to as part of the reflexive process of template analysis so that the scope of the analysis was not prematurely narrowed.

**Development of the template**

The first coding template was taken from the long list of themes in Cahill et al.’s (2008) framework. This produced an extremely broad template of over 70 total themes. Although this was a rather unwieldy initial template, it was held lightly as a provisional structure that would be heavily refined during the analysis.

Data was collected, transcribed and read thoroughly. Initial coding took place on the data as more was being collected, in line with TA guidance (King, 1998; 2012). This allowed the template to be significantly condensed to better fit the data and streamline the coding process. This second simplified template was used to code the remaining data. At this point a reflexive check was conducted, comparing the original template, the second template, and the source data to check that no important themes had been missed, no emergent themes had been overlooked, and that the source data supported the emerging analysis.

This process led to the observation that Cahill et al.’s model (2008) had neglected the **process of ending**, so this was added as a new theme under the superordinate theme **maintaining the relationship**, since it seemed to be connected to existing themes of **rupture, repair**, and the objective of **change**. It also resulted in several examples of **counter-evidence** being highlighted more clearly, e.g. moments where The Prof’s actions could potentially hinder the therapeutic relationship. Following the example of King, Carroll, Newton, & Dornan (2002) I also chose to create two integrative themes, so-called because they cut across the others. They allowed a more holistic analysis and in particular served as a way to highlight this counter-evidence and pertinent elements of the therapeutic relationship that were absent. The integrative themes are named in
the final thematic template, but they are not discussed in their own sections since they are present throughout the descriptions of the other themes.

The majority of the final themes and concepts and terminology present in the original template without unduly forcing the data to fit the conceptual map. Hopefully this will improve links between my results and pre-existing literature.

The final template is presented in Table 1.

Findings

Table 1. Final thematic template

<table>
<thead>
<tr>
<th>TOP-LEVEL THEMES</th>
<th>SUB-THEMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Establishing &amp; developing the relationship</td>
<td>1.1 Warmth &amp; empathy</td>
</tr>
<tr>
<td></td>
<td>1.2 Promoting expectancy</td>
</tr>
<tr>
<td></td>
<td>1.3 Collaboration &amp; commitment</td>
</tr>
<tr>
<td>2. Maintaining the relationship</td>
<td>2.1 Responsiveness</td>
</tr>
<tr>
<td></td>
<td>2.2 Rupture &amp; repair</td>
</tr>
<tr>
<td></td>
<td>2.3 The process of ending</td>
</tr>
<tr>
<td>3. Role of the therapist</td>
<td>3.1 Expert</td>
</tr>
<tr>
<td></td>
<td>3.2 Secure base</td>
</tr>
<tr>
<td>4. Role of the user</td>
<td>4.1 Consumer</td>
</tr>
<tr>
<td>5. Context</td>
<td>5.1 Accessibility</td>
</tr>
<tr>
<td></td>
<td>5.2 Diversity</td>
</tr>
<tr>
<td>INTEGRATIVE THEMES</td>
<td></td>
</tr>
<tr>
<td>Positivity</td>
<td></td>
</tr>
<tr>
<td>Misattunement</td>
<td></td>
</tr>
</tbody>
</table>
1. Establishing & developing the relationship

1.1 Warmth & empathy

The course content is communicated almost exclusively by the character of The Prof. His words, behaviours, and characteristics such as tone of voice and facial expressions can all be interpreted as attempting to demonstrate empathy and engender a warm interpersonal experience for the user. For example, at the start of each session he greets the user with a wave and says in a friendly and engaging tone:

“Hello again! How can I help?”

And finishes sessions with comments such as:

“Good luck, and I'll see you soon”.

“Great. I look forward to seeing you again then”.

Throughout the program The Prof is generally up-beat but when discussing difficulties the user may be experiencing he regulates his tone to express concern and empathy, lowering the pitch of his voice and looking concerned rather than smiling. His words also attempt to communicate empathy. When repeating some of the racing thoughts that clients typically report he says:

“I'm not going to sleep a wink tonight and it feels as though the whole rest of the world is sleeping. Oh yes, that's a nasty one”.

“Lonely, anxious, annoyed … what a horrible thought”.

The Prof’s voice also guides users through mindfulness and relaxation techniques, both during sessions and in eight audio recordings available to download or accessible via the mobile app. The slow pace and soothing tone used in these seems designed to encourage a feeling of warmth towards The Prof as a professional who promotes peace and calm:

“Finally, let yourself lie there, and breathe slowly (pause). Aaah (relaxing sigh)”.

However, these attempts to be warm and empathic could result in a backfire effect be experienced as counter-productive if the user attends to the underlying reality that they
are generic and the product of an animator and a voice actor. Future research might explore whether there is a limit to the level of empathic warmth that is beneficial, and whether the experience of this approach in virtual therapists varies dependent on client characteristics, such as technological literacy or personality traits.

1.2 Promoting expectancy
The Prof builds expectancy of positive change by explaining to the user that his advice is based on:

“... scientific evidence”, “... proven techniques” and “... facts”.

Terms like this are used frequently near the start of the program, seemingly in an attempt to build expectancy from an early stage:

“Everything we do here at Sleepio is rooted firmly in scientific evidence”.
“... clinically proven to work”.

This evidence-based expectancy of the CBT techniques The Prof is delivering is repeated at key points during the course. For example:

“... there we go, a new more positive way of looking at things, and all based on simple facts!”

Expectancy that change is not only possible but likely is also built by reference to statistics taken from outcome measures:

“Long-term poor sleepers fall asleep over 50% faster, reduce night-time awakenings by over 60%, and boost day time energy and concentration”.

Messages of hope are also peppered throughout The Prof’s speech. For example, after describing a sleep problem The Prof often returns the focus to positive expectancy of change with the phrase the good news is...:

“The good news is that cognitive techniques can really help you…”

“The good news is that, with practice, it's possible to develop a more relaxed approach to sleep, and to life in general”.

In fact this phrase is repeated six times across the six sessions. In a similar way he also implores the user not to “be disheartened” because:
“There are proven ways to improve sleep like yours without pills or potions. The most effective of which is cognitive behavioural therapy, or CBT”.

A significant amount of The Prof’s dialogue could be understood as attempts to directly address any possible scepticism and doubt in the user:

“Now you may be thinking, why should I trust you to tell me what to do?”

This technique of encouraging a sense that The Prof has a personal belief in the user’s future is employed several times to pre-empt potential doubts in the user:

“I feel more sure than ever that we're going to get you back to sleep”.

“I honestly think you may never have a better chance to sort out your sleep problems”.

This can be interpreted as evidence that the program’s designers are using an interpersonal technique employed by therapists: expressing a personal belief in a client’s potential so as to boost expectancy more than if the material was simply presented without a personal message of hope. However, these positive messages are used very frequently, which could be experienced as misattunement on the part of the virtual therapist if it does not match the user’s experience during the intervention. Despite my simulating some periods of severe deterioration in sleep and wellbeing during one of the test Sleepio accounts, The Prof seemed rather insensitive to this and consistently responded with positive reassurances. Future research would be needed to see exactly how this approach is experienced by clients with a range of presentations and the effect on any potential relational experiences.

1.3 Collaboration & commitment

Collaboration and commitment are features that most closely fit within the therapeutic alliance, an aspect of the therapeutic relationship that originated in psychodynamic therapy but has become a central features across several models, including CBT (Horvath & Luborsky, 1993). The clearest examples of how The Prof directly encourages these relational features can be seen in the ‘contracting’ process which occurs in the first full session. The Prof introduces this by explaining in a firm tone that:
“Now we know where we're headed but what’s it going to take to get there? In short some serious commitment”.

“It will require work from both of us so before we go any further we both need to commit”.

At this point The Prof stands in front of a document which looks like a contract (figure 2) and explains his personal commitment to the user:

“I, the Prof, solemnly swear to give you the best possible advice …”

Once the user agrees by clicking a button which reads “Sounds good!” they are then presented with their own “agreement” (figure 3), written as if the user had authored it:

“I, [user’s name], understand that the Sleepio course will only work if I give it some serious commitment … I commit to following the course as closely as possible”.

If the user expresses doubts by clicking “I’m not sure” the messages of collaboration and commitment are not adjusted or negotiated but instead The Prof reinforces them, with a greater emphasis on the agreement as being a personal collaboration between him and the user:

“(sighs) I know it can be hard but the course will only work if you're ready to commit … I need you to trust me … can I count on you for that commitment?”

Once the agreements are signed The Prof’s demeanour shifts back to positivity, and suggests that he is personally looking forward to working with the user:

“I've got a feeling we’re going to make a great team”.

A similar sentiment is repeated later:

“What I can tell you for sure is, if we work closely together on this we have an excellent chance of defeating your poor sleep”.

These seem to be clear examples of attempts to use interpersonal and relational features to increase adherence and reduce the likelihood of drop-out by encouraging the user to feel like they’ve made a commitment to a real person. Similar language is repeated in each of the sessions to encourage continued collaboration and commitment.
Figure 2.

Our Agreement

I, the Prof, solemnly swear to give you the best possible advice to help you improve your sleep.

I promise that everything in Sleepio will be rooted in scientific evidence and proven to be effective if followed correctly.

I assure you I will be here for you whenever you need me.

Signed,
The Prof

Figure 3.

Our Agreement

I, [Name], understand that the Sleepio course will only work if I give it some serious commitment.

We will need to totally change my sleep routine, and at times this will be uncomfortable.

I commit to following the course as closely as possible, I am ready to put in the willpower and persistence to stick at it even when it gets tough.

Signed,

I'm not sure  Sounds good!
2. Maintaining the relationship

2.1 Responsiveness

The opportunity for technology to provide a personalised and interactive intervention is central to the promotion of cCBT, and Sleepio heavily emphasises its responsiveness to the user:

“Each week I teach you new cognitive and behavioural techniques, which, through the power of technology, are tailored to you”.

These personalised features include the first technique The Prof guides users through, which is dependent on which of five options they selected in the initial questionnaire as causing them problems most often, for example, “worries about future events” and, “bodily discomfort or pain”, etc.

A further example of personalisation and responsiveness is evident when users are asked at the start of the course whether any particular issues, such as “working night-shifts” or “pregnancy” are relevant to them. Several days later users receive an unexpected email written from The Prof, with a link to an article giving advice on that issue:

“Hi [user’s first name],

As I’m sure you know, finding time to rest as a new parent can be a challenge. Check out this online guide designed to help you get your little ones off to sleep and maximise your rest time.

Enjoy!

The Prof”

As well as emulating the responsive nature of human-to-human therapy this could also be seen as evidence of a simulated version of when a therapist keeps a client in mind between sessions and provides them with something relevant to them at their next meeting. However this is more un-boundaried example, where The Prof emails extra unexpected support and psychoeducation to the client between sessions. Exploring the ethics and the effect of including behaviours like this, which are not typical of human therapists, would be an interesting area for future research and development.
The use of this virtual therapist in a media-rich computer program provides other novel opportunities. One example of personalised responsiveness comes at the start of the first session when The Prof verbally greets the user by name:

“Hello there [User’s first name]. Thanks for answering those questions. Very interesting. I am The Prof, and I’m here to do everything I can to help you sleep better”.

Another interesting example is triggered when the user accesses the program late at night. The following morning they receive a text message:

“[User’s first name]. I’m sorry you were up late last night. Hang in there - we all have bad nights”.

This level of personalisation and responsiveness displays interesting possibilities for virtual therapists to interact with users in ways that might feel more engaging than traditional cCBT, and more involved in the client’s daily life than could be expected of a human therapist.

However, the automated personalised messages again raise questions about whether The Prof’s relational approach might come across as misattuned through his being intrusive, repetitive, or robotic. Sleepio allows users to opt into a range of reminder services. While each email includes a link to opt-out, the reminders can be very frequent and use personalised relational language to encourage the user to keep to the course and the schedule they agreed. For example, session reminders sent via email:

“Hi [name]. Looking forward to seeing you at 9:00 am today for your weekly Sleepio session! All the best, The Prof.”

If the user is late for the session this is followed by a second email:

“Hi [name] - it's time for your weekly session. Are you coming? I'm here waiting for you”

The repetitive nature of these messages may feel misattuned and disrupt the sense of therapeutic relationship because the words in the reminders do not change. For example, every morning The Prof sends the same message:

“Good morning [name]! I hope you managed to get some good sleep last night. Remember to fill in your Sleep Diary while it's still fresh in your mind” (figure 4).
As with missed sessions, users are sent a reminder if they do not complete it within four hours:

“I see you've not yet filled in your Sleep Diary for last night. Sorry to hassle but it really is best to get it recorded while it's still fresh in your mind.”

This message seems to show an attempt to make automated email reminders less impersonal by using the virtual therapist to apologise for them on a personal level.

This may contribute to the sense of a positive interpersonal relationship between The Prof and the user. However, this could also engender a sense of The Prof as being overly prescriptive and intrusive. For example:

“Hi [name]. It's best for you to avoid alcohol, smoking and exercise for the rest of today. And make sure to eat your main evening meal soon! The Prof” (text message).

The Prof is more involved in the client’s life than a human CBT therapist would be. Yet he may also be more involved than a human CBT therapist may consider ethically appropriate or therapeutically beneficial, given that the CBT relationship is based on empowering the client to take responsibility for their own growth and change.

Figure 4.

Each session ends with a multiple choice quiz and the user’s answers result in further responsiveness with a distinctly interpersonal quality. For example, when a question is answered incorrectly The Prof responds with one of a selection of encouraging phrases, such as:

“Ahh, 'fraid not. Try again”,

Or for a correct answer:
“Bang on!”

When a high score is achieved on the quiz he says:

“Let's see how you did. Very well done! That’s excellent! You’ve clearly been paying attention. Let's see if you can keep it up next week”.

And for a low score:

“Ahh, so you struggled a bit. But you got there in the end”.

Reviewing the sleep diaries also allows for weekly, personalised interaction between The Prof and the user. Depending on how many days have been completed The Prof gives a range of comments:

“So we’re missing most diaries and fewer than we had last week, perhaps you've had a tough week or we've hit some problems (spoken in a concerned tone and lower pitch)”.

“Great! More diaries than last week. Well done! How about we push for a full seven this week?”

“100 percent complete! Excellent work. Let's see if you can keep that up this week”.

These kinds of response from The Prof may set up a particular type of therapeutic relationship where users feel encouraged to hit targets in order to receive praise. This relational dynamic could be a factor in Sleepio’s effectiveness, but it also demonstrates the narrow range of therapeutic relationship, and is at the coaching end of the therapy spectrum.

When a user is struggling or getting something wrong, The Prof can only use relational techniques to express concern and then encourage the user to get back on track. A real, human therapist could ask more complex questions about why the user isn’t meeting their goals, or whether the tasks being set are appropriate for them. CBT advocates a truly collaborative approach to how client and therapist decide on homework, but for this virtual therapist there is a fairly limited level of responsiveness lying on top of a fixed therapeutic agenda. This could be interpreted as another example of the integrative themes of positivity, as well as an area where misattunement is possible.
The process of completing sleep diaries and rating one’s progress on goals also provided an example of misattunement when the program’s responsiveness was inaccurate. In this example, when the worst possible scores were put into the program the response from The Prof appeared inappropriate and contained a mistake regarding progress on goals:

“Sleep efficiency is not where it should be but that's why we're here. And a mixed bag with regard to your goals. So not the easiest of weeks it seems, but don't worry … I can promise you that you're not alone”.

