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editorial

Motivational Interviewing - lessons learnt and challenges ahead

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Motivational interviewing (MI) has become a well-recognised person-centered counseling approach aiming at eliciting and strengthening motivation to change (Miller & Rollnick, 2013). It is designed to guide toward a specific goal by eliciting and exploring the person's own reasons for change, goals and values within an atmosphere of acceptance and empathy. The application of MI continues to grow at a rapid pace, crossing the boundaries and generating intense interest in various fields. Over the last decades practitioners and researchers extended MI well beyond its application in alcohol and drug use disorders to areas as diverse as health care, preventive care, homelessness, criminal justice, and education. Common in all settings and applications is behavior change.

There is now wealth of evidence from randomised trials for the effectiveness of MI in the treatment of substance abuse as well as a number of other settings, including family practice, chronic care, diabetes, cardiac rehabilitation, and diet and exercise. Several systematic reviews and meta-analyses of MI have now been published and these generally report positive small-to-medium but clinically significant effects (see e.g. Burke, Arkowitz, & Menchola, 2003; Lundahl et al., 2013).

This special issue of the European Health Psychologist addresses current topics of interest in MI research and practice, such as the identification and best promotion of core MI techniques, limitations and novel areas of research in MI, and the importance of developing adequate cross-cultural training to insure best MI research and practice.

Contents of the issue

The first contribution by Resnicow, Gobat and Naar (2015, this issue), discusses the central role of eliciting Change Talk (CT) in MI. According to the MI literature, the expression of CT is a key factor for behavior change and positive outcomes in the MI context. It is therefore crucial that practitioners are provided with guidance on how to do it effectively, including the mode and context in which it is promoted (e.g. relational skills). Starting with a description of CT and its role in MI, the authors then describe core – reinforcing and eliciting - techniques to facilitate CT.

Next, Lee and Griva (2015, this issue) highlight the possible interface between neuroscience and MI, drawing on evidence from two novel studies that have sought to explore the neurobiological correlates/effects of MI. The authors provide examples of these studies on brain activity markers related to change talk, and propose avenues for future research such as examining the connectivity within and between neurological networks, to better understand activation and functionality patterns during MI.

Sarah Hardcastle (2015, this issue) presents us with a position paper on the need for improvement in the description and classification of the techniques commonly used MI in interventions. The taxonomies of techniques can guide both research (i.e.

development of interventions) and practice in terms of training and supporting competency in practionner. The paper also contrasts content-related and relational-interpersonal techniques in MI, and discusses the importance of identifying techniques that are unique to MI (e.g. Change Talk) and those that are common to other counseling and health behavior change methods, as described in the Behavior Change Techniques Taxonomy (Michie et al., 2013)

This special issue ends with a contribution from McMaster and Griva (2015, this issue), who report on their experience on delivering MI training for practitioners with various backgrounds and acting in a variety of contexts worldwide. Using as examples activities conducted with trainees on their perceptions of clinical practice, the authors point out similarities between different locations (e.g. features of and barriers to good practice), and draw attention to need of cross-culturally adapt MI training to increase the acceptability of the training and feasibility of increase the effectiveness of applying MI in different cultures.

In Conclusion

This special issue brought together a practical guide for addressing core MI techniques, contributions on current limitations and innovative research, namely on the neurological markers associated with MI, and on the identification of the MI techniques (i.e. what characterizes MI counseling), a much needed step in MI research; and reflections on the use of MI in different health care settings and cultures.

We hope that these contributions will stimulate consideration and reflection in the research and application of MI for health behavior change among our readers.

We hope you enjoy this issue!

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original article

Intensifying and igniting change talk in Motivational Interviewing: A theoretical and practical framework

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Introduction

Reinforcing and eliciting change talk (CT) has emerged as an essential active ingredient of Motivational Interviewing (Barnett et al., 2014; Gaume, Bertholet, Faouzi, Gmel, & Daeppen, 2013; Glynn & Moyers, 2010; Miller & Rollnick, 2013; Miller & Rose, 2009; Moyers, Martin, Houck, Christopher, & Tonigan, 2009). Evidence for the causal role of change talk includes the association between the amount and trajectory of client change talk expressed within session and subsequent behavioral outcomes (Amrhein, Miller, Yahne, Palmer, & Fulcher, 2003; Gaume et al., 2013; Gaume, McCambridge, Bertholet, & Daeppen, 2014; Magill et al., 2014; Vader, Walters, Prabhu, Houck, & Field, 2010) as well as studies demonstrating that specific therapist behaviors (and training activities) can facilitate expression of CT (Barnett et al., 2014; Carcone et al., 2013; Gaume et al., 2014; Glynn & Moyers, 2010; Magill et al., 2014; Moyers et al., 2009). Given the importance of encouraging Change Talk, providing MI practitioners with strategies that can encourage its expression can substantially improve the efficacy of their counseling. This article describes a series of CT evocation strategies, some of them new; some tried and true, as well as a framework for when and how to employ them. We differentiate between strategies that intensify or reinforce organically expressed change talk, even if only weakly expressed by the client, and strategies to elicit or ignite it. We begin first by providing some theoretical considerations as well as placing the aforementioned strategies within the overall context of the MI encounter.

A common framework for understanding and structuring MI encounters is the "four process" model proposed by Miller and Rollnick (Miller & Rollnick, 2013) that entails; 1) Engaging, 2) Focusing, 3) Evoking, and 4) Planning. A similar, three-phase model (Explore, Guide, Choose) was previously described by Resnicow and McMaster(Resnicow & McMaster, 2012). In the Engaging and Focusing phases (the Explore phase in the three-phase model), the MI counselor first works to establish rapport and trust, support autonomy, and collaboratively set an agenda for what will be discussed. Whilst change talk can occur across any process or phase, it is typically during Evoking (Guide in the three phase model) where the counselor employs targeted technical skills to help the client express and expound upon change talk, ideally leading to a crescendo of motivation that culminates with a commitment to change. Evoking change talk can entail several sub-steps including recognizing it, reflecting it, and extracting it. In this article we will distinguish between intensifying organically expressed CT and igniting CT that may not yet have been expressed but may have been nonetheless dormant within the client.

As represented by the DARN-CAT continuum (with the acronym standing for: Desire, Ability, Reasons, Need , Commitment/Intention, Activation, Taking Steps (Miller & Rollnick, 2013; Moyers et al., 2009)) change talk can manifest in numerous forms and degrees, ranging from the

client expressing only muted interest in change or problem recognition to enthusiastically exploring how their life would be without the current problem behavior or health condition at hand. This exploration can involve looking backward to explore how the client used to feel or looking forward to imagine how their life might look like if they made the change at hand. This exploration can occur verbally during an MI session where the counselor can observe and react to it, although at other times the "change talk" experience can be more intra-psychic or it can occur outside the counseling encounter. Regardless of where or how it occurs, we refer to this exploration as the client's "behavioral test drive". The more time they spend behind the wheel of their new "car", the more likely they are to purchase it. In the parlance of Self-Determination Theory (SDT), CT expression builds autonomous motivation and energizes the change attempt, which leads to greater effort and persistence, and ultimately better outcomes (Deci & Ryan, 1985; Deci & Ryan, 2000; Ng et al., 2012; Ryan & Deci, 2000). One key insight from SDT is that clinicians should try to evoke change talk that is rooted in the client's roles, goals, and values (called identified or integrated motivation) and avoid change talk that is based on "introjected" feelings such as shame, guilt, embarrassment, or social pressure.

Below we describe some specific strategies to help clinicians elicit CT, beginning with some suggestions to intensify or magnify naturally occurring CT followed by some methods to generate additional change talk, when what has been expressed so far is insufficient.

Strategy 1: Reflecting and intensifying buried change talk

When a client expresses faint change talk, that may be buried amidst a litany of otherwise strong sustain talk, a key objective is to encourage the client to elaborate on their reasons and drivers for change; to intensity their CT and move to commitment. This can be accomplished by reflection or question. When using reflections to respond to tepid change talk care should be taken not to overstate client readiness. Overstating client readiness, rather than encouraging elaboration, and progression toward action, can quickly create reactance or discord and move the client backwards motivationally. From a Self-Determination Theory perspective, pressuring a client into a commitment they are not ready to make or overstating their interesting in make a change may be experienced as controlling (Resnicow & McMaster, 2012; Vansteenkiste, Williams, & Resnicow, 2012). Rapport will be weakened and the client's sense of autonomy support eroded. The ideal counselor response corresponds to the strength of the client's expressed change talk. If clients express weak or moderate change talk we generally recommend that counselors reflect at a level of intensity equal to or weaker than what the client has just expressed, i.e., undershoot client motivation. This differs from how we recommend clinicians reflect emotion, where we often encourage reflecting at a level of intensity equal to or stronger than what the client has just expressed, i.e., overshoot emotion. If on the other hand clients express strong change talk, reflecting at that level can be effective, and in fact, understating it (which could be perceived as minimizing their interest in change) could be counterproductive and unnecessarily move the client away from change.