Several glitches were also encountered, where parts of The Prof’s speech were repeated before cutting out suddenly. These technological limitations could disrupt the illusion of a human-to-human interaction, thus weakening any potential positives gained by emulating the therapeutic relationship.

2.2 Rupture & repair

There seems to be evidence that The Prof’s designers are aware of the high drop-out rates for cCBT since he regularly addresses the potential for rupture using relational and personal language. For example, The Prof frequently highlights the possibility of ruptures in highly interpersonal language. This happens at the beginning of the course when he predicts the possibility of drop out:

“Parts of the course may be uncomfortable, at times you might feel like quitting or even giving up. But don't despair, this is totally normal”.

And when the user has had a worse week than the one before, he repeats the same encouragement in a responsive and personalised way.

“So a drop in sleep efficiency. Not yet where we want it. And sadly down on your goals this week. Now, you seem to have found the past week a bit of a challenge. Don't worry this is totally normal. Changing your sleep pattern will be hard at times and you shouldn't be disheartened”.

Furthermore, the use of virtual agents allows for ruptures and repairs to be modelled by The Prof. At one point The Prof has a conversation on-screen with a second unnamed character, who represents a struggling user of the course (figure 5):

“Now, there's a very good chance that you are seriously worried. Here are some common concerns I hear”
“But the whole thing sounds so tough” (said by second character)
“‘I'm not going to pretend I know that sleep restriction is going to be difficult
for you … Try to think ‘this problem is hard to break but I'm going to stick at
it because it's been shown to be effective for people just like me’ … your
motivation will come and go that's to be expected … the best thing to do is to
get right back on course … I honestly think you may never have a better
chance to sort out your sleep problems’.

The same technique is used when The Prof is demonstrating a mindfulness technique.
This demonstrates an interesting example of the potential to represent a therapeutic
relationship in computerised therapy. Although the user cannot talk to The Prof
directly, the program has been designed to represent an avatar of a typical user who
has a dialogue with The Prof and expresses what the real user might want to say. And
although the on-screen user asks the questions, it is then unclear whether The Prof is
directing his responses to the real user or the on-screen user. This seems to invite the
user to see themselves in the on-screen user and feel as if they are in dialogue with
The Prof.

The introduction of a third ‘person’ into the therapeutic conversation could also been
seen as blurring the lines between individual therapy and something akin to group
therapy. Hearing another ‘client’s’ difficulties seems designed to invite the user to feel
that they are not alone. One of the other benefits of group therapy is that the client can
benefit from seeing other positive relationships, which serve as models. For the user to
see the virtual therapist work a virtual client may be intended to endorse the notion
that The Prof is an effective and relationally-skilled professional. However this is a
pre-determined conversation, which always ends in The Prof providing perfect advice
and benefit to the simulated client. This over-simplified image of how CBT works
may encourage clients, but it could also give them false expectations.
2.3 The process of ending

The Prof counts down to the final session and the end of the program on a regular basis. He builds anticipation and motivation to reach the final session:

“We're oh so close now. Well done for making it this far. One last push to see you over the line”.

The sixth session culminates in ‘graduation’, where a certificate is presented on screen listing the user's achievements (figure 6). The relational style of The Prof is central to the way this process occurs and appears to be employed to increase the meaningfulness of the experience:

“It's finally that time (clears throat). It is with great honour that I present you with your certificate of graduation. Very many congratulations! It's a great achievement just to have completed the course. It looks like there may still be some room for improvement in your sleep but this doesn't surprise me. Yours is more than just a passing problem, and may need you to work on it over a longer period of time to overcome it. Nonetheless, I hope you've benefited from following the course and that you want to continue with the techniques I’ve shown you”.

This passage came from the user profile where sleep efficiency did not improve. This shows an example of how the ending process might be experienced as evidence of
relational misattunement when the user’s problems have not changed. The Prof does not seem to reflectively acknowledge the possibility that the therapist or the intervention may have been ineffective for this client. Instead, responsibility for change is returned to the user who must continue to applying the proven techniques in the future, and negativity is responded to only with positivity. When summarising features of the therapeutic relationship that harm outcomes, Cahill et al. (2008) note that “one significant factor related to negative outcome is therapists’ underestimation of the seriousness of problems” (p. 12). Taking into account that Sleepio is being promoted as effective for issues beyond insomnia, including use in the NHS to alleviate anxiety and depression (Luik et al., 2017), this may raise questions as to whether this extremely positive and motivational approach is an appropriate relational style for all clients. Users who do not experience positive changes despite adhering to the course could find this ending indicative of a failure on their part.

The Prof finally wishes the user well at the end of the sixth session:

“Well that’s the end of the course. It’s been a great pleasure working with you, and I hope you're glad to have done it…”

However, the ending is not clearly defined:

“As long as your account is active you can continue to use all aspects of the Sleepio site … and if you’d like a weekly progress update you can still come and see me each week”.

If users log back into Sleepio after the six sessions they are greeted by The Prof, he comments on their progress with their sleep diary, and wishes them good luck until next week:

“Hello again. How can I help? … (The Prof requests the user’s sleep diary) so not the easiest of weeks it seems. But don't worry these are big changes we’re trying to make … (further motivational statements). Good luck with everything this week and see you next time”.

This highlights another unique difference between a virtual therapist and a real therapist in that the character of The Prof can be visited for brief meetings indefinitely. The process of ending and saying goodbye in face-to-face therapy is one of the most complex interpersonal moments in the course of the therapeutic
relationship. However, in this application of a virtual therapist there is an indistinct end that does not align with the therapeutic relationship as defined by any therapeutic modality. Whether this indefinite check-in support enhances or diminishes users’ experience of the therapeutic relationship could be an area for future investigation.

**Figure 6.**

![Graduation certificate](image)

3. **Role of the therapist**

3.1 **Expert**

Analysis suggested that The Prof communicates to the user in ways that imply he is a recognised voice of authority and seems to invite the user to relate to him in that light:

“The most common question people ask me is ‘how much sleep do I need’?”. This expert role is supported by expressions of personal opinion and knowledge. For example, when the client is asked to select between true and false statements about sleep disorders The Prof responds with answers such as:

“Well I'd say this one is false”

Or,

“I know for a fact that 10% of people have insomnia”.
The sense that the program is credible and beneficial is communicated by The Prof’s personalised guarantees:

“One in 10 people suffer from ongoing sleep problems … the good news is I’ve been able to help a great many of them”; Similarly, The Prof offers reassurance based on the professional career he is implied to have had prior to meeting the user:

“If my experience is anything to go by your motivation will come and go, that's to be expected.”

However, The Prof’s stance as an expert does not stand in isolation: the Sleepio course is presented to the user as being imbued with expertise and authority. The first information presented to potential clients on Sleepio’s homepage are profiles of three “world experts in sleep science and Cognitive Behavioural Therapy” (Figure 1), as well as prominent publications featuring reviews of Sleepio. The clinical record and research base behind Sleepio are regularly referred to on the website and within The Prof’s script:

“we know from research that all the techniques have been shown to be effective”

This could be an attempt to convince users to trust The Prof as the representative of that expertise and effectiveness. The program also makes reference to human academic experts, for example:

“a quick reminder [that] ... Sleepio expert Dr Bryony Sheaves will be online from 7:00 PM ... to answer your burning questions about sleep and the Sleepio program ... The Sleepio Team” (email),

More often, The Prof supports his own expertise by referring to unnamed “experts”:

“all of the most senior sleep experts agree that this is the single most effective technique”.

These devices position the program as representing a consensus among experts, and moreover that The Prof is the user’s personal expert and intimately linked with this community. Choosing “The Prof” as his name is also interesting, suggesting expert authority but, by being a nickname, also a sense of familiarity and friendliness.
3.2 Secure base

Derived from attachment theory, a secure base is conceptualised as an important type of relationship: someone to whom one can turn for comfort, particularly at times of distress. After reducing anxiety through reassurance, the individual can re-engage with the world knowing that the secure base is there whenever they need them (Bowlby, 1988). Attachment based models see part of the therapist’s role as offering a temporary secure base for the clients as they sort through their issues (Jordan, 2010). The Prof seems to offer himself as someone who can fill this role, particularly when it comes to sleep. He makes statements such as:

“I assure you I will be here for you whenever you need me”

“Don't despair, your sleep may not be where you want it to be, but that's why I'm here”

“Good luck, and remember that I'm always here if you want any help”.

The personal tone of these assurances of constant availability could be interpreted as encouraging the user to see The Prof as a kind of secure attachment figure. As previously noted, his constant availability is also unique to the virtual therapist and adds a dimension to the relationship that, for a human therapist, may be considered counterproductive.
4. Role of the user

4.1 Consumer

The role of the individual in the relationship with The Prof could be conceptualised as a client of a therapist, or a user of a computer program. The idea of being a consumer of a commercial product has been included because there seem to be distinct features in this example of a relationship with a virtual therapist that are noticeably different from a human-to-human relationship.

Despite the friendly tone to all interactions with The Prof, Sleepio users are required to pay for the service. The boundary between patient and consumer becomes blurred at times. For example, the user is offered a taster session featuring one CBT technique for free before paying for the course. During this interaction The Prof interacts with the user and encourages them to pay:

“On the full Sleepio program we give your sleep a complete overhaul. Personalised to your problems and clinically proven to work … so what do you say: shall we give it a go?”

This represents another example of a difference between a virtual therapist in a commercial program and a regulated human practitioner, who would be obliged by their professional ethical standards to offer the most appropriate treatment for that individual.

Sleepio only ever refers to its customers as “users” in its terms and conditions, and The Prof never refers to users as anything other than “people”. Although the content of the course is entirely drawn from recognised cognitive behavioural therapy methods and The Prof performs the role of a CBT therapist, the terms ‘therapist’ or ‘client’ are not used within The Prof’s script. The very few emails that are not delivered from The Prof relate to subscription details and payment:

“We have upgraded you to a Graduate subscription! From your next payment date you'll only be charged £5.99 for a full month's access” (From “The Sleepio Team” rather than The Prof).

This could be understood as a way of distancing payment issues and the client as consumer from the relationship with the virtual therapist. This is something that
human practitioners may not be able to outsource and can affect the nature of the therapeutic relationship. These issues may point to some of the interesting legal and ethical grey areas that the use of automated virtual agents as practitioners opens up.

5. Context

5.1 Accessibility

Accessibility is not noted by Barazzone et al. (2008), so was added as an emergent theme. Many physically unavoidable factors can affect the therapeutic relationship in face-to-face therapy, such as the time of appointments; the physical setting; distance of travel to therapy; and limitations on the availability of the therapist. The virtual therapist does not have any of the physical limitations on these issues that a human therapist has, which may affect the relationship in unknown ways. Another difference in accessibility is that The Prof gives the user the opportunity to choose any preferred time for the next appointment:

“Shall we meet at the same time next week? If you like I can remind you to come and see me (user enters their preferred time)”.

And he finishes each session with a reminder that unlike real therapists he is always available:

“Remember that I'm always here if you want any help”.

This may help many users and change their relationship with the virtual therapist in interesting ways. But it is also worth considering whether any important aspects of a human therapeutic relationship are lost, since interpersonal work regarding therapist imperfection and setting boundaries is theorised to be an important element of the therapeutic relationship within many modalities.

The fact that the virtual therapist is interacted with both in private and through a computer screen may also add distinct features to the quality of the therapeutic relationship that warrant further research.

5.2 Diversity

The two profiles used in the research were deliberately different in as many ways as possible. On the first run-through, the user’s profile was that of a 30 year-old male.
The on-screen character that engages in conversation with The Prof was also a male who appeared to be roughly in his 30s (figure 5). However, in the second run-through the user’s profile was as 70 year-old woman, but the on-screen character representing a hypothetical user struggling and receiving advice from The Prof (as noted earlier) remained the same male in his 30s. This raises questions of diversity and how well the program can relate to people from different backgrounds.

Similarly, there are many cultural identifiers within the design of The Prof as a virtual therapist. The ‘character’ of The Prof is a middle-aged white male, a professional academic, and CBT therapist. He also has a distinct Scottish accent, which could very reasonably be characterised as sounding well-educated, or perhaps middle-class. All of these are significant cultural identifiers that have been chosen to enhance the effectiveness of the program, and will affect the relationship users develop with The Prof. As the co-founder of Sleepio said, the actor used was selected because his voice combined “authority with approachability” (Halperin, 2014). However, the design of the virtual therapist in Sleepio is fixed and different users may have very different reactions to these cultural identifiers. This fixed image of a therapist, being promoted to thousands of users, could be inadvertently discriminating against users who would prefer a therapist with different characteristics. These issues are important to counselling psychologists since we promote non-discriminatory practice and try to be mindful of the risks of perpetuating inappropriate biases.

**Discussion**

**Summary**

The findings provide various examples demonstrating that Sleepio makes explicit use of the virtual therapist to emulate many of the roles typically performed by a human CBT therapist. These include more basic procedural-type tasks, such as presentation of relaxation techniques, checking up on homework and selecting relevant content based on clients’ questionnaire responses. However, the findings indicate that The Prof has been specifically designed to emulate many emotional and interpersonal behaviours as well, in ways that are less evident in self-help cCBT programs without a virtual therapist. For example, expressing personal belief in the client’s ability to
change, expressing empathy when the client is struggling, and giving warm praise when the client is doing well. Users also seem to be encouraged to trust the virtual therapist as an expert who and a secure base due to his personality. The findings highlight that this use of a relational virtual therapist represents a significant new phenomenon in computerised self-help interventions, which has multiple implications for clients, practitioners, and how the therapeutic relationship is defined.

**Limitations**

The primary limitation in this study is that it describes and interprets a virtual therapist in the absence of a real client. The rationale for this is that despite Sleepio being available to the public and within healthcare services for several years, there was thus far no independent academic research analysing; what the intervention is, how it operates; or the role the virtual therapist plays within it. As a first stage in understanding the virtual therapist it is necessary to gain some sense of the phenomena under discussion. The findings within this research will therefore be complemented by subsequent studies investigating user experience of the therapeutic relationship.

This study builds on a niche strand of research based on the idea of analysing self-help CBT interventions through the lens of the therapeutic relationship (Barazzone et al., 2012; Richardson et al., 2010). To date, one of the weaknesses of this research approach had been that the self-help CBT interventions being analysed were not representing themselves as therapists, meaning the analysis of their content in terms of the therapeutic relationship followed a questionable rationale. The current study applies this research approach to a significantly more coherent subject, since the findings demonstrate that Sleepio encourages users to relate to The Prof as a virtual therapist and draws upon a far wider range of relational features than any preceding self-help intervention. This method for researching virtual therapists is of benefit to the wider research community because it provides an example on which future research into this emerging grey area between inanimate and animate therapeutic relationships can be developed. By virtue of being a unique research method into a
developing area of psychological intervention this study can best be thought of as exploratory, and consequently it opens up many questions for future research.

One question requiring further investigation is how to define the difference between meaningful components of the therapeutic relationship, as opposed to the triggering of involuntary responses. For example, experiments have demonstrated that participants behave more pro-socially when ‘watched’ by an on-screen character (Burnham & Hare, 2007), they involuntarily pay attention to faces presented on computer screens (Driver, Davis, Ricciardelli, Kidd, Maxwell, & Baron-Cohen, 1999), and they involuntarily smile when a virtual agent smiles (Krämer, Kopp, Becker-Asano, & Sommer, 2013). Taken in combination these effects might explain some of the effects that virtual therapists tap into, without the need for more complex interpersonal theories of the therapeutic relationship. Experimental studies could be conducted that vary these known and measurable involuntary responses in the design of virtual therapists to see how they affect outcomes and user experience.

**Relevance to virtual therapist development**

Findings suggest that The Prof provides an example of how virtual therapists can use the unique medium of computer technology to emulate the therapeutic relationship in a variety of interesting ways. Examples highlighted include: speaking to the user by name; encouraging them to use to the virtual therapist as a constantly available support; and agreeing a contract directly between user and virtual therapist. This study aimed to observe and describe these processes and relate them to existing models of the therapeutic relationship. The effect of these behaviours by the virtual therapist on client experience or therapeutic outcomes remains unknown.

The use of The Prof as a virtual therapist is a multi-faceted and complex, and no research has yet been done on which of his characteristics and behaviours might enhance the relationship users feel to him, and which might be counter-productive and disrupt the relationship. This study has contributed to the field by providing interested parties with an overview of some of The Prof’s relational features. Future research could attempt to separate out the effect each of these has for users. cCBT designers
may wish to draw on the processes outlined in this report to enhance their own programs and improve outcomes.

The possibility for paradoxical side-effects of attempting to emulate the therapeutic relationship are also highlighted. The deliberate attempt to relate to the user in an intimate human-to-human manner could bring into focus the inherent limitations of the technology and disrupt user experience by making clients aware of the lack of true relational depth. A misattuned message displayed in text within a typical cCBT program might cause some dissatisfaction with the therapeutic experience, but whether this is more or less disruptive than a virtual therapist expressing the same misattuned response in personalised language could be explored in future research. Relational features may well be useful to encourage engagement, but deciding on the practical and ethical limits of this approach requires further debate and empirical study.

**What kind of relationship can be computerised?**

Findings suggest that The Prof attempts to emulate a particular kind of therapeutic relationship based around guidance, motivation and positivity. In this respect The Prof represents what some within the counselling psychology community have lamented as an unhelpfully narrow definition of the therapeutic relationship, “exclusively characterised by respect and warmth” (Milton 2016, p. 186). Milton’s argument is that this devalues the importance of other experiences, such as disappointment, boredom, disgust, resentment and hate “…if therapists cannot engage with these, what hope is there that clients can come to understand and manage them through therapy?”

One example of the narrowness of the therapeutic relationship provided by The Prof is demonstrated by the misattunement possible with unsuccessful endings. The ethics of providing clients an intervention that glosses over less positive experiences in the therapeutic process is questionable. This application of the therapeutic relationship represents a very directive style of CBT. However the analysis also suggests that The Prof may be designed to engender other relational responses, more often considered part of working at relational depth, such as acting as a secure base for the client.
(Jordan, 2010). The finding that The Prof attempts to communicate in a very warm and empathic manner also points towards the possibility that the simulated therapeutic relationship may increasingly tap into emotionally resonant qualities beyond simple direction and instruction.

Individual practitioners will take different perspectives on whether a manualised and directive, or an emotionally resonant and interpersonal, relationship is appropriate depending on the particular needs of each individual client. It is therefore important that thorough research is conducted about the nature of each particular variation of virtual therapist, and that this information is made publically available, so that practitioners and clients can make informed choices.
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Appendices to Research Report 1

Representative images of The Prof within Sleepio program

Screen shown after user completes questionnaire prior to signing up. Contains first on-screen representation of The Prof and text written in the first person.

Your Personal Sleep Report

Your Sleep Score

Your overall Sleep Score takes into account your sleep pattern and the impact it has on your life. I’m afraid to say that your sleep is rated as very poor, scoring only 0.0 out of 10. You’ve had a problem with it for a number of years, and it seems to have a significant impact on how you are during the day. The first appearance of The Prof in animated form.
Typical mid-session scene with The Prof talking on screen and background graphics

Typical end of session where The Prof is off-screen talking user through a quiz
Representative selection of the data source

N.B. The first 2 pages of a transcription of The Prof’s monologue from one full session is presented, followed by a selection of representative emails

Transcript from session 4
Hello again! How can I help? [click button to start session]
Great. Let’s get going. First let's take a look at your sleep diary for last week. So you’ve completed some days but we’re missing others [1 out of 5 days completed]. Do you have the missing days written down? If so, fill them in now. If not click continue. [user does not enter missing diary days]
-- so you've completed some day...-- [glitch]. So we’re missing most diaries. And fewer than we had last week. Perhaps you've had a tough week, or we've hit some problems. To help you get back on track I will send you some links to useful community topics at the end of the session. For now, how about you give me a rough estimate of your sleep over the whole week? [user inputs estimated typical night]
A few more questions. How have you been finding things in general since we last met? [client uses Likert scales to answer questions] And what impact has your sleep had on you during the day? Finally, how have you been feeling emotionally since we last met? Great that gives me everything I need to calculate your progress this week. Give me a moment.
So a drop in sleep efficiency. Not yet where we want it. And sadly down on your goals this week. So not the easiest of weeks it seems. But don't worry, these are big changes were trying to make and it may take time and effort to get them to stick. Many people on the course have found it tough at times and I urge you to seek out their support and advice in the Sleepio community. At the end of this session I'll send you some links to discussion topics that you might find helpful. I can promise you you're not alone.
This session we're going for the big one, we're creating your brand new healthy sleep schedule. I have to warn you that this is the toughest part of the Sleepio course, but it's also the most powerful. The peak of the mountain is it were. By the end of this section you'll be doing everything you can from the moment you wake up until your head hits the pillow at night to maximize your sleep efficiency. We'll look at the principles of a pro-sleep schedule, your routine before you get into bed and the importance of improving your bed-sleep connection when you’re in bed. Then we'll look at the single most effective element of the whole course, sleep restriction. Before putting it all together into your brand new sleep schedule. As usual we'll end on our weekly quiz to check that you've taken everything in.
Let's get cracking!
[During the rest of the session The Prof walks across the screen with animations demonstrating the concepts he’s explaining moving in the background] Now remember we spoke about energy levels last session. I explained that things that boost your energy levels like caffeine and exercise should be restricted to the day time. Then, when the evening comes your energy levels will be low and your body will be ready for sleep. Now let me expand on that point. Our bodies have a natural system called
homeostasis that keeps everything balanced. It make sure that we get the right amount of everything that we need. So for example if your body needs water you become thirsty and you're driven to find something to drink. Well it works the same way with sleep. If you don't get enough then your body's homeostat will naturally kick in and increase your sleep drive. This force builds, making you sleepier and sleepier, until you just can't stay awake any longer. Then, with every hour that you're asleep through the night your wake drive builds. So that by morning you wake up naturally feeling refreshed, having satisfied you sleep drive. Through the day, aided by the natural trigger of daylight, you stay awake, building your sleep drive again. And the cycle continues. The technical term for this is the circadian system. You may know it better as the body clock. Lovely in theory, eh? You may not be experiencing this stable pattern right now, but we can harness the natural force of your sleep drive to get you closer to this ideal. The principle is simple, if you keep your energy levels high during the day you sleep drive will build up, only to be satisfied at night in your bed. So the general rule of a pro-sleep schedule is simply to stay awake and energized during the day, and relaxed and asleep at night. Sounds obvious! But let's think what it means in practice. First of all, it means you should avoid napping during the day. Napping uses up your sleep drive at the wrong time, reducing the natural pressure to sleep later at night. So when you get to the evening you feel more awake. Not what we want at all. If you're in the habit of an afternoon snooze this may be hard at first, but this is where you can use some of those energy boosters to your advantage. When you feel sleepy drink a tea or coffee. Stretch and exercise a little to perk you up. Or just get some sunshine. All of these things will boost your energy. As a last resort if you absolutely have to take a nap I’d say 10 to 15 minutes is the optimum length. Enough to refresh you, but without removing too much precious sleep drive. As a general rule though, do everything you can to stay awake during the day. One important final word though. If you ever feel dangerously sleepy, as if, for example, you might drop off behind the wheel of your car, then having a nap is absolutely the right thing to do. And if you're at all worried about feeling sleepy during the day then you should consult your doctor as soon as possible. How about we get this first principle into your schedule? [summary is entered into schedule on screen] Now does all that make sense? [user selects option to say yes and move on or hear section again].

As evening approaches your energy should begin to decline and your sleep drive should be building. But although it's bedtime it's ridiculous to expect yourself to just collapse into bed and fall asleep instantly, especially if you have a disrupted sleep pattern. So to help you transition into a nice relaxed state, ready for sleep, I suggest we develop a wind-down routine for you to follow every night. Starting about an hour and a half before bedtime your routine should focus on finishing off your work for the day and then dedicating some time to doing something relaxing, something for you. For many people this is the only ‘me time’ they get each day, so it's a chance to make it extra special. A wonderful idea in principle, but in practice many people who suffer from to poor sleep find it hard to relax. Fortunately relaxing is a general skill that can be learnt, and one that can help you not just with your sleep but give you a calmer approach to life in general. So let's figure out how you could relax.

There are really two types of relaxation. Active relaxation involves high-energy activities that burn up stress. … [End of transcript sample]
Email summary sent following each session

Email subject line: A summary of Session 4

Hi [user’s first name]

Good to see you earlier, and well done for making it this far! Stick with it - the course techniques will take some effort to get into place, but they are likely to improve your sleep if you stick with them. And remember there are lots of other people going through the same thing right now!

Despite all this you seem to have had a great week, so I urge you to use the community to give others the benefit of your experiences. You can discuss the course so far here: [hyperlink to web page]

This session we looked at that familiar enemy - the racing mind. We looked at the three types of thought that commonly keep people awake at night - planning and problem-solving thoughts, heightened awareness thoughts and thoughts about not sleeping and its consequences.

We then looked at three techniques that could help you overcome your particular persistent thoughts - you can see them listed in your To Do list below, and feel free to review the techniques in the Library section of your case file.

Good luck for this week. Feel free to drop by [hyperlink to web page] if you need any help whatsoever.

All the best
The Prof

+++  

YOUR PROGRESS THIS WEEK
Sleep Efficiency 89% (+14% this week)
Overall goal: I want to get to sleep more easily. (+75% this week)
Daytime goals: I want to improve my mood and relationships. (+88% this week)
Emotional goals: I want to feel more relaxed and more positive. (+75% this week)

YOUR TO DO LIST
Bedroom:
- Try noise desensitization
- Adjust your heating
- Change duvet

Schedule:
- Fill in your Sleep Diary every day.
- Avoid napping during the day.
- Follow my Wind Down Routine each night before bed.
- Sleep and only sleep in my bedroom.
- Get out of bed if awake for more than quarter of an hour.
- Follow my 'Wake up plan' to get relaxed.
- Only return to bed when 'sleepy tired'.
- Stick to my new sleep window 7 days a week.

Lifestyle:
- Avoid caffeine from 6 hours before bed
- Exercise 2 - 3 times a week
- Have your main meal 3 hours before bed

Thoughts:
- Challenge your thoughts using the Thought Checker.
- Develop my imagery skills.
- Try thought blocking.
- Try a mindful approach.
Email reminding user to complete sleep diary
Email subject line: [user’s first name], I'm still missing your diary.

Hi [user’s first name].

I see you've not yet filled in your Sleep Diary for last night. Sorry to hassle but it really is best to get it recorded whilst it's still fresh in your mind. You can access it here: [hyperlink to web page]

I hope you have a good day.

All the best
The Prof

PS. If you'd rather I didn't send you these reminders you can change your settings here: [hyperlink to web page]

Email reminding user to complete scheduled behaviour modification
Email subject line: 8:00pm - best avoid alcohol and smoking from now.

Hi [user’s first name].

It's best for you to avoid alcohol and smoking for the rest of today. And make sure to eat your main evening meal soon!

All the best
The Prof

PS. If you'd rather I didn't send you these reminders you can change your settings here: [hyperlink to web page]
Email informing user that next session is available

Email subject line: Your next Sleepio session is now available!

Hi [user’s first name]

I just wanted to let you know that your next Sleepio session is now available for you to start. Visit me here to get cracking: [hyperlink to web page]

I hope to see you soon to continue with the course!

All the best
The Prof

Second email prompting user about session

Email subject line: Are you coming to today's session?

Hi [user’s first name] - it's time for your weekly session.

Are you coming? I'm here waiting for you: [hyperlink to web page]

All the best
The Prof

Email sent if session missed

Email subject line: Today's session

[user’s first name] - a pity not to see you today.

But not to worry. Drop by at any time to start your next session: [hyperlink to web page]

Alternatively set a reminder here: [hyperlink to web page]
I hope to see you soon.

All the best
The Prof

Email sent 6 months after final session completed
Email subject line: Checking in!

Hello there, [user’s first name]!

A full 6 months has passed since you graduated from the Sleepio program. Can you believe it? It feels like just yesterday.

I wanted to get in touch to see how you have been sleeping since we last spoke. Do you have a moment to tell me how you’ve been getting on?
[hyperlink to web page]

As I’ve mentioned before, if you ever want to refresh your memory on the techniques that we learnt during the Sleepio program, you can visit me anytime in the Sleepio app or on Sleepio.com. I’m here if you need me!
[hyperlink to web page]
All the best
The Prof
Excerpts from stages of template analysis

Template analysis allows researchers to define an initial list of a-priori themes prior to analysis of the data. For this study the initial themes were derived from an extremely broad pan-theoretical map of the therapeutic relationship (Cahill et al., 2008). This map is summarised by the tables below:

**Establishing the relationship**

<table>
<thead>
<tr>
<th>Engagement processes</th>
<th>Engagement objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Empathy, warmth and genuineness</td>
<td>Expectancies</td>
</tr>
<tr>
<td>Negotiation of goals</td>
<td>Intentions</td>
</tr>
<tr>
<td>Collaborative framework</td>
<td>Motivation</td>
</tr>
<tr>
<td>Support</td>
<td>Hope</td>
</tr>
<tr>
<td>Guidance</td>
<td></td>
</tr>
<tr>
<td>Affirmation</td>
<td></td>
</tr>
</tbody>
</table>

**Developing the relationship**

<table>
<thead>
<tr>
<th>Processes</th>
<th>Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exploration</td>
<td>Openness</td>
</tr>
<tr>
<td>Reflection</td>
<td>Trust</td>
</tr>
<tr>
<td>Secure base</td>
<td>Commitment</td>
</tr>
<tr>
<td>Feedback</td>
<td></td>
</tr>
<tr>
<td>Relational interpretations</td>
<td></td>
</tr>
<tr>
<td>Non-verbal communications</td>
<td></td>
</tr>
</tbody>
</table>

**Maintaining the relationship**

<table>
<thead>
<tr>
<th>Threats</th>
<th>Processes</th>
<th>Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Therapist behaviour</td>
<td>Self-reflection</td>
<td>Satisfaction</td>
</tr>
<tr>
<td>Intrusive</td>
<td>Metacommunication</td>
<td>Alliance</td>
</tr>
<tr>
<td>Defensive</td>
<td>Flexibility</td>
<td>Cohesion</td>
</tr>
<tr>
<td>Negative feelings</td>
<td>Responsiveness</td>
<td>Emotional expression</td>
</tr>
<tr>
<td>Self-disclosure</td>
<td></td>
<td>Changing view of self</td>
</tr>
<tr>
<td>Patient behaviour</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resistance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hostility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative feelings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relationship challenges</td>
<td>Repair</td>
<td></td>
</tr>
<tr>
<td>Ruptures (confrontations or withdrawal)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Misunderstandings</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Patient and therapist individual differences