Consider the following exchange.

> Client: "I really like cigarettes. They help me relax and cope with stress. It's better than heroin, something I kicked years ago, and I have never been able to stay smoke free for more

than a few days. But sure I know it's a nasty habit. It's embarrassing; people bug me about it all the time. Maybe someday I might quit for good. Things are fine now, but I know on some level I can't go on like this forever".

Counselor: You seem really ready to quit this time. You are tired of everyone nagging you and you're feeling bad about your smoking. Setting a quit goal would be a good first step.

In the example above, the client has expressed weak/moderate CT (ambivalence) and, in response, the counselor overstates the client's expressed commitment to quit, and jumps prematurely to the planning phase. A likely outcome of this over-statement is that the client would push back, creating discord. Under-shooting the client's CT intensity might instead sound something like:

Counselor: Although cigarettes help you handle your stress and are something you enjoy, part of you feels that this isn't something you may want to be doing down the line. It's something that you eventually might want to remove from your life. You don't feel you necessarily want to be smoking ten years from now.

Consider another case.

Client: I do smoke a lot of weed; practically daily. Sure, I know it kind of makes me a bit of a zombie but it can't be that bad if they are making it legal everywhere, and I still do just fine at work, unless I have to memorize things or write things down.

Counselor: Though you are not convinced it is that bad for you, you are starting to feel that weed might be making you a little less sharp and less efficient as you would ideally like.

In the examples above, note the tentative tone used by the counselor, with phrases like; starting to feel, might be making you, and a little less sharp. Care is taken to not overstate the client's desire or readiness to change. The type of understatement is difficult for the client to argue against, although it is of course possible. Note also, by making the reflection double sided, i.e., recognizing the reasons not to change, the counselor can further soften any potential reactance, and therefore increase the likelihood that the client will elaborate on their reasons for change. In the event a counselor does overshoot the client's commitment to change, they might be required to take a step back and Re-Engage (i.e, regress to an earlier process) before trying to Evoke any further.

Table 1 provides some other examples of similar tentative reflective language that can be used to ensure that the level of client CT is not overshot. Using this type of cautious language decreases the chances that the client will argue with the reflection or experience the statement as controlling.

Although the examples provided are in the form of reflective statements, and reflections are generally encouraged in these cases over questions, the same general principles would apply if the evocation response is implemented through a question. For example, the counselor might ask, "how if at all, might changing xx possibly influence yy in any way", or "what reasons, if any, might you be able to find for changing xx.?

When undershooting CT, the counseling objective is to encourage the client to elaborate and intensify their commitment to change; to pry open the door to change and allow the client to walk through it. In the examples above, the change talk, albeit relatively weak in intensity and buried within other sustain talk, was organically expressed by the client. Sometimes however, there is insufficient organic change talk to unearth; there is not enough raw material to

Table 1
Sample undershooting language for reflecting change talk

You are starting to feel you might want a change xx
You are thinking that you may no longer want xx in your life..
You are starting to think it might be time to change…
You are starting to feel xx has gotten a little out of control
You are beginning to see the benefits of…
You are moving toward….
You are starting to worry a bit more about….
Things are fine as they are, but you are starting to feel you can't go on like this forever
You are beginning to move toward change or considering change…
You are starting to wonder what it might be like with/without XX,,,,
You are starting to feel a little dependent on xxx (for addictive behaviors)….
XX does not feel as sustainable as it once did…
XX is starting to catch up with you…
Something about XX is starting to feel not right for you….
XX is starting to bother you a bit more…

magnify into commitment; no crack in the door. In these situations, counselors can implement one of several strategies to ignite it or extract CT.

Strategy 2: Igniting change talk

There are several methods at the disposal of the MI practitioner to give clients an opportunity to express change talk that has not yet been verbalized. These include the 1) Importance/ confidence rulers, 2) Roles, goals, and values linkage, and 3) Self-affirmation/strengths linkage.

2A: Rulers

Perhaps the most commonly used method to elicit CT through MI is the 0-10 importance and confidence rulers. Because of its relatively long history and wide use amongst MI practitioners, we will only briefly review the ruler strategy. It typically begins with two questions: (1) "On a scale from zero to ten, with ten being the highest, how important is it to you to change [insert target behavior/condition]?" and 2) "On a scale from zero to ten, with ten being the highest and assuming you want to change this behavior, how confident are you that you could (insert target behavior/condition)?" (Miller & Rollnick, 2013; Rollnick, Butler, & Stott, 1997; Rollnick, Heather, Gold, & Hall, 1992). After obtaining the client's numeric rating, the counselor typically asks some combination of the following three probes:

- Why did you not choose a lower number?
- Why did you not choose a higher number?
- What would it take to get you to a higher number?

The first and third probes are intended to elicit CT, whereas the second probe, which some practitioners omit, allows the client to express their fears, dread, and other aspects of their sustain talk. Probing confidence scores can elicit elaboration on the client's perceived ability to achieve change and identify skills or knowledge deficits that may need to be addressed prior to initiating a change attempt.

2B: Roles, goals and values

Another means to ignite CT is to employ the ROLES, GOALS, and VALUES (RGV) linkage. Here

Table 2
Sample list of roles, goals, and values

GOOD PARENT	DISCIPLINED
GOOD SPOUSE/PARTNER	ATTRACTIVE
RESPONSIBLE	IN CONTROL
STRONG	ENVIRONMENTAL CONSCIOUS
ON TOP OF THINGS	RESPECTED AT WORK
COMPETENT	POPULAR (YOUTH)
ATHLETIC	INDEPENDENT (OLDER)
RESPECTED AT HOME	TOLERANT
ENERGETIC	RESPECT FOR OTHER
CONSIDERATE	JUSTICE
SUPPORTIVE OF OTHERS	COMMUNITY/NEIGHBOR
SUCCESSFUL	SPIRITUAL
YOUTHFUL (OLDER)	NOT HYPOCRITICAL
GENUINE	AUTHENTIC

the counselor asks the client to choose from a list of RGV (see Table 2) three to five that are important to them. Other lists have been suggested elsewhere(W.R. Miller & Rollnick, 2013). The counselor next explores how the RGV chosen may be related to the behavior change at hand. To increase the likelihood that CT can be elicited, the linkage can be probed bi-directionally, to see if the RGV might be impacted by the behavior change or conversely, if the behavior change might be supported the RGV. The bi-directional probes generally take the form of:

1) How if at all, if you made this change, might that influence the roles, goals, or values you chose; that is, make you more able to experience them?, and

2) How if at all, might the roles, goals, or values you chose, possibly support or influence your motivation to change xx?

Fail safe Option 3. Occasionally, neither probe elicits useful change talk as the client is unable to link the behavior with the RGV selected, or at times this activity can even lead to expression of sustain talk, if the value, role, or goal chosen support the risk behavior. When this occurs, the counselor can implement the "fail safe" option. After acknowledging the lack of connection between the behavior at hand and the values chosen, the counselor can try a different "linkage" approach, asking the client to look at the full list of RGV and then ask a variant of the two probes noted above

1) Are there any roles, goals, or values on this list that if you made this change, might be impacted, that make you better able to experience them ?, and

2) Are there any roles, goals, or values on this list that you can draw on to help support or motivate you to make this change?

An interesting theoretical question raised by a recent study (Burson, Crocker, & Mischkowski, 2012) is whether the list of values should be limited to those which are more self-transcendent in nature (e.g., considerate, justice, good parent) compared to those which are more self-serving (attractive and successful) or negatively framed (e.g., not feeling hypocritical). The former may encourage autonomous motivation whereas the later may instill more controlled or introjected motivation, which according to SDT decreases the power of the RGV

linkage.

2C: Self-affirmation and strengths linkage

Whereas the RGV activity aims to build importance or desire to change, sometimes the core issue for the client is insufficient confidence; lack of perceived skill or fear of failure. To build confidence CT, we developed a Self-affirmation (SA) /Strengths (SA/S) activity, rooted in Self-Affirmation Theory (Epton & Harris, 2008), that is a variant of the more traditional RGV activity noted above.