<table>
<thead>
<tr>
<th>Patient differences</th>
<th>Therapist differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coping style</td>
<td>Attachment style</td>
</tr>
<tr>
<td>Severity of impairment</td>
<td>Attitudinal variable</td>
</tr>
<tr>
<td>Relationship experiences</td>
<td>Relationship experiences</td>
</tr>
<tr>
<td>Social support</td>
<td>Values</td>
</tr>
<tr>
<td>Defensive style</td>
<td></td>
</tr>
</tbody>
</table>

### Contextual factors

<table>
<thead>
<tr>
<th>Therapy context</th>
<th>Broader context</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confidentiality</td>
<td>Race, ethnicity, culture</td>
</tr>
<tr>
<td>Boundaries</td>
<td>Social class</td>
</tr>
<tr>
<td>Influence</td>
<td>Religion</td>
</tr>
<tr>
<td>Values</td>
<td>Age</td>
</tr>
<tr>
<td>Power</td>
<td>Gender</td>
</tr>
<tr>
<td>Type of therapy</td>
<td></td>
</tr>
</tbody>
</table>

### Therapist and patient roles

<table>
<thead>
<tr>
<th>Therapist roles</th>
<th>Patient roles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friend/companion</td>
<td>Client</td>
</tr>
<tr>
<td>Advocate</td>
<td>Patient</td>
</tr>
<tr>
<td>Attachment figure</td>
<td>User</td>
</tr>
<tr>
<td>Expert/authority/leader</td>
<td>Consumer</td>
</tr>
</tbody>
</table>

### Framework of the relationship

<table>
<thead>
<tr>
<th>Managing therapy process</th>
<th>Matching of therapist and patient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collaborative</td>
<td>Convergent</td>
</tr>
<tr>
<td>Structuring</td>
<td>Complementarity</td>
</tr>
<tr>
<td>Directive</td>
<td>Congruent</td>
</tr>
</tbody>
</table>

A full list of these themes and sub-themes was entered into a table and given a corresponding number. These numbers were used to code the data. This long list of a-priori themes was quickly condensed in the early stages of analysis based on the data.
This allowed the process to be much more streamlined and focus in on areas relevant to the research aim. Over the course of analysis this condensation of themes continued through four stages. The table reproduced on the next page gives a representative example of the codebook used in the analytic process. The table demonstrates numerical coding, condensation of the themes through three stages, as well as a section to note the presence or absence of various themes within the data.
<table>
<thead>
<tr>
<th>Numerical coding system for annotating transcripts</th>
<th>Themes 1 (Direct and full list of themes drawn from Cohill's et al. 2008)</th>
<th>Codes combined from &quot;Themes 1&quot; to create &quot;Themes 2&quot;</th>
<th>Themes 2 (Simplified template based on first analysis of data)</th>
<th>Prominence of themes (Highly present/ Present/ Absent / Not applicable)</th>
<th>Themes 3 (primary relevant themes only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establishing the relationship</td>
<td>Establishing the relationship</td>
<td>Establishing &amp; developing the relationship</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.10 Empathy, warmth and genuineness</td>
<td>1.10; 1.35 Empathy, warmth &amp; affirmation</td>
<td>Present</td>
<td>Warmth &amp; empathy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.15 Negotiation of goals</td>
<td>1.15; 1.20 Goal setting &amp; collaboration</td>
<td>Present</td>
<td>Collaboration &amp; commitment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.20 Collaborative Framework</td>
<td></td>
<td></td>
<td>Promoting expectancy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.25 Support</td>
<td>1.25; 1.30 Support &amp; guidance</td>
<td>Highly present</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.30 Guidance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.35 Affirmation</td>
<td>1.35; 1.40; 1.45; 1.50; 1.55</td>
<td>Expectancy &amp; motivation</td>
<td>Highly present</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.40 Expectancies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.45 Intentions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.50 Motivation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.55 Hope</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Developing the relationship</td>
<td>Developing the relationship</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.10 Exploration and reflection</td>
<td>2.10; 2.20 Exploration, reflection, feedback</td>
<td>Present</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.15 Secure base</td>
<td>Secure base</td>
<td>Present / ?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.20 Feedback</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.25 Relational interpretations</td>
<td>-</td>
<td>Relational interpretations</td>
<td>Absent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.26 Non-verbal communication</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.27 - Humour</td>
<td>-</td>
<td>Humour</td>
<td>Highly present</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.28 - Tone of voice</td>
<td>-</td>
<td>Tone of voice</td>
<td>Present</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.29 - Body language</td>
<td>-</td>
<td>Body language</td>
<td>Present</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.30 Transference</td>
<td>-</td>
<td>Transference</td>
<td>?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.35 Self-disclosure</td>
<td>2.35; 2.40 Self-disclosure &amp; openness</td>
<td>Absent</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.40 Openness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.45 Trust</td>
<td>2.45; 2.50 Trust &amp; commitment</td>
<td>Highly present</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.50 Commitment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
At the end of the process of analysis a final thematic template was produced with which to structure the write up:

**Table 1.** Final thematic template

<table>
<thead>
<tr>
<th>TOP-LEVEL THEMES</th>
<th>SUB-THEMES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Establishing &amp; developing the relationship</strong></td>
<td>1.1 Warmth &amp; empathy</td>
</tr>
<tr>
<td></td>
<td>1.2 Promoting expectancy</td>
</tr>
<tr>
<td></td>
<td>1.3 Collaboration &amp; commitment</td>
</tr>
<tr>
<td><strong>2. Maintaining the relationship</strong></td>
<td>2.1 Responsiveness</td>
</tr>
<tr>
<td></td>
<td>2.2 Rupture &amp; repair</td>
</tr>
<tr>
<td></td>
<td>2.3 The process of ending</td>
</tr>
<tr>
<td><strong>3. Role of the therapist</strong></td>
<td>3.1 Expert</td>
</tr>
<tr>
<td></td>
<td>3.2 Secure base</td>
</tr>
<tr>
<td><strong>4. Role of the user</strong></td>
<td>4.1 Consumer</td>
</tr>
<tr>
<td><strong>5. Context</strong></td>
<td>5.1 Accessibility</td>
</tr>
<tr>
<td></td>
<td>5.2 Diversity</td>
</tr>
<tr>
<td><strong>INTEGRATIVE THEMES</strong></td>
<td></td>
</tr>
<tr>
<td>Positivity</td>
<td></td>
</tr>
<tr>
<td>Misattunement</td>
<td></td>
</tr>
</tbody>
</table>
Clients’ experiences of interacting with an automated ‘virtual therapist’ in a computerised CBT program. An interpretative phenomenological analysis

**Aims:** An emerging approach in computerised therapies is the use of automated ‘virtual therapists’ to deliver interventions. Previous research has suggested that virtual therapists can be conceptualised as emulating aspects of the therapeutic relationship but there is currently a lack of research into how they are experienced by clients. This study sought to address this by interviewing users of Sleepio, a prominent computerised Cognitive Behavioural Therapy for insomnia (cCBT-i) delivered by a fully-automated interactive virtual therapist called The Prof.

**Methodology:** Six participants who had used Sleepio were purposively sampled. Semi-structured interviews were conducted and analysed using Interpretative Phenomenological Analysis (IPA). This method allowed for detailed description of clients’ experience of relating to the virtual therapist and interpretation of these experiences in relation to the extant literature.

**Findings:** Analysis produced four superordinate themes: relational and personal features of The Prof; relational depth vs. technological illusion; to whom or what is the user relating?; and a need to qualify and justify the experience. The findings highlight ways that clients engaged with relational features of The Prof’s design despite awareness that he is not ‘real’. Limitations of this relational ‘illusion’ are noted, as are complexities over the extent to which The Prof can be separated from his human designers. Issues around the social acceptability of engaging with a virtual therapist are also discussed.

**Conclusions:** This study provides original insights into an emerging form of therapeutic intervention by considering some of the paradoxes users experience when relating to a virtual therapist. Opportunities for the use of virtual therapists are discussed as well as concerns regarding virtual therapists with a fixed cultural identity being offered to diverse populations.

**Keywords:** Computerised CBT; Sleepio; The Prof; virtual therapist; therapeutic relationship.
Introduction

A broad range of computer technologies are being applied in ways which overlap with the skill set of psychological therapy practitioners. Examples include automated collection of psychometric measures, recognition of emotions, therapeutic chatbots, and risk assessment using natural language analysis. This has been developed to the extent that therapeutic interventions are being delivered with no human input (for a review of these topics see Marrinan, 2015). For professions such as counselling psychology that are grounded in humanistic praxis (British Psychological Society, 2014) these developments are significant because they give rise to questions about the nature of the ‘therapeutic relationship’ and its importance for successful therapy.

The most common form of automated intervention is computerised Cognitive Behavioural Therapy (cCBT) (Hedman, Ljótsson & Lindefors, 2012). Systematic reviews of randomised control trials indicate that on the whole cCBT is moderately effective for a wide variety of common psychological complaints (Andrews, Cuijpers, Craske, McEvoy & Titov, 2010; Mayo-Wilson & Montgomery, 2013). The principle underlying computerised interventions is that reducing the need for trained therapists reduces costs and allows support to be delivered to a greater number of people (Nordgren et al., 2014). However, the addition of some supplementary human-to-human contact has consistently been found to lead to improved adherence rates and outcomes (Mayo-Wilson & Montgomery, 2013; Palmqvist, Carlbring & Andersson, 2007). This implies that some factors inherent in the therapeutic relationship may contribute to more successful interventions.

Some developers have attempted to address this by creating programs with on-screen avatars or conversational agents interacting with users in ways that emulate the therapeutic relationship. Initial research suggests that users enjoy interacting with these ‘virtual therapists’ and often describe their experience of the interaction in relational terms (Fitzpatrick, Darcy & Vierhile, 2017; Ly, Ly & Andersson, 2017). Yet there has been minimal research exploring whether ‘relational’ processes may be occurring at the interface between user and program. My research addresses this gap
by conducting a detailed investigation of *Sleepio*, the most prominent and thoroughly researched example of a sophisticated therapist-emulating computerised intervention.

Sleepio is a CBT program for insomnia (CBTi) following established protocols (Harvey & Tang, 2003) that involves zero human-to-human interaction as a standard part of the course. Instead, an animated character called The Prof guides users through six sessions, using a mix of audio, video and email. Content is interactive and responsive to user input, and is delivered in the first person (for an overview see Marrinan, 2016). Sleepio is one of the most widely used computerised interventions available. It has been used by tens of thousands of clients, is endorsed by major health insurance companies and the NHS, and is provided within some Improving Access to Psychological Therapies (IAPT) services. Sleepio is also supported by a large body of quantitative research suggesting that it is as effective as face-to-face CBTi (Espie et al., 2012) and that it reduces depression and anxiety (Luik et al., 2016). Is was also the subject of “the largest randomised controlled trial to date of a psychological treatment” (Freeman et al., 2017, p. 750), which concluded that in a sample of 2,614 university students it was effective at reducing psychotic experiences. Despite the abundance of quantitative research into outcomes there does not appear to have been any independent research into how The Prof has been designed or how he is experienced by users.

Previous research has concluded that it is possible to conceptualise self-help CBT materials as being designed to activate certain aspects of the therapeutic relationship. Richardson, Richards and Barkham (2010) analysed three CBT bibliotherapy texts and proposed evidence for attempts to draw on relational principles such as *establishing a collaborative framework, developing a secure base, and rupture prevention and repair*. Barazzone, Cavanagh & Richards, (2012) used the same approach to analyse three cCBT programs and argued that similar features had been designed into the programs, including attempts to convey *empathy*, the use of *feedback*, and *flexibility*. Building from their methodology I conducted a template analysis (King, 2012) looking for evidence of the therapeutic relationship using The Prof’s ‘script’ as data.
Findings suggest that in many ways The Prof is designed to be therapist-emulating. These include aspects of the therapeutic relationship previously identified (e.g. empathic communication, rupture prevention) as well as novel features specific to the computerised medium (e.g. speaking to the user by name, expressing personal belief in the client’s ability to change). However, there was also evidence of limitations that might be counterproductive to the simulation of a therapeutic relationship, such as inappropriate responses and technological glitches. It was concluded that The Prof is designed to emulate multiple aspects of the therapeutic relationship (Marrinan, 2016) and can reasonably be thought of as a form of *virtual therapist* (Crow, 2013).

However, the therapeutic relationship is, by definition, a two-way phenomenon and the extent to which The Prof is successful at simulating the therapeutic relationship is not known. The study described hereafter complements my previous research by investigating users’ personal experiences of The Prof.

Conducting research as a counselling psychologist necessitates a consideration of underlying ontological and epistemological assumptions (Rafalin, 2010). My personal stance most closely aligns with critical realism (Archer, Lawson & Norrie, 1998). This posits that while an objective physical reality exists, our means of understanding reality are inherently partial. This is particularly the case with complex social phenomena, such as interpersonal relationships. Pure phenomenological or positivist paradigms would be limited if applied to the topic under investigation. Instead contextual interpretation is necessary, and in empirical research this is acknowledged as an unavoidable process undertaken by participants, researchers and readers. My methodology reflects this balance between phenomenology and interpretation.

**Method**

**Design**

This study explores an under-researched topic centred on subjective experience and sense-making processes. It also aims to consider these experiences with reference to the wider contextual knowledge developed through the preceding literature review and template analysis (Marrinan, 2015; 2016). Interpretative Phenomenological Analysis (IPA) was selected as the most suitable methodology to capture this kind of data. IPA requires researchers to give voice to participants’ phenomenological experiences by
grounding the analysis in their accounts. However, the analytic process also moves beyond description and involves the researcher acknowledging and drawing upon their presuppositions and assumptions to interpret the participant’s own sense-making process through a double-hermeneutic process (Willig, 2013). Thus IPA consists of a blend of description but with the emphasis on reflexive interpretation (Hefferon & Gil-Rodriguez, 2011).

Since The Prof represents a novel phenomenon, and because the details of Sleepio’s content are not widely known, I chose to systematically explore the program before interviewing users. This was so that when I came to interviewing participants I had enough of an understanding of the programs features to be able to conduct interviews that explore their entire experience. My prior research report can also be referred to by readers of this report so that they can understand what the participants are referring to. Alternative methodologies such as Descriptive Phenomenology or Grounded Theory would not have been as coherent because they try to avoid linking the analysis to pre-existing theory and knowledge.

**Participants**

Criteria for sample selection in IPA is typically based around participants having meaningful experience of the phenomena (Smith, Flowers, & Larkin, 2009). No minimum length of Sleepio use was specified as since there is no reason to assume this should correlate with having a meaningful perspective. Participants were required to have last used Sleepio at any point after 1 January 2014 so that the version of the program they used was not significantly different from that investigated in the preceding study (Marrinan, 2016), and so that experiences were recent enough to recall. Clients who were provided Sleepio as part of NHS treatment were excluded due to the need for enhanced ethical approval.

While Sleepio does not involve any human-to-human interaction as standard, users are prompted that they can share advice and offer support to other users via a moderated forum. It is also possible to communicate with a Sleepio employee for technical issues, and ‘real life sleep experts’ are occasionally available for live Q&A sessions on the community forum. This study was specifically interested in users’ experiences
of The Prof but also aims to understand this experience in the wider context of how the program is interacted with outside of experimental constraints. Therefore participants were not excluded if they had had real human contact through Sleepio supplementary to The Prof. Instead questions exploring this topic formed part of the interview.

Six participants were recruited. This was based on Pietkiewicz and Smith’s (2012) advise that IPA needs rich enough data to make meaningful interpretations, but this should be balanced with the space available so that individual experiences can be represented accurately. Posters displayed at the University of Surrey yielded two responses, one of whom followed through to being interviewed. Online versions of the poster were publicly posted on social media but this did not yield any responses. Google, Facebook and Twitter were also searched for key terms to find public posts mentioning having used the program. Where publicly contactable, prospective participants were sent the poster. 22 people responded and five followed through to interview. Participants were sent full details by email, including a participant information sheet and consent form, which could be signed online using a secure service.

**Ethics**

Conducting qualitative research remotely is widely practiced (Hewson & Laurent, 2008), and there is good evidence that conducting interviews via telephone (Holt, 2010) or video call (Hanna, 2012; Janghorban, Roudsari, & Taghipour 2014) can produce sufficiently rich data for most analyses. Mann & Stewart (2002) suggest that for research related to online activity interviews should also be offered through the internet to maintain contextual naturalness and allow clients who are more comfortable with being online to participate. For this reason, participants could select their preferred medium for interview. One was conducted in person, two by audio call, and three by video call. Online research often entails additional ethical considerations (James & Busher, 2015). It was made clear to participants that well-established security procedures would be used, which included end-to-end encryption when using internet telephony and storage of personal data on password-protected drives (Fielding, Lee & Blank 2008).
Sleep disturbance correlates with many other wellbeing problems (Baglioni, et al. 2016) so participants were advised that they should only discuss what they were comfortable with, that the interviews did not constitute therapy, and several resources were suggested for further self-care if required.

To minimise potential bias Sleepio were not contacted about the study. It was also made clear to participants from first contact that this was not Sleepio-sponsored research.

Detailed demographic information was not formally recorded as the relevance to the research question was not evident. Instead diversity issues were discussed with each participant as part of the interview schedule, allowing discussion to be guided by the extent to which the participant felt this was relevant to their experience of The Prof.

To give readers some context, five participants were female and one male. Three participants were from England, two were from the US and one was from the Republic of Ireland.

**Procedure**

Data was collected using semi-structured interviews lasting between 40 and 60 minutes. To refine the questions and improve interview technique, practice interviews were conducted with a colleague about their experience of a personal therapist, and with a friend about their experience of using a virtual assistant (e.g. Apple Siri, Amazon Alexa). These were chosen as partial substitutes for the experience of interacting with a virtual therapist. This contributed to an interview schedule (see appendices) that followed the technique of *funnelling* (Smith & Osborn, 2015) whereby initial questions allow participants to direct the interview while more directive questions come later so as not to influence the way the participants discuss their experience. For example, ‘Do any interactions with The Prof stand out in your memory?’ was be explored until no more interactions come to mind, after which specific interactions could be prompted (e.g. quizzes, emails, graduation). Brief summaries, clarification and reflections were used to check that the participant’s views had been correctly understood. Prompts were also used to elicit more detail,
return the focus to experience of The Prof, and to encourage personal reflections rather than generalised statements. A sample transcript is included in the appendices.

**Analysis**

Analysis was conducted following IPA guidelines (Smith et al., 2009). To assist the analytic process, transcriptions were made from audio recordings as soon as possible after interview and initial process notes made, such as observations of non-verbal communication or reflections on the process of the interview. All interviews were completed and transcribed before full analysis took place but each interview refined the data collection process.

After transcription, recordings were listened to again and transcripts read through to become immersed in the participants’ accounts. Detailed annotations were made of initial observations, descriptions and interpretations. These unstructured comments were condensed into more abstract emergent themes, but always referring back to the source data to ensure faithfulness to the participant experience and remain aware of potential presuppositions on the part of the researcher.

This process was completed for each transcript before all emergent themes were compiled and clustered into coherent groups. Themes were then revised and combined to create a table of themes with supporting passages frequently referred back to ensure they were supported by the data. In accordance with IPA guidelines this process was not based on the frequency or commonality of the theme’s occurrence across participants, but instead on relevance of the data to the overall research question being asked (Smith & Osborn, 2015). Samples demonstrating the analytic process can be found in the appendices.

Themes emerged via a double hermeneutic process whereby the researcher attempts to interpret the clients’ own sense-making process. Because this analysis involves structuring the complexity of participants’ experiences there is some unavoidable overlap between themes. In the findings section the themes are presented in an order that progresses from more descriptive themes to an increasingly interpretative level of analysis. In the course of the interviews all participants discussed their experience of
the cCBTi intervention as a whole. However, in accordance with the aims of this study the analysis focuses on participant experiences of The Prof.

I have chosen to present the findings in-line with a strategy proposed by Smith & Osborne (2015). Using this method the ‘findings’ and ‘discussion’ are combined into a single ‘findings and discussion’ section. This is intended to produce a more coherent narrative which promotes linking analysis to literature as the findings are presented, rather than implying a sharp distinction between phenomenological and interpretative processes. Further implications and conclusions are considered in the final section of the report.

Findings and discussion

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**Relational and personal features of The Prof**

This superordinate theme demonstrates that participants described their feelings towards The Prof with language typically used to describe a person’s personality or professional identity. Participants were also in agreement that the quality of The Prof’s relational features was an important part of their overall positive experience of the therapy.

1. **Reassurance, friendliness and encouragement**

The Prof’s ability to communicate warmth and kindness was noted by all participants. Yan noted he had a “positive and reassuring demeanour”, Jude experienced him as “gentle and friendly”, “kind” and “approachable”, Tim described him as “benign”, and Steph explained that “he’s calm” and “he was very supportive”. Elizabeth gave an example of these traits from The Prof’s response to potential ruptures:

- If you haven’t logged in for a while you get a little message to say “Ooh! Been a long time since I saw you!” (Elizabeth smiles as she impersonates his tone of voice). Umm, and just, it makes it a little more, umm, conversational and relaxed. [Elizabeth]

And:

- If you did answer things wrong, which I did sometimes, it was, it was dealt with in a very gentle way. [Elizabeth]

Other participants noted that even when their sleep worsened The Prof was always encouraging and never critical and this contributed to their positive experience of the intervention:

- I just felt that, umm, I was being encouraged, you know? Encouragement obviously, umm, made me want to continue. [Jude]

- For me I need the positivity more than I needed the true talk of, like, ‘Well, you know, it's fine. It's the same as last week. It's fine. Whatever. Keep on going’. Umm, having that positivity motivated me more. [Steph]

Maintaining warmth, compassion and belief in clients’ capacity for growth is advocated as an important therapeutic skill in multiple models of the therapeutic relationship (Gilbert, 2005; Rogers, 1957; Stickley & Freshwater, 2002). For a human
therapist sustaining positivity can be a challenging interpersonal skill, but for a virtual therapist there is no difficulty in being consistently upbeat and responding compassionately because they are not subject to real emotional responses. These quotations illustrate the overriding experience of all participants that the consistency of The Prof’s relational positivity was beneficial. Other themes will highlight times when this inflexibility can also result in incongruence between client and virtual therapist and may have been disruptive to the therapeutic relationship.

Another example of The Prof employing a very personal tone was experienced by some participants when he ‘signs’ a therapeutic contract with the user:

- I just thought it comes across nicely. You're making a commitment to me first and this is what you want from me in response. Rather than saying, ‘Right, if this is going to work you are going to need to do the following things, and if you do we will be doing this’. You just-- the order of events-- it felt a little bit hand-holdy. [Anna]

For Elizabeth the virtual therapist employed a similarly reassuring tone at points when rupture or drop-out might occur:

- You’re very much made to feel like it’s okay. You know, it's alright to have a bad week. It’s not the end of the world. [Elizabeth]

Anna also experienced The Prof as appropriately moderating his style from upbeat to reassuring depending on the therapeutic task:

- when he's talking to you in the little video clips he's a little bit more upbeat and encouraging and it does feel like that but the, the meditations themselves are very soothing and reassuring [Anna]

The bulk of research into personalisation of virtual assistants has been conducted from a commercial perspective as a way of improving the user interface, increasing customer satisfaction and ultimately driving profits (McTear, 2017). This analysis provides an interesting in which where principles developed for commercial customer satisfaction may be transferrable to the development of a therapeutic relationship with a virtual therapist.
2. Authority and reliability

As well as the reassurance noted above, Anna reported that at other times The Prof could relate to the user as a “coach or as an instructor”. For Tim, The Prof was also felt to be “a guide”. Anna, who works in education herself, noted that he spoke like a good teacher might:

- *It's like, ‘Right, we're all in this together, and this is what we're going to do. This is what I'm going to do. This is what you're going to do and it's going to be okay’.* [Anna]

Often connected to this instructive style, The Prof was also described as radiating intelligence and authority. Yan felt that The Prof “seemed knowledgeable and trustworthy”.

Similarly, Jude felt affection toward The Prof and attributed intelligence to him because he reminded her of a former colleague:

- *I associated him with one of the consultants I had worked with in the past who I admired greatly. And he was a very clever person but he was also a bit of a buffoon. I don't mean that rudely, but I don't know if you've ever come across people in your life who verge on the really intelligent, but they-- part of them is almost mad! ... We all loved him and he was very clever but there was a side of him which was humorous and kind. I don't know I just saw that in The Prof.* [Jude]

Similarly, Anna experienced positive associations with this stereotypical “scatty” “professor” side of The Prof’s character:

- *Looking like people expect a professor to be, I think it adds authority to it, which means that you can believe it.* [Anna]

This may suggest that the way the virtual therapist has been designed in Sleepio draws on cultural stereotypes. This could be interpreted in at least two ways: either the designers deliberately chose to create a virtual therapist who tapped into these common perceptions; or users are attributing these characteristics to The Prof because of their own preconceptions. This calls to mind transferential processes that are central to psychodynamic psychotherapies (Arundale & Bellman, 2011), however when applied to a virtual therapist this becomes a complex and perhaps novel variation of transference. Psychodynamic approaches expect clients and therapists to have
transference experiences of one another. A skilled reflexive therapist can engage with these processes to facilitate therapeutic change. In computerised therapy, the client may experience transference feelings towards the virtual therapist but any two-way interaction stops at this point since an algorithm does not currently have the capacity for intuition or self-awareness. Psychodynamic theory also notes that people often experience strong emotional connections towards inanimate objects (Winnicott, 1953). The phenomena of having semi-transference experiences towards a virtual therapist seems to represent a novel blend of both human-to-human and human-to-object processes. Further research into these phenomena could be conducted from a psychodynamic perspective.

It should also be noted that using caricatures of a virtual therapist may be an effective method for designers to improve their outcome data, but it runs the risk of perpetuating existing societal biases and detrimental stereotypes. Further diversity issues are noted later in the findings and discussion section.

A similar aspect of The Prof is that both by name and by behaviour he is a representation of a clinician. Yan seems to touch on this by saying that “the bedside manner is helpful”. Tim expresses a similar impression of medical expertise when he says he felt The Prof’s character was “like a sort of kindly GP (laughing)”. However, both Yan and Tim also noted limits to this:

- It also conveys expertise. It’s also, I guess, a prof, not a doctor. So it’s like you have a sense you’re there to learn and not necessarily to get treated, in a medical sense, and that sets a positive tone for the interaction. [Yan]
- It’s more like going to a pharmacist and buying something over the counter than it is like going to either a doctor, or indeed to a psychologist. In that it’s very much, like, I want it to do a job for me. [Tim]

Among the participants, Yan and Tim were the ones who expressed the least emotional or relational depth to their experience of The Prof and described him using the most technical and medicalised language. Interestingly, Yan works in the technology industry and Tim works in a medical profession. As well as using Sleepio to address his own insomnia, Tim was conscious of whether he might recommend Sleepio to patients as he was using it. One interpretation of this is that users’ relational
experience of a virtual therapist may vary based on their level of knowledge of technology or their perspective on the intervention being applied.

Designing a virtual therapist in a way that leans towards an academic or clinical identity, rather than a counsellor or therapist identity, may encourage users to relate to The Prof as an authority but could limit more humanistic ways of experiencing the virtual therapist. This is of interest to counselling psychologists because our humanistic values lead us to work in ways that question imbalances in power and authority between client and practitioner. Future virtual therapists could be designed with a variety of ‘professional identities’ to explore how this affects client experience or outcomes.

3. Cultural identity

All participants felt that The Prof’s character agreeable, and many linked this to his cultural characteristics. Steph is American and loves British culture, so one of her favourite things was his Scottish accent:

- *I loved his accent (laughs)… I found it very charming.* [Steph]

And for Tim, who is Irish, it held pleasant associations:

- *My family would have ties to Scotland going back a while. I suppose that I have quite a benign image of it as a place.* [Tim]

Jude, who has a southern English accent, was the only participant who disagreed:

- *The only thing that irritated was the strong Scottish accent.* [Jude]

Other participants made connections between their positive feelings towards The Prof and his age and gender:

- *Because he’s, obviously, umm, an older looking person. Not, he’s not a young, umm, trendy person. He seems like someone that knows what he’s talking about.* [Elizabeth]

- *They designed him to be very, err, non-threatening and, err, almost a sort of paternal figure.* [Elizabeth]

Anna expresses a similar sentiment when sharing the kind of internal dialogue she had towards The Prof:
‘I’m kind of alright but if I’m not I’ll tell you and you’ll give me something to make it better.’ It’s lovely isn’t it? It’s quite parental. [Anna]

The effects of the therapists’ age, gender, ethnicity etc. on the quality of the relationship and on outcomes has been extensively researched and debated (e.g. Staczan et al., 2017). The Prof is clearly designed to be inoffensive, but my participants’ experiences suggest that a virtual therapist with a fixed character and cultural identity may not suit all clients. If Sleepio is to be offered as the first intervention in a stepped-care model (Elison et al., 2017) this highlights important ethical questions for service providers, especially since a paternalistic approach to mental health provision is increasingly being challenged. Research into different cultural groups’ experience of The Prof and other virtual therapists will be important to inform ethical practice.

4. Enjoying The Prof’s character

Another recurring comment was that beyond Sleepio simply being a beneficial intervention, The Prof’s character actually made the experience enjoyable:

- [It was] kind of fun to have this little character that’s talking to you, and that’s talking to you. [Yan]

Yan, Tim and Steph all described The Prof as “cute”. One might wonder whether this ‘cuteness’ detracts from the sense of The Prof as an authority, but that was not the sense participants gave. Instead it made them like their interactions with him more.

Tim gave a clear explanation of this when he described The Prof as:

- A cute engaging thing. Umm, it had a little bit of a sense of humour. And, sort of, not as, kind of homeworky, or not as prescriptive as a CBT interface could be. [Tim]

- You’re asking people to do a lot of work basically. Umm, and I do think with The Prof it did make it less like work. [Tim]

The fact that The Prof is visually presented as an abstract cartoon rather than a life-like representation seemed to be part of the appeal:

- I much preferred it to if it was like a little video of either a, sort of, umm, a sort of realistic kind of computerised human. You know? Or if it was like little video snippets of a person. Because I think that would seem more canned and
more, the artificiality and the formulaic part would be much more evident.