Similar to the RGV activity, the counselor shows the client a list of potential strengths, skills, or accomplishments (see Table 3 above), and asks something along the lines of; "Think for a minute about some of the things you are good at, like sports, being a father, art, or meeting challenges at work or something you have achieved, or an obstacle you have overcome." Given the almost limitless universe of strengths, skills, and accomplishments we suggest adding a statement similar to: "Feel free to suggest something that may not be on the list." Next, the counselor probes with some variation of:

Looking at the strengths, abilities, or accomplishments you picked...

- How might your success in any of these areas, possibly help you find the confidence to try and change XX or support your efforts?,
- How might your ability to do xx, possibly help you find the confidence to change XX?,
- How might the fact that you were able to overcome xxx, possibly help you find the confidence to try and change XX?

The goal is to encourage elaboration on the "A" or ability of the DARN-CAT model, whereby the client finds new reasons or stronger belief that they can accomplish the change at hand.

Choosing between the two "ignition" options

Although both the RGV and SA/S activity can be implemented in the same session, there is the potential for some redundancy as several items appear on both lists. To help decide which of the two approaches to employ, counselors can use the numeric values obtained from the importance and confidence rulers to guide their strategy.

Table 3
Sample list of strengths, skills, and accomplishments

SPORTS	BEING CREATIVE
MUSIC	STAYING POSITIVE
ART	LEARNING NEW THINGS
COOKING	STAYING COOL UNDER PRESSURE
MY JOB	BEING PATIENT
MATH	HELPING OTHERS
SCIENCE	FORGIVING
LANGUAGES	APPRECIATING/BEING THANKFUL
WRITING	RESEARCHING THINGS
DISCIPLINE	LISTENING TO OTHERS
STRONG	CARING
FIXING THINGS	BEING SPONTANEOUS
TRUSTWORTHY	BEAT AN ILLNESS
PARENTING	OTHER_____

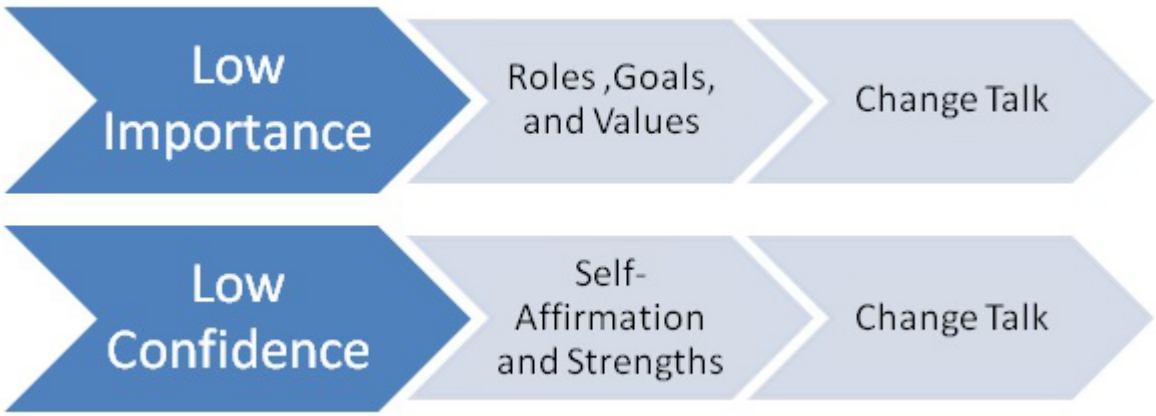

Figure 1. Igniting change talk clinical algorithm.

When importance scores are low, counselors may want to use the RGV strategy whereas, when confidence needs boosting using the SA/S activity may be a better fit. The same algorithm would apply when importance and confidence levels are inferred from the encounter, absent the formal ruler or numeric assessment. See Figure 1.

Conclusion

Providing clients with opportunities to express change talk is critical to achieving outcomes in MI counseling, and is one of the four core processes of MI. This article provides some theoretical background and practical strategies to help practitioners reinforce resident change talk and elicit it, even when not expressed by the client. We have focused here on the technical aspects of eliciting and reinforcing change talk. However these strategies have value only insofar as they are delivered in the context of autonomy support and a mutually agreed upon behavioral target. The strategies presented are not meant to get clients do what counselors might want them to do but rather they offer practical ways of energizing naturally occurring change processes. Forcing expression of "empty" change talk simply for the sake of CT, is itself likely of little value to the client. These techniques need therefore to be accompanied by strong relational skills that establish the rapport and trust needed for the client to safely explore the possibility of change.

Developing and testing methods to train practitioners to effectively use these strategies is encouraged. Additionally, research to test the efficacy of the suggested clinical algorithm for when to choose the RGV versus SA/S strategy is also needed.

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Motivational Interviewing and Neuroscience: Moving forward while looking deeper

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Psychosocial interventions have been comparatively effective at promoting behavioural changes through addressing maladaptive cognitions and affects. (Clark & Beck, 2010; DiClemente, Nidecker, & Bellack, 2008; Straube, Glauer, Dilger, Mentzel, & Miltner, 2006; Strauss, Cavanagh, Oliver, & Pettman, 2014; Teasdale et al., 2000; Tevyaw & Monti, 2004). While the main research focus still remains on how to effect changes and links between cognition affect and behaviour, there is increasing interest in understanding how changes are made at a neurobiological level. With increased emphasis on cross disciplinary intervention and research the potential linkage between brain topological measures with cognitive and behaviours changes is particularly compelling. Firstly, it 'connects' cognitive and behaviour changes to putative neural mechanisms hence providing an avenue towards understanding how psychosocial interventions work (Feldstein Ewing, Filbey, Sabbineni, Chandler, & Hutchison, 2011). Secondly, it may serve as a potential promising tool for monitoring of treatment effects through examining whether treatment in question demonstrates an alteration or shift of brain state that resembled that of healthy counterparts (Etkin, Pittenger, Polan, & Kandel, 2005). Thirdly, Sensitivity of neuroimaging allows categorization of individuals with distinct etiologies previously indistinguishable through clinical variables. Independent examinations of these subgroups provide critical information regarding applicability of particular treatments, allowing further refinement of treatments (Etkin et al., 2005; Linden, 2006).

There is evidence of adaptive brain functional changes in response to exposure/participation in psychosocial interventions. For instance, the brain regions (namely dorsolateral prefrontal cortex and parahippocampal gyrus, of individuals) that are typically activated during state of fear, were no longer activated after Cognitive Behaviour Therapy (CBT) based intervention. These study findings suggest a deconditioning of brain response through decreasing disruptive and misattributing thinking at the level prefrontal cortex and parahippocampal (Paquette et al., 2003). Likewise, other studies revealed a decrease of activity in brain regions specifically the amygdala of limbic system and cingulate cortex in individuals with depression, further implying a shift from abnormality to normality patterns after treatment [for review see Collerton (2013)]. In general, the potential of psychological interventions to alter the brain function may 'rewire' the dysfunctional brain circuitry associated with disruptive behaviours and symptoms (Gorman, Kent, Sullivan, & Coplan, 2000; Paquette et al., 2003). While aforementioned studies illustrated an enormous lead towards unravelling how effects of psychosocial interventions can be transduced at neurobiology level, there is nonetheless relatively limited work on the neurobiological processes of Motivation Interview (MI).

MI is a counselling approach that is person

centered, collaborative and focused on eliciting and strengthening a client's motivation to change (Miller & Rollnick, 2013). Studied extensively since the early 1990s, MI has demonstrated efficacy with behaviours ranging from substance use (Lundahl, Kunz, Brownell, Tollefson, & Burke, 2010) to promoting health behaviour(Martins & McNeil, 2009). Despite its effectiveness, measurable constructs, well-defined theoretical mediators and models (Feldstein Ewing et al., 2011; Houck, Moyers, & Tesche, 2013), there is limited work on the neurocognitive processes that may underpin the observed effects. With recently published work on proof of concept in relation to neurobiology and, this line of research should gain momentum (Potenza et al., 2013).