[Tim]

This was a common view among the participants. When Elizabeth was asked whether The Prof being a cartoon was preferable to him being more realistic or a video she replied “definitely”, “it works really well”. Steph expressed the exact same view, and then made the additional comment that:

- *I definitely liked him as a character and it was definitely something I looked forward to every week, for sure.* [Steph]

Despite the appeal of The Prof’s character Tim, Steph, Anna and Yan all said that they might have preferred to see a real therapist but did not because of cost or availability. Yan summarises this point most clearly:

- *It also just depends on how available is it, how convenient is it, how much does it cost. Like, you know, if I could talk to a real person on demand whenever my schedule fits for me at the same price then absolutely I'd prefer that.* [Yan]

When asked if constant availability was important, Anna answered:

- *Exactly. And that's quite reassuring.* [Anna]

Money and convenience are important factors that are known to affect the therapeutic relationship (Thompson, Graham, Brockberg, Chin & Jones, 2017). This analysis suggests that for most of my participants a virtual therapist may not be their first choice, but these two factors seem to somewhat offset the negatives. The extent to which treatment price and ease of access effect outcomes and the nature of the therapeutic relationship could be tested in future randomised trials.

About half of the participants explained what it was like to interact with The Prof by doing affectionate impressions of him and repeating characteristic phrases. One interpretation of this is that the addition of a virtual therapist with a distinct character adds a novel and memorable relational experience to a self-help intervention. These findings support similar qualitative data from pilot studies into user experience of automated therapeutic agents (Fitzpatrick et al., 2017; Ly et al., 2017), and suggest that future software designers may wish to copy this approach to improve user engagement.
Relational depth vs. technological illusion

Participants all discussed the interactive and responsive features of The Prof in ways that suggest he is able to elicit certain relational responses. Every participant also made clear the limitations of these features and how they balanced their relational responses with an awareness of the underlying technology, although at times they seemed to struggle to describe this paradox clearly.

5. Conscious suspension of disbelief

Anna, Yan and Tim, who all have a good understanding of computer technology, framed their experiences as involving the suspension of disbelief to varying extents:

- *I'll suspend disbelief. I think it is-- I think, you know, there's clearly some very clever stuff going on behind it that partly has worked out what sort of content I need. Because that always does seem to be accurate. So that feels very personalised.* [Anna]
- *I think there is quite a large extent to which you do just, sort of, buy into the premise.* [Anna]
- *I think to the extent that you suspend disbelief while you were talking to him it's still effective, right? Like it's still more effective then maybe, like, if I think about getting that same information off PDF.* [Yan]
- *I don't think you fully buy that this is a real person, but you do kind of go along with the-- I mean it just kind of feels warmer.* [Tim]

This suggests that despite technological literacy clients can still engage with the relational qualities of virtual therapists through a conscious process of bracketing their disbelief.

A slightly different experience is reported by Jude, who is retired and described herself as not very technologically literate. As with the other participants, near the beginning of the interview she wanted to make clear to me that:

- *I never accepted him as a real person. He was always this cartoon character with his, with his dog. Umm but, err, I accepted it seriously enough.* [Jude]

Yet later in the interview, when asked how her experience of The Prof changed over time, she suggests that the relational illusion could be quite convincing:
- He became more of a real person. And obviously was the expert that I suppose, deep down, I was hoping might come change my life. And, umm, I-- I felt it was personal. I felt, umm, he was actually talking to me. [Jude]

- I didn't so much look at the cartoon character as listen to what I was being told. So the cartoon character slipped into this, err, insignificance maybe. I don't know really. I find it hard to describe. [Jude]

One interpretation of this struggle for how to describe her experience could be that this represents a type of relational experience that is simultaneously personal and impersonal, and that the participants are not used to experiencing or describing this experience to another person without sounding naïve. This may be evidence that once a common and culturally understood language exists to describe such virtual relationships users may be more willing to engage with virtual therapists.

6. Relational responses despite awareness

Across the majority of interviews participants attempted to explain the paradox of being relationally affected by The Prof despite awareness of the underlying automation. Anna seemed the most impressed and engaged by this illusion:

- Anna: I liked the way that it gave you somebody, a specific person, albeit not a real person, who was doing this with you.

Interviewer: So even though it wasn’t a real person some of those same qualities--?

Anna: Yeah it was very-- there was a lot of personification, in the way that he is, he has a character, a personality. It's not just a, sort of, cartoon figure without anything at all. It has,--you know, he isn't a person but he has personhood in a way. [Anna]

- It's genius really isn't it? Because there isn't a person helping you. You just kind of feel like there is. [Anna]

- There's something as well (sighs) even though he's not real and he's a little cartoon character, there is something about whoever has come up with him and his manner kind of gets it just right ... it feels, well as personal as something impersonal can be. [Anna]

Other participants noted the same phenomenon but described it more analytically:
- Knowing that it’s not an actual human being I didn’t necessarily take it super seriously. That I know that it’s-- as a program he can’t not put in the effort and do his part of it because he is programmed to do that. Umm, but it is a nice-- I mean a-- for the personal signing of a contract, you know, it does hold you a bit accountable, even though it’s, you know, not serious. [Steph]

- He does all these little social things to try to, to keep you interested and motivated, to tolerate the program. I think those are nice and, and I think they are really helpful. Even if you’re aware that you’re not talking to a real person (laughing). You know? [Yan]

- I suppose you know you could say there is an illusion when you’re doing it that this is all going back to someone. [Tim]

Participants make links between this paradoxical experience to moments of personalised responsiveness, such as when The Prof verbally greets participants by name. Some participants reported an experience that could be interpreted as relational:

- I just thought ‘Oh! I really like that’. And I know it's not hard to do or anything but it felt personal in a way that the others aren't. [Anna]

Anna is referring to several other computerised programs she has tried. This provides some idiographic data suggesting that the addition of a virtual therapist, which was not part of the other systems, added something distinctive and positive to her experience. Jude also stated that being greeted by name made her “feel as if he was just talking to me and not, sort of, a whole crowd”. For Steph the personalised content and responses felt “less like a computer program and more like someone was actually focused on you”. And Yan noted that hearing from a “real voice” speaking in “a friendly manner” made it “easier to react to that emotively, the way you need to, than just reading-- say reading it in text”.

For Elizabeth, receiving emails from The Prof “was almost like, umm, a friend checking up on you, rather than, umm, a reminder.”

When reflecting on the significance of emails being ‘written’ by The Prof rather than from the Sleepio company Steph seems to simultaneously suggest that this both was and was not important:
- I don’t remember any difference. It was always, I always read them. I did actually always read them which normally if it’s a-- from a company I don’t (laughs). [Steph]

Tim expresses a similar contradictory sense that the reminders being ‘written’ by The Prof affected his behaviour, although only to a limited extent:

- They'd come from The Prof and that was like, it was like more, it was less irritating than just a sort of ‘You have failed to fill out your form’. Umm, but it was still-- look, again I think like most emails and notifications after a while it gets a bit staler. [Tim]

These comments hint that there may be some disparity between the actual effect of the virtual therapist and what clients self-report. Future trials may want to use multiple ways of measuring the effect of The Prof to see whether the means of testing his significance varies with different methodologies. More generally, the qualitative information outlined in this subordinate theme may be of particular interest to developers who want to design automated interventions that are agreeable to clients tapping into interpersonal effects.

7. Limitations and glitches

Every participant also gave examples of times when the technological limitations of the virtual therapist came through and relational resonance was disrupted. For most of them this appears to have been associated with some frustration and reduced satisfaction. Steph gave an example due to technical glitches:

- He would say, like ‘I’ll see you next week’ and then you click, whatever, the exit button. And then the, the thing would pop up that ‘Oh. Your next session is available.’ And so normally it would say you can’t access your session until next Friday. But then you’d go through it again and then like the exact same things would happen, I’d answer exactly the same way (tone of frustration in her voice) and then all of a sudden it would, like, remember that it had done it. [Steph]

Anna gave a different example of a limitation that occurred when The Prof’s responses did not match her subjective rating of the quality of her sleep:

- I thought, ‘well are you not concerned about how I felt I slept then? And if you're not, why do you keep asking me?’ So I suppose in a way that's a sort of
negative thing of creating quite a personal experience, that you and if-- it's only a very minor niggle, but I guess if something doesn't go right with it you could feel quite let down. [Anna]

Tim experienced the same issue, and although he noted it “wasn’t particularly upsetting” he did comment that:

- I suppose what illusion there was of it being human kind of went then really.
  Because I think a real therapist would talk that through with you. [Tim]

One way of interpreting this is that although The Prof is designed to be responsive and empathic there is an underlying prioritisation of quantitative over qualitative measures of insomnia that can cause small ruptures in the therapeutic relationship. Interestingly, research suggests 10% of insomnia complainers when measured do not have abnormal sleep, while 16% of people displaying abnormal sleep do not report any problems (Lichstein, Durrence, Taylor, Bush & Riedel, 2003). A recent review also found that “individuals claiming an insomnia identity, regardless of sleep status, are at greater risk for ... depression, suicidal ideation, anxiety, hypertension, and fatigue” (Lichstein, 2017). This suggests that subjective experience may be more important than objective data when it comes to sleep issues. This is also supported by a finding that complaining about insomnia was more strongly associated with suicidal ideation than poor scores on a sleep diary (Woosley, Lichstein, Taylor, Riedel & Bush, 2016). This is congruent with counselling psychology’s stance that subjective meaning is crucial to understanding distress. A skilled human therapist can integrate objective and subjective difficulties and manage the relationship with more genuine empathy and understanding than this example of a virtual therapist is currently able to replicate.

Future research should attempt to distinguishing between clients who have subjective sleep difficulties, versus those with objective sleep difficulties, and whether face-to-face or automated therapy is more suitable for each group.

The designers of Sleepio suggest that being able to message real people in the forums adds relational support for those participants who want it (Coulson et al., 2016). Elizabeth was the only participant who said she had significantly benefitted from the forums:
- I think it gave you that human interaction. Because you’ve got his voice, umm, and you get the personalised responses, but there was no confusing the fact that this wasn’t real. And if you wanted a real interaction go to one of the forums. [Elizabeth]

Tim tried them but “didn’t find it added all that much”. For Anna, online safety was the main reason she chose not to use them. Whereas Jude said:

- I felt completely comfortable interacting with The Prof, and at ease, but I didn’t feel it with the forum. [Jude]

Steph had intended to use the forums but held back for too long and her subscription expired:

- I hadn’t really thought about when the graduation was going to be ... Which I think is part of the reason why I didn’t go through the forums as much, because I knew that every week I was going to be talking to him. And then when I realised that I wasn’t going to be talking to anybody, even though, you know, he being not real, I didn’t. Like, I should have then gone more into the forums, but I didn’t really. [Steph]

This suggests that there are a variety of reasons why users might rely on the virtual therapist or the forums. This again points to the need for more fine-detail research to discern what works for whom and why (Cooper, 2008; Roth & Fonagy, 2005) particularly since this is an emerging type of intervention.

To whom or what is the user relating?

So far the client relationship with The Prof has been considered in isolation, but counselling psychology takes a broad definition of relationality and findings suggest that wider contextual factors affected participants’ relationship to the virtual therapist.

8. Relationship to the humans behind The Prof

For many participants the sense that The Prof is the on screen representative of the designers enhanced their trust in the virtual therapist:

- It’s really all automated, but someone has thought about what message is relevant to a person in that situation. And, so it is personalised, even though it is automated. [Elizabeth]

- It felt like The Prof was an extension of that support and care. [Elizabeth]
- I don't think I consciously unpicked it at the time but if you think about it you can say that even though you know that's not a real person there are real people behind it who made choices about how he is. [Anna]
- They've created a character that portrays all of the things that I want it to portray so it's sort of symbiotic in many ways. [Anna]

Being a Scottish male professor as well as a CBT practitioner and a sleep expert, The Prof is clearly inspired by Dr Colin Espie, the academic who helped create Sleepio. Some of the clients seemed to know or at least suspect this, and it contributed to their positive relationship:

- It did feel like The Prof was the, sort of, the voice of the, umm, the sleep experts, he was the voice of them. [Elizabeth]
- I suppose I thought maybe they made The Prof look like that, that particular person. I don't know whether they did or not, and I don't know if they did or not, but I think they did. [Yan]

Interestingly this was also implied by two participants who said they were not aware this was the case:

- Somehow The Prof feels quite real, as if he is a caricature of a real person, who's just like that. Rather than just to-- make-believe figure. And obviously I do know it's not like that, but I'm just saying the feel they have to it, it's really nice. [Anna]

And again, at the end of our interview, Jude was keen to know:

- **Interviewer:** So was The Prof a significant part of the program for you?
  **Jude:** Oh yes absolutely he, he was the program wasn't he? Can I ask you a question?
  **Interviewer:** Yes, of course.
  **Jude:** Was he a real person or was he completely fabricated, and just used all the research to cross-programme? [Jude]

This provides evidence that understanding how clients relate to virtual therapists requires consideration of the levels of relationship that are at play in the wider context. Jude was clear that she did not in any way think The Prof was a real person but her question suggests that some users might not be certain where the boundary between virtual therapist and real therapist lies. This could lead to harm if vulnerable clients use similar systems thinking that a real person will respond if needed. The findings of
this study suggest that making this clear to users may need to become part of ethical standards, particularly as computer systems develop and become increasingly complex and people expect more from them.

Sleepio also emphasises that it is supported by science and The Prof makes frequent reference to this. Participants commented that they felt more trust in the intervention and the virtual therapist because they could look into the supporting research:

- I had looked them up. But that was because of the research thing. And I found out that, you know, I think they just got some funding in some way to develop it. And I thought, okay it is actually a serious-- you know, it's not somebody making some podcasts to help somebody sleep, that may or may not work, and they're making some money from it. I thought there is actually something proper behind. [Anna]

Tim has academic training and also looked up the evidence base since he was considering recommending it to others:

- I did a lot of reading around the course and I did look up the, kind of, evidence base for it. [Tim]

This may suggest that for other developers, simply creating a virtual therapist with similar qualities to The Prof is not sufficient to build trust, because users may moderate their relationship to the virtual therapist based on their knowledge of the credibility of the people behind the scenes.

9. Separating The Prof from the program

When discussing her experience of the ending Jude seems to express some sadness and disappointment, but she makes an interesting distinction between the character of The Prof and the rest of the program:

- Jude: I just didn't expect it to be so abrupt I think. I think what it was, was the fact that I tried to get onto the program and it was all gone. I couldn't get access. And it was like 'This is the end go away. You're finished with'. Even though it wasn't The Prof, it was just the ending of the whole program really.

Interviewer: When you put that voice on and you said 'This is the end go away', who or what did it feel like was saying that to you?

Jude: Hmm, just wording on the screen I think.
Interviewer: But that wording didn't feel like it was The Prof saying it? It felt like it was the website?

Jude: No, no, no! It didn't feel like it was The Prof. It was not, not in that character.

Interviewer: So if it had been-- this is all hypothetical, but if it had been The Prof telling you that, you know, your subscription has run out..?

Jude: Oh I think I would have been, I would have been quite let down I think.

For real therapists part of their professional skill set involves dealing with complex relational processes, such as ending therapy when the client wants it to continue. For Jude the separation of The Prof’s kind nature from the website’s bluntness could be interpreted psychodynamically as a way of maintaining The Prof as a good object while splitting any negative feelings off and directing them towards the website as if they are separate entities (Greenberg & Mitchell, 1983). At a separate point Jude makes a similar separation between The Prof and the computerised medium when she describes how sessions kept “grinding to a halt” on her device, which she describes as “very irritating”, but when asked if any of that irritation “was directed towards The Prof?” she again replies “No, no, no. Not at all.” Tim, despite taking the most analytical and abstract view of The Prof, made a similar distinction between The Prof and the program when he encountered a problem:

- I saw it more as a bit of a flaw in the Sleepio program. I don't think-- I don't think it affected me feeling how The Prof was. [Tim]

It could be argued that Anna engages in a similar process. She explains that someone “telling you what to do and making the decisions for you” was a big part of what she liked about her experience. But when asked how she understands whether that ‘someone’ is The Prof or the Sleepio creators she replied, perhaps with a hint of embarrassment:

- No it does feel like The Prof. Because the, the things the ‘Help Me Get To Sleep Now’ thing that they have, I mean that's always a man talking to you. And I just-- I mean I don't think it’s him really, but I kind of do, you know? (laughing). I, I, I, I know he isn't real, but. [Anna]
This hesitant explanation points to some of the social complexities that explaining the experience of relating to a virtual therapist brings up for my participants, as I will discuss in the next theme.

**A need to qualify and justify the experience**

When probing participants to get a sense of the depth of their relational experiences with The Prof, their responses could be interpreted as displaying a desire to justify or qualify their experience. A particular feature was the frequent use of laughter as a social cue.

**10. Qualifying behavioural responses**

The phenomenon of having their behaviour changed by the relational aspects of the virtual therapist’s actions seemed to lead participants to laugh at themselves, perhaps indicating surprise at their realisation as they described the experience:

- *If you tell people you’re going to do things you’re more likely to do them. Even though he’s not real (laughs).* [Steph]
- *I think The Prof actually did make a difference. Because it's not a very pleasant thing to have to do. And I think, well, I did it I suppose (laughing). And I was pretty compliant!* [Tim]

This may also have acted as a signal to the interviewer that they are not naïve, and are aware of the social responses the virtual therapist was tapping into.

**11. Justifying the experience to others**

When asked how they might explain The Prof to someone who has never heard of him there are signs the unusual nature of interacting with a virtual therapist may lead them to feel the need to justify themselves:

- *My starting position would be ‘this is going to sound silly, but’. And then justify it. Because I think that I was surprised by how, sort of, convincing it was. Umm, yeah. You know, ‘there is a little cartoon man who tells me how to get better sleep’. It just sounds a bit weird, doesn’t it? But you know I think it is a great device. And I think it has made it far better and more personalised for me that it would be without The Prof.* [Anna]
Well I think I've done this before to friends, so I've talked about Sleepio (laughing). I talked about the little, a little adorable Scottish professor and his dog Pavlov. [Steph]

If advocates of virtual therapists want the approach to spread, then this analysis suggests that the social acceptability of this approach may be a limitation and is an area that needs to be better understood.

12. Qualifying enjoyment of The Prof

Another factor that users seem to feel the need to justify is their enjoyment of a virtual therapist whose characteristics might seem trivial or childish. Elizabeth has worked with children and this seems to shape her experience:

- **Interviewer:** Do you remember what, kind of, what it was like to get the questions right, for you?
  
  **Elizabeth:** (Smiling) Yeah, yeah, there was a lot of, sort of ‘Hooray! You got it right!’ So yeah, it was-- it was funny. Umm, but umm, encouraging as well. It was I think, err, err, I think adults probably do enjoy that more than they would let on (laughs). [Elizabeth]

- I think adults would maybe, umm, feel uncomfortable to say that they, err, they enjoyed getting encouragement from a cartoon character. But I think the fact that you could watch it on your phone or on your laptop in private means that you can, err, you can enjoy that little interaction. And you, you can almost take a moment back to your childhood and err, just enjoy that little, little feeling of, ‘Oh yeah, I did it’ (laughs). [Elizabeth]

Tim also seemed to feel a need to qualify his enjoyment of the cartoon representation of a virtual therapist with laughter:

- I have young children and I'm very familiar with a lot of different cartoons (laughing) and I suppose I gave it a bit-- like characters in these things are, sort of benign sort of figures. [Tim]

The world’s largest tech corporations (Google, Apple, Amazon, Facebook) are all investing heavily in interactive and responsive assistants and they are predicted to become more common. As society becomes more familiar with such technologies it may be that social awkwardness diminishes. An area for future research could be to see whether this hypothesised need to qualify and justify the relational experience
changes over as new generations grow up in a world where such relationships are seen as more normal.

13. Use of laughter to qualify emotion

The use of laughter to qualify emotion could have been presented as an integrative theme. It is included here as a subordinate theme because some examples of participants’ laughter can be interpreted as being used to qualify expressions of emotional connections to The Prof. This was mainly present in Anna and Jude’s accounts. As mentioned previously, Anna felt a bit disappointed that The Prof did not respond appropriately to what she felt was a bad night’s sleep. Reflecting on this she said:

- Perhaps you sort of forget that it is actually, it is just a series of, sort of, you know, things in programming, isn’t it? Really not an actual per-- (laughs), there isn’t actually a person sat there saying ‘Oh dear. She thinks she slept very badly. But it looks like we think she slept very well. Perhaps someone ought to talk to her’. Because that isn’t actually happening (laughs). [Anna]

Similarly, Jude uses laughter when describing more emotive and meaningful experiences. For example, at the start of the interview when Jude explains her first experience of The Prof:

- Jude: I was excited! That, umm, this, this character was, umm, telling me these, these things that I, I could do. And that I could achieve for myself. But I was very excited. And I stuck to it like glue and saw it all the way through to the end. And I changed-- changed my whole routine to accommodate it. And I took it very seriously and I believed in it.

Interviewer: Right. I understand, thank you.

Jude: Does that sound a bit emotional? (laughing) [Jude]

Jude’s words seem to convey a surprising depth of relationship with The Prof, which I interpret as leading her to feel a need to qualify through laughter. This is also evident in her account of how she felt disappointed at the abrupt end of the program:

- Jude: I felt quite sad when it finished. Um, I missed him. Umm, I, I, I felt (laughing) a bit bereft.

Interviewer: Yeah?
Jude: Yeah. A bit. I didn’t realise how much of a part of my life it had become. And, umm I-- when it had finished I was-- umm, sounds a bit extreme, but umm, yeah. [Jude]

Later in the interview Jude repeats the same pattern of expressing a relational experience, but needing to qualify this through self-deprecation:

- Jude: I felt sad! (laughing) He’d gone! He’d become my friend over the weeks.
  Interviewer: Mmm so it wasn’t just the, sort of, the program? It was The Prof as well?
  Jude: Yeah, yeah. Daft isn’t it really? [Jude]

This suggests that even though Jude had a very positive experience of the program overall, the designers may have underestimated the level of relational depth that the virtual therapist can create and consequently underestimated the need for a gradual end to the relationship. A better experience with virtual therapists may be possible by taking into account more of the existing literature from psychological therapy about how to manage endings in therapy (Murdin, 2000). However, ending any meaningful therapeutic relationship can also be understood as necessarily and appropriately sad and a process of loss. Jude’s experience could therefore be interpreted as an indication that the virtual therapist had successfully formed a beneficially deep level of relationship.

16. Justifying experience of cultural factors

This final subordinate theme could also have potentially been an integrative theme since cultural and diversity issues have been touched upon throughout the analysis. It is included here because there again seems to be a pattern of justifying positive experiences of The Prof in relation to his cultural identifiers. Anna expressed this in the most reflective and relational manner:

- I can’t believe that I bought into this sort of male older persona as the appropriate caricature of a professor. And, I thought, that's, that's not, I thought I'd better not tell (laughing), tell some of my female colleagues that! But, and then I, I find myself sort of equally with the equal awful thing, really, that I liked-- I thought it felt right for me that he was older and that he was a man. [Anna]
- Just like if you had booked to see a real therapist they'd be a person of a particular age and sex, and that would be constant. I quite like that I got the person I got. [Anna]

Yan was more indifferent to The Prof’s cultural identifiers, but again made some attempt to justify her experience:

- The progressive in me would love to see someone who is not a white male. But also, realistically, I know that probably for the majority of the population a white male probably is more effective still than having someone who is the opposite, right? So you know, that's fine I guess. [Yan]

And Tim, who is Irish and had previously noted positive associations with Scottish accents, said:

- Tim: I'm thinking how to be polite about this (laughing). I think, I wonder if it was a more classically English accent it mightn't have had quite the same impact?

  Interviewer: Right, yeah.

  Tim: I'm not trying to be offensive (laughing). [Tim]

This tension or awkwardness that seems to come out when discussing the virtual therapist’s cultural identity may be indicative of the sensitive nature of these topics in wider society.

At the start of the course participants are greeted by name by The Prof. As has been noted previously, some participants found this a memorable and engaging experience. However, Yan, who has an East Asian name, did not have her name spoken by The Prof:

- I don't think he did in the voice but he definitely did in the emails. [Yan]

This is presumably because the actor who voices The Prof only recorded more common names, but these are likely the common names for Western / Anglophone cultures. This is admittedly a small example, yet this principle of attempting to make a virtual therapist more engaging on the utilitarian basis of providing the most agreeable experience to the average user raises ethical questions about whether users who fall outside of the majority are marginalised by mass-market virtual therapists with fixed characteristics.
Limitations and suggestions for future research

As an exploratory investigation of the experience of only six users, these findings may be useful in developing theories and ideas that can be transferred to other research, but they cannot be generalised to a broader population of Sleepio users. Similarly, this study only focuses on one aspect, the virtual therapist, of one intervention, Sleepio. Other examples of virtual agents in therapeutic programs are fairly limited and use a diverse number of strategies. Therefore, the transferability of findings related to The Prof to other virtual agents is also limited. However the results here are still of significance to the psychotherapeutic professions for at least three reasons: in and of itself Sleepio is already a prevalent intervention and worthy of investigation; as a proof of concept this study might inspire similar research into new virtual therapeutic agents; and it may provide insights for developers of such programs as to how they can use relational features to enhance their programs as well as how they might manage ethical dilemmas in the design of virtual therapists.

Participants were not meant to be representative of any particular population beyond their having had experience of The Prof. However there is evidence that those who are active in online communities tend to over-represent strongly polarised positions (Bessi et al., 2016; Del Vicario, Scala, Caldarelli, Stanley & Quattrociocchi, 2017). Anecdotal evidence from the process of recruiting participants suggests that the majority of users who had mentioned Sleepio online were expressing positive experiences. The few prospective participants who had openly expressed more negative perspectives about Sleepio and The Prof did not follow through to interview. Furthermore, dropout rates of around 50% were reported in the largest Sleepio study to date (Freeman et al., 2017). Future research should look into this significant number of people whose experience of the virtual therapist remains unknown.

Conclusions

Randomised control trials of Sleepio have suggested that it is as effective as face-to-face CBTi. Overall all, participants reported that they found Sleepio to be beneficial. Furthermore they all reported that The Prof was a positive aspect of the course, and felt that the same program content without the virtual therapist would not have been as
engaging or effective. They all shared experiences which illuminate the ways in which The Prof was interactive and emulated certain behaviours that one would expect of a real therapist. They also all gave examples of how this ‘illusion’ and ‘suspension of disbelief’ were only partial and could easily be disrupted.

Despite these similarities there was a noticeable difference in the extent to which they saw their relationship with The Prof as rich or central to their experience. Some seemed to suggest that the application of a virtual therapist was little more than a pleasant gimmick that made the information easier to listen to. Roughly speaking, these participants were Tim, Yan and Elizabeth. Others seemed to suggest that the Prof was more central to their experience, and their relationship with him seemed richer and more emotional. I would suggest this includes Jude, Anna, and to a lesser extent Steph. This finding is important because until now there has been no publicly available research distinguishing between those users who find the virtual therapist more or less important. In Sleepio’s efficacy studies the participants in this research would likely all be recorded as positive outcomes and there would be no way to discern what exactly the active ingredients were for each user. Further research into differences between sub-populations could allow virtual therapists to be designed and deployed in a more targeted manner. Such research could include idiographic approaches, outcome measures of relevant psychological complaints (insomnia, depression, anxiety, psychotic experiences) and measures of the therapeutic relationship (e.g. Working Alliance Inventory (Horvath & Greenberg, 1989)).

It is clear that Prof has been designed to be positive, reassuring, and kind as he motivates and guides users through cognitive and behavioural tasks. However, this represents only one small part of the broad range of interactions that have been theorised to be of importance in the wider therapeutic relationship (Cahill et al., 2008). Most therapeutic modalities recognise the importance of what one might consider less friendly emotions, including anger and hate (Epstein, 1977). In this sense the boundaries of the therapeutic relationship that this example of a virtual therapist emulates is quite narrow. Consequently, I would suggest there seems no need to fear that the entire therapeutic relationship is anywhere near being replaced by computer technology or that the psychotherapeutic professions are under threat from virtual
therapists. However, since computerised therapy programs such as Sleepio are advocated as being as effective as human-delivered CBT (Espie et al., 2012), producing detailed evidence of the strengths and limitations of current virtual therapist technology is essential to allow practitioners, clients, and commissioners to make informed decisions about their suitability on a case by case basis.
References


Appendices to Research Report 2

Interview schedule

A) Preamble:
1) Although Sleepio has a variety of features I’m primarily interested in The Prof so please share anything at all that comes to your mind that relates to your personal experience of The Prof.

B) General introductory questions:
2) How did you come to use Sleepio?

3) What led you to use a computerised program?

4) How did you typically access Sleepio?

C) First impressions of The Prof:
5) Did you already know anything about the role of The Prof’s role in the program?

6) What were your expectations of using a program that includes a “virtual sleep expert”?

7) What were your first impressions of The Prof?

D) Specific features and behaviours of The Prof (majority of interview time spent on these questions)
8) What did you make of The Prof’s personal characteristics?
   (Prompts/Examples: appearance, voice, and explore any other characteristics they mention)

9) Do or any interactions with The Prof stand out in your memory? In what way?
10) Can you tell me about any other features of the course that you remember? What was The Prof’s role in that? / What was it like to engage with The Prof around that feature?
   (Prompts/Examples of interactions & features: signed agreements, requests for sleep and mood diaries, completion of quizzes, notifications/texts/emails from the Prof, mindfulness audio recordings guided by The Prof, graduation certificate.)

11) Did you experience the Prof as responsive or unresponsive? How so? Can you talk me through any examples?
   (Prompts/Examples: times when mood/sleep ratings went up or down, times when tasks completed correctly or incorrectly, times when tasks completed on time or late, use of their first name)

E) Overall experience of The Prof
12) What did you find most helpful in your interactions with the Prof? What did you find least helpful?

13) Would you say that the Prof made a difference to your experience? If so, in what ways?

14) Did you have any contact with other people via the program? (e.g. forums, staff). If not, why not? If so, what difference if any did this make to your experience of The Prof?

15) Did your experience of The Prof or your feelings towards him change across the duration of the course?

16) How relevant was it that The Prof was addressing sleep issues? How would you feel if it was possible to work with The Prof on other mental health or other wellbeing issues?
17) What would you think if The Prof had a different appearance? (e.g. accent, gender, race, etc.)

18) Overall, would you say you built a relationship with the Prof? How would you describe your relationship with The Prof?