The handful of studies to date that attempted to map MI processes to brain activity using fMRI have focused on change talk predominantly because change talk is key element in MI [see Resnicow, Gobat, & Naar (2015) in this issue, for a review on key Change Talk strategies]. Houck et al. (2013) has examined the neural circuity underlying change talk. Participants who listened to their own change talk as compared to 'sustain' talk showed significant activation in inferior frontal gyrus, insula and superior temporal cortex. These regions were previously found to be involved in self-perception, cognitive dissonance and attitude change. Feldstein and colleagues (2011) work on the other hand suggests that MI may operate thorough the dampening of reward/motivational circuitry. When adults with alcohol dependence were in change talk condition there was no activation in their reward processing area (OFC, nucleus accumbens, insula, caudate, putamen, PCC and ACC) upon presented with alcohol cue, thus suggesting that change talk might inhibit these regions. Despite that both studies focused on alcohol usage and change talk, there is some variation in their findings in that regions such as insula appeared to be activated in Houck et al's (2013) study while inactivated in Feldstein et al.(2011)'s study. Methodological differences may account for the inconsistent results. Different imaging methods such as haemodynamic imaging (in this instance the fMRI) and neurophysiological imaging (MEG) were used. Moreover, presence of cues used to elicit addictive responses and time of scanning (before, during or after treatment) may also contribute to different results.

Both studies however highlight the neurobiological pathways related to effectiveness of MI intervention in field of addiction and clearly path the way for future cross disciplinary investigations. One of the key directions that may be worth exploring related to connectivity of regions. Traditionally, neuroimaging studies focus on localization of brain functions and identifying brain regions that are activated selectively during the tasks (Chan, Cheung, Ho, & Jing He, 2000). However the architecture of the human brain is organised in terms of several modular neural networks (Fox et al., 2005), suggesting that neural processing involves an integration of distinct brain regions. Of note, it is also important to acknowledge that regions identified do not belong mutually exclusive to a particular network as it could also play a role in another network i.e. orbitofrontal in both motivation and rewards processing networks. Thus, in looking at how change talk may alter the functions of brain, proposed models for future research should also examine functional connectivity within and between multiple networks to allow better understanding of activation patterns and brain functional organization. These may include but not limited to the rewards networks (regions commonly include nucleus accumbens, amygdala, orbitofrontal cortex and the insula), motivation network (orbitofrontal cortex and subcallosal cortex), executive control (mostly located at prefrontal cortex and the anterior cingulate

cortex) as well as memory and learning (hippocampus, amygdala and Precuneus) (Collerton, 2013; Feldstein Ewing et al., 2011; Robbins, Ersche, & Everitt, 2008; Volkow, Fowler, & Wang, 2003).

While examining the connectivity within and between networks shed light into the architecture of human brain functional connectivity and the interplay of regions involved, study could also look at the hierarchical representations of brain regions within and between the networks. Such analysis involves effective connectivity where casual relationships among regions are investigated (Deshpande & Hu, 2012). In another words, casual influences of a particular brain region on another regions can be examined. With this complementary information on top of the aforementioned functional connectivity, regions that play a crucial role in influencing other regions within and between networks can be identified as key neurobiological markers targeted for behaviour change.

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original article

Identification of the motivational techniques within Motivational Interviewing and relations with behaviour change techniques from the BCTTv1

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Motivational interviewing (MI) has been shown to be a promising approach for promoting health behaviour change in a number of contexts including substance abuse (Jenson, Cushing, & Aylward, 2011), quitting smoking (Heckman, Egleston, & Hofmann, 2010; Lai, Cahill, Qin, & Tang, 2010), physical activity promotion (Bennett, Lyons, Winters-Stone, Nail, & Scherer, 2007; Carels et al., 2007; Hardcastle, Taylor, Bailey, & Castle, 2008; O'Halloran et al., 2014), and dietary change (Armstrong et al., 2011; Befort et al., 2008). MI can be considered a complex intervention comprising multiple techniques. Complex interventions have posed considerable challenges to researchers attempting to identify the mechanisms underpinning their effects and replicate them due to the fact that it is difficult to isolate the individual techniques effective in changing behaviour. Although researchers adopting MI interventions have described the general characteristics of MI interventions in some detail (e.g., identifying who delivers the intervention, how often the intervention sessions are delivered and duration of sessions, context in which the intervention is presented), attempts to distil the components of MI have been impeded because descriptions of exact content of the intervention have lacked detail, precision, and clarity.

There has, however, been considerable recent progress in the scientific literature on identification and isolation of the techniques adopted in interventions to change behaviour, resulting in the development of numerous taxonomies of the techniques that 'do the work' in terms of changing behaviour in health-related behaviour change interventions (Abraham & Michie, 2008; Michie, Abraham, Whittington, McAteer, & Gupta, 2009; Michie et al., 2011; Michie et al., 2013).

Following these developments, there is a need to identify the content of specific techniques employed in MI and examine the extent to which these techniques are unique or exhibit overlap with behaviour change techniques identified in the most recent behaviour change techniques taxonomy (BCTTv1) (Michie et al., 2013). Such research would advance knowledge by enhancing the conceptualization and operationalization of interventions adopting MI. The identification of the specific components that make up MI interventions will enable researchers to develop studies that may establish which of the techniques, or combination of techniques, is most effective in changing health behaviour. This will not only assist in identifying the key components, but will also assist researchers and practitioners increase the effectiveness and efficiency of, and reduce redundancy in, their interventions.

The behaviour change techniques identified by Michie and her colleagues (2013) have been derived from multiple approaches and theories applied to health behaviour. There is evidence that interventions aiming to promote health-related behaviour adopting techniques identified in the taxonomy have been effective in bringing about behaviour change (Avery, Sniehotta, Flynn, Trenell, & van Wersch, 2012; Dombrowski et al., 2012; Gilinsky et al., 2014; Olander et al., 2013).

However, MI has not been included in the 2013 taxonomy even though it is regarded as a popular approach that has shown to be effective in promoting health behaviour change in several systematic reviews and meta-analyses (O'Halloran et al., 2014; Armstrong et al., 2011; Knight, McGowan, Dickens, & Bundy, 2006; Lundahl & Burke, 2009; Lundahl et al., 2013; Rubak, Sandbaek, Lauritzen, & Christensen, 2005; VanBuskirk & Wetherell, 2014). For example, a meta-analysis of 72 randomized controlled trials using MI in health related contexts revealed that it was more effective in improving both behavioural and health related outcomes relative to usual care in 80% of studies (VanBuskirk & Wetherell, 2014).

There are three main barriers to understanding the effectiveness of MI-based interventions: (1) the complexity of MI as an intervention comprising multiple behaviour change techniques, as noted earlier (Hagger & Hardcastle, 2014); (2) poor reporting of MI intervention components (Michie & Abraham, 2008; Michie & Johnson, 2012); and (3) the lack of research on the techniques of MI that are affecting behaviour change.

MI is comprised of several techniques used by interviewers to evoke motivation and behaviour change in clients. Some of the MI techniques focus more on 'content' (e.g., the provision of information or the identification of past successes), which is similar to the operationalization of the behaviour change techniques outlined in other taxonomies. In contrast, a substantial number of the MI techniques focus on the relational-interpersonal style that captures the manner in which other content-related techniques are delivered. The relational-interpersonal style components are usually referred to collectively as the MI 'spirit' (Miller & Rollnick, 2013). However, the reporting of MI interventions has tended to be insufficient in fully documenting intervention content, particularly of the individual MI techniques. In general, reporting of intervention content in research adopting MI is often brief and lacking in specific detail and content making the intervention difficult to replicate or pinpoint the precise components that may be affecting observed behaviour change. For example, several studies have failed to provide any description of the specific MI techniques used (Ackerman, Falsetti, Lewis, Hawkins, & Heinschel, 2011; Armit et al., 2009; Harland et al., 1999; Kerse, Elley, Robinson, & Arroll, 2005; Lakerveld et al., 2013; Lawton, Rose, & Elley, 2008; Whittemore et al., 2009; Penn et al., 2009). Furthermore, many MI studies lack detail in their descriptions of the precise techniques adopted, how they were delivered, practitioner training and competency in MI. Such intervention reporting presents considerable challenges to researchers attempting to replicate the intervention and to understand how the intervention works (Michie & Abraham, 2008).

It seems that most intervention research adopting MI has made links between its set of techniques and dominant theoretical approaches adopted in health behaviour research such as the theory of planned behavior and the transtheoretical model... (Armit et al., 2009; Lakerveld et al., 2013). The problem is that the links have been vague and lack precision when it comes to examining parallels between behaviour change techniques and MI techniques. In addition, identifying the key psychological constructs targeted by the techniques that should mediate any observed change in behaviour brought about by these techniques. This is not confined to MI, various theorists and researchers have noted a generalized problem in the scientific literature of the lack of clear mapping of intervention techniques onto theoretical constructs that lead to change (Fortier, Duda , Guerin, & Teixeira, 2012; Michie, Webb & Sniehotta, 2010). Numerous examples exist, for

instance researchers have aligned their MI intervention with the transtheoretical model (Armit et al., 2009) and a recent study made links between MI and the theory of planned behavior (Lakerveld et al., 2013). In both examples, the authors do not clearly elucidate how the techniques of MI match up with the concepts of the theory that ostensibly provides an explanation for the action of the MI techniques on behaviour.

There are, however, instances in the literature where researchers have provided explicit detail of MI intervention content sufficient for replication and for the understanding of the mechanisms underpinning the intervention effect. For example, Resnicow, Jackson, and Braithwaite (2002) provided considerable detail on their MI intervention and the specific techniques used. The description is comprehensive, clear, and incorporates all the necessary information to classify the appropriate techniques and identify the key mediators from self-determination theory, the target theoretical basis. The authors also provide sufficient information for a precise replication of the intervention. Fortier and Kowal (2007) also listed the specific self-determination theory and MI techniques of interventions to promote physical activity and, similar to Resnicow et al. (2011), identified and explained which variables from self-determination theory would be expected to mediate effects of the intervention techniques on physical activity behaviour change.

The second barrier underlying the lack of progress in understanding the effectiveness of MI-based interventions is the lack of research identifying the precise MI techniques that are affecting behaviour change in MI-based interventions. This has made it difficult to draw precise conclusions regarding how MI facilitates behaviour change. Therefore, consensus is needed to elucidate the various MI techniques.

Research generally supports the efficacy of interventions that adopt MI, but a high degree of variability in the strength of the effects of MI observed in trials across studies, contexts and practitioners. Miller and Rollnick (2013) suggest that the effectiveness of MI is strongly influenced by the practitioner, that is, the techniques that specify the relational-interpersonal style of the practitioners when delivering the intervention content. The notion that these techniques of MI are fundamental is evidenced in the fact that studies employing didactic manuals of MI have been shown to be less effective (Hettema, Steel, & Miller, 2005; Lundahl, Kunz, Brownell, Tollefson, & Burke, 2010). Meta-analytic data has indicated that the effect size of MI was half the size when the intervention was guided by a manual (Hettema, Steel, & Miller, 2005). Specifically with regards to the physical activity context, a recent systematic review and meta-analysis revealed that MI treatment fidelity (practitioner's adherence to the relational-interpersonal style techniques of MI) produced larger physical activity effects (O'Halloran et al., 2014). These data provide some initial indications that the interpersonal aspects of MI are paramount to the efficacy of these interventions.

Motivational interviewing is primarily a counseling approach and a way of interacting with a client in health contexts (Miller & Rollnick, 2013). Collectively the interaction and counseling aspects of MI are known as the 'spirit' of MI. This is essentially characterized by the interpersonal behaviours and actions of the practitioner above and beyond the content of the techniques (Hagger & Hardcastle, 2014). The 'spirit' is central to MI and is made up of four key elements: collaboration, evocation, autonomy, and compassion. Collaboration refers to relations between the practitioner and client grounded in the perspectives and experiences of the client. Evocation refers to drawing out the client's ideas about change. The practitioner draws out the client's own motivations and skills for change

rather than tell them what to do or the reasons why they should do it. Definitions of the evocation component make reference to the generation of 'change talk' in the client. Change talk is a key mediator at the core of MI and is defined as "any self-expressed language than is an argument for change" (Miller & Rollnick, 2013, p.159; for a review on Change Talk strategies see Resnicow, Gobat and Naar in this issue). One of the primary roles of MI practitioners is to elicit and evoke change talk and to reduce 'sustain talk': "the person's own arguments for not changing, for sustaining the status quo" (Miller & Rolnick, 2013, p. 7). Promoting autonomy in the client refers to the practitioner ensuring that the decision to change rests with the client. Finally, the practice of compassion refers to the practitioner's acceptance of one's path and choices. The practitioner is committed to seek an understanding of the other's experiences, values and motives without engagement of explicit or implicit judgment.

The relational-interpersonal style components of MI are fundamental and few other approaches are as explicit about the importance and impact of the relational- interpersonal style in which interventions are delivered. In fact these techniques have tended to be neglected or omitted from previous behaviour change technique taxonomies (Hagger & Hardcastle, 2014), although the distinction between content and interpersonal style has been noted previously (Michie, Churchill, & West, 2011). Future taxonomies should incorporate these relational-interpersonal techniques as MI techniques in their own right sitting alongside the content-related behaviour change techniques. Such an endeavour is essential if the effectiveness of complex interventions that adopt both content and relational-interpersonal behaviour change techniques are to be adequately evaluated.

In summary, there are several reasons for the need to identify and isolate the components of MI interventions that are effective in evoking change. The first is that MI has been recognised as a complex intervention comprising multiple techniques and, to date, the specific unique MI techniques have not been systematically identified. If the effectiveness of MI interventions is to be improved, then it is necessary to isolate and define the individual techniques of the MI approach that are effective in changing behaviour. Second, in earlier iterations of the behaviour change technique taxonomy, Michie et al. (2013) isolated MI as a single behaviour change technique. However, according to theory and evidence, MI is a complex intervention comprising multiple techniques, some of which are content-related and others are relational-interpersonal. MI, therefore, needs further elaboration in the contexts of existing techniques to identify uniqueness and redundancy. Third, given that the BCTTv1 is based almost exclusively on content related strategies, we may expect to find significant differences between existing behaviour change techniques and those techniques in MI that have a greater emphasis on the interpersonal components of MI interventions that are fundamental to this approach.

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original article

Motivational Interviewing across cultures:Training notes

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In this brief paper, we aim to present our experiences of training clinicians from all disciplines in the changing context of healthcare. From a standpoint that seeks commonalities in clinical practice across the globe, we share the experience of using a particular activity in different settings, and share our own tips on how small changes in the presentation of training materials can lead to better parity for participants in the continuing professional development training room.

Changes in global healthcare

The provision of healthcare is changing. In the last 30 years, patients and their communities have become (or have had the potential to become) more informed about conditions and treatment possibilities, and practitioners have had more timely access to the latest science about medications and approaches to behaviour change. Alongside this, improved economic progress in lower-income countries (LICs) has increased life expectancy and in part brought about a shift in the disease burden: communicable disease outbreaks now coexist with chronic diseases and diseases of 'affluence' such as diabetes and hypertension (Global Burden of Disease Study 2013 Collaborators, 2015).

Across the globe, we are all living longer, and so have the potential to spend more years of life with chronic conditions. Many of these conditions are down to the lifestyle choices that we make on a daily basis; in general we know that we shouldn't smoke, drink too much, choose healthier food and be more physically active, but other priorities (motivational, economic and family) are constant barriers to achieving optimum health. In this context, healthcare practitioners across disciplines are being asked to address behaviour change with patients and embrace more psychological techniques as part of regular clinical practice.

Commonalities in practitioner experience

Despite the differences in healthcare funding systems, practitioners across contexts and cultures often have a shared set of experiences. In the past 4 years, one of the authors (FM) has collected responses during continuing professional development training sessions delivered across continents to healthcare practitioners. One opening activity involves a discussion where participants indicate what they would consider 'good practice' in their own settings, and follow this up with a discussion of the barriers to this good practice, again in the context of their own clinical environments. Responses generated across over 50 groups of multi-disciplinary health professionals spanning North America, Europe, Africa and Asia, have been remarkably similar (see Table 1).

Table 1
Top Five Features and Barriers to Good Practice

Features of Good Practice	Barriers to Good Practice
1. Listening skills	1. Time for each patient too short
2. Knowledge of practice area (and own limitations)	2. Resources limited
3. Respect for patient and patient's experience	3. Variable ability to refer to appropriate support services
4. Acknowledgment of patient's role in management of condition	4. Difficulty in communicating with patients from a different linguistic background
5. Ethical Conduct	5. Limited time for training and supervision of new techniques

From this (albeit potentially skewed) sample of participants in training sessions, the following insights can be drawn. 1. Practitioners are busy: in Singapore, psychiatrists reported seeing more than 60 patients per day, a situation also not uncommon for general practitioners in Nigeria. 2. Language matters: a language barrier was present in all continents, and only one group (in South Korea) did not list this as a major barrier to effective care. From urban centres with a large influx of nationalities of practitioners and patients (UK, USA, Singapore, Hong Kong), to communities where there are multiple national languages and local dialects (Singapore and Nigeria), practitioners are increasingly interacting with multiple cultures on a daily basis.

Motivational interviewing

Motivational interviewing is a type of person-centred counselling that has a broad international evidence-base across health risk or health promoting behaviours (Lundahl, Kunz, Brownell, Tollefson, & Burke, 2010; Lundahl, et al., 2013; Martins & McNeil, 2009). With this body of research literature, MI appears in national guidelines in multiple contexts, and many healthcare organisations include training in MI as a key area of professional development for front-line medical and social care staff. Interest and demand for MI training courses is intensifying along with growing numbers of MI trainers across the world who have joined professional networks such as the Motivational Interviewing Network of Trainers (MINT). The role of the MI trainer is often more than the facilitation of a learning process, with many trainers asked to give follow-up skill-focused supervision for clinicians, and sometimes institutional support in the integration of MI into existing services and routine care.

One key area where motivational interviewing training can be particularly helpful is in giving practitioners the time and space to re-engage with their respective professions and re-define the scope of their 'helping' role in relation to their patients. In an age that is increasingly driven by targets, cost-cutting measures and an overwhelming barrage of politically-driven protocols and care pathways, combined with frequent reports in the media of poor standards of care and failures in communication, motivational interviewing can be an effective way to deepen skills in expressing empathy and building rapport with the patient while responding to the cost-effectiveness agenda.

Conducting training against this backdrop can sometimes be a minefield for trainers – who are often brought in as a managerial response to a perceived shortcoming in either staff

performance or patient outcomes. However, with supportive working environments that allow professional development, even a two-day training in motivational interviewing can urge clinicians/practitioners to think more deeply about engaging with patients, and to have brief but meaningful conversations that reflect good practice yet do not require additional time or resources.

Activities, Culture and Language

Miller and Rollnick's core texts (2001; 2013) have been translated into multiple languages, and there is a strong tradition within the MI community of sharing practice and experience at regular professional and scientific meetings, held both internationally (usually in English) and regionally in local languages. At the core of motivational interviewing are four processes: Engage, Focus, Evoke and Plan, around which typical two-day 'introduction to motivational interviewing' trainings may be framed. Within this, specific skills such as using reflective listening strategies are practiced, with most trainers encouraging a practice-based training environment for participants to develop and hone their skills. While linguistic differences in the formation of particular parts of speech such as questions (de Ruiter, 2012) could affect some parts of the training, to date, we have observed that reflections appear to function in the same way across linguistic groups and trainees respond to the core material in similar ways across continents.

An example of the similarity in reactions of trainees to their training materials is a favourite exercise among some trainers that has the core purpose of developing (in trainees) empathic reflections in response to a single sentence stimulus. This is an activity that has been used across different cultures and indeed languages, to a similar effect. The trainer asks for one or two volunteers to give the group a single sentence of something that they are worried about at present (for the activity process, see table 2). This is typically framed as something they are comfortable to discuss in public, yet something that is a genuine concern. Over the years, the worries that have been presented in my trainings have been varied but have generally fallen into the following categories: concerns about health systems, workloads and patient care, work-life

Table 2
Reflection Activity Process

1. Trainer requests volunteer with a current concern
2. Volunteer writes the first sentence of their concern at the top of a piece of paper
3. Volunteer leaves the training room to continue their 'story' in note form
4. Participants form reflective statements based on their own experience, to try to express empathy with the participant
5. Trainer facilitates group work with suggestions for 'underselling' reflections, encouraging participants to think about situations where they have had similar concerns
6. Volunteer returns
7. Participants read out reflections (volunteer asked to just nod or shake their head, without expanding)
8. Volunteer speaks about their reaction to the reflections– if they were right or wrong, and then expands on their original concern.

Source: Motivational Interviewing Network of Trainers

balance, or broader political issues that trainees are facing in their own countries.

What is most significant, rather than the individual concerns, is how trainees respond to the activity. It has been a true source of the 'a-ha' moment that can be so rewarding during training, and is a good example of reminding clinicians that the delivery of the message is as important as the message itself, and also how a subtle reflective statement can do much to build rapport and express empathy. This activity also can be a great source of unexpected learning moments, with a trainer able to respond to questions about nuances in language, and how framing each reflection in different ways affects the response from the volunteer once they are back in the room. Additionally, there is the valuable personal reaction from the volunteer. Their reactions to statements that are accurate, i.e. in line with their experience can often be a smile and deep repeated nodding of the head (remember that during this part of the activity, the volunteer is encouraged to avoid verbal responses). Furthermore, where a response may not quite reach the mark it becomes evident that the volunteer/speaker is keen to add further information to correct the inaccuracies of the reflection. Taking this back to the clinical context, it is a powerful demonstration that as clinicians, we do not need to be absolutely accurate, but that in trying to understand a patient, we should aim to open the door for them to share their world and how best to work together.

In addition to the success of the activity in different cultures, this is an activity that has been conducted in different languages and seems to work in the same way within each linguistic group. Some areas of language are different across cultures, for example, in how different linguistic groups form questions - however, reflective statements have, across the authors' training settings at least, been consistent.

Cross-cultural adaptations of material

In an ideal training universe, each training course would have the resources to commission a specific, tailored set of accompanying materials that reflects the cultures, context and clinical issues of the participants. MI trainers make frequent adaptations, and negotiate content within the flow of the workshop in response to trainee feedback. Trainers are arguably even more

I am worried that I am working too much… ☹

1. You are worried that you have too little time with your family
2. It sounds like you are under a lot of pressure at the moment
3. Perhaps you don't have much leisure time
4. Feels like you are not enjoying your job so much at the moment
5. You would like to have a bit more breathing space

Figure 1. Example of reflections activity in Chinese-language context with translation

flexible where there may not be many target-language resources available (the majority of professionally-produced training video clips are in English and Spanish language versions). Experienced trainers borrow techniques from the discipline of second language acquisition where these challenges have been well established, and where new teachers are taught to adapt 'authentic materials' for training purposes (Gilmore, 2007). In the MI training room, these authentic materials may involve the trainer modelling motivational interviewing in live demonstrations with a real or simulated patient, who may be a co-trainer or participant. Beyond specific activities embedded in the training situation, trainers model and emphasise collaboration and autonomy with participants, just as a clinician would be encouraged to collaborate with their patient/client.

Although the options to access training materials in languages other than English may be limited, live demonstrations, continuous modelling, and experiential learning through activities, can have a powerful impact on understanding and building competence around MI. A range of MI training activities can work across cultures and contexts with no changes to procedures or content yet adaptations in the materials can improve engagement with the audience/trainees and hence learning environment.

These adaptations of materials broadly fall into two categories, linguistic or visual. In settings where slides are used, there may also be a combination of these two categories. In health communication, we know the importance of face validity with a group; for audiences in Singapore, training materials that contain images of patients should include representations of the racial and ethnic diversity of the target population of trainees. Similarly, when addressing Nigerian clinicians, it may not be appropriate to have images of patients who are ethnically Chinese or Malay as this can weaken the core message of the training.

Linguistic changes can involve a subtle change of the context and phrasing to make statement more relevant to different settings. In training I commonly use the patient's statement 'I don't even know why you're here. We are doing fine. It's not as if you understand what life is like for me anyway'. This kind of sentiment is reported frequently by trainees and clinicians in practice, so has become part of a slide used to encourage discussion of the different reactions by clinicians to this kind of discord from a patient (discord in MI refers to interpersonal tension in the interaction and serves as a red flag for the need to re-engage). However, the initial prompt slide could look quite different according to the audience. Linguistic adaptations are presented in table 3.

Many tips for good training apply as much to cultures within the trainer's home setting, such as the organisational culture within a hospital or institution as they do to less familiar settings. In setting up an activity for any group, it is important to consider how to encourage participation. In addition to careful consideration of the wording of various exercises and activities, and the design of slides (Undrill & McMaster, 2012), activities can be subtly structured to meet cultural norms and expectations, particularly in how participants may expect particular traditions at the start or end of their training day (Mead, 2003). However, in general, there are a few principles that we find particularly helpful in cross-cultural training, which will be familiar to anyone working in adult education or language acquisition: engagement, humility and respect are important with any group; small group activities build confidence when tackling new material; and materials that reflect the participants' clinical settings add to the validity of the training.

Of course, spending time in the culture and

Table 3
Cross cultural linguistic adaptations to slide content

UK	Singapore	Nigeria	USA
'I don't even know why you are here – it isn't as if you know what life is like for me anyway'	*'Bringing up three children on my salary isn't easy and my family are back in Malaysia.'*	*'Bringing up ten children isn't easy and we also look after my brother's children too. How can you understand!'*	*' I don't even know why I am here, it isn't as if you know what life is like for me anyway'*
Original sample statement from a home visit setting from a health visitor in the UK.	To reflect typical family size of 3 children, and also that there is migration so that families with children do not always have the older generation nearby to assist with childcare and financial support.	To reflect larger family size in parts of Nigeria, and also the cultural norm for community help to families in need	Change of location – in the US healthcare system, most child visits are done in a clinic rather than in the home by community nurses.

context in which you are training is the best way of understanding the training group, at the very least allowing additional time upon arrival to gauge some measures of culture. Both authors, in their international work, have developed habits of walking around, reading the local newspapers, and seeking the current trends on social media. With just a little time immersed in the environment there can be invaluable insights into preparing materials that are appropriate and useful to the target population of clinician training participants.

Conclusion

It is rare to find clinicians who are not genuinely compassionate, or who do not have the underlying intention of caring for their patients. However it is extremely common in almost all locations to find clinicians who feel busy, overworked, undervalued and increasingly pressured to deliver in terms of number of patients seen and in improving patient outcomes. Many clinicians feel burned-out, and acknowledge that their clinical practice may suffer as a result. Motivational interviewing is a style of communication that can, with careful preparation of training material, be synergistic with trends and priorities in the caring professions across different cultures. The appreciation that patients have for the effort and concern demonstrated by practitioners to see the world through their eyes can deepen rapport, and lead to better clinical outcomes (Del Canale et al., 2012; Kelley, Kraft-Todd, Schapira, Kossowsky, & Riess, 2014). Even in the context of the routine brief consultation, a couple of minutes of engagement can save practitioners time in allowing them to build a better basis for working on the presenting issue(s).

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original article

Why mHealth interventions are the new trend in health psychology?

Effectiveness, applicability and critical points

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Introduction

Mobile health, widely referred to as mHealth, constitutes part of eHealth and signifies the usage of mobile and wireless technologies designed to achieve medical objectives (World Health Organization [WHO], 2011). Mobile phones, tablets, smartphones, wireless devices, sensors, biometrics and GPS (Global Position Systems) are the most commonly used technological devices for the delivery of mHealth interventions (Olla & Shimskey, 2015). Among the several offered features, mHealth programmes and interventions utilize more SMSs (Short Message Services), MMSs (Multimedia Messaging System) and smartphone applications (Ben-Zeev et al., 2015). Smartphones have an advanced operating system, which incorporates many of the previously separately sold technological devices, providing users with a high tech apparatus (Boulos, Wheeler, Tavares & Jones, 2011). Grartner Inc (2014) in its annual report announced that the number of smartphones sold worldwide for 2014 was one billion, which is estimated to double in the next two years. Moreover, the most recent reports estimate that by 2018 there will be approximately six billion mobile phone users and half of the global population will be using smartphones (Statista, 2015a; 2015b).

Smartphones' software enables the operation of health and medical applications to be used both by patients and healthcare professionals. In 2014 the number of health and medical applications officially registered in the lists of the two major application stores (Apple App Store and Google Play Store) was around 100,000 and is expected to grow annually (Lupton, 2014). Interestingly enough health and wellness applications have the highest usage rates and are considered the biggest consumers' market with the greatest potential for the field of applications' development (Malvey & Slovensky, 2014). Health and medical applications can be categorized with respect to their medical objectives. There are various applications targeting health and wellness, behavioural modification, patients' compliance, patients' monitoring, medical professionals' efficiency and productivity, improvement of community health and health education (Ola & Shimskey, 2015).

Healthcare in the digital age

In effect, the penetration of mHealth has radically changed the practice of medicine. Healthcare professionals were the first to integrate the use of smartphones in their daily professional routine and there are numerous applications specifically designed to assist in medical practice, training and decision making (Boulos et al., 2011; Recio-Rodríguez et al., 2014). Another very important factor highlighting the impact of mHealth on healthcare is the digitalization of patients' medical records. So far Electronic Health Records (EHRs) have proven very helpful and efficient since doctors can easily

communicate with each other, immediately access their patients' records regardless of place and time, especially in case of emergency (King, Patel, Jamoom & Furukawa, 2014). Similarly, the UK has set an ambiguous goal, regarding the digitalization of all medical records of every patient using the National Health System (NHS) by the end of 2018 (Department of Health, 2013). However, the potential downside to EHRs may be egradation in the art of medical history taking. More specifically, the automation of medical history taking via EHRs can result in doctors being observers and not participants of the actual procedure (Chi & Verghese, 2014). Thus, EHRs can assist in the practice of medicine if accompanied by careful surveillance and supervision and without underestimating the dynamics of the doctor-patient relationship.

mHealth continuously evolves. The latest development regarding mHealth technologies is the integration of medical applications and wearable devices. An instance of this, are watches able to support medical applications, such as the recently released Apple Watch. It has embedded sensors, which can track levels of physical exercise, heart rate and other body metrics. Since the day of its release all the developers have focused upon designing suitable health applications for this technological innovation, "health on the wrist" (Apple Inc, 2015). Medical professionals already use it as its ergonomic design enables them to directly communicate via video conferences.

Apple Inc (2015) also announced the launching of ResearchKit, an interdisciplinary research platform addressed to medical professionals and developers. ResearchKit overcomes many previous obstacles such as the recruitment of participants, volume of data, multicultural populations, flawless record of medical information, frequent data and the protection of information privacy. Similarly, Medic Mobile is a platform designed by health workers addressed to health workers, which offers a variety of mobile services and tools to implement mHealth projects and interventions. Specifically, it provides health workers with the appropriate tools, guidance and information to design their projects, implement and evaluate them and simultaneously be part of a bigger multidisciplinary healthcare team working to improve public health (Medic Mobile, 2015). mHealth is a revolution in the medical field and medical research since it transforms a mobile phone to a well-equipped research laboratory with worldwide range (Kazemi, Cochran, Kelly, Cornelius & Beck, 2014).

Examples of mHealth interventions

The simplest technologically-wise form of one mHealth intervention is sending educational and informational SMSs and has shown some success with regard to greater adherence to medication and behavioural change in the short term (Clauson et al., 2013). An instance of this is a mHealth intervention conducted on patients with type 2 diabetes mellitus, which showed that after 12 months of receiving informational SMSs a significant decline was noted in their glycosylated hemoglobin levels (Clauson et al., 2013). Text messaging seems to also be a successful strategy for smoking cessation. Personalized text messages help smokers cope with craving and relapse, and help them feel encouraged and accompanied in their effort to quit smoking (Buller et al., 2014). The most enlightening example of a mHealth intervention has been implemented in Turkey by the National Institute of Health (NIH, 2010). The project was addressed to whoever attended a smoking cessation facility and was based on sending SMSs designed using a cognitive behavioural approach. So far the results are very promising and there is an intention of scaling up the effort and developing the same

programme in the US.

Undoubtedly, the new trend in healthcare services and health promotion interventions is to incorporate the element of technology and especially smartphone applications in order to achieve the desirable behavioural changes. The applications which are based upon the patient centered approach are focusing on the distinctive individual characteristics in order to scrupulously understand users' particular needs (Lupton, 2012). The rationale behind this is to motivate patients to fully engage in changing their lifestyle and actively participate in their treatment process (Wofford, 2013). In effect, consumers of medical applications and mHealth interventions' participants report that applications are more convenient and less judgmental than the human alternative both in terms of medical practice and research participation (Sánchez-Ortiz, 2011).

Congruently, mHealth has proven to be a useful platform for facilitating patient self-management when the condition requires adherence to the prescribed medication and self-monitoring (Tufts et al., 2015). A mobile device can monitor and transmit information automatically to the healthcare provider or researcher the moment the targeted behaviour occurs (Lupton, 2014; Shaw et al., 2014). Thus, participants and researchers have the opportunity to immediately intervene by providing participants/patients with positive reinforcement and/or by sending a personalized message that increases the possibility of repeating the action, which means altering a maladaptive behaviour in the longer term (Davis & Oakley-Girvan, 2015). Similarly, the introduction of mHealth applications in mHealth interventions moves a step further, as there is a plethora of applications focused on mental health problems. Mobilyze! is an application targeting depression, which takes data from sensors installed in users' smartphone to spot states that may be relevant to their treatment, such as location, activity, social content and mood (Burns et al, 2011).

The great success of mHealth lies on its flexibility and interoperability. mHealth technologies can be used globally and easily adapted independently of socioeconomic background and age at all the different areas of health interventions such as prevention, promotion, surveillance and evaluation (Jordan-Marsh, 2010). Moreover, the potential of mHealth is limitless given its feasibility, cost-effectiveness, physical and regional accessibility (Ni Mhurchu et al., 2014). People from remote areas, patients with severe mobility problems as well as patients after serious operations can reach their doctor, receive reminders to take their medication and easily access informational resources (West, 2013).

mHealth in developing countries

One of the foremost contributions of mHealth is related to healthcare services in the developing countries. Internet penetration and laptop ownership is extremely low in the developing world. However, data from the International Telecommunication Union (ITU) indicates that 90 per cent own mobile phones (ITU, 2013; The Radicati Group Inc, 2014). mHealth has emerged in order to better respond to the medical needs of the disfranchised population, assist in the direct delivery of healthcare, diagnosis and dissemination of health-related information (Chib, Car & van Velthoven, 2015; ITU, 2013). Designing tailored mHealth interventions, which can be addressed to specific cultural backgrounds and different languages, illustrates the opportunity of providing people from under-resourced regions with informational and educational material at minimal cost (Davis & Oakley-Girvan, 2015). Nevertheless, mHealth is another way of promoting and supporting health

as a non-negotiable human right underpinning universality, equity and solidarity and in effect tackling health inequalities (European Observatory on Health Systems and Policies, 2015). Thus, it is imperative that mHealth research and funding focus on the delivery of interventions in developing countries considering the positive consequences these initiatives could have on public health.

The encouraging results that mHealth interventions can have on non-communicable diseases (such as cancer, diabetes, cardiovascular diseases) provide an exemplar (Majumdar, Kar, Palanivel & Misra, 2015). A recent example is "mDiabetes", an mHealth intervention started in Senegal focusing on the prevention of complications that diabetic patients usually encounter during the month of Ramadan due to the associated cycles of fasting and feasting. In a similar line, Lund and her colleagues (2014) launched a mHealth project in Zanzibar focusing on maternal health and prevention of antepatrum complications. The results revealed that there was an increased number of mothers who complied with the instructions they received through SMSs, followed by an increased number of visits for the desired check-ups (Harvard School of Public Health, [HSPH], 2012).

Critical issues and challenges

The exciting developments in mHealth need to be welcomed with some caution. There is not yet any official regulatory framework that mHealth researchers and interventionists should follow. The US Food and Drug Administration (FDA) has only provided guidance for the regulation of the medical applications targeting on self-management and self-diagnosis in order to reassure that patients using them will be at no risk (Malvey & Slovensky, 2014; FDA, 2013). However, both FDA and EU (European Medicines Agency) regulations neither guide nor impede the design and dissemination of medical applications. Since this is becoming the biggest pitfall of mHealth research it is urgent that policy makers publish official guidelines and legislation. The proliferation of medical applications highlights the need for them to be under greater scrutiny, be authorized via a licensing system and undergo legislative oversight for users' data protection and guarantee confidentiality to prevent personal data misuse (ITU, 2014; Rich & Miah, 2014). It is of vital importance to warrant the security of the medical data received, to ensure that different cultural norms are respected, to evaluate the usability of the application, the service reliability and prevention of attrition (WHO, 2011; Boulos et al., 2011).

Despite the fact that the usefulness of mobile technologies is scientifically acknowledged their integration into healthcare systems is still underestimated (Shaw et al., 2014). Additionally, the exponential development of smartphone applications in the field of healthcare has not been accompanied by sufficient scientific evidence of their actual impact on the improvement of population health (Recio-Rodríguez et al., 2014). A possible explanation could be that technology continuously evolves and its progress does not coincide with the scientific evaluation of its published results (Fjeldsoe, Miller, O'Brien & Marshall, 2012). Additionally, many applications are being withdrawn without allowing for longer-term evaluation of their effectiveness (Becker et al., 2014).

Furthermore, patients should be informed of all the negative consequences the reliance upon applications can have. More precisely, diagnostic outcomes from an application should always be accompanied by a proper consultation with the appropriate healthcare professional (Becker et al., 2014). The content of mHealth interventions also needs to be regularly adapted so as to engage

participants over time and maintain their interest (Shaw et al., 2014). Regarding the stakeholders involved it is imperative that they are technologically-up-to-date and well trained in order to incorporate all the above in the implementation of mHealth interventions (Clauson et al., 2013). Nevertheless, it should be stated that although mHealth interventions are technologically sophisticated they typically lack a theoretical background. Thus, the development of methodology and further research are imperative (Payne, Lister, West & Bernhardt, 2015; Tate et al., 2013).Therefore, all the professionals and stakeholders involved in the design and implementation of mHealth interventions should anchor their projects and applications on an evidenced-based approach (Shaw et al., 2014).

Lastly, it is worth noting that mHealth technologies in general and mHealth applications in particular, do not by any means replace the importance of physical contact and social interaction. For example, the pivotal role that the expression of emotions plays in the process of medical care cannot be substituted by any medical applications. mHealth technologies can be a very convenient interventional and medical material as well as profitable diagnostic tool. Yet this does not imply that mHealth technologies can replace and undermine the actual need for better healthcare facilities. Despite all the critical points mHealth is undoubtedly a new world of opportunities offering great potential in the healthcare field.

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announcement

29th Conference of the European Health Psychology Society

Conference workshops and meetings

It gives us great pleasure to welcome you to the 29th Annual Conference of the European Health Psychology Society in Limassol, Cyprus (Tuesday 1st to Saturday 5th of September, 2015) titled "Principles of Behaviour Change in Health and Illness". We are honored to have four distinguished keynote speakers: Prof. Howard S Friedman, Prof. Susan Michie, Prof. Ronan O'Carroll and Prof. Joanne Dahl. We have a wide range of topics with 7 parallel sessions and hundreds of posters presenting cutting edge research in the area of Health Psychology. The conference program is enriched with the preconference activities i.e. the Synergy Expert Meeting, titled 'M-health for behaviour changes: Opportunities, challenges, and future directions' and will be facilitated by Professors Lucy Yardley, Susan Michie and Robert West (held on 31st August and 1st September); the Create workshop, titled 'Writing science for journals, funders and other audiences' and it will be facilitated by Dr. Jean Adams, Dr Justin Presseau and Professor Martin White (held on 30th August to 1st September); the Meet-the-experts session (held on 1st September) where individuals can have a chance for an intimate scientific discussion with one of our keynote speakers; as well as five excellent conference workshops. The conference workshops will be held on Tuesday 1st September and include the following:

1) Using Item Response Theory in questionnaire development and theory testing in Health Psychology, facilitated by Dr Katarzyna Byrka, Dr Mieke Kleppe, and Dr Alexandra Dima.

2) To Provide Innovative Strategies for Writing Scientific Papers, Including Creative Use of New Internet Resources, and Responding to Reviews, Including Rejection, facilitated by Professor James Coyne.

3) How do you conduct a meta-ethnography? An introduction to meta-syntheses, facilitated by Dr Gülcan Garip.

4) Motivational Interviewing in Health Care - willing ready and able to change health behaviours, facilitated by Dr Konstadina Griva and Dr Graeme Horridge.

5) Using Acceptance and Commitment Therapy (ACT) in Health Psychology settings - an experiential introduction, facilitated by Nuno Ferreira.

The conference venue, the Grand Resort, is a beautiful 5 star hotel right by the seaside offering high standards of services at a premium location. It is located at the outskirts of Limassol town (approximately 11 km from the city centre) with numerous buses and taxis running between the hotel and the city centre throughout the day. There is also a beautiful "foot and cycle" pathway by the seaside, close to the hotel, that takes you right to the centre. The town of Limassol is located on the Southern coast of the island, on Akrotiri Bay, between the ancient towns of Amathus and Kourion. Limassol was inhabited continuously since ancient times and tombs discovered there date back to around the 2nd century B.C. Its special characteristics, including

the blend of ancient, contemporary and multicultural infrastructure, along with the 16 kilometers of sandy beaches, and the colorful wine villages surrounding the town, offer countless opportunities for endless activities for everyone.

The registration is open and you can find more information for all the activities before and during the conference at the following link: http://www.ehps2015.org/?page_id=68

We very much look forward to welcome you to our beautiful island!

On behalf of the Local Organising Committee