19) How might you summarise what it’s like to interact with The Prof to someone who has never heard of Sleepio?

20) Is there anything else about your experience of The Prof that you’d like to share that we haven’t discussed yet?
Example section of transcript of an interview

\textit{N.B. Only 2 pages of a transcript of one interview is presented.}

\textbf{R} = Researcher  \\
\textbf{A} = Anna

\textbf{R}: So it sounds like your experience overall was very friendly. Very nice. Very positive. And would you say that The Prof is part of that experience? As well as other parts of the program?  
\textbf{A}: Yeah (smiling). I really like that as a character, because you do feel like somebody is--well, I think that's my thing isn't it? Telling you what to do. And making the decisions for you. It's not just like there are-- here is a--. Like, you know, I use, like I say, Buddhify. And there's a sleep version of Buddhify isn't there? Is it just called Sleepify?  
\textbf{R}: Yeah, yeah.  
\textbf{A}: Maybe? It's all there and it's all colour-coded on a wheel in a way but you choose, you choose. Whereas with this it's a bit more like (long pause). It's more like following a program. Because somebody else is, sort of, giving you things in chunks. So you answer some questions, and you keep a sleep diary for a week, then they come back to you and change what you're doing. So somebody else is giving you direction.  
\textbf{R}: So for you that-- it being someone else giving direction, advice, guidance, was a big part of what you found beneficial?  
\textbf{A}: I think so.  
\textbf{R}: And so that other person, is that, for you, The Prof?  
\textbf{A}: Yeah.  
\textbf{R}: Or is it kind of the Sleepio creators? How do you understand that?  
\textbf{A}: No it does feel like The Prof. Because the, the things the ‘Help Me Get To Sleep Now’ thing that they have, I mean that's always a man talking to you. And I just-- I mean I don't think it's him really, but I kind of do, you know? (laughing). I, I, I, I know he isn't real, but.  
\textbf{R}: Well that's really interesting to me, so I'm interested to hear more about that.  
\textbf{A}: I just-- and the first time I used it I just, sort of, I don't know, it was just (pause). Yeah, that's just who you think it is. And you’re sort of-- there are so many, I've done so many guided sleep meditations, and some of them there's a very particular way that people talk in them. And it's almost-- I've got a friend and I told him about one sort of series that I'd found on, on Spotify. And I said they are really good, you just have to ignore the voice. And he just came back to me and said “No. I can't. It sounds too spooky. It's like someone doing a fake
séance”. And there's a sort of sort of pace and a tone and a resonance to the way that people do that which is almost faux calming, you know? And (laughs) is actually really unsettling. Because nobody talks like that. Whereas the Sleepio ones, it is just, it's a calming type of speech, but there's still just quite normal and ordinary. And I remember thinking for the first time I used it “I'm really glad The Prof is not using a silly voice”. And it so I do personalise it little a bit like that, yeah.

R: That's really interesting. One of the things I wanted to ask about was your experience of those kind of personal characteristics of The Prof, like his voice, his tone of voice, his accent. You've already said some of it but if you could just say a little bit more about your experience of The Prof’s voice.

A: I mean, I think it gets it kind of right. Because when he's talking to you in the little video clips he's a little bit more upbeat and encouraging and it does feel like that but the, the meditations themselves a very soothing and reassuring.

R: And you listen to them at night? Using the “I need to sleep” feature?

A: Yeah “can't sleep”. Because it gives you a choice. It, you know, “what's the problem”, “my mind's racing. I can't relax. I'm worried about sleep.” And you see there's always a choice of four, which-- of which one do you want. And even within them the tone is slightly different. And he's-- I don't know if you can imagine a person sat with you telling you how to relax and get to sleep, like a sleep tutor, it's kind of how you'd want them to sound. And I think, having heard lots of examples of, like, as I say, you know, sleep meditations, I think they just get it really right.

R: That's really interesting. Yeah.

A: But in the video clips his tone of voice is definitely, it's more, it's more it's the sort of thing I use with my students really. It's like, “right, we're all in this together, and this is what we're going to do. This is what I'm going to do. This is what you're going to do and it's going to be ok”. And even the sort of the way that he moves when he's talking to you, it just kind of works.

R: I think that's really interesting. So the idea that, for you, he-- The Prof’s tone of voice is adjusted to be suitable to the information that he's delivering, and to the time that you need it...?

A: No. I feel that. Yeah.

R: And you mentioned also the way that he walks. Were there any other features of The Prof’s, kind of, personal characteristics, things like the way he looks, the way he talks, what kind of a character he is, that stand out in your mind?

A: I mean, well he looks, he looks like a lot of people think of a professor as, wouldn't he? I'd say, umm (long pause for thought). I don't know (pause).
Excerpts from stages of interpretative phenomenological analysis

Extract taken from Steph’s interview.

Looking for themes in the first case

<table>
<thead>
<tr>
<th>Data</th>
<th>Initial notes</th>
<th>Emerging themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>What was that like?</td>
<td>Maybe qualifying her emotion?</td>
<td>Like a real therapeutic experience.</td>
</tr>
<tr>
<td>S: Aah, it was a little bitter sweet.</td>
<td>Calls the sessions talks, but she’s not talking.</td>
<td>Prof as authority.</td>
</tr>
<tr>
<td>I definitely appreciated the weekly</td>
<td>Appreciated Prof’s instructive role.</td>
<td>Layers of responsibility - client / Prof / program / team.</td>
</tr>
<tr>
<td>talks. And, umm, the different things</td>
<td>Disappointment?</td>
<td></td>
</tr>
<tr>
<td>I learned about sleep, and different</td>
<td>Lack of being prepared - who was responsible for</td>
<td></td>
</tr>
<tr>
<td>strategies. Uh.</td>
<td>this?</td>
<td></td>
</tr>
<tr>
<td>Actually it was funny, I</td>
<td>Lack of clarity.</td>
<td></td>
</tr>
<tr>
<td>hadn’t really thought about when the</td>
<td>Responsibility for this hers or Prof/program’s?</td>
<td></td>
</tr>
<tr>
<td>graduation was going to be. I wasn’t</td>
<td>She has to fit set limit even if she hasn’t hit her</td>
<td></td>
</tr>
<tr>
<td>really sure if it was graduation after</td>
<td>goals. Automated nature of experience.</td>
<td></td>
</tr>
<tr>
<td>your 6 weeks, or graduation after you’ve</td>
<td>Surprised.</td>
<td></td>
</tr>
<tr>
<td>accomplished your sleep goals. So that</td>
<td>Not ready to graduate.</td>
<td></td>
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<tr>
<td>was like “Oh yeah. I guess this does</td>
<td>Wants more support.</td>
<td></td>
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<tr>
<td>make sense that I would be, err,</td>
<td>Switch of responsibility from Prof to her.</td>
<td></td>
</tr>
<tr>
<td>graduating after the six week program,</td>
<td>Badly managed ending.</td>
<td></td>
</tr>
<tr>
<td>and now it’s more on me to work on it”.</td>
<td>Loss of routine.</td>
<td></td>
</tr>
<tr>
<td>Which I think is part of the reason</td>
<td>Depended on Prof.</td>
<td></td>
</tr>
<tr>
<td>why I didn’t go through the forums as</td>
<td>Surprise. Disappointment.</td>
<td></td>
</tr>
<tr>
<td>much because I knew that every week I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>was going to be</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
talking to him. And then when I realised that I wasn't going to be talking to anybody even though, you know I-- he being not real, I didn't. Like I should have then gone more into the forums. But I didn't really. I think it was like this disconnective. “Oh. I'm done with this.” and I don't know how long-- I didn't know if I had only 12 weeks in the Sleepio programme. So it was-- yeah. I had that disconnect of like “Oh. Now it's time to really talk to people and be on the forums and be asking questions”. And like I had-- I had graduated. I can impart my knowledge or ask questions of the people.

Not sure how to best continue change.
Acknowledging use of word talk again?
Qualifying her experience to me.
Prof as real vs. not real.
Should transition from virtual to real.
Disappointed in self.
Cutting off from loss of relationship.
Their responsibility for not communicating therapy length.
Annoyance at surprise.
Literal disconnect and psychological disconnect.

Didn't feel ready to be graduate.
Expectations: to be sleep expert, to others.
Limitations of relationship with Prof - depth, knowledge, duration.
Client to peer expert.

relationship.
Prof as reliable / secure base.
Qualifying relational experience.
Confusion between relationship vs. technology.

Emotional / relational / psychological response to the experience.

Limitations of relational experience.

Layers of relationship - Prof, program, forums, real people.

Initial un-structured list of themes
The Prof’s character /characteristics
Confusing use of pronouns
Like a real therapeutic experience
Personalised vs. automated
Illusion of two--way relationship
Prof as secure base
Qualifying relational experience
Confusion between relationship vs. technology
Cultural lens
Emotional responses
Relational responses
Psychological responses
Embarrassment about enjoyment
Embarrassment about meaningfulness
The Prof as reassuring
The Prof as an authority
The Prof as a friend
The Prof as a coach
The Prof as professor
Limitations of relational experience
The Prof as more reliable than a real person
Keeping the balance between real and artificial in one’s head
Need to qualify and justify experience to others
Novelty vs. repetition
Suspension of disbelief
Relationship with The Prof
Relationship with the program
Relationship with the staff
Relationship with the creators
Relationship with the scientists / science
Responsiveness
Glitches
Who to allocate positive /negative experiences to?
Who to allocate positive /negative qualities to?
Ruptures in therapeutic experience
Multiple layers of relationship
Multiple layers of responsibility
Need to justify that The Prof tapped into behavioural responses
Need to justify liking The Prof despite his ethnicity, gender, etc.

Loosely clustered themes
The Prof’s character /characteristics
The Prof as more reliable than a real person
Prof as secure base
The Prof as reassuring
The Prof as an authority
The Prof as a friend
The Prof as a coach
The Prof as professor
Like a real therapeutic experience
Illusion of two-way relationship
Personalised vs. automated
Novelty vs. repetition
Confusion between relationship vs. technology
Emotional responses
Relational responses
Psychological responses
Limitations of relational experience
Keeping the balance between real and artificial in one’s head
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Responsiveness
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Ruptures in therapeutic experience
Confusing use of pronouns.
Relationship with The Prof
Relationship with the program
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Relationship with the creators
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Who to allocate positive /negative experiences to?
Who to allocate positive /negative qualities to?
Multiple layers of relationship
Multiple layers of responsibility
Qualifying relational experience
Embarrassment about enjoyment
Embarrassment about meaningfulness
Need to qualify and justify experience to others
Need to justify that The Prof tapped into behavioural responses
Need to justify liking The Prof despite his ethnicity, gender, etc.
Cultural lens
**Initial table of superordinate and subordinate themes, including basis in source material to ensure connection to participant accounts**

<table>
<thead>
<tr>
<th>Theme</th>
<th>Identifier</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RELATIONAL FEATURES OF THE PROF:</strong></td>
<td></td>
</tr>
<tr>
<td>- Reassuring</td>
<td>Y: “positive and reassuring demeanour”</td>
</tr>
<tr>
<td>- Friendly</td>
<td>J: “gentle and friendly”</td>
</tr>
<tr>
<td>- Encouraging</td>
<td>S: “positivity motivated me more”</td>
</tr>
<tr>
<td>- Reliable</td>
<td>A: “Exactly. And that’s quite reassuring”</td>
</tr>
<tr>
<td>- Secure base</td>
<td>A: “quite parental”</td>
</tr>
<tr>
<td>- Authority</td>
<td>J: “associated him with one of the consultants”</td>
</tr>
<tr>
<td>- Academic</td>
<td>A: “like people expect a professor to be”</td>
</tr>
<tr>
<td>- Coach / Instructor / Guide</td>
<td>A: “this is what I’m going to do and this is what you’re going to do”</td>
</tr>
<tr>
<td>- Cultural identifiers</td>
<td>E: “an older looking person”; S: “I loved his accent”</td>
</tr>
<tr>
<td>- Pleasure in his character</td>
<td>Y: “kind of fun to have this little character”</td>
</tr>
<tr>
<td><strong>RELATIONAL DEPTH VS TECHNOLOGICAL TRICKS:</strong></td>
<td></td>
</tr>
<tr>
<td>- Suspension of disbelief</td>
<td>Y: “you suspend disbelief”</td>
</tr>
<tr>
<td>- Illusion</td>
<td>T: “you could say there is an illusion”</td>
</tr>
<tr>
<td>- Keeping balance between real and artificial in one’s head</td>
<td>J: “never accepted him as a real person”</td>
</tr>
<tr>
<td>- Relational &amp; psychological responses</td>
<td>Y: “they are helpful. Even if you’re aware”</td>
</tr>
<tr>
<td>- Like a ‘real’ relationship</td>
<td>S: “more like someone was actually focussed on you”</td>
</tr>
</tbody>
</table>
| - Limitations | A: “if you’re not why do you keep
- Glitches

**TO WHOM OR WHAT IS THE USER RELATING?:**
- Relationship to team behind Prof
- Relationship with sleep expert
- Relationship with scientific basis
- Multiple layers of relationship
- Who to allocate positive / negative experiences to?

**A NEED TO JUSTIFY OR QUALIFY THE EXPERIENCE OF RELATIONSHIP:**
- Qualifying that The Prof tapped into behavioural responses
- Qualifying experience to others
- Qualifying enjoyment of The Prof
- Qualifying re: cultural markers
- Use of humour to justify emotion

<table>
<thead>
<tr>
<th>Asking?</th>
<th>S “all of a sudden it would remember”</th>
</tr>
</thead>
<tbody>
<tr>
<td>E: “someone has thought about”</td>
<td>E: “the voice of the, umm, the sleep experts”</td>
</tr>
<tr>
<td>T: “I did look up the evidence base for it”</td>
<td>A: “I don’t think it’s him really, but I kind of do”</td>
</tr>
<tr>
<td>J: “No! It didn’t feel like The Prof”</td>
<td>T: “did make a difference … I did it I suppose … I was pretty compliant!”</td>
</tr>
<tr>
<td>A: “this is going to sound silly!”</td>
<td>E: “adults probably do enjoy that more that they would let on”</td>
</tr>
<tr>
<td>Y: “for the majority of the population a white male probably is more effective”</td>
<td>J: “I felt sad! (laughing)”</td>
</tr>
</tbody>
</table>
### Final table of condensed superordinate and subordinate themes for write up

<table>
<thead>
<tr>
<th>Relational and personal features of The Prof</th>
<th>Relational depth vs. technological illusion</th>
<th>To whom or what is the user relating?</th>
<th>A need to qualify and justify the experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Reassurance, friendliness and encouragement</td>
<td>5. Conscious suspension of disbelief</td>
<td>8. Relationship to the humans behind The Prof</td>
<td>10. Qualifying behavioural responses</td>
</tr>
<tr>
<td>2. Authority and reliability</td>
<td>6. Relational responses despite awareness</td>
<td>9. Separating The Prof from the program</td>
<td>11. Justifying the experience to others</td>
</tr>
<tr>
<td>3. Cultural identity</td>
<td>7. Limitations and glitches</td>
<td></td>
<td>12. Qualifying enjoyment of The Prof</td>
</tr>
<tr>
<td>4. Enjoying The Prof’s character</td>
<td></td>
<td></td>
<td>13. Use of laughter to qualify emotion</td>
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<td></td>
<td></td>
<td></td>
<td>14. Justifying experience of cultural factors</td>
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</tbody>
